Framework for Chinese construction projects extension of time claims analysis through a comparative study between the Chinese and English legal systems

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DECLARATION OF AUTENTICITY AND AUTHOR'S RIGHTS

This thesis is the result of the author's original research. It has been composed by the author and has not been previously submitted for examination which has led to the award of a degree.

Signed: _____
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Date: May 1st, 2024

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ABSTRACT

In both the China and the UK, delays in construction projects are a common occurrence and the analysis of EOT claims has become a regular part of the work of practitioners and decision-makers. A framework for this work, offering analysts relatively unified evaluation procedures and standards will therefore increase the efficiency of the overall industry. The UK has developed a relatively complete system for EOT claims analysis based on extensive case law, academic research and project practice. EOT claims can thus be evaluated and determined based on relatively unified procedures and a high degree of certainty. Comparatively, China has a significant gap in this field: its systems are relatively undeveloped and EOT determinations tend to be made superficially, often therefore bringing about injustice and legal uncertainty.

To fill this gap, this research aims to establish a framework for China through a comparative study of the Chinese and English legal systems, in order to provide a relatively unified basic work procedure and principles to help construction practitioners analyse EOT claims. To achieve this, the research employs a mixed methodology, combining comparative legal analysis with quantitative-based survey research as part of the process of developing and testing the framework.

The comparative legal research is conducted through a five-phase research framework. The first phase includes preliminary research work and determines use of the functional method as the principal method of comparison. The conceptualisation phase, using a literature review, decides on a compulsory procedure of EOT claim analysis, and taking into account other factors which may influence the effect of the EOT claim analysis, extends that procedure to a self-contained framework of EOT claim analysis in the Common Law system. It comprises a core module (causation establishment), supported by a proof module, extended by a legal-contractual obligation and procedure compliance module, and affected by an external surrounding module. The works or factors under each module therefore become key concepts or units for the following comparison.

The comparison between the two jurisdictions is conducted through identification and explanatory phases at the level of law, contract and project practice respectively. At the level of law, the comparison is conducted on the salient aspects of legal systems, and on how legislation and litigation operate in aspects of proof, approaches and legal-contractual obligations and procedures for compliance with EOT claims. At the contract level, a comparison is conducted of each point in the context of provisions of EOT claims contained in standard forms of contract in the UK and China. Amongst others, comparisons on delay risk allocation, approaches to and instruments for delay and EOT analysis, and claims procedures are conducted. At the level of project practice, a comparison is conducted in the context of industry practice in relation to EOT claims analysis. In the UK, practice and usage developed by the *SCL Delay and Disruption Protocol* and *COIB Guide (A Practice Treatise on Time Management*) are used for analysis. In China, the findings provided by relevant

literature as well as a separate quantitative investigation with contractors in China are used for the analysis.

The comparison finds that, amongst other elements, the law in China lacks relevance to practical problems and leaves legal gaps in many aspects; standard forms of contract provide a basic mechanism for EOT claims but have inherent problems such as structure and wording; both law and contract fail to take sufficient account of the unique Chinese culture and therefore have relatively low enforceability in relation to EOT claims; there is significant divergence between the law and contract on paper and in action. Furthermore, in project practice, the industry has not established a mature and unified industry practice or usage in this field, with the result that EOT claims are often processed, analysed and determined in a disordered, reconciliatory and impressionistic way.

Finally, having been tested by a quantitative specialist investigation and interviews as reasonable and feasible, the evaluation and confirmation phase develops a framework for EOT claims analysis for construction projects in China. It firstly provides the general principles of the framework establishment, then establishes two basic analysis principles – the tests of causation and burden of proof, and then provides methods, approaches and procedures for EOT claims analysis and determination, together with proposals for each key concept under each module, to guide practitioners in presenting, demonstrating, analysing and determining EOT claims, from proposals to improve the external environment for EOT claims analysis to improvements in practitioners' behaviour, attitudes and capability from the perspectives of legislation, litigation, contract drafting and project performance.

The research is conducted through the extensive creation of work including conceptualising and concluding a common EOT analysis framework in Common Law; detecting, analysing, and explaining differences and similarities between the UK and China from unique perspectives; and offering a thorough review and evaluation of EOT claims analysis in China from a foreign law perspective. It raises social implications in China by helping to establish time management and EOT claims within industry practice, and provides academic attributions by 1) filling the gap in China with systematic research on time management and EOT claims analysis, 2) providing a pioneering work to establish private construction law in China, and 3) providing a typical comparison study in the field of construction law between two distinct jurisdictions.

ABBREVIATIONS

CA	Contract Administrator
CCL	*Contract Law* of PRC (1999)
CESMM	*Civil Engineering Standard Method of Measurement*
COIB Guide	*A Practice Treatise on Time Management*
CPM	Critical Path Method
DMCC	*Demonstration Model of Construction Contract* in PRC
EOT	Extension of Time
GPCL	*General Principle of Civil Law*, PRC (1986)
GRCL	*General Rules of the Civil Law*, PRC (2017)
Keating	*Keating on Construction Contract*, 11th edition
PRC	People's Republic of China
Protocol	*Delay and Disruption Protocol* by Society of Construction Law, UK
SPC	Supreme People's Court, PRC

Contents

Chapter 1

Introduction

1.1. Overview of the study

1.1.1. The background of the study and problem statement

A. Delay in construction projects

In modern times, construction delays are a common occurrence in the global construction market. Delays inevitably lead to cost escalation and time overrun and are "considered as one of the most common factors that caused a multitude negative effect on the project and its participating parties".[1]

In the UK, construction delays have been reported as a major factor in cost escalation[2]. According to the 2019/2020 UK Industry Performance Report,[3] from 2010 to 2020, the time predictability of projects was maintained within a range of 40% to 60%, except in 2017 when it reached 68%. In 2019, construction was on time or better for 58% of projects, down slightly from the 59% quoted in the 2018 survey. In another survey conducted in 2016,[4] 85% of respondents admitted they had experienced construction delays. However, due to the challenges of the past six years, such as COVID-19 and Brexit, occurrences of delay grew, and 91% of respondents in 2022 reported having experienced construction delays, with 28% of respondents stating that more than 50% of projects were experiencing one or more delay compared with 15% in 2016. As regards the duration of delay, in 2016 the most popular answer was less than 10% of the original completion time, but this had increased to 21–30% in 2022, and the number answering that their last project had been delayed between 21–50% had also significantly increased. In 2016, the additional costs incurred by delay were most commonly less than 10% but this increased to 21–31% in 2022. As to the cause of delay, respondents attributed increased delays to a lack of workers to meet the increased demands of construction and contractors' need to comply with new regulations. According to the same survey, the top two causes of delay are poor original planning and unrealistic scheduling, and the availability of resources (labour

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[1] Muhammad Fikri Hasmori and et al, Significant factors of construction delays among contractors in Klang Valley and its Mitigation, *International Journal of Integrated Engineering, Civil & Environment Engineering*, 2018(10),p.32-36

[2] *A survey on the costs & reasons for delay in construction industry projects in 2017.* https://www.cornerstoneprojects.co.uk/index.php/delays-in-construction-projects/

[3] Constructing Excellence, *Construction Industry Performance Report*, 2021, http://constructingexcellence.org.uk/wp-content/uploads/2020/11/UK-Industry-Performance-Report-2019.pdf

[4] Icornerstone Project Ltd, *Delays in the construction industry: Our 2022 survey results and how they compare to 2016 - Cornerstone Projects Ltd,* https://www.cornerstoneprojects.co.uk/blog/delays-in-the-construction-industry-our-2022-survey-results-and-how-they-compare-to-2016/

and suppliers). Additional factors include lack of or delay in information, changes to information, resource productivity, weather and finance shortages.[5] The above figures illustrate a shocking increase in the percentage of construction projects delayed in recent years, leading to higher costs and longer timelines across the UK. Under such circumstances, EOT claims are some of the most common and most straightforward in the UK.[6]

In China, the overall construction industry also runs with low efficiency and poor profit margins.[7] Delay is one of the most common and significant reasons for this and constitutes one of the main sources of Chinese construction disputes and proceedings.[8] An investigation conducted by Wang[9] found that of 76 construction projects, only five were completed by the scheduled completion time. Between 2010 and 2020 in China, a total of 1,473,371 construction dispute cases were determined by the courts, of which 59,101 were related to delay and EOT. While delay/EOT disputes were at a relatively low level before 2013, they doubled in 2014 and maintained a continuous growth trend afterwards.[10] According to a survey conducted by our team in 2018, 84.62% of the total of 390 respondents – senior project management staff from 139 projects – asserted that delays frequently occurred in construction projects on which they had worked. It was found that employers failing to complete land acquisitions or provide the necessary conditions for construction was the primary cause of delay in all types of projects, while payment delays, objections by local residents or other parties, suspension by local government due to concerns around environmental protection, and significant or frequent variations also constituted significant causes of delay. Compared with civil construction projects, engineering projects – *inter alia*, hydro and water conservation projects – show a high occurrence of delay, revealing that challenges in progress control and EOT claims are much higher in these remote and complicated engineering projects.

Nevertheless, delayed completion of projects is not a unique phenomenon in any one country but is common across the global construction market.[11] Delays have been the most cited source of construction claims and disputes around time extensions in

[5] Icornerstone Project Ltd, supra note 5

[6] David Chappell, *Building contract claims*, 5th ed., Wiley-Blackwell, 2011, p.94

[7] Deng Fei and Yang Baoming, Analysis of problems, direction and important fields of construction industry development in our country, *Construction Economy*, 2011(10)

[8] Mao Hongbin, Discussion of methods of construction time evaluation, http://blog.sina.com.cn/s/blog_5e3b679b0102wrnl.html,

[9] Wang Ben-mei, et al, Study on the time claim in project management, *Journal of Qingdao Technological University*, 2015(02)

[10] Yuan Huazhi & Qiu Chuang, *Guidance to dispute resolution of construction delay*, Law Press (China), 2021

[11] Andrew Burr, *Delay and Disruption in Construction contracts*, 5th edition, Sweet & Maxwell, 2016, p.1-002

construction projects,[12] and delay claims are also some of the most difficult to resolve.[13]

The common occurrence of delays is due to the inherent character of modern construction which has become increasingly complex, bringing more uncertainty and risk to the parties involved. Each risk may make the work beyond the parties' expectations and control and, in turn, disrupt the due progress and prolong the time for completion. Therefore, delay management is a regular part of construction management;[14] practitioners must invest significant effort in managing delay and EOT disputes and this has, therefore, become a decisive topic in construction law globally.

B. The framework of EOT claims analysis

EOT claims

Upon delay in construction, diverse remedies are commonly provided by the law and/or contract in different countries to the innocent party, and EOT is one of the most important. Where the delay is caused by the employer, the law or contract normally establishes a remedy mechanism allowing contractors to complete the project in an extended time, releasing the contractors from liability for delay. Since the extension is in addition to the fixed contractual construction time, EOT claims are, essentially, requests by contractors for the right to additional time to complete the project.[15]

Theoretically, EOT claims are limited to EOT and should be distinguished from cost claims. However, in practice, these two types of claim are linked, and very few practitioners would dogmatically follow such a dichotomisation; indeed, they commonly treat prolongation costs claims as an essential part of an EOT claim. In this sense, this research will primarily focus on time compensation, but include a discussion of EOT-related cost claims to some extent.

EOT claims analysis

Like all types of claim, the relevant parties should always conduct an EOT claims analysis carefully to enable decision-makers to make a fair determination. However, practitioners' efforts, records, expertise and ingenuity may be greatly challenged as it is a rather complicated process. According to Bramble, the process can be conducted in phases of work, including delay events identification, schedule and delay analysis, detailed event analysis, project documentation analysis, cost analysis and damages

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[12] Nurul Hud Muhamad, et al, Delay analysis methodologies (DAMS) in delivering quality projects: contractor and consultants' perceptions, *Procedia - Social and Behavioral Sciences*, 2016 (7), https://www.sciencedirect.com/science/article/pii/S1877042816302750?via%3Dihub

[13] Nuhu Braimah, Construction Delay Analysis Techniques—A Review of Application Issues and Improvement Needs, *Buildings,* 2013(3)

[14] Barry B, Bramble & Michael T. Callahan, *Construction Delay Claims*, 7th edition, Wolters Kluwer Legal & Regulatory U.S., 2021, p.1

[15] Nael G. Bunni, *The FIDIC forms of contract*. 3rd version, Blackwell, 2005

apportionment, and report/determination preparation.[16] In China, judges commonly adopt three steps in analysing and determining EOT claims: 1) identifying the fact of delay and allocating the liability between parties, 2) quantifying the EOT, and 3) quantifying delay-related damages.[17]

It is noted that the scope of EOT claims analysis is not necessarily the same as that of delay analysis. The latter is normally confined to a construction scheduling analysis of delay based on CPM methods to detect the cause, responsibility for and length of the delay.[18] Following the discussion above, delay analysis is only one step in an EOT claims analysis, despite playing a key part in the overall process of EOT claims analysis.

EOT claims analysis and its framework

In accordance with usual practice in construction, EOT claims analysis is usually conducted in two stages, i.e. by project practitioners during the project performance, or by decision-makers during dispute resolution. The different work should be carried out in different stages, and therefore all work in both stages constitutes a comprehensive system for EOT claims analysis.

Although the detailed content of the system may vary from country to country and even from project to project, there are some common tasks to be carried out, such as documentation review, factual analysis and causation analysis. Additionally, factors such as concurrency, float, legal principles and contract schedule should also be taken into consideration.

In projects performed under a specific legal system, the more common work factors can be refined; therefore, it is possible to create a relatively stable system of EOT claims analysis in such a country or state, and that stable system may be further developed into a relatively unified framework for EOT claims analysis, which can be unitarily used in the domestic construction industry. Such frameworks will guide practitioners in addressing EOT claims more efficiently and reasonably.

C. Problem of EOT claim analysis in China

The substantial body of literature on construction delay and EOT claims mainly originates from Common Law jurisdictions. In the UK, EOT mechanisms were created by diverse standard-form contracts and supplemented by industry usage as well as extensive academic research, and thus developed into a self-contained system of delay and EOT claims. Based on this work, a relatively common work system of EOT claim analysis can be identified; therefore, it is possible to refine and conclude a framework for EOT claim analysis from the extensive literature.

In contrast, China adopts Civil Law and there is no such abundant and fundamental research available. Both the literature and construction project practice suggest that

[16] Bramble, supra note 14, p.10-3

[17] Zhai Jia, Advice of contractor's progress management based on the judicial determination of liability of construction delay and its loss, http://www.360doc.com/content/18/0707/18/33975444_768590387.shtml

[18] Chappell, supra note 6, p.45

the field of EOT claims is in a somewhat disordered and undeveloped state: no mature delay or EOT claims theory system has been established; research in this area is almost non-existent; no unified terminology or principles in relation to delay claims are available and therefore there is no platform for discussion or research, and few unified bases can be relied on by practitioners to conduct EOT claim analysis. Thus, determinations of EOT are made unscientifically and even arbitrarily. This leads to injustice and legal uncertainty[19] and greatly affects the healthy development of the construction industry. All these problems constrain practitioners in China from carrying out in-depth EOT claims analysis. This calls for the establishment and development of a relatively unified EOT claims analysis framework to guide practitioners more efficiently in processing EOT claims, decrease disputes and increase the overall efficiency of the construction industry.

1.1.2. Aim, objective, justification and significance of the research

Aim of the research

Given the problems above, it is commonly agreed and proposed by practitioners and scholars in China that a general framework for EOT claim analysis is needed to guide practitioners to conduct EOT claims in a standard way. To meet this requirement, this research aims to establish a framework for EOT claims analysis for the construction industry in China through a comparison of the law in the UK and China, to provide a relatively unified basic work procedure and principles for construction practitioners in China to analyse EOT claims.

Objectives

To achieve the above aim, the research will be proceed by addressing the objectives below:

Objective 1: To develop a conceptual framework for EOT claims analysis under Common Law provisions and practice;

Objective. 2: To review how the UK and China operate elements of the framework in terms of legal environment, legal rule and litigation, and identify similarities and differences;

Objective 3: To review the application of general provisions of extension of time under the main standard-form contracts used in China and the UK, and identify similarities and differences;

Objective 4: To review the practice of extension of time claims analysis in the UK and China, and identify similarities and differences;

Objective 5: To identify the gaps and requirements for the successful application of a common-law EOT claims analysis framework in the context of Chinese Civil Law;

[19] Refer to: Shi Yaxi, Research about the education of construction law discipline, *Journal of Architecture Education in Institutions of Higher Learning* (China), 2003 (12); Hao Jing & Yang Hongshen, From the current position of the legislation of legal system of construction to review drawback of Chinese Construction law and its improvement, *Economic Research Guide*(China), 2009(11); and Zhai Jia(supra note 17)

Objective 6: To develop a conceptual framework for EOT claims analysis under Chinese civil law.

1.2. Scope of research

In accordance with the research aim, this research will focus on creating a comparative study of Chinese and English law in relation to EOT claims analysis, in order to establish a framework for EOT claims analysis in China.

Due to limitations of time and word limits, 'Chinese law' is limited in this research to the legal system in mainland of PRC, and 'English law' is limited to the legal system in England and Wales. Furthermore, this research will be conducted through the comparative study of aspects of law, contracts and project performance in relation to EOT claims analysis. It will focus on EOT claims analysis and related areas, such as the legal grounds and principles for EOT, delay analysis and responsibility identification, the principle of EOT-related damages, proof and demonstration approaches to claims, legal obligations and contract procedures regarding claims. Other topics in relation to delay, such as causes and effects of delay, time management, records management, disruption, cost claims and dispute resolution will not be considered in-depth.

1.3. Justification for and significance of the research

Given the scenario in China, as stated above, it is imperative to provide in-depth legal research for EOT claims analysis and establish a framework for this, to offer practitioners a systematic and consistent reference and fill a legal loophole in this field. Furthermore, such a framework will provide a unified principle and terminology for academic research and industry practice in the field of construction delay, enabling practitioners and scholars in China to "speak the same language"[20] when it comes to such matters.

Generally, comparative law research has distinct functions, including 1) to offer general legal education to legal scholars, improving knowledge of other national cultures and lifestyles; 2) to improve people's understanding of their own national laws; 3) to learn and refer to foreign laws; 4) to achieve harmonisation and unification in law; 5 to better apply native law.[21]

To solve the problems above and achieve the aim of this research, comparative law research is the most efficient and feasible tool; functions 1 and 2 will help Chinese practitioners to review and evaluate their own law and practice in delay claims, explore the problems they face and the loopholes in law and contracts, and identify possible directions and routines to improve the current situation. Particularly, given

[20] Julian Bailey, The Society of Construction Law Delay and Disruption Protocol: A retrospective analysis, *SCL Paper*, 2014

[21] Edward J. Eberle, The Method and Role of Comparative Law, *Washington University Global Studies Law Review*, 2009(3), p.453~454

that in China the law allows the use of comparative law to fill legal loopholes,[22] Functions 3 and 5 will offer Chinese practitioners an in-depth understanding of the more pertinent and problem-solving principles and practices which have already been developed by foreign jurisdictions in this field, and provide abundant reference to improve their own law and practice in dealing with EOT claims. Compared with other legal systems, it is commonly recognised that English law is highly developed in the field of construction law, due to its high level of pertinence, created by abundant case law, toward particular construction disputes, and its dominant influence in the international construction industry, created by the international construction market's common usage of or reference to standard forms of construction contract drafted by the UK. Therefore, the most suitable legal system to be compared with the Chinese legal system is the English law system applied in the UK (England and Wales), and this research is justified in establishing a framework for EOT analysis through a comparative study of the English and Chinese legal systems.

Besides the significance of the functions above, this research will conduct pioneering work to establish a specific legal discipline – private construction law – in China. On the one hand, it will provide guidance and reference to practitioners in legislation, litigation, contract drafting and project performance. On the other, it will offer an in-depth analysis of issues around EOT claims to fill the gaps in China in this field, and thereby establish a completely new platform for Chinese scholars to conduct education and further research. Furthermore, the research will provide another by-product – a typical comparative law study of the Chinese and English legal systems. It will not only provide a micro-level comparison of the legal rules and practice in the topic under research but also a macro-level comparison to reveal the underlying reasons, created by inherent differences in the social, cultural and legal systems, between the two jurisdictions, and help readers achieve a more complete understanding of the overall legal culture of these two distinct jurisdictions.

1.4. Thesis structure

The research objectives above will be addressed in the following chapters：

Objective	Researched and solved by
1	Chapter 3
2	Chapter 4
3	Chapter 5
4	Chapter 6
5	Chapter 7.2
6	Chapter 7.3

Accordingly, the research will follow the structure below:

Chapter 1 – provides a general introduction to the research.

[22] Refer to Article 142 of GPCL

Chapter 2 – conducts a detailed discussion of the methodology, inter alia in comparative law, for this research.

Chapter 3 – by examining the literature about general theories and principles of EOT claims analysis, provides a general comparative research framework for the research. Approaches to and proof of EOT analysis, and factors determining or affecting EOT analysis will be introduced, concluding with a framework for EOT claims analysis commonly used in the construction industry in the UK and other Common Law countries.

Chapter 4 – conducts a comparative study at the legal level comparing how factors in the EOT claims analysis framework are operated in legislation and litigation in both jurisdictions.

Chapter 5 – conducts a comparative study at the level of standard-form contracts. The comparison will focus on an analysis and comparison of how factors in the EOT claims analysis framework are operated through diverse forms of contract in the two countries.

Chapter 6 – conducts a comparative study at the level of project performance, through a comparison of industry practice in both jurisdictions, to detect how factors of the EOT claims analysis framework are operated by practitioners at the project performance stage in both jurisdictions.

Chapter 7 – based on the preceding comparison, summarises the status quo and problems of EOT claims analysis in China, and establishes a framework for EOT claims analysis in China.

Chapter 8 – provides the conclusion and findings and highlights directions for future research.

Chapter 2

Research methodology

2.1 Introduction

A research methodology refers to the analysis of the methods and principles used in research; it aims to establish the overarching philosophies and approaches of the research and results in a coherent and logical scheme of research methods. This chapter, based on a general review of research methodologies, analyses and determines the most appropriate research philosophies and paradigms to adopt. Given that this is comparative law research, relevant comparative law research methods and steps for such research are discussed and determined, resulting in the framework determined for this research.

2.2 Philosophical underpinning of the research

2.2.1. Introduction

A research philosophy is a system of beliefs and assumptions regarding how knowledge is developed. It is the research's philosophical position – it underpins the basic theme of the research and is at the centre of the research methodology.

When research is processed, it is supported by many assumptions, which can be categorised into basic types: 1) ontological assumptions about the nature of reality, 2) epistemological assumptions about knowledge, and 3) axiological assumptions about the researcher's values and ethics which may influence the research. All these assumptions will influence the questions, methods and conclusion of the research. In the field of social sciences research, typical research philosophies followed include positivism, critical realism, interpretivism, postmodernism and pragmatism, their differences are underpinned by the difference in the three types of basic assumption.

2.2.2. Objectivism and subjectivism

The two dimensions of objectivism and subjectivism represent the two extremes of the researcher's position. In reality, researchers normally take a position between these two extremes.

Objectivism, often used in natural science research, believes in the existence of an objective and cognisable world external to people's minds and perceptions,[23] a world that is completely independent of the world established by people's values and subjective interpretations. Subjectivism, often used in the arts and humanities, argues that reality is not independent of people but made up of people's perceptions and consequent actions. Subjectivists argue that truth and falsity are not a simple matter

[23] Mark Saunders *et al*, *Research methods for business students*, 8th edition, Pearson, 2020, chapter 4th

of fact but depend on the attitudes, feelings and points of view of the makers and hearers of the judgement.

2.2.3. Research philosophies and paradigms

The research paradigm is a set of beliefs and agreements shared between researchers about how problems should be understood and addressed.[24] As discussed above, ontological and epistemological assumptions constitute the major content of research philosophy. Ontology, epistemology and other typical research methods constitute research paradigms.

Ontology, epistemology and methodology constitute a necessary and progressive relationship and, therefore, need to be understood in conjunction with one another. Ontology acts as the preliminary layer, detecting the nature of the subject which is investigated. Following its answer, epistemology constitutes the next layer, revealing what can we hope to know about the knowledge. It detects the relationship between the researcher and the research subject, and the result of the second layer leads to the third layer, i.e. methodology, which addresses how researchers acquire knowledge and find the truth.

According to Lewis et al., there are five types of major research philosophy: positivism, critical realism, interpretivism, postmodernism and pragmatism.

2.2.4. Relevance to research

Reading the research aim in conjunction with the research paradigms above, we may observe that:

a. This research is concerned with natural sciences; the existing appearance is not an ideal result to solve problems and, therefore, the positivist paradigm should not be primarily followed.

b. This research is either a legal study or a methodology study in claim evaluation. An EOT evaluation framework is synthetically developed from case law as well as management and computer science. It has both objective and subjective existence; therefore, the critical realist paradigm should not be followed.

c. The aim of the research is not to test and reconstruct an existing theory from the perspective of an individual personal experience, but to establish a relative objective work framework which can be commonly used by industry. It requires a definite solution rather than vague feeling; therefore, the postmodernism paradigm should not be followed.

d. Given that the aim of the research is to establish an EOT evaluation framework, the legality and technical feasibility of the framework should be studied, thus the pragmatism paradigm can be used to some extent. For instance, multiple methods, such as investigation plus analysis, should be adopted; to ascertain

[24] Idem

industry practice in EOT claims in China, interviews are used to test the feasibility of the research results. Nevertheless, since this is legal research, it should be conducted primarily on a qualitative basis through an inductive manner, this paradigm therefore should be merely used to some extent.

The interpretivist paradigm should be used principally in this research, for the reasons below.

Ontologically, describing law is not an objective activity – it cannot offer pure facts that everybody would see in the same way;[25] therefore, this research should be underpinned by a subjectivist rather than objectivist philosophy. To identify differences between Chinese and UK law, the researcher should explore the underlying reasons from complex contexts including social culture and behavioural patterns. Many related findings are socially constructed through culture and language analysis; this research compares two distinct jurisdictions, and the researcher must address different understandings and interpretations of similar concepts, and take multiple meanings, interpretations and realities into consideration. As the framework is used for a practical purpose, the research should be based on extensive experience and practice in the construction industry.

Epistemologically, given this research is a typical social study, analysing a series of sophisticated social phenomena, extensive social circumstances should be comprehensively studied, and the research should not be limited by simple theories and concepts. Since the underlying reasons for both the legal rules and their application need to be studied in the context of subjective interpretations and understandings within specific circumstances, the research should focus on narratives, case studies, perceptions and interpretations. As the aim of the research is to establish a new practical framework, new understandings and views should be provided within the findings of the research.

Axiologically, the research is based on the assumption that relevant lessons can be drawn from a foreign country; however, whether that lesson is valuable should be evaluated taking into account social background according to predetermined criteria. Therefore the research should be value-bound. Furthermore, the assumptions should be tested and adjusted by the researcher through interactions with relevant practitioners and in particular circumstances. The rules and practice, about topics of delay analysis methods, time management approaches and approaches to dealing with different situations concerning delay and damages, should also be affected by research's and reviewer's subjective criterion. Due to complications in the underlying reasons of practice in both the legal jurisdictions and EOT claims evaluations, the researcher must adopt their own interpretation and perception in exploring these and formulating their contribution.

As a result, this research will follow a typical inductive format, using an extensive literature review and case studies to form conclusions. A wide-ranging literature review and interpretation of legal and construction practice in both jurisdictions

[25] Saunders, supra note 23, p.27

should be conducted to give the researcher an in-depth understanding of the differences under different circumstances. Qualitative analysis will be the primary tool used to conduct the research while data in project practice is a necessary auxiliary tool to provide the sub-findings that support the research. Particularly, this research will take the approach of a comparative law study, which is in perfect harmony with the interpretivist paradigms and subjectivist philosophy to be used by this research. Given that this is legal research employing a comparative approach, it is essential to understand and establish the framework of a comparative law study, as below.

2.3 Theoretical framework of comparative law research

2.3.1 Introduction

This section provides the methodologies and framework for this comparative research. It will do so by using a literature review and taking into account the specific aim and character of the research. It starts by introducing the legal research style, then discusses the comparative law research methodologies that may be used, and finally concludes with the framework of this research and an explanation of how it works.

2.3.2 Positioning of research in terms of legal research styles and comparative legal studies

Legal research styles

According to Chynoweth,[26] there are four types of legal research: Type 1 – expository research – researches black-letter law and relevant articles; Type 2 – legal theory research – researches jurisprudence; Type 3 – law reform research – researches law in context and Type 4 – fundamental research – researches legal sociology and critical legal studies. These in turn provide further two categories of legal research: applied/purer, from the perspective of the research purpose and interdisciplinary/doctrine, from the perspective of the research methodology. The above types of research may have additional distinctive characters: Type 1 is applied research employing doctrinal methodologies; Type 2 is pure research employing doctrinal methodologies; Type 3 is applied research employing interdisciplinary methodologies, and Type 4 is pure research employing doctrinal methodologies.

From the perspective of the research purpose, this research aims to establish a working framework and is, therefore, applied research. From the perspective of methodologies, given that the legal systems in China and the UK are completely distinct from each other, macro-comparisons should be conducted in specific fields such as legal culture, social actors' behavioural modes, litigation practice and project management modes. Therefore, interdisciplinary methodologies should be employed.

[26] Chynoweth, P, *Advanced Research Methods in the Built Environment*. Wiley-Blackwell, 2008,p.29-38

Given these two characteristics, law reform research should not be limited by black-letter law and contract, but needs to be conducted from a social-legal perspective with an emphasis on the observation and evaluation of practice in law and contract, in order to reform and develop Chinese law in this field.

Comparative legal study methods and relevance to this research

In general terms, comparative law provides a method of research and study,[27] used by researchers to understand foreign laws and culture and, in turn, understand their own laws and culture better through a process of comparison.[28] Other aims such as seeking the universal legal principles that transcend culture also play an important role in the research and development of law in modern countries.

Since its emergence in the early 20th century, comparative law has undergone stages of development, with diverse scholars providing various methodologies. Based on all positions presented, Hoecke provides a general conclusion accounting for the various levels and methods of comparison.[29]

In terms of approaches, the methods below may be used singly or multiply as appropriate.[30]

a. Functional method. This seeks solutions for particular social problems under different jurisdictions following similar or different routes and results, with an emphasis on particular problems and definite legal solutions. The method emphasises cases and facts, to enable the conceptualisation and categorisation of these facts, and can explore solutions to specific problems, which in turn allows for a greater explanation of the comparative world. It is typically used for micro-comparisons.

b. Structural Method. This focuses on the internal structures of the legal system and its core elements reconstructed through an analytical approach (that structure is not of the compared legal system in itself, but one way to analyse it). Researchers stress the structures hidden within the phenomenon being observed and research it through comparison criteria. This method is normally used in a broad perspective.

c. Analytical method. This focuses on analysing the underlying meaning of different aspects of the law. It analyses how the same concept or rule can be understood in numerous ways under different legal systems, thus resulting in difference and commonality; however, through a deep analysis some common basic concepts, namely system-independent concepts, can be identified. Therefore, the analytical method may be appropriate for a structural comparison of legal systems.

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[27] Pier Giuseppe Monateri, Methods of Comparative Law, *Edward Elgar*, 2012, p.1

[28] Eberle, supra note 21, p.453

[29] Mark. V. Hoecke, Methodology of Comparative Legal Research, *Law and Method*, 2015(6)

[30] Idem, P28~29

d. Law-in-context method. This holds that comparative research should take into account the law's social context, including cultures, economy, psychology and religion. This can complement comparative law research by filling the gaps left by other methods through relevant contributions to underlying society reality. The functional method includes the law-in-context method to some extent.

e. Historical method. This is merely one aspect of the law-in-context method focusing on the historical origins of current laws, and enables researchers to explain the origins and reasons for the law as it is today in a specific society. It is suggested that no comparative law can avoid this approach.

Furthermore, in addition to selecting the comparative method, researchers should also determine the level of comparison, as categorised below:

a. Macro and micro level. The former focuses on the comparison of legal systems, while the latter is conducted on the level of concrete rules and legal solutions in the same or a different legal style or system.

b. Underlying general and professional legal culture. The latter is a deeper level, comparing the context of legal culture, argument, judicial decision-making, statutory interpretation, the role of legal doctrine and the role of the legal professions. At this level, analytical and historical methods are primarily used and often reveal hidden world views.

c. Law in actions vs law in the books. This level is concerned with the scope of comparison between black-letter law and law in practice.

d. Surface and deep levels. The former is limited to finding superficial similarities and differences, the latter extends to comparisons of doctrinal constructions or paradigmatic frameworks. When comparing the law in radically different legal cultures, research should be conducted at a deep level of underlying cultures, in-depth views and theories on meaning and interpretation.

e. Doctrinal framework vs underlying legal culture. The former compares the conceptual frameworks of legal systems, while the latter compares the conceptual frameworks of underlying legal cultures.

As discussed above, comparative methods are not mutually exclusive but can be applied synthetically depending on the aim and content of the research. In this research, since the aim is to solve a micro-practical problem rather than to compare legal systems at the macro level, the functional method should be the primary tool used to conduct the research. However, as this research aims to conclude and establish a framework in a specific legal field through a comparison between two jurisdictions that have marked differences in terms of legal systems and underlying legal cultures, a broad investigation of legal systems, provisions and practice as well as the underlying legal culture should be conducted, employing analytical methods to provide detailed comparisons of how relevant concepts are interpreted and applied in the two distinct jurisdictions, to provide content for the functional comparison. Moreover, applied legal research should be conducted taking account of the specific

social context but not limited to studying black-letter law; therefore, the law-in-context and historical methods should also be employed to complement the research.

Furthermore, regarding the level of research, as this research is conducted between countries with different legal systems and concerns practical legal solutions to a specific practical problem, it entails macro-level research into differences in legal systems and micro-level research into legal rules, contract provisions, practice in law and contracts. Given that superficial differences between these two jurisdictions are determined by the underlying differences in the social context, the research should be conducted at the underlying level of the professional legal culture, using the law-in-context and historical methods.

2.3.3 Theories on the methodology for comparative law

Regarding comparative law methodology, besides the specific methods discussed under heading 2.3.2.2 above, scholars have mainly offered views on the function of comparative law and the resulting phases of research.

Roman believed that any comparison should start by identifying the object of comparison; he categorised in this respect units of law and forms of legal thoughts and suggested that comparison might be implemented in both objects. He suggested that the comparison should follow modes of scientific methodology, units of law (e.g. legal norms or institutions, systems of law) should be compared with one another based on predetermined criteria.[31]

Örücü[32] suggested that various methods can be used in comparative law and identified five steps for conducting such research:

Step 1 – conceptualisation – creates a level of abstraction of concepts for comparison. It includes the object to be compared and the categorisation of concepts.

Step 2 – description – includes describing the norms, concepts and institutions and examining related socioeconomic problems and solutions provided by legal systems.

Step 3 – identification – compares concepts and identifies differences and similarities.

Step 4 – explanation – explains the reasons for differences and similarities.

Step 5 – confirmation – tests the hypothesis and offers a conclusion.

Pieters[33] made a unique taxonomy of the function of comparative law, including 1) near goals, about gaining knowledge only; 2) intermediate goals, including the teaching of law, correctly interpreting international law and applying foreign law; 3) distant goals, including law-making or reform, law harmonisation or unification, developing a Common Law and identifying common basic principles. In terms of

[31] Roman, T. Some considerations on comparative law. *Revista Juridica U.P.R.*, 59 (4), 1990, p. 951 – 968

[32] Orucu, Esin Örücü, Methodology of comparative law, *Lgarencyclopedia of Comparative Law*, 2006 , 442~454

[33] Danny Pieters, Function of comparative law and practical methodology of comparing, 2014, p.13

steps for comparison, he agreed that five phases should be employed, as below, but not necessarily in a strict consecutive sequence.

Phase 1 – a clear identification and formulation of the goal of the comparative research

Phase 2 – knowing – to gather and systematise information about the research question

Phase 3 – understanding – to understand the information gathered through situating what is found within its national context

Phase 4 – comparing – to compare, establish and explain differences and similarities

Phase 5 – evaluating – to evaluate the results of the comparison and make suggestions to policy makers.

Eberle generally agrees on the function of comparative law as suggested by Pieters.[34] As to the route of research, he suggested four steps:[35]

Step 1 – acquiring essential comparative skills

Researchers should first shed their built-in and native bias, explain the various cultural mentalities, consider the underlying concepts, beliefs and reasons behind a law, and acquire the legal mind or framework of the legal philosophy, then set out and interpret the data gathered.

Step 2 – evaluating external/overt law, written or stated

The researcher should carefully review, assess and understand the law's content, meaning and application, then compare and contrast the similarities and differences between legal points in different legal systems, and then explore the reasons behind these similarities and differences and evaluate their significance.

Step 3 – evaluating internal law

This work includes studying a legal culture to identify the rules by which it is run, how these rules function, how effective they are, how they influence and form the culture, and how cultural elements influence the law.

Step 4 – determining comparative observations

This involves assembling the results of the investigation by focusing on the legal data, to answer questions such as what is the significance of the data, what have we learned, and what has the foreign system taught us?

Besides the above, regarding the functional method, as planned for this research, it is concluded that a typical framework for this method is:

Step 1 – identify a specific factual problem, and gather information about domestic and foreign law on how to solve it; the scope of information can be

[34] Eberle, supra note 21, p.453~454

[35] Idem, p.457~470

extended beyond the law, provided that the function of solving the problems remains the same.

Step 2 – identify approaches to solving problems in the jurisdictions under comparison; compare and analyse the differences and similarities in approaches. This should be closely related to function interpretation.

Step 3 – establish a comprehensive function system, through which various problem-solving approaches can be compared, establishing relatively general broad concepts to contain diverse instruments which are different in form but comparable from the perspective of the function.

Step 4 – provide a critical evaluation of the research results.[36]

2.3.4 Formation of comparative law methodology

Based on the above-selected discourses on comparative law, the following observations are made:

a. Pieters, Roman and Konrad hold that before conducting a comparison it is important to identify its goal. Edward suggests it is essential to acquire basic comparative skills regarding law and the related social context.

b. Roman stresses the element to be compared: units of law should be selected and established so as to compare comparable elements. Besides, following Konrad, the context beyond the law should also be included within the compared units. Öruüu particularly stressed the importance of Step 1, which establishes a framework of compared elements by diverse abstract concepts and classifies them. This phase corresponds with Konrad's Step 3, establishing a comprehensive function system.

c. Regarding the next phases, superficially scholars suggest different phases or steps, which essentially follow a similar route:

   a) collecting, understanding and classifying data (Phases 2 and 3 in Danny, Step 2 in Örücü, the latter part of Step 1 in Edward);

   b) comparing units of comparison and identifying differences and similarities (part of Phase 4 in Danny, Step 3 in Örücü);

   c) understanding, explaining and evaluating the compared results (the remaining part of Step 4 in Danny, Step 4 in Örücü, Steps 2 and 3 in Edward).

d. Most scholars suggest the comparison study should end by testing the theory or hypothesis, evaluating the result and offering suggestions (Step 5 in Örücü, Phase 5 in Danny, Step 4 in Edward).

In accordance with the above, the methodology of this research will follow the phases outlined below:

[36] Konrad Zweigert & Hein Kotz, *An Introduction to Comparative Law*, 3rd edition, 2006

1. Preliminary phase

To perform preparatory work before the comparison work, i.e. to first identify the research aim, fix the scope of comparison, and then determine the methodology and strategy to be employed. In the meantime, the researcher should also equip themselves with the necessary skills and knowledge in both legal and socioeconomic contexts.

2. Conceptualisation phase

In this phase, the key comparable concepts and units of comparison are recognised, analysed and defined, to progress to the next phase of comparison and provide a functional system for comparison. Given that the functional method is the principal method used in this research, the units should not be strictly limited to concepts within one jurisdiction, but should be established based on the functions of legal concepts or instruments. When the concepts and units are established, the comparable concepts and units should exploit the substance of the subject of comparison, and the compatibility of units should also be evaluated. Furthermore, the various concepts and units should be precisely described and classified, and interrelations between concepts and units should be detected and highlighted to allow the comparison to be conducted systematically.

3. Identification phase

To collect, understand and classify relevant information, compare concepts and units one by one and thus identify differences and similarities.

4. Evaluation phase

To explain the reasons underpinning differences and similarities, evaluate and provide judgements. Given that this research will adopt an interpretivist paradigm, Roman's theory of the value application can be applied, predetermined criteria should be evaluated, and the evaluation should be conducted through law-in-text and historical methods.

5. Confirmation phase

To test and confirm the theory if proposed, provide a proposal to solve the problem, develop the law or make policy.

2.4 Application of comparative law theoretical framework

Following the five phases established above, the framework of this comparison will be as follows:

1. The preliminary phase

To provide the problem statement, identify the research aim and objectives, formulate research questions, determine the scope and context of the research, establish research strategies and methodologies, and select the comparison method. In the meantime, develop skills and knowledge in law, language, legal culture,

project management and scientific research methods. This work will be covered in Chapters 1 and 2.

2. The conceptualisation phase

This identifies and defines the key concepts and units for comparison. Given that the research aims to establish a framework in China through comparative law research, it requires a framework which has essentially been formed in foreign countries through a literature review, and that includes key concepts which are linked by a logical relationship. As the functional method is the principal method used for the comparison, the selection of concepts and units should extend from legal concepts to the practical functions, i.e. including all relevant practical factors that would affect the analysis of EOT claims, to enable the resulting comparisons to be conducted. This work will be implemented in Chapter 3.

3. The identification and explanatory phase

After the unified framework for EOT claim analysis is established, differences and similarities in how key concepts and units operate in the two jurisdictions are identified. Since the research is concerned with the law and construction projects, and is comparing countries with different legal systems and socio-cultural backgrounds, it requires a comparison conducted on different levels, i.e. the legal system and culture, black-letter law, law in action, contracts and project management.

4. The discussion phase

Differences and similarities are explained and discussed alongside the comparison in Chapters 4, 5, 6 and 7.

5. The evaluation phase

Based on differences and similarities, this phase evaluates the strengths and weaknesses in the field of EOT claims analysis in China, detects the underlying problem, proposes solutions by establishing the framework under research in China, and testing it through specialist interviews. This is covered in Chapter 7.

2.5 Ethical approval

In accordance with Ethical Principles and Guidelines,[37] three core principles form the universally accepted basis for research ethics: 1) respect, to ensure the autonomy of research participants; 2) beneficence, to minimise the risks associated with research, and 3) justice, to ensure a fair distribution of the risks and benefits resulting from the research.

The Code of Practice on Investigations Involving Human Beings published by the University of Strathclyde in 2017 established general principles in Sections 3.2 and

[37] *Ethical Principles and Guidelines for the Protection of Human Subjects of Research*. Available: http://ohsr.od.nih.gov/guidelines/belmont.html.

3.3 mainly reflecting the general principles set out in the paragraph above. However, in accordance with Section 2, the code is not applied to research which only involves working from historical and literary databases and documents. As this research involves comparative law research based on theory analysis and a literature review, it does not involve people; therefore, application for approval is not deemed necessary.

2.6 Summary

This chapter, through a literature interview, conducts a thorough analysis of the strategies and methodologies of the research. It defines the taxonomy of research philosophies and paradigms and establishes that a subjectivist philosophy and interpretivist paradigm should be employed by the research. It then defines the taxonomy of types of legal research, methods and forms of comparative law, and establishes that the type of research should be law reform research, that the functional method should be the principal comparative research method and this should be complemented by analytical, law-in-context and historical methods. Finally, it establishes a five-phase framework for the overall research.

Chapter 3

The framework for EOT claims analysis under Common Law

3.1 Introduction

In construction projects, the assessment and determination of an EOT claim should always rely on a comprehensive analysis of the delay in terms of causes, effects, legal and contract grounds and circumstances. In practice, systematic work should always be conducted, resulting in a relatively stable framework for EOT claim analysis. This comparative research starts by formulating such a general framework applied in the practice of Common Law, therefore to provide a conceptualization framework, which contains relevant general legal and project management concepts, for the subsequent comparison study work.

In Common Law, claims in construction commonly require claimants to prove the balance of probability and entitlement raised by the claimed events, and to establish factual causation – that the loss was indeed caused by the event and that a causal link therefore exists between the events and the loss, and legal causation – that no legal or contractual events intervened to break the causal link.[38] Therefore, the concepts constituting the framework should include the burden of proof, causation and legal concerns impacting EOT claims. Additionally, claimants' EOT entitlement may be undermined by a failure to comply with legal and contractual obligations and the quality of analysis may be impacted by external factors such as the level of project management, role of supervision and legal culture. All these factors should be taken into consideration when EOT claims are analysed; therefore, the relevant concepts are discussed below.

3.2 General requirement for EOT claims – Burden of proof and causation for EOT claims

3.2.1 Introduction

In Common Law, when a civil claim is analysed, the courts or arbitration will focus on testing whether the party alleges that certain points have discharged his burden of proof by proving that, on the balance of probability, there is causation between the claimed event and the loss, and the quantum of the loss has occurred.[39] Therefore the primary task of the EOT claim analyst is to analyse the available proof so as to 1) check whether there is true causation, and 2) evaluate the extent of the loss or other impact incurred.

[38] Refer to the case *John Doyle v Laing Management*

[39] Refer to the case *Water Lilly*

3.2.2 Burden of proof

General principle

The principle of burden of proof originated from the Latin maxim *semper necessitas probandi incumbit ei qui agit*, which means "the necessity of proof always lies with the person who lays charges." The underlying rationale is that the party that does not carry the burden of proof carries the benefit of the assumption of being correct, until the burden shifts after the presentation of evidence by the party bringing the action.
In an adversarial system, the court generally cannot conduct its own search for information concerning the case; it must wait to see what evidence the parties present. In Common Law, the court is not in the position of a public enquiry which is seeking to determine the cause of an accident; it must simply decide whether on a balance of probabilities the cause of any problem was that contended, usually by the claimant.[40] The function of the burden of proof rule is to apportion the task of presenting evidence. In essence, it requires one party to produce evidence sufficient to convince the court (to the required level of confidence) of his position. Thus, if one party has the burden of proof, he loses the case if he introduces no evidence to prove that the claimed event occurred.[41] In the case of *Rhesa v Edmuds,* Lord Branden stated:

> In approaching this question it is important that two matters should be borne constantly in mind. The first matter is that the burden of proving, on a balance of probabilities, that the ship was lost by perils of the sea, is and remains throughout on the ship owners. ------
> The second matter is that it is always open to a court, ------to conclude, at the end of the day, that the proximate cause of the ship's loss, even on a balance of probabilities, remains in doubt, with the consequence that the shipowners have failed to discharge the burden of proof which lay upon them.
> No judge likes to decide cases on the burden of proof if he legitimately avoids having to do so. There are cases, however, in which, owing to the unsatisfactory state of the evidence or otherwise, deciding on the burden of proof is the only just course to take.[42]

The standard of burden of proof refers to the quantum of evidence that must be presented before a court as to whether the case exists or not. It affects the difficulty and likelihood of proving a legal claim in a court of justice, specifying how a legal or factual claim is to be grounded for relief to be granted. Standards of proof are an institutional variable determined by procedural rules, and vary depending on the type of cases.[43] For civil cases, in Common Law, the commonly used standard of proof is to require plaintiffs to prove their claim by the "preponderance of evidence" standard

[40] Justice Akenhead, Causation, loss and damage: the challenge of change, *SCL Paper*, 2010

[41] Bruce L & Kathryn Spier, Burdens of proof in civil litigation: an economic perspective, *Journal of Legal Studies*, June 1997

[42] *Rhesa Shipping Co SA V Edmuds* [1985]

[43] Guerra, A., Luppi, B., & Parisi, F. Standards of Proof and Civil Litigation: A Game-Theoretic Analysis, *Journal of Theoretical Economics*, 2019,19(1)

(referred to as the "balance of probabilities" in English law), and explained by the Federal jury practice and instructions as follows:

> To 'establish by a preponderance of the evidence' means to prove that something is more likely so than not so. In other words, a preponderance of the evidence in the case means such evidence as, when considered and compared with that opposed to it, has more convincing force, and produces in your minds belief that what is sought to be proved is more likely true than not true. This rule does not, of course, require proof to an absolute certainty, since proof to an absolute certainty is seldom possible in any case.[44]

Guiding principles on standard of proof were further laid down by the House of Lords in the two cases of *Re H (Minors)*[45] and *SoS v Rehman*:[46]

1. Where the matters in issue are facts, the standard of proof required in non-criminal proceedings is the preponderance of probability, usually referred to as the balance of probability.
2. The balance of probability standard means that the court must be satisfied that the event in question is more likely than not to have occurred.
3. The balance of probability standard is a flexible standard. This means that when assessing this probability, the court will assume that some things are inherently more likely than others.[47]

Furthermore, when the balance of probability is determined, the tribunal should adopt a common-sense approach to the evidence adduced to decide whether the occurrence of fact is more probable than not. Nevertheless, the tribunal should also always take account of the cogency and relevancy of the evidence adduced. It was stated by Lord Brandon in the *Rhesa shipping* case:

> The third reason is that the legal concept of proof of a case on the balance of probabilities must be applied with common sense. It requires a judge of first instance, before he finds that a particular event occurred, to be satisfied on the evidence that it is more likely to have occurred than not. If such a judge concludes, on a whole series of cogent grounds, that the occurrence of an event is extremely improbable, a finding by him that it is nevertheless more likely to have occurred than not, does not accord with common sense.[48]

Application of burden of proof in EOT claims analysis

In Common Law, when a civil claim is analysed, it is axiomatic that the party which has the burden of proof must prove its case on a balance of probability.[49] Therefore

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[44] O'Malley, *et al*, Federal jury practice and instructions, *Eagan, MN: Westlaw*, 2001, § 166.51)

[45] *Re H (Minors) (Sexual Abuse: Standard of Proof)* [1996] AC 563

[46] *SoS for the Home Department v Rehman* [2003] 1 AC153

[47] Jeremy Cooper, The burden and the standard of proof, https://www.judiciary.uk/wp-content/uploads/2016/01/cooper-burden-standard-of-proof-spring2008.pdf

[48] Supra note 42

[49] Justice Akenhead, supra note 40

when contractors intend to receive compensation under EOT claims, they have to bear the burden of proof to prove the case through presenting all necessary evidence to decision-makers, and satisfy the decision-makers that it is more likely than not that the claimant has suffered the delay and loss for the reasons he states.[50] In claims, the tribunal must look at the evidence and decide not what is most or more probable, but what probably happened or was said: there is a difference.[51]

However, there is a clear distinction in the approach and level of burden of proof to demonstrate the entitlement to time and delay damages.

In English law, as to the burden of proof to prove entitlement to EOT, it may be acceptable to demonstrate entitlement to EOT by reference to the likely effect of an event on completion.[52] The primary reason for this is that many standard forms of contract request that EOT should claimed and determined prospectively; therefore it can be proved based on the likely delay effect. The other rationale is that where the entitlement to EOT is claimed, in practice, the claimant shall merely prove the fact that the critical path has been or is likely to be prolonged and that the completion is likely or would have been delayed. This can be supported by the planed work through plan technology, but unnecessarily supported by factual records of the project which can merely be obtained after the occurrence of the delay event, therefore he has less burden to prove the actual extent of delay to completion which eventually occurs.

In contrast, as to loss and expense, normally a very strict standard of burden of proof should be met by claimants. The rationale is that the impact not only of activities on the critical path but also non-critical paths shall be taken into account. In such circumstances, a theoretical method used for CMP analysis is insufficient to evaluate the comprehensive impact caused by delay. The actual effect of an event can only be proved by reference to the way the works were conducted in fact. In most Common Law countries, the courts have held that financial compensation must be related to a loss or expense actually suffered as a result of an event at the defendant's risk as to cost.[53] Principally, a claimant cannot recover the loss and expense caused by the defendant's default unless he can separate it from that caused by his own default,[54] therefore the claimant is required to show what part of the claimed loss has been caused solely by the defendant.[55]

The distinction was explained by the judge in *Costain v Haswell*:

> It is necessary to draw a distinction between a claim for damages for delay and a claim for an extension of time of the completion date on account of delay. When an extension of time of the project completion date is claimed, contractor needs to establish that a delay to an activity on the critical path has occurred of a certain number of days or

[50] Chappell, supra note 6, p.125
[51] Justice Akenhead, supra note 40
[52] Burr, supra note 11, p.660
[53] idem, p.661
[54] Roger Knowles, *200 Contractual Problems and their Solutions*, 3rd edition, Wiley-Blackwell, 2012,p.97
[55] Keating, p9-096

> weeks and that that delay has in fact pushed out the completion date at the end of the project by a given number of days or weeks, after taking account of any mitigation or acceleration measures. If contractor establishes those facts, he is entitled to an extension of time for completion of the whole project including, of course all those activities which were not in fact delayed by the delaying events at all, ie they were not on the critical path.
>
> But a claim for damages on account of delays to construction work is rather different. There, in order to recover substantial damages, contractor needs to show what losses he has incurred as a result of the prolongation of the activity in question. Those losses will include the increased and additional costs of carrying out the delayed activity itself as well as the additional costs caused to other site activities as a result of the delaying event. However the contractor will not recover the general site overheads of carrying out all the activities on site as a matter of course unless he can establish that the delaying event to one activity in fact impacted.[56]

This distinction has a significant impact on delay analysis methods, which normally employ common sense as long as they can reflect the likely delay effect, to be used to demonstrate an EOT claim, but not necessarily supported by detailed factual proofs or authentic analysis.

In contrast, any proof of a claim for delay to progress,[57] or prolongation for which delay damages are claimed, must be related to the period of delay, or prolongation actually suffered. Therefore, the actual effect of delay events can be proved by reference to the way the work was actually performed, but not the way in which it was planned to be performed; prospective methods should not be used.[58] Generally, the as-built schedule must be used as the baseline from which such periods are measured; except in simple cases, forms of forensic scheduling analysis methods, such as methods of time-impact or collapsed as-built, are normally required.[59] If the contractor fails to follow the original schedule and suffers a sequential or concurrent delay to progress, the analysis methods selected must be able to identify the effect of the contractor's events independently of the effect of the employer's events. This may be achieved by time-impact or collapsed as-built methods; with sufficient updated as-built information, it may also be analysed by the as-planned vs as-built method to some extent, provided that the as-plan schedule has been updated frequently.[60] This point will be detailed further in the subsequent Chapters 4, 5 and 6.

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[56] *Costain Ltd v Charles Haswell & Partners Ltd* [2009] EWHC B25(TCC);[2010]TCLR 1.

[57] In accordance with Burr, the concept of "delay to progress" should be strictly distinguished with "delay to completion". The former means a temporary delay in one activity, in a schedule it may amount to an interim delay on a critical or noncritical path, and therefore may or may not lead to a delay to final completion; the latter means a delay to the entire project and therefore renders a prolongation of the entire works, and brings about a base for remedies of EOT and/or delay damages.

[58] Ian Duncan Wallace, Blinding with science? The SCL Protocol, as revised: a critique, *Construction Law Journal*, 2019, 35(1)

[59] Burr, supra note 11, p.661

[60] Idem

3.2.3 Causation

A. General principles

In a construction dispute, in most instances the factual proof is readily apparent and the link between cause and effect is clear; therefore, there is no dispute between the parties or analysts. In such circumstances, the analysis of EOT claims can be simply conducted with conventional delay-analysis technology. However, when multiple competing facts interact with each other to cause delay and/or loss, dispute is likely to arise around causation and the parties turn to the analysis of causation to attribute liability.[61] In Common Law, a party intending to bring a construction dispute must establish a causal connection between the wrongdoer's conduct and the remedy that it is seeking, whether that is damages for breach of contract, an EOT for completion, or a claim for loss and expense under the contract.[62]

Causation is the relationship between cause and effect; in the context of a construction claim it is the link between the event and damages,[63] but a number of limiting principles are used by courts to keep wrongdoers' liability within practical and sensible limits.[64] A distinction is made between philosophical causation and legal causation: the former originated from classical philosophical terms, as expounded by Aristotle and later philosophers, is more general and contributes to the understanding of causation in the natural sciences, while the latter is used to attribute legal responsibility for the effect felt by the injured party to one or more potential causes. It operates to limit a wrongdoer's liability[65] and should be guided by a plain man's notion of causation (i.e. common-sense causation), and should be determined by the common-sense principle.[66] Lord Hoffmann had this to say:

> …to emphasis that the concept of causation is used by the law for the purpose of attributing responsibility and that attribution of responsibility, for example, on the grounds of fraud or negligence, is often based on moral notions, not only as to the kind of conduct which should make one liable to pay compensation but also of the extent of the harm for a person who has been guilty of such conduct should be responsible.[67]

Lord Salmon further stated, in *Alphacell v Woodward*:

> …consider, however, that what or who has caused a certain event to occur is essentially a practical question of fact which can best be answered by ordinary common sense rather than by abstract metaphysical theory.[68]

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[61] Nicholas Baatz QC, 'Factual' and 'Legal' Causation in Construction and Infrastructure Law: A Thorny Subject, *SCL Paper*, November 2015

[62] David Sawtell, Causation in English Construction law: time for a re-statement? *SCL Paper*, 2021

[63] Chaudhary, How causation should be analyzed in construction claims, *Construction Law Journal*, 2019,35(6)

[64] Nicholas Baatz, supra note 61

[65] David Sawtell, supra note 62

[66] Hart and Honoré, *Causation in the Law,* Clarendon Press Oxford, 2nd Edition 2002, p.1 and preface

[67] Leonard Hoffmann, Causation, *Law Quarterly Review*, 2005 (121), p.594.

[68] *Alphacell v Woodward* [1972] A.C. 824, 847.

Although legal liability cannot be created merely by relying on causation, it is an essential part of a multi-stage test to establish the legal liability of the defendant and thus demonstrate the entitlement to the claimants. Lord Hoffman comments in this respect:

> There is nothing special or mysterious about the law of causation. One decides, as a matter of law, what causal connection the law requires, and one then decides, as a question of fact, whether the claimant has satisfied the requirements of the law. There is, in my opinion, nothing more to be said.[65]

Where causative principles are applied in the first instance, the starting point shall be the contract. However, when considering the appropriate causative test to be applied, it is often the case that express contractual terms are inadequate. Analysts must seek assistance from Common Law. While it is difficult to identify any fixed pattern as to how causation in contracts is addressed, some constants can be relied upon and assist analysts in arriving at a conclusion.[69]

Legal liability is normally established through two types of causation – factual causation and legal causation; both are necessary but not sufficient.[70] The principle of causation differs between causation in fact and causation in the law.

Factual causation

Factual causation is generally understood as a physical correlation between the "cause" and "effect"; in law, it assesses whether the defendant's default has indeed been instrumental in the plaintiff's loss. It is understood that factual causation is mainly used where no prima test for causation has been agreed by the parties in a contract or is stipulated by law on a certain matter. The facts of the issue are therefore analysed on merit instead of by interpretation or legal position in order to identify the event that caused the damage.[71]

The primary method of establishing factual causation is the "but-for" test, which enquires "but for the defendant's default, would the loss have occurred?" In effect, it is a test of necessity, referring to a basic criterion of causation and called a causative filter. However, it usually operates in an "all or nothing" way unless a statutory apportionment is applied on the basis of the parties' respective responsibilities.[72] The test is limited in cases where multiple causes may have a combined effect on loss and/or delay, which is often seen in concurrent delays or global claims. The existence of concurrency may undermine the effect of the "but for" test; therefore, satisfaction of the "but for" test is generally a necessary but not sufficient condition for establishing factual causation in contract law.[73] Nevertheless, the "but for" test is generally accepted by courts in Common Law countries notwithstanding its weaknesses, and is

[69] Justice Akenhead, supra note 40

[70] Nicholas Baatz, supra note 61

[71] Chaudhary, supra note 63

[72] Vincent Moran, Causation in construction law: the demise of the "dominant cause" test*? SCL Paper*, Nov. 2014

[73] Keating, section 9-062

normally qualified by stating that causation is to be understood "as the man in the street" would do so, or by supplementing it with "common sense". It is, therefore, another principle in the construction industry. When an analyst investigates the causality of factual events and their effect on claims, he must do so by the application of common sense,[74] as the judge stated in *Galoo v Bright Grahame Murray*:

> In considering whether a breach of a duty owed by the defendant (whether in contract or in tort in a situation analogous to breach of contract) was the effective cause of loss or merely the occasion for the loss, the court had to arrive at a decision by applying common sense to the facts of the particular case.[75]

However, it was held by *Keating* that such a position may be misleading.[76] For instance, in the recent case of *Beattie Passive Norse v Canham Consulting*, it was held that:

> Notwithstanding the fact that the case was largely decided on questions of causation, there was no appeal to "common sense" when determining liability. Instead, Fraser J approached the case by applying established legal principles as to causation and how they placed a burden of proof on each party. Thereafter, causation became a matter of factual logic.[77]

Therefore, it is suggested that the application of common sense is better explained retrospectively based on the circumstances, rather than through any definitive definition known and applied as the circumstances unfold.

Legal causation

Legal causation is the analysis of the duty which is breached, with the aim to impose liability on normative or policy grounds.[78] From a contract law perspective, legal causation is "attributive" in nature. When factual causation is established, a decision-maker must attribute legal responsibility regarding the cause and subsequent events. This implies that although factual causation has been established, not all factual causes are necessarily legal causes of the loss. Lord Hoffman commented in this respect, "The question of what should count as a sufficient causal connection is a question of law, just as the question of what makes an act wrongful is a question of law."[79]

Of the diverse factual causes, only proximate causes are legal causes. Furthermore, causation may be broken by intervening causes, in which case, the loss is not a consequence flowing naturally from the initial factual causes and legal causation cannot be established. A further test of foreseeability and remoteness is needed to test whether the loss is the natural and probable consequence of the factual causes.

[74] Chappell, supra note 6, p.183
[75] Galoo v Bright Grahame Murray [1994], 1 W.L.R
[76] Keating, section 9-091
[77] David Sawtell, supra note 62
[78] Chaudhary, supra note 63
[79] Lord Hoffman's guidance

Furthermore, in the context of construction law, the parties may agree on certain tests for causation; therefore legal causation may also involve the interpretation of these tests.[80] As Sawtell stated, it is now more readily accepted that "common sense" is not the only test; instead, causation is a mixed question of fact and law. The judge in the tort case *Kuwait Airways v Iraqi Airways* stated:

> One cannot separate questions of liability from questions of causation. The are inextricably connected. One is never simply liable; one is always liable for something and the rules which determine what one is liable for are as much part of the substantive law as the rules which determine which acts give rise to liability. It is often said that causation is a question of fact. So it is, but so is the question of liability. Liability involves applying the rules which determine whether an act is tortious to the facts of the case. Likewise, the question of causation is decided by the rules which lay down the causal requirements for that form of liability to the facts of the case.[81]

However, it should be borne in mind that causation is always a highly fact-sensitive arena,[82] and that factual and legal causation cannot operate independently, as stated by Hobhouse LJ in *County Ltd v Girozentrale Securities* that:

> ---conclude which contains no element of fault will not without more be treated a cause in law ----It is often said that legal causation is a matter of fact and common sense. Causation involves taking account of recognised legal principle but, that having been done, it is a question of fact in each case.[83]

Therefore, it is submitted that legal causation primarily fulfils three functions: 1) to provide a legal or contractual test for causation, 2) to limit the analysis results drawn by factual causation, and 3) to participate in causation analysis through some fixed legal test for causation such as a test of foreseeability or remoteness.

B. Establishment of causation in EOT claims

a. The basis for establishing causation

Although it was believed by many judges in the UK that causation should be established based on common sense,[84] and the "deduction of causation by inference being the application of common sense may seem an attractive proposition to many for those who practice in the field of delay analysis", it is held by commenters in Common Law that "the linking of cause and effect by inference tends to be a product of intellect and logical reasoning which is not given to many and, in complex cases, it is apparently an approach which rarely produces a 'common sense' result."[85] It was held in the UK case *Ascon v McAlpine*:

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[80] Chaudhary, supra note 63

[81] *Kuwait Airways Corp V Iraqi Airways Co* (Nos 4 and 5) [2002] UKHL 19

[82] *Beattie Passive Norse Ltd v Canham Consulting Ltd*.

[83] *County Ltd v Girozentrale Securities* [1996] 3 ALL ER 834 (CA)

[84] The case of *Leyland Shipping*

[85] Burr, supra note 11, 14-005

> That brings me back to the factual issues of causation. The first is whether it is proper, in the absence of other evidence, to infer that the causes of delay at one stage have a continuing effect so as to produce the same delay at a later stage. I believe that that is in principle a proper inference, but that the probability that it will be drawn, or drawn to its full extent, is likely to diminish with the passage of time and the complexity of intervening events.[86]

In summary, in the practice of construction projects, it does not seem that the causation established based on inference from common sense can truly reflect the fact of a project with many complex concurrent, parallel or intervening events. Therefore, in order to identify the extent to which any activities have delayed the completion of the works, it is necessary, as scientifically as possible, to "identify those parts of the works which had to be carried out sequentially (in series) on the critical path, rather than in parallel with it, and whether, and to what extent, the critical path was adversely affected by all the changes imposed upon it, regardless of liability".[87]

Furthermore, it is admitted that UK judges may be reluctant to conduct forensic analysis in claim assessments as they may lack technical expertise. However, this does not mean that determination by common sense is conducted purely subjectively. It was held by Lord Justice Evans in the case *Humber Oil v Sivand*:

> The reference to common sense must be accompanied by a reminder that it is not a subjective test, which would be an unreliable guide. It implies full knowledge of the material facts and that the question is answered in accordance with the thinking process of a normal person. The reference to "material" facts means that some mental process of selection is required. It is not enough in my judgement, to specify "common sense" standards without identifying the reasons involved.

This indicates that the test of a case cannot be conducted via a purely technical process but that mental judgement is needed such as in analysis methods; however, such mental judgement is restricted and should be implemented based on concrete factual proof.

b. Causation in simple EOT claims

Generally, in accordance with many standard-form contracts, upon each contemporary delay – normally caused by a straightforward employer-caused event – the contractor should promptly submit delay claims for EOT and/or reimbursement of costs. Even in straightforward EOT claims, claimants should still follow a fixed path to try to establish the chain of causation, and that path therefore constitutes a basic framework for causation establishment in EOT claims.

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[86] *Ascon Construction Ltd. v Alfred McAlpine Construction Isle of Man Lt.*[2000],C,I,L,L,1583(QBD) (TCC)

[87] Burr, supra note 11, p.14-008

Causation chain for claims for EOT only

Based on the routes for claims demonstration commonly required by courts in English law,[88] following the principles of causation above, Andrew Burr concluded that steps to establish causation should be conducted in an EOT claim.[89] This is further developed, amplified and supplemented by the framework below, which takes the form of a flowchart in which the questions in each step should be identified and tested:

1. Has a delay to progress occurred or is it likely to occur?

2. If so, has an employer's time risk event occurred and, if so, has this occasioned or is it likely to occasion a delay to progress, either independently or together with other events?

3. If so, did the delay to progress have, or is it likely to have, a negative impact on the critical path(s)?

4. If so, which particular section of the critical path(s) was, or is likely to be, affected by the delay to progress? How did it affect, or is it likely to affect, the completion date?

5. In Step 2, besides the employer's time risk event, if a contractor's time risk event also occasioned or is likely to occasion a delay to progress, legal causation should be further developed. If the employer's time risk event is not a proximate reason for delay, the causation link is broken. If the employer's time risk event is the only proximate reason for delay to progress, the analysis should be continued in Step 3 and/or 4. If both employer and contractor's time risk events are proximate reasons for delay, the parties' liability for the delay should be allocated based on relevant principles of concurrent delay as appropriate, and then be continued in Step 3 and/or 4.

Specifically, the question in Step 1 is one of fact, should be answered through delay identification and approaches of progress monitoring with delay-analysis methods such as as-planned vs as-built.

Step 2 enables a preliminary delay analysis to establish factual causation, which can be identified by the "but for" test such as the Collapsed As-plan or collapsed as-built methods, and other methods such as the Time Impact method. If it is found that no employer's risk event is the factual cause of the delay to progress, the chain of causation is broken, and no EOT claim analysis is required.

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[88] For instance, it is held by the case of John Doyle v Laing Management that in a construction claim the contractor must prove that: 1). the existence of one or more events which the employer is responsible; 2) the existence of loss and expense is suffered by the contractor; and, 3)a causal link between the event or events and the loss and expense suffered by the contractor.

[89] Burr, supra note 11, Chapter 14

Step 3 verifies whether the employer-caused delay to progress has indeed caused, or is likely to cause, a delay to completion. It is again a question of factual causation, and a "but for" test can be conducted to check the effect of the delay on progress in the critical path. In practice, this can be simply performed by CPM by observing whether the delayed activities lie on the critical path(s) of the schedule. If so, the analysis can be continued; otherwise, the causation is broken and no EOT should be awarded to the contractor.

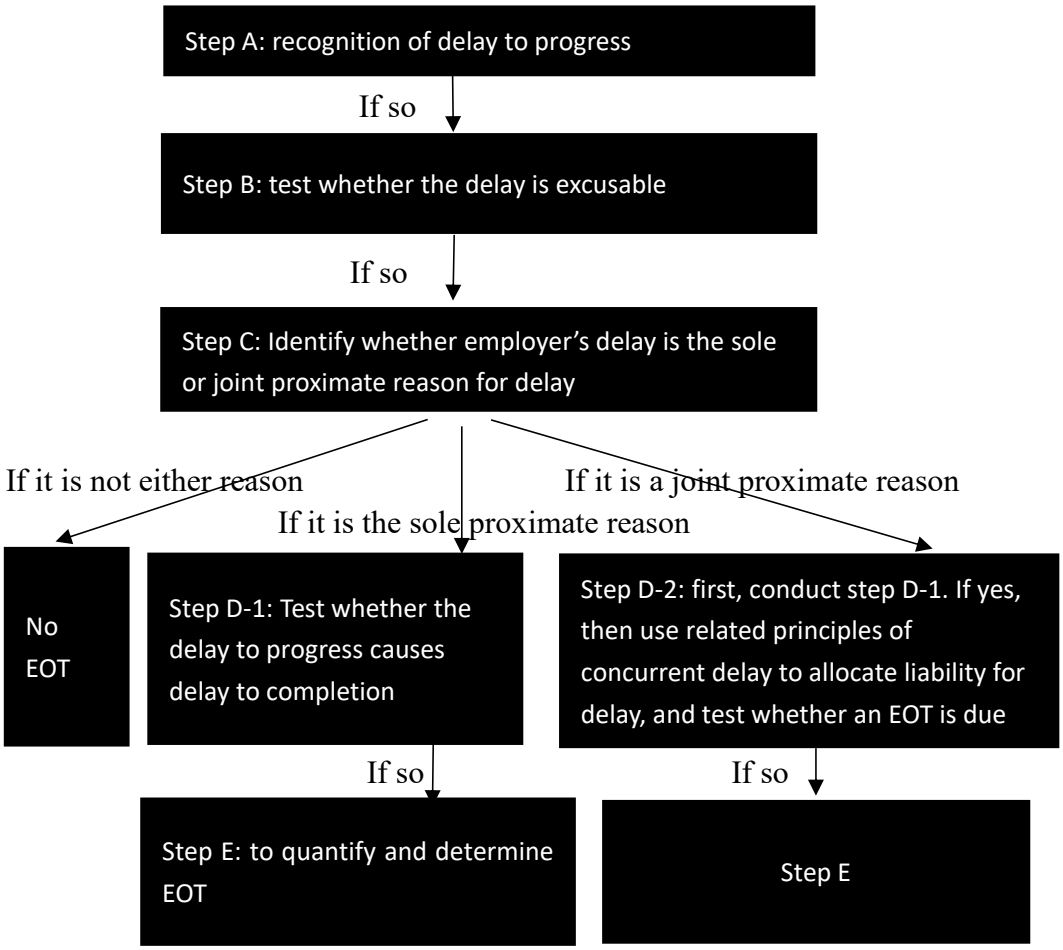
Step 4 detects the true effect of the delay on progress to completion, and therefore quantifies the EOT. This step is a question of fact and should be quantified by diverse particular delay analysis methods or drawn by inference in some cases, adopting a common-sense approach.[90] It is noted that when the delaying effect on completion is analysed, the knock-on effects caused by special circumstances, such as festivals or seasonal conditions, should be taken into consideration.[91]

Step 5 is to be conducted in the case of exceptional circumstances in Step 2 where there are concurrent delays. If the established factual causes include concurrency and intervening events, legal causation should be further established to identify the primacy causes of the delay to progress in order to decide culpability and allocate responsibility for the delay, which can be tested and identified using practical approaches to address concurrent delay or parallel delays.

To make the process more operable, it is presented as a flow chart below:

[90] Burr, supra note 11, p.14-112
[91] Idem, p.14-112~119

Chart 1: Flowchart of causal links in pure EOT claims



The above chain of causation in EOT claims comprises five parts. Essentially, Step A is one of delay identification and Step B tests whether a delay is excusable through reference to risk allocation. Step C tests concurrency and Step D tests whether the delay is critical to completion (D-1); if there is concurrency, the liability for the concurrent delay should also be allocated (D-2). Step E is EOT quantification. The flow chart clearly shows that time risk allocation, the criticality of the delay and concurrency are essential factors in the chain of causation in a pure EOT claim. It is noted that the results of each step are not independent causes but merely successive links in a single chain and are usually necessary to prove entitlement to EOT. However, the Scottish case *City Inn* held that no reference to Step C of the chain of causation was needed because pursuant to the Joint Contract Tribunal (JCT) contract causation could be deduced in any way insofar as it is reasonable.[92]

[92] Burr, supra note 11, p.14-025

Causation establishment for claims for both EOT and financial compensation

Where both EOT and delay-related financial compensation are claimed, the chain of causation should be extended to a modified causation link. The chain of causation will include:[93]

a. whether a delay to progress has occurred and whether employer's costs have been incurred and a time risk event has occurred.

b. if so, whether the delay to progress has caused a delay to completion?

c. if so, whether the delay to completion has been mitigated by the contractor's measures?

d. d-1: if not, whether the delay in progress has caused loss and expense as well as prolongation costs to the contractor. If so, what particular losses and expenses can be related to the delay in progress?

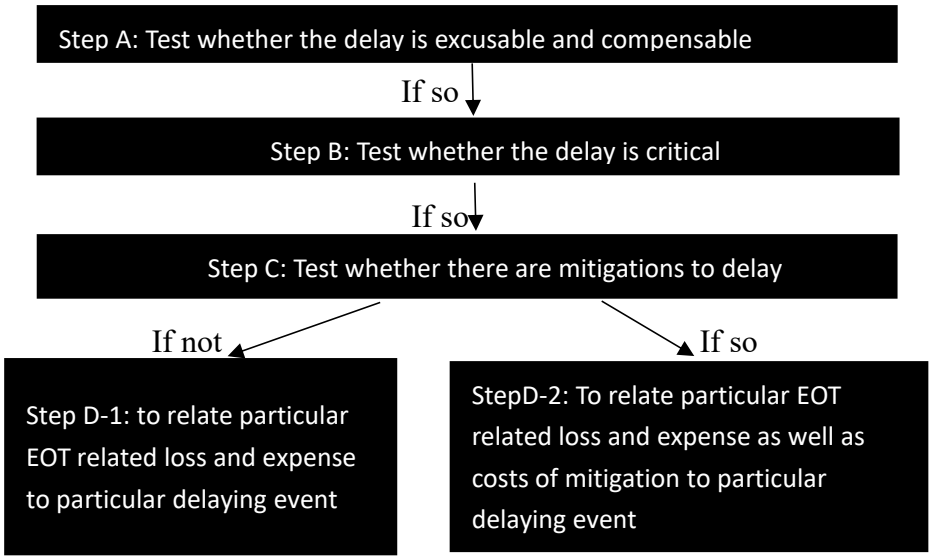
d-2: if so, besides prolongation costs, what has the delay in progress caused in terms of extra loss and expense in the contractor's rectification measures, such as acceleration, and re-sequencing of work?

In the above chain, the analysis of Steps a–c follows the same procedure of claims for EOT only. However, the starting point for triggering EOT-related financial compensation is not only the employer's time risk event but the employer's time and cost risk event(s), as prescribed by the contract or law. This is because in most standard forms of contract, the grounds for EOT and delay damages are not necessarily the same.

After establishing the chain of causation for EOT entitlement, two variants may derive from Step C, resulting in two possible scenarios. One is Step D, in which following the employer's delay no mitigation measures are taken by the contractor, who may suffer direct loss and expense as well as prolonged time-related costs; the other is Step E, in which although the contractor was entitled to EOT, and had mitigated the effects of the delay to some extent, he may have suffered from additional costs of acceleration and lost productivity.

[93] Idem, p.14-025~069

Chart 2: Flow chart of causation links of EOT and related costs claims



When the causation of EOT-related damages is analysed, pursuant to English law, additional consideration of global claims and concurrent delay should be made, especially in the analysis of Step A.

If diverse employer's risk events jointly result in delay, analysts should isolate each event and each heading of loss and expense to determine the entitlement to EOT-related financial compensation. If such an attempt fails, contractors are likely to lose entitlement in this regard; however, global claims depend on principles or approaches provided by contracts and/or law in different countries.[94] If concurrent causes amount to concurrent delay, whether the chain of causation is broken or not will depend on the principles or approaches adopted by the contract or law. If the "but for" test is applied, contractors will completely lose the right to financial compensation if the chain of causation is broken. If the "dominant cause" approach is applied, contractors may succeed in their claim if the "dominant cause test" indicates that the employer is the dominant or effective cause of delay, and the establishment of causation can be continued. In some jurisdictions, e.g. Scotland, the apportionment approach is allowed: courts may apportion the loss in terms of the parties' respective culpability and the potency of each cause, in which case the establishment of a chain of causation can also be continued.[95]

Lastly, unlike the chain of causation of claims for EOT alone, the establishment of a causation of claims for both time and costs can only be supported by actual as-built information rather than a likely delay tendency, and by forensic analysis rather than inference; thus it is desirable to use retrospective analysis to analyse EOT-related financial compensation.

[94] Refer to Burr, supra note 11, Chapter 19
[95] Keating, p.9-101

Chain of causation in prospective/retrospective analysis

It is noted that establishing the above chain of causation normally follows the sequence in the flow chart above. This approach can be used to analyse whether an employer's time risk event is likely to result in a delay to completion and thus enable the analyst to determine an EOT prospectively; this prospective analysis can be conducted at any time before the substantial completion date. Conversely, with a factual delay to completion, the chain of causation can also be established through following a converse sequence, starting from Step D and proceeding to A, to detect whether that delay to completion has been, singly or concurrently, caused by an employer's time risk event(s). This analysis can be conducted at the end of the project or at any time after the continuous effect of a delaying event; in effect, it is a retrospective analysis.

C. Causation in EOT claims involving multiple events caused by parties in the construction chain

Section 3.2.2.3 above discussed scenarios with a single cause of delay; therefore, the cause of loss is relatively straightforward. In circumstances where there are multiple events, which involve different parties in the construction chain (e.g. employers, main contractors, subcontractors, designers and/or suppliers) who interact with each other, disputes around causation arise and causation analysis should be conducted to attribute parties' liability more reasonably.

a. Tests for causation

In the UK, in claims involving multiple causes, the test of causation differs between claims for damages in negligence, damages for breach of contract duties and claims under construction contracts. If there are two or more causes of the loss, caused by the claimants and defendants respectively, in the first type the claimant is entitled to full recovery of damages provided that the actions of the defendant materially contributed to the loss. Therefore, the dominant cause approach is applied, while the "but-for" test is less strictly used in negligence. However, the "but for" test is normally applied to the second type of claim in relation to liability in contract.[96]

As to the third type of claim – for EOT and expenses under contract – the starting point for testing for causation of claims will always be the express terms of the construction contract; there the matter of causation becomes a question of law. Since the nature of the common test of causation in claims for breach of contract where there are concurrent independent causes remains unclear, Common Law concepts are not automatically applied. Instead, since the contract may already have provided the method of testing for causation in EOT and expense claims, the contractual test should be applied first. Since this starting point is now a matter of contractual purpose between the contracting parties, the test of causation may differ between claims for EOT and those for expenses. The parties may agree a more relaxed test of causation for EOT, such as the *Malmaison* approach, as the contract terms are

[96] Vincent Moran, supra note 72

intended to benefit both contracting parties, while the test of causation for claims for losses and expense is always the stringent "but for" test, as its purpose is to benefit one side.[97]

Of course, beyond the starting point, during the analysis of causation, the use of other regular tests for factual causation (the "but for" test) and legal causation (test of foreseeability and remoteness) should be dependent on the facts of the claims.

b. General principle of causation analysis

a) The cause alleged must precede the effect.

It is a general principle in English law that if an event which has a delaying effect occurs after another event which has already caused a delay, the event that occurs later has no effect on the delay. In the *Haversham Grang* case,[98] in which a steamship was run into by two ships on different sides, the Court of Appeal apportioned the costs for dry docking to both ships but rejected the claim that costs for loss of use should also be apportioned to both ships as the length of time that the steamship was out of action was not extended by the damage caused by the second collision, therefore such loss could not be avoided in any event. The House of Lords, in *Carslogie Steamship v Royal Norwegian Government,*[99] stated that the argument of the owner of the second ship should have succeeded in relation to costs for dry-docking as well, and analysed the decision of *Haversham Grang* was made based on common sense.

The principle was confirmed by the construction delay case *Royal Brompton v Hammond*,[100] in which the contractor contended that the employer should be liable for delays and consequent loss and expense. The employer in turn tried to recover costs from the project manager and architect, arguing that their breaches of duty had caused delays. Judge Seymour rejected the contractor's claim by holding that an event, even if it would have resulted in delay had no other event occurred, could not be regarded as a cause of delay where another event had already had that effect. The case therefore implied a principle for delay claims – that where a delay has already occurred, events that occur after that will not entitle the contractor to an EOT.

b) The cause must be an effective cause, not just an occasion of loss, but it need not be the dominant or proximate cause.

In *County Ltd v Girozentrale Securities,*[101] the claimant bank agreed to underwrite a share issue based on engaging the defendant stockbrokers to approach potential investors. The deal failed, leading to losses for the claimant, and the judge at first instance held that the defendant's breach was not an

[97] Vincent Moran, supra note 72
[98] *The Haversha Grang* [1905] p307(CA)
[99] *Carslogie Steamship V Royal Norwegian Government* [1952] AC292(HL)
[100] *Royal Brompton Hospital NHS Trust v Hammond* (No 7) [2001]
[101] Supra note 83

effective cause of the claimant's loss as a number of causes had combined to bring about that loss. The judgement was overturned on appeal as the fact that another cause contributed to the loss did not mean that the judge needed to choose which contributory cause was more effective; it was enough that the breach was an effective cause.

The decision was endorsed by the recent case *Petroleo Brasileiro SA v ENE Kos 1 Ltd*, which held that:

> The real question is whether the charterer's order was an effective cause---. I used the expression "effective cause" in contrast to a mere "but for" cause which does no more than provide the occasion for some other factor unrelated to the charterers' order to operate. If the charterer's order was an effective cause in the sense, it does not matter whether it was the only one.[102]

Therefore, if there are multiple causes, it is not necessary to identify which one is the most proximate or to search for the sole cause; there may be more than one effective cause. Under such circumstances, the "but for" test is limited, since some factual causes merely provide an occasion or opportunity for the loss, rather than being legally causative.[103] In *Galoo Ltd v Bright Grahame Murray,*[104] the claimant raised a claim for losses resulting from the improper preparation of their accounts by a number of defendants. It was held by the Court of Appeal that a breach would result in damages only if it were the dominant or effective cause of the loss, and not if it had merely allowed the opportunity for the loss. On how to determine whether an event is the cause or merely the occasion of a loss, it was said that the court should apply common sense to the facts.[105] The authorities in English law have not made clear what exactly amounts to an "effective cause", despite Beldam LJ holding in *County v Girozentrale Securities*[106] that it can mean something less than "of equal causative potency" to other causes.[107]

c) The chain of causation will be broken where an intervening event is an effective cause of the claimed loss.

Where a loss results from the continuous effect of a train of events that occur continuously, liability shall be attributed based on testing whether the chain of causation is broken by the intervening event(s).

In *BHP Billiton Petroleum Ltd v Dalmine SpA*,[108] it was claimed by the contractor that the non-compliant pipe supplied by the defendant led to the collapse of a pipeline. It was argued by the defendant that the claimant's welding was so defective that it would have resulted in the collapse anyway. The court

[102] *Petroleo Brasileiro SA v ENE Kos 1 Ltd* [2012] UKSC 17
[103] David Sawtell, supra note 62
[104] Suppra note 75
[105] David Sawtell, supra note 62
[106] Supra note 83
[107] Vincent Moran, supra note 72
[108] *BHP Billiton Petroleum Ltd v Dalmine SpA* [2003] EWCA Civ170

held that the claimant's welding amounted to an effective intervening event, therefore the chain of causation was broken.

This type of case is, on one hand, about legal causation in respect of an intervening event, remoteness and mitigation and, on the other, also about factual causation as it was highly fact-sensitive and can be examined by the "but for" test. Thus, the parties may opt for either aspect in processing the case. Under these circumstances, it was held in *Borealis AB v Geogas Trading SA*[109] that the burden of proof to demonstrate a break in the chain of causation should rest on the defendant supplier, who supplied contaminated butane and contended that the chain of causation in the claimant contractor's loss was broken by the claimant's failure to react appropriately to the PH alarm which had already responded to the contaminated butane. Gross LJ also summarised that, to prove a break in the chain of causation, the claimant's conduct must obliterate the impact inflicted by defendant and constitute the true cause of the loss; if both parties' subsequent conduct are true causes, the chain or causation will not be broken and the claimant's state of knowledge at the time of and following the defendant's breach is a significant factor in the analysis of whether the chain of causation is broken. However, he summarised in another case, *Barings plc v Coopers & Lybrand,*[110] that since the question of whether the chain of causation is broken is highly fact-sensitive, there was no all-embracing test for it. Case law in English law has not shown a clear method to approach the question of whether the chain of causation is broken except in providing phrases such as "obliterated" and "effective cause" which are impressionistic rather than precise; however, this does not mean the appropriate test should wholly or simply be one of common sense.[111] Analysts may conduct analysis based on the principles above summarised by Gross LJ.

d) Reserve cause

As to loss caused by sequential events which are independent of one another, causation may also be analysed based on the concept of reserve cause, which means that a prior event has the power to cause a loss which is subsequently strengthened by other independent event(s). In such circumstances, merely a limited amount but not the overall loss may be recovered against the reserve cause. In *Beoco v Alfa Laval,*[112] a heat exchanger was designed and supplied by the first defendant with a defective crack in the casing. The second defendant was employed by the claimant to repair it; the repair was performed imperfectly and the exchange exploded when it was subjected to a pressure test. The Court of Appel awarded damages against the first defendant for the cost of repair, but not for the hypothetical loss of use of the exchanger for the period during which the original defect would have been under repair because the exchanger was not

[109] *Borealis AB v Geogas Trading SA* [2010] EWHC 2789(Comm)
[110] *Barings Plc v Coopers & Lybrand* [2003] EWHC1319(Ch)
[111] David Sawtell, supra note 62
[112] *Beoco Ltd v Alfa Laval Co Ltd* [1995] QB 137

a profit-earning chattel because it had already been damaged by the second defendant and the claimant's action.

e) To prove a loss, claimants generally need to satisfy the "but-for" test, which needs to be modified when there are concurrent independent causes of loss.

Where there are multiple sufficient causes of loss, which may be caused by one or more defendants and even the claimant, and each cause could independently result in a loss, a strict "but for" test cannot appropriately be applied as it may absolve both defendants and therefore offer no remedy to the claimant.[113] Hamblen J commented in the case *Orient-Express Hotel v Assicurazioni:*[114]

> As a general rule the "but for" test is a necessary condition for establishing causation in fact. However, there may be cases in which fairness and reasonableness require that it should not be a necessary condition. --- I would also accept that a case in which there are two concurrent independent causes of a loss, with the consequence that the application of the "but for" test should not be a necessary condition of causation, particularly where two wrongdoers are involved.

It should be noted that concurrent independent cause differs from concurrency. Coulson J stated in *Greenwich Millennium v Essex Service*[115] that:

> A distinction should be drawn between cases where there are two concurrent independent causes of the loss, dealt with above, and those cases where there are two co-operating causes, that is to say, situations where two causes give rise to the loss but where each, on its own, would not have done so.

This case is a typical case of causation in the construction chain. The claim was made by the claimant contractor against the defendant ME subcontractor and defendant mechanical designer; the latter then passed the claim down the construction chain to the labour-only sub-sub-subcontractor. It was found that the non-function of a surge protector was caused by two defective valves, with each defective valve independently sufficient to have caused the non-function. It was held inappropriate for the "but for" test to be applied.

f) Where causation is analysed, a distinction should be drawn between claims of breach of contract for damages and claims for entitlement based on contract provisions.

In the former, causation should be analysed conventionally. In the latter, the provisions regarding entitlement to EOT and/or monetary compensation shall be the starting point of the causation analysis. In many standard-form contracts, provisions for EOT and monetary compensation differ and therefore lead to different results in relation to compensation.

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[113] Daniel Gorman, Contracts, Causation, and Clarity, *University of Pittsburgh Law Review* (2017) 78

[114] *Orient-Express Hotel Ltd v Assicurazioni General SpA* [2010] EWHC 1186(Comm)

[115] *Greenwich Millennium Village Ltd v Essex Service Group Ltd* [2013] EWHC 3059(TCC)

g) A distinction should also be made between claims involving competing causes resulting from the claimant, and claims involving multiple independent concurrent causes resulting from the defendants and defendant respectively.

   In the former, the principles above in this section can be applied: the orthodox "but for" test of causation still has to be satisfied to determine which part of the claimed loss is attributable to each cause.[116]

   In the latter, the causation relation to concurrency in relation to time and monetary compensation should be analysed in accordance with the default rule provided by the law and/or particular terms of the contract.[117]

   Causation in concurrency will be discussed in further detail in the section on concurrent delay.

h) In some Common Law jurisdictions, the "dominant cause" test can be applied for claims containing multiple competing causes in construction contract claims. However, in the UK, although the dominant or proximate cause approach is universally applied in claims for damages for breach of contract as well as insurance cases, no authority has yet allowed its application for construction contract disputes.[118]

c. Practice of causation analysis

In accordance with Chaudhary, causation analysis for claims involving multiple events can be handled in practice by the following steps:

1) Identification of possible events;

2) Elimination of possible events through the "but for" test;

3) A focus on what probably happened.

   The third step is the core works of the analysis, where various checks are conducted in the order below:

   i. Apply the "but-for" test to check whether the loss would have occurred in any event. If so, the alleged cause will not be the effective case.

   ii. Check whether there is a close connection between the alleged event and loss; a test for legal causation may be applied depending on the merits of the case.

   iii. Check the limits of the contractual duty in question in accordance with contract terms or the local legal position.

   iv. Check whether the alleged event is a cause or a mere occasion of the loss.

[116] Vincent Moran, supra note 72
[117] David Sawtell, supra note 62
[118] Vincent Moran, supra note 72

v. Check whether there is any intervening event and, if so, whether the causation chain is broken by it.

vi. Check whether the effective cause precedes the loss.

vii. Check whether there are concurrent causes of loss; if so, further check links and interdependency between events, and find out whether the issue is one of concurrency or causation. It is noted that a claim involving events operate independently is an issue of causation. If the events operate dependently, there is no causation between events; rather, it is an issue of concurrency.[119]

D. Causation analysis in anomalous circumstances

As discussed above, in anomalous circumstances, including concurrent delay claims and global claims, liability attribution is not an issue purely of causation, and analysis should encompass other considerations and principles.

a. Concurrency

General principle

Concurrency is a situation in which the claimant and defendant are both responsible for competing effective causes of damage. In Common Law, the "dominant cause" is not applied in concurrency, except in certain jurisdictions where an apportionment approach is allowed. In the UK, as Ramsey J held in *HI-Lite Electrical v Wolseley,* apportionment of liability on the basis of causation is either not generally possible, unless for cases in relation to a breach of legal duty, or contributory negligence is provided as a defence.[120]

In the context of delay, concurrency is amplified by the concept of concurrent delay. In English law, there is no clear legal authority defining this concept. A consensus in this regard in the UK was summarised in 2002 by Marrin, who stated that the true concurrent is a situation where two or more events amount to the effective cause of delay and are of approximately equal causative potency, and their delaying effect is felt at the same time. Obviously, such a definition excludes the application of the dominant cause and apportionment approach. It was agreed by commentators that true concurrency can only occur in exceptional factual situations.[121]

The criteria for concurrent delay were therefore relaxed to some extent by Marrin in 2013, when he stated that the true cause with less causative potency should be treated as if were not causative at all.[122] In essence, concurrency becomes a different situation in that there are diverse true competing causes of delay, although they may differ in the extent of their causative potency. Thus, concurrency demands hybrid tests for causation, i.e. firstly to test whether the cause is a dominant one; if not, then

[119] Chaudhary, supra note 63
[120] *HI-Lite Electrical Ltd v Wolseley UK Ltd* [2011] EWHC 2153(TCC)
[121] John Marrin, Concurrent Delay, SCL Paper, 2002
[122] John Marrin, Concurrent Delay revisited, SCL Paper, 2013

the less onerous *Malmaison test* is applied.[123] Common law implies that the dominant approach should be applied where a dominant cause is identified; this position was held in the Scottish case *City Inn* and Hudson concluded that it reflects the law in England and Wales:

> If one of the potential causes of delay could be identified to be dominant then it should be regarded as the cause to the exclusion of other potential causes, if no cause could be identified as the dominant cause a claim for extension of time should not fail.[124]

However, with concurrent delay containing competing causes with differing causative potency, it was held by the Scottish court that it is possible to carry out an "apportionment as between different causative factors".[125] In contrast, the courts in England take a different approach by continuing to look at the event for which the employer is responsible and the effect it would have had on the original (or extended) completion date, if such

> An event occurs (no matter when), then the fact that the works would have been delayed in any event because of a contractor default is, in the context of an extension claim as opposed to the assessment of loss and expense, likely, under most contracts, to be irrelevant. It is not an apportionment exercise. Where contractors can show that an operative cause of delay was a Relevant Event, they are entitled to an extension to such new date as would have allowed them to complete the works in terms of the contract.[126]

However, it is now commonly accepted by commentators in the UK that the "dominant cause" test has many inherent problems as it may be against expressed contract terms and there is no general rule of law applying the test of Common Law damages claims.[127] Therefore, recently, authorities in England have suggested a move away from the dominant cause test and hybrid test above in favour of a more relaxed test, the "effective cause" test.[128]

It is noted that a distinction should be made between contributory concurrent causes and independent concurrent causes.[129] It was held by the Court of Appeal in *Heskell v Continental Express*[130] that contributing causes have to be of equal efficacy with each able to satisfy the "but for" test. The Court of Appeal held in the *Girozentrale* case that the court does not have to choose between contributory concurrent causes in terms of which is the more effective and that even the less significant one may be considered an effective cause of loss as a matter of law.[131] It is noted that this proposition is not only applied for concurrent competing causes, but also to decide whether the causation chain is broken by the claimant's intervening act.

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123 Vincent Moran, supra note 72
124 Atkin Chambers, *Hudson's Building and Engineering Contract*, Sweet & Maxwell, 14th ed, 2020, p. 6-062
125 *City Inn v Shepherd Construction* [2010] B.L.R. 437.
126 Atkin Chambers, supa note 135, p.6-602
127 Vincent Moran, supra note 72
128 Idem
129 HLA Hart & Tony Honore, supra note 66
130 *Heskell V Continental Express* [1950]1 All ER 1033(KBD)
131 Vincent Moran, supra note 72

International approaches

In both English and US law, the contractor is entitled to EOT but cannot recover delay-related costs for concurrent delay. In English law, this is referred to as the *Malmaison* approach.

From the perspective of English law, approaches to address concurrent delay can be a matter of fairness under the terms of contract or simply be treated as a matter of causation based on the interpretation of contract.[132] It was held by Akenhead J in the *Walter Lilly* case[133] that concurrent delay is still a matter of two causes with competing effect and different contractual interpretations.

As regards causation, since the "but-for" test is a necessary but not sufficient test of causation, it was held in some cases[134] that the courts regard it as appropriate to relax the "but for" test in concurrent delay; otherwise, both parties would be left without a remedy, particularly in a situation where a concurrent delay is caused by two defendants.[135] However, other cases suggested that test should be applied to concurrent delay in a modified way, for instance, in the UK, Edwards-Stuart J provided the rationale to the *Malmaison* approach in the case *De Beers v ATOS Origin:*[136]

> In the case of the former (extension of time), this is because the rule where delay is caused by the employer is that not only must the contractor complete within a reasonable time but also the contractor must have a reasonable time within which to complete. It therefore does not matter if the contractor would have been unable to complete by the contractual completion date if there had been no breaches of contract by the employer (or other events which entitled the contractor to an extension of time), because he is entitled to have the time within which to complete which the contract allows or which the employer's conduct has made reasonably necessary.
>
> By contrast, the contractor cannot recover damages for delay in circumstances where he would have suffered exactly the same loss as a result of causes within his control or for which he is contractually responsible.

This clearly laid down the rationale for concurrent delay – that where an entitlement to EOT is analysed, both the interpretation of contractual terms and the "but for" test can be applied; however, due to the Prevention Principle in English law, the "but for" test is conducted "but for" employer's preventions or another event which may entitle the contractor to EOT. However, where the entitlement to compensation is analysed in concurrent delay claims, the "but for" test will be strictly conducted, "but for" the event for which the contractor is responsible.

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[132] David Sawtell, supra note 62
[133] Water Lilly v Macky
[134] Supra note 130
[135] Marrin, supra note 122
[136] *De Beers UK Ltd v ATOS Origin IT Services UK Ltd* [2010]EWHC 3276(TCC)

In Scotland, the legal position on concurrent delay arises from the *City Inn* case, which is a radical departure from the *Malmaison* approach. In this case, Lord Drummond Young apportioned responsibility for the delay between the employer risk events and contract risk events, taking account of the relative causative degree of significance in the parties' culpability for the delay. It created a typical apportionment approach. Keating concludes:

> Where there are concurrent causes of delay, none of which can be described as dominant, the delay should be apportioned between the Relevant Events and the contractor's risks events.[137]

In essence, it approved two approaches: a preliminary dominant cause test and apportionment approaches. Although the apportionment approach is in line with contribution negligence legislation in the UK, such an approach has not yet been adopted in construction contract claims. It was severely criticised in England as it is against the Prevention Principle; it was held in *Adyard Abu Dhabi* that:

> "in English law, the approach would be to recognize that the builder is entitled to an extension of time, not an apportionment"[138]

In the USA, in concurrent delay claims, the courts generally take the approach of "time but no money"; however, they also offer two other approaches: 1) apportionment, and 2) responsibility based on a network or CPM method.[139]

The rule of "time but no money" was articulated in the case *Greenfield Tap*:

> This court has held that where both parties to a contract are responsible for a delay in its performance the court will not undertake to apportion the responsibility for the delays."[140]

As time elapsed, the rigorous position of that rule was softened to some extent in relation to the recovery of delay costs: courts were likely to apportion delay costs where evidence permitted the segregation of costs, taking account of parties' liabilities. It was held in *Coath & Goss* that:

> Where both parties contribute to a delay neither can recover damage, unless there is in the proof of a clear apportionment of the delay and the expense attributable to each party.[141]

However, where the segregation of delay costs is impossible, the apportionment will be refused by the courts, as confirmed by *PCL Construction Service v US*.[142] In essence, the apportionment approach is a modified rule of "time but no money" in the context of cost recovery; the SCL Protocol in the UK takes the same position.

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[137] Keating, 8-028

[138] *Adyard Abu Dhabi v SD Marine Services* [2011]EWHC 848

[139] Cocklin, International approaches to legal analysis of concurrent delay: is there a solution for English law? *SCL papers*, 2013

[140] *Greenfield Tap & Die Corp v US* 68 Ct CL 61,(1929) WL 2482

[141] *Coath & Goss Inc v US* 101 Ct Cl 702 (1944)

[142] *PCL Construction Service v US* 47 Fed CL 745 (2000) US

In Canada, upon concurrent delay claims, courts are reluctant to adopt a fixed rule which may create a disproportionate result; they commonly adopt the apportionment approach as standard. Generally, courts must do the best they can to ascertain delay damages,[143] and this gives courts the ability to allocate responsibility for the delay between the parties in a broad approach. They also like to extend contributory negligence legislation to concurrent delay claims via an apportionment approach.[144]

In Australia, the legal position towards concurrent delay is unclear despite some standard-form contracts attempting to provide prescriptive rules for the assessment of concurrent delay.[145] In the leading case *Kane Construction v Sopov,*[146] it was held by the Victoria Supreme Court that "then the situation of concurrency may exist and the contractor would not be entitled an additional extension of time; it would be calculated as if just one event of delay had occurred." This implied that against a concurrent delay at least one EOT should be applied. Generally, given that the Prevention Principle is well applied in Australia, it is believed that a restrictive interpretation of the *Malmaison* approach should generally be applied where there are no contract terms about assessment rules for concurrent delay.[147]

b. Delay caused by consecutive causes

Where events occur successively or sequentially, they are called sequential causes.[148] A delay to progress caused by such an event is called a sequential delay; a distinction should be made between this and concurrent delay, as laid out in the US case *Essex Electro.*[149]

In the case of claims raised by employers for liquidated damages where delay in completion is caused by different consecutive causes for which the employer and contractor are responsible separately, the contractors must pay all the damages unless they can show for which part of the delay they are not responsible; while for claims for EOT raised by contractors, EOT should be awarded to cover the entire period of delay to completion if the employers cannot prove for which part of delay they are not responsible.[150] No prolonged costs should be awarded to contractors unless they can segregate the costs for which they are not responsible.[151] Therefore, the key factor in these claims is the attribution of liability between the parties; thus the analysis of the causative relationship between sequential causes and the final completion should be conducted based on the principles and practice in Section 3.2.3.3 above. In particular, taking into account these principles, three consequential delay scenarios may be assessed, as below:

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143 *Wood v Grand Valley Railway* (1915) 51 SCR 283
144 Cocklin, supra note 139
145 Paul Tobin, Concurrent and consequential cause of delay, ICLR (2007) 24
146 *Kane Constructions Pty Ltd v Sopov* [2005] VSC 237 (Australia)
147 Jim Doyle, Concurrent delays in contracts, *Australian Construction Law Newsletter*,2007(112)
148 Nader Emile, The causal link and the dark art in delay claims, *Construction Law Journal*, 2021,37(6)
149 *Essex Electro Engineers Inc* 224F 3d 12831295-969FED Cir 2000) (US)
150 Burr, supra note 11, p.18-023,081~096
151 Idem, p.18-114

The first is where the effect of the first event is extinguished by the second event; in this situation, the second event is the "pre-emptive cause" and the causal link is only established with regard to it; as illustrated in *NHP Billiton Petroleum v Dalmine SpA.*[152]

The second is where the effect of the preceding event continues in such a way that the succeeding event has no effect at all. Here, the preceding event will be the "pre-emptive cause" and the causal link is only established with regard to it. This principle is well illustrated by *Performance Cars v Harold James Abraham*.[153]

The third is where two or more sequential events cause two or more periods of delay to progress. In this case, each party shall take the liability for the period of delay caused by himself, based on an analysis of the cause and effect of each period of delay.

In the meantime, it is noted that a forensic scheduling analysis based on a CPM approach can be very helpful in detecting causal relationships in sequential delay claims. For instance, in *Peak v McKinney,*[154] which was a case delay caused by sequential events for which the employer, contractor and a nominated subcontractor were separately responsible, Burr concludes that if the facts were put into a schedule, it would be apparent that every period of delay as well as its true cause could be separately identified and, taking account of the principle of causation above, an analysis could quantify the proportion of the total delay attributable to each respective party.[155]

c. Global claims

General principle

As discussed above, it is a legal requirement in Common Law that any claimant should bear the burden of proof to demonstrate and prove their case by relating each loss in time or cost to each delaying event. This requirement has been criticised as, in practice, particularly in complex modern projects, it is always unrealistic to do so; employers who insist on contractors doing so generally seek to profit from their own wrong.[156] Therefore, in practice, many practitioners broadly adopt the approach of global claim, which was defined in *Walter Lilly* as follows:

> … a contractor's claims which identify numerous potential or actual causes of delay and/or disruption, a total cost on the job, a net payment from the employer and a claim for the balance between costs and payment which is attributed without more and by inference to the cause of delay and disruption relied upon.

In practice, total cost claim and total time claim are two special forms or varieties of global claim. Keating notes that:

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[152] *NHP Billiton Petroleum Ltd Dalmine SpA* [2003]EWCA Civ 170
[153] *Performance Cars Ltd v Harold James Abraham* [1962]LQB 33
[154] *Peak Construction (Liverpool) Ltd v McKinney Foundation Ltd* (1970) 1 BLR 111
[155] Burr, supra note 11, p.18-053
[156] Knowles, supra note 54, p.106

> One that provides an inadequate explanation of the causal nexus between the breaches of contract and delay that relief is claimed for. In such claim the claimant does not seek to attribute specific loss or delay to a specific breach or event, but rather alleges a global or composite loss allegedly the result of the breaches or events relied on.[157]

It is, therefore, a special form of claim which runs counter to the legal requirement for claimants in relation to the burden of proof and causation. However, this does not mean that consideration of causation is completely ignored when global claims are presented and determined; instead, causation must be established by referring to common sense rather than forensic evidence. It was held in *Merton* that:

> a global claim is one that does not provide the causal nexus---. Causation under such circumstances, must be inferred by the application of common sense. [158]

It was further confirmed in the *John Holland* case that:

> (In a global claim) any question of the causal link was to be examined in a pragmatic way by the application of common sense to the logical principles of causation ... It was sufficient that the breach be a material cause.[159]

International approaches

Since claimants in global claims obviously fail to comply with the legal requirement to link cause and effect directly, Common Law courts have long been sceptical about global claims.[160] Traditionally, Common Law courts were reluctant to accept such claims as they do not comply with the burden of proof. Therefore, global claims are not an ideal choice for claimants and are very likely to be rejected simply because of their form of demonstration. Nevertheless, whether they may be acceptable depends on the courts' attitude and the requirements of the level of burden of proof in different legal systems.

In England, it is noteworthy that, in recent decades, given the increased complexity in construction projects, courts have been more receptive and accommodating to global claims.[161] For instance, it was held by Byrne J in the *John Holland* case that:

> Where a plaintiff established a breach of contract, it would not be denied relief solely because it was difficult to estimate the damages which flowed from that breach. ----. It was permissible to plead a claim for damages for breach of contract in global form, that is, not attributing any specific loss to a specific breach of contract, where it was impractical to disentangle that part of the composite loss

[157] Keating 9th ed., 9-064

[158] *London Borough of Merton v Hugh Stanley Leach* (1985) 32 BLR 68

[159] *John Holland Construction & Engineering Pty Ltd v Kvaerner RJ Brown Pty Ltd* [1996] 8 VR 681 (Australia)

[160] John Me Lyden, Global claims in Common Law Jurisdictions, *SCL Paper,* 2008

[161] Anneliese Day & Jonathan Cope, Lilly and Doyle: a common sense approach to global claims, *SCL paper*, 2013

> which was attributable to each head of claim and where that situation had not been brought about by delay or other conduct of the claimant.[162]

This does not, however, deny the need for causation in EOT claims analysis; causation links are still significant in proving damages, and practitioners in England are still not encouraged to broadly use global claims to recover damages caused by delay.[163] It was stressed in *Walter Lilly,* which authoritatively recognised England's current legal position regarding global claims, that a contractor must still prove its claim as a matter of fact and, in particular, must demonstrate three things on the balance of probabilities. This could still prove difficult when there is no direct causal link.[164]

Generally, in accordance with case law in England, it is concluded that the legal position regarding global claims includes: 1) all contractual requirements for a valid claim must have been complied with; 2) it is open to the contractor to prove its case in any manner, while the claim must be proved as a matter of fact; 3) proof must be provided that the contractor would not have incurred the loss in any event; 4) any significant matters for which the employer is not responsible should be eliminated; 5) all parts of the claim where a causal link can be demonstrated should be pleaded separately.[165]

A distinct feature of the legal position in England in relation to global claims is that courts are reluctant to conduct an apportionment exercise between causes for which the defendant is responsible and/or associated costs. They may endeavour to identify and separate each cause and effect as far as possible[166] but will not exhaust themselves apportioning causes and liabilities between parties.[167]

In Scotland, the current law in relation to global claims was set out in *John Doyle v Laing* and further elaborated as a Scottish approach in the *City Inn* case. Generally, the above five principles from England are also recognised by the courts in Scotland.[168] Furthermore, where multiple employer risk events occasion a loss and result in a global claim, the dominant test should first be applied by testing whether there is a material causative factor for which the defendant is not liable; if so, the claim may fail.[169] As to deciding which factors are materially causative, the causation must be established based on common sense. However, even if no materially causative factor is found, a global claim may not fail as long as there is evidence to support causal connections between certain events for which the defendant is responsible and related losses.[170] This position was further elaborated and extended by the *City Inn* case. Lord Young held that if the loss has no other

[162] Supra note 159
[163] Keating, p.9-065
[164] Anneliese Day, supra note 161
[165] Idem
[166] Supra note 101
[167] Anneliese Day, supra note 161
[168] Idem
[169] *John Doyle v Laing*
[170] *John Doyle v Laing*

significant cause, it may be possible to link groups of causes with groups of losses. Furthermore, in attributing causes to losses under global claims, if one cause can be identified as proximate or dominant, it should be regarded as the operative cause. If no dominant cause is found, it may be possible to apportion the loss between the causes for which the pursuer and defendant are responsible.[171] Clearly the Scottish approach is more inclined to accept global claims in relation to plead approaches, and its courts take a distinct approach in endeavouring to step in the claims to search for causation as far as possible through dominant test and/or apportionment approaches.

In the US, courts are cautious regarding global claims. For instance, a global claim based on total costs was dismissed in the leading case *Boyajian v United States*.[172] Even when it was allowed in other cases, it was restricted by conditions. It was held in *Sternberger v. US*[173] that:

> Both jury verdict and total cost standards are not favored, and are permitted to be used to compute damages only upon strict conditions---, and finally, that the additional costs must be attributable only to the employer's changes and delays. These conditions are no more than just if the contractor is to meet his essential burden of establishing the fundamental facts of liability, causation, and resultant injury.

However, where global claims are permitted, courts in the US are likely to step in the case and are willing to apportion liability between parties taking account of culpabilities.[174] An apportionment exercise was conducted by the court in *Lichter v Mellon-Stuart*,[175] on condition that any such apportionment must be based on the evidence and carried out on a basis that was reasonable in all the circumstances. Furthermore, like the recent lenient position of contractors in relation to ascertaining compensation under global claims, a similar position was seen in the US long ago, for instance, in *Wunderlich Contracting Co v US*[176] it was held that:

> The Contractor needs not provide his damages with absolute certainty, or mathematical exactitude. It is sufficient if he furnishes the court with a reasonable basis for computation, even though the result is only appropriate. Yet this leniency as to the actual mechanics of computation does not relieve the contractor of his essential burden of establishing the fundamental facts of liability, causation, and resultant injury."

In Australia, although *John Holland v Kvaerner*[177] provided some legal position regarding global claims, there is no clearly binding judicial consideration of all the

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[171] Supra note 125

[172] *Boyajian v United States* 423 F 2d 1231 (1970) (US)

[173] *Joseph Sternberger, Trustee in Bankrupt For Spenco, Inc v The United States,* 401 F 2d 1012 (1968) (US)

[174] John Me Lyden, supra note 160

[175] *Lichter V Mellon-Stuart* Co 305 F 2d 216 (1962) (US)

[176] *Wunderlich Contracting Co v United States*, 351 F 2d 956 (1965) US

[177] Supra note 143

relevant issues.[178] Although *Kane Constructions v Sopov*[179] held that "the analysis should be principally a factual one, with good records in support.--- in other words, global claims are bound to fail---", courts generally take the same position as in England that the contractor should first make all attempts to separate their damages and prove entitlement based on the effect of each employer-caused event. However, where it is impossible to do so, it may be appropriate in certain circumstances to apportion the contractor's losses between the employers and the contractor in order to avoid the "all or nothing" effect, which is in line with the "common sense" apportionment approaches applied in contributory negligence and proportionate liability legislation.[180]

In summary, in relation to global claims, it is seen that in recent years the courts in Common Law jurisdictions have adopted a lenient approach to the method of claim despite holding that the basic legal requirements regarding causation and burden of proof shall not be completely ignored. In relation to awards, courts in England retain a rather reserved attitude to stepping in to separate parties' liability where they are unable to do so, while courts in other jurisdictions are likely to take a more pragmatic attitude to apportioning losses between parties based on somewhat imprecise inferred criteria. Furthermore, where there are competing causes, the causative test in other jurisdictions may be the dominant cause, but in England is the effective cause.

d. Causation in claims involving multiple defendants

Introduction

Another type of anomalous EOT claim involves two or more concurrent or sequential independent causes of loss which are the responsibility of separate defendants.

Where a delay is caused by multiple defendants, therefore amounting to "cumulative causes", it is essentially a question of joint and several liability. Causation depends on the legal position in different jurisdictions: while generally the doctrine of joint and several liability is applied against a loss, the plaintiff may enforce the judgement against each and every defendant to the action, and each defendant may be liable to the plaintiff for the full extent of the damages.[181] Therefore two defendants, each responsible for an event, would be jointly held liable for the loss.[182] Furthermore, in Common Law, the claimant may raise a claim based on contract terms or Common Law in relation to damages for breach of contract, or even based on tort,[183] while the causation used may also be different.

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[178] Paul Tobin, supra note 145

[179] Supra note 147

[180] Paul Tobin, supra note 145

[181] Adrian Baron, Joint and several liability in the construction industry: is it time for law reform in the UK?, *SCL Paper*, 2004

[182] Nader Emile, supra note 148

[183] Chrisotpher Ennis & Wolfgang Breyer, Comparison of treatment of claims for extension of time and compensation under the FIDIC Red Book form according to Civil Law and Common Law Jurisdictions, *Construction Law Journal*, 2014(30)

International approaches

In England, under a claim based on contract terms against multiple defendants, claimants need only to show that an individual defendant/cause is an effective contributory cause of the loss in order to recover damages in full from either defendant.[184] Under a claim based on tort of negligence, the claimant is entitled to recover damages in full against the defendant who is responsible for the cause that materially contributed to the loss; however, if the claimant is responsible for one of the causes of the loss, the claim will be reduced to reflect contributory negligence.[185] In England the doctrine of several and joint liability was strictly followed in early times, as laid down by the case *Merryweather v Nixan*[186] which denied the right of liability attribution between defendants, thus rendering it possible for a defendant with "a deep-pocket" (at the election of the plaintiff) to be held legally liable for all the damage, even if only responsible for a small part of it.[187] However, the effect of this doctrine was removed by the Civil Liability (Contribution) Act 1978 in the UK in relation to damages claimed under Common Law. This provided the power to make awards of contribution against multiple defendants. Therefore, in EOT claims which are claimed under Common Law against multiple defendants, the court is liable to distribute liability between them, and the approaches should be the same as those discussed in Section 3.2.3.3 above. While that Act remains in effect in the field of negligence only, the Law Commission concluded that joint and several liability should not be replaced by proportionate liability; it therefore still remains applicable in construction cases, and to professionals in the construction industry.[188]

Therefore, for claims made under contract terms, the court may still distribute liability between several defendants. It is possible that the defendants may sue each other to recover the damages for which each is not liable;[189] however, if a judgement is made based on a *bona fide* compromise by one of the defendants, his later attempts to recover damages from other defendants may fail if the other defendants refuse to admit liability based on fact (see, for instance, *IMC v Delta*[190]). The claims should still depend on contract terms, taking account of the establishment of approaches of causation discussed in Section 3.2.3.3 above.

In the US, the majority of states have modified the doctrine of several and joint liability in favour of some form of proportionate liability, and some states have even abolished the doctrine entirely. Therefore, in a case involving multiple defendants, it is possible that individual defendants may be liable to pay only their proportionate share of the judgement; furthermore, a damages award attributed to an insolvent defendant may also be reallocated between the remaining defendants.[191]

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[184] Keating, 9-102
[185] Keating, 9-107
[186] *Merryweather v Nixan* (1799) 8 TR 186
[187] Adrian Baron, supra note 181
[188] Adrian Baron, supra note 181
[189] Ben Patten & Sian Mirchandani, Contribution claims: sharing pain after IMI v Delta, *SCL Paper*, 2018
[190] *IMI plc v Delta Ltd* [2016] EWCA Civ 773
[191] Adrian Baron, supra note 181

In Canada, the legal position in claims involving multiple defendants is that if the plaintiff has contributed to the loss or damage, his liability should be proportionate; if not, the doctrine of several and joint liability should be retained. Recently some organisations have recommended abolishing the doctrine, but this has had no effect on construction cases yet.[192]

In Australia, there is a stark trend of removing the doctrine of several and joint liability: the majority of states enacted legislation to remove it from construction cases, holding that no defendant should be liable for more than his individual apportionment – therefore architects, engineers, government offices and building surveyors should not have to assume liability for the mistakes of other defendants. It is stipulated by the *Building Act in Victoria*[193]that:

> After determining an award of damages in a building action, the court must give judgement against each defendant to that action who is found to be jointly or severally liable for damages for such proportion of the total amount of damages as the court considers to be just and equitable having regarding to the extent of the defendant's responsibility for the loss or damage.

Furthermore, this prevents a defendant against whom judgement has been given in an apportionment claim from recovering or contributing damages from other defendants, and the courts retain the right to join any new party as a defendant in an apportionment claim. All these developments suggest that courts are now required to focus on each defendant's degree of culpability.[194]

3.3 Proof of EOT claims and delay analysis

3.3.1 Types of proof for EOT claims

Following Section 3.3, the claimant should establish a causation link in EOT claims while, for any claims, proof of causation shall be established. The level of causation to be established depends on the standard of proof allowed. In accordance with the literature review, proof includes factual and analytic proof.[195] Factual proof refers to raw records and evidence without, or with very few, compiled works to provide factual findings to claims analysts; analytic proof comprises compiled documents prepared by analysts using relevant analytic methods and discretion, based on factual proof, to assist the factual tribunal.[196]

In practice, both types of proof are essential to support the analysis of EOT claims. Analytic proof, which is mainly produced through delay analysis, forms part of the investigation of factual findings regarding the causes and effects of the delay. It helps simulate the occurrence of the works through certain models and assumptions and

[192] idem
[193] Building Act 1993 (Victoria, Australia)
[194] Adrian Baron, supra note 181
[195] Keating, 8-064
[196] Refer to the *Protocol*

can assist decision-makers form a more systematic impression of the factual proof to make a determination. Nevertheless, it cannot absolutely replace the role of factual findings and can never be a substitute for relevant and convincing factual evidence.[197]

3.3.2 Factual proof

In practice, in EOT claim analysis, the relevant documents and records should be broadly reviewed and researched in order to establish a clear and complete chain of proof. The evidence review is critical to delay analysis and is an essential part of the EOT claim analysis. On the one hand, it provides general impressions and basic information for the delay analysis; on the other, it provides much more information to examine, rectify, supplement or reinforce the result of delay analysis.

Specifically, in construction project practice, to support EOT claim analysis diverse evidence should be captured, arranged, filed and researched, including tenders, contracts, designs and drawings, shop drawings and logs, as-built drawings, subcontracts, correspondence, the general plan of the works, general schedule, notice of commencement, site diary, weekly and monthly progress reports, progress photographs and video, and all other relevant site contemporary records.[198] It is suggested that a check list of all the above items is made for each claimed delaying event, the source and location of all documents related to the potential issue identified, and priorities for the analysis established.[199] If possible, external discovery of evidence may also need to be conducted.[200]

3.3.3 Analytic proof-delay analysis

A. The primary analysis instruments

Schedule

In EOT claims, pursuant to the burden of proof, claimants have to provide proof of the occurrence of delay and its impact on works. Amongst other approaches, the schedule is the most common and straightforward instrument for that purpose as it provides a detailed medium for comparing and measuring time and intent.[201]

According to the CIOB Guide, the schedule is "the computerized calculated activity dates and logic, the process is to be referred to as scheduling and the occupation that of the scheduler, it is a process manifest in an editable computer file". [202]

The term "schedule" is mainly used by construction contracts in the US to refer to the timing of the works established through the critical path network. In contrast, the

[197] Keating, 8-064
[198] Bramble, supra note 14, p.10-12
[199] Idem, p.10-11
[200] Idem, p.10-13
[201] Idem, p.11-3
[202] CIOB Guide, Principle 5

form used to record the proposed timing of the works of a construction contract in the UK model is generally called the "programme". Very few contracts require a critical path network. The programme usually takes the form of a paper copy of a chart and is not expected to be revised or updated. However, with the need for an updated schedule widely recognised by practitioners and commentators, the divergence between schedule and programme has been diluted to a great extent in recent years,[203] thus these two terms are both referred to as "schedule" in this research.

It is suggested that the schedule was commonly used in construction to meet the increased complexity of modern construction projects. In earlier times, the construction process was relatively straightforward: it was sufficient for practitioners to plan the works, measure delays and quantify EOT by comparing the actual substantial completion date to the contract completion date. As time went on, construction became more and more complicated and multiple delaying events often interacted with each other. Traditional approaches to planning and delay analysis through human calculation were no longer sufficient to accomplish the task. Practitioners were compelled to use computerised network schedules to conduct calculations or simulations to plan the timing of the works and conduct delay analysis.[204] Through graphical information, these computer systems can pictorially represent the documentary evidence of what happened on-site to make it easier to understand and allow practitioners to explain complicated reactions better than using thousands of words[205].

It is common today for parties in construction disputes to present evidence from schedule experts on delay analysis and conclusions on the cause and timings of periods of delay.[206] Indeed, a network schedule used to measure delay is part of one party's proof, to be judged and considered by tiers of fact like any other proof in a dispute resolution, lawsuit or hearing.[207] It is said that schedules are increasingly used to prove delays in the US and other countries.[208] Courts in the UK also routinely permit and consider such expert evidence if it is performed correctly[209] and recognise that such sophisticated analysis is often necessary in complex cases.[210] It is submitted that practitioners should use computerised schedules to monitor the progress of works and assist in the analysis of EOT claims. All parties would thus be assisted in making prompt claims and offering a speedy response, facilitating the understanding and settlement of claims.[211] Therefore, it can be concluded that the schedule is the most powerful instrument in delay and EOT claims analysis in modern construction projects.

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[203] Burr, supra note 11, p.1-025
[204] Bramble, supra note 14, p.11-4
[205] Chappell, supra note 6, p.185
[206] Keating, p.8-059
[207] Bramble, supra note 14, p.11-4
[208] Idem, p.11-3
[209] Chappell, supra note 6, p.185
[210] Keating, p.8-060
[211] Chappell, supra note 6, p.185

Reliability of the schedule

Notably, although the schedule has the potential capacity to help delay analysis, it is inevitably an imperfect instrument[212] as it is man-made and may therefore be incorrect. A schedule can only be established based on certain preconditions;[213] any deliberate, negligent, erroneous or improper propositions in these preconditions will undermine the reliability of the schedule.[214] The schedule can also be manipulated by parties for their own interests, thus becoming unreliable and inadmissible.[215] Thus, the schedule is not automatically generated by computers but, to a great extent, depends on the schedulers' art,[216] which is why in the UK computerised schedule analysis was treated sceptically by the courts.[217] Therefore, before the schedule is accepted as a measurement of time analysis, its reliability should be strictly verified and demonstrated.[218]

To be specific, the reliability of the schedule should be established through the following process:

a. The supporting information e.g. the start and finish times of activities, available resources, relevant external conditions and constraints must be accurate and reliable.[219]

b. Schedules should include all activities and processes, e.g. time of equipment procurement; otherwise the logic, works sequence and completion time will be undermined.[220]

c. Schedules should be updated promptly upon the occurrence of every significant delaying event, and valid critical paths have to be established initially and at every later material point since they will almost certainly change.[221]

CPM schedule and critical path

Traditionally, construction schedules have been presented as bar charts, which give an outline plan of the timescale of a project, broken down into a relatively small number of components, each comprising a collection of many activities. This method does not suit a complicated project as it does not show how all the activities are connected and sequences and constraints between them,[222] and cannot reveal the impact of one event on succeeding activities.

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[212] Idem, p.186
[213] Chappell, supra note 6, p.186
[214] The case of *City Inn* paragraph 29 per Lord Yong
[215] Bramble, supra note 14, p.11-37
[216] Idem. Section 10.03
[217] E.g. the case of *City Inn*
[218] Bramble, supra note 14, p.11-4
[219] Idem, p.11-31
[220] Idem, p.11-23
[221] The case of *Balfour Beatty*
[222] Bunni, supra note 15, p.358

Therefore, network schedule adapting CPM was developed and commonly used to identify various details of each activity and the interrelationships between them.[223] A CPM schedule can produce a work plan which includes not only the starting and finishing times of activities and the relationships between them, but also details of each activity such as material procurement, resources availability and work methods.

After a CPM schedule is established, the resulting critical path is the longest continuous path connecting all critical events and activities crossing all the schedule. This determines the time within which the project may be completed and the duration within which each activity must be accomplished to ensure the completion date remains unchanged. Therefore, where the scheduled completion date matches the contract completion date, any delay in critical activities may render a prolongation exceeding that completion date.

Float

The above process calculates not only critical events, activities and path(s), but also non-critical events, activities and the float.

The term "float" is used to describe the difference between the time required and the time available to perform a task,[224] that is, the difference between the earliest and latest time of an event. Since no time difference exists between the earliest and latest time for a critical activity, a float cannot exist in a critical path.

Normally, two types of float are commonly used in delay analysis. One is the total float, which is the amount of time an activity can be delayed without affecting the project's completion date, but that float is shared with other activities. The other is the free float, the amount of time that an activity can be delayed without delaying the start of the succeeding activity or affecting any other activity in the network. Elimination of the free float does not eliminate an equal amount of total float.[225]

Since no float is on the critical path, no space for delay is allowed on the critical path; any float would result in an eventual prolongation. As for non-critical activities, if the total float is used up, or the free float is eliminated, the existing critical path will have to be changed, and may also result in an eventual prolongation. Therefore, a float is an important concept which may determine whether a delay can result in an EOT.[226]

In practice, the ownership of the float in a schedule is always debated by practitioners. Employers may contend the ownership of a float; if so, any contractor delay to progress in non-critical activities will not be allowed and may render contractors liable to pay delay damages. Conversely, contractors also usually claim the float for their benefit and may argue that an EOT is due even for the delay of a non-critical activity. They may also claim that EOT due to employers has prevented

[223] Idem
[224] Chappell, supra note 6, p.189
[225] Bramble, supra note 14, p.11-13
[226] Idem

earlier completion by engrossing the contractor's float[227]. Therefore, the absence of an express contractual specification in this regard will render it difficult to conduct an EOT claims analysis.

B. Forensic delay analysis methods and application

As discussed above, a CPM schedule employs a critical path method to plan the timing of works and conduct forensic delay analysis. The core approach of this process is a forensic scheduling analysis, which is "the study and investigation of events on a project using CPM or other recognized schedule calculation methods, for potential use in a legal proceeding", in effect, "a study of how actual events on a project interacted in the context of a complex scheduling model for the purpose of understanding the significance of those events on the following activities within the scheduling model".[228]

Critical path method

As discussed above, a delay on the critical path prolongs the overall works. Thus, a critical path analysis, by identifying the criticality of activities in terms of their potential effect on the completion date, is fundamental to identifying the critical path of a project[229] and helps to show the causal relationship between a delaying event and the completion date. It is also possible through CPM analysis to demonstrate the effects of: 1) concurrent delays; 2) unproductive working; 3) secondary or consequential delay; and/or 4) acceleration or mitigation.[230]

Delay identification and preliminary analysis

In practice, project practitioners need to identify delays at an early stage and conduct a preliminary delay analysis. As for contractors, the timely identification of delays or potential delays enables all parties to take measures to avoid further delay or to mitigate the effect of the delay, and to focus on the delaying event to conduct preliminary work for future EOT claims. Furthermore, preliminary delay analysis is a requisite for meaningful and successful mediation.[231]

However, the complexity of construction projects makes it very difficult for practitioners to perceive and identify delays through impressions or intuition, and it is not enough to infer that a delay will necessarily delay completion. It is essential to conduct early identification and preliminary delay analysis using diverse approaches including CPM methods.[232]

To be specific, the first step is to review the basic project documentation, such as the schedule and costs, to gain insight into the events which may result in delays and

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[227] Scott Beisler & Stevej Collins, Early completion schedules and early completion delay claims-"the contractor's right to finish early", *Construction Law Journal*, 2016 (32)

[228] James G. Zack, et al, Delay and delay analysis: Isn't it simple? *AACE International RP/FSA Project*, 2006

[229] Keating, p.8-062

[230] Burr, supra note 11, p.14-226

[231] Bramble, supra note 14, p.10-3

[232] Lucinda Robinson, Claims for compensation events- how should a contractor prove its claim for time? *Construction Law Journal*, 2012,28(6)

create a checklist of these issues. These issues can then be prioritised for investigation and the parties may also establish priorities for analysis by performing a preliminary cost evaluation.[233]

The second step is to monitor progress and recognise any delay to progress. This can be achieved through diverse approaches, primarily a comparison of as-plan and as-built schedules to identify delays. Additionally, reviewing significant changes in orders, increased turnover, costs and resources input or cash flow may also indicate potential delays. Finally, a review of documentation, including the daily diary, progress reports, correspondence and minutes of meetings is also helpful in revealing occurrences of delay.[234] After a delay is identified, a cursory analysis should be made to check whether the delay to progress falls on a critical path, before determining whether it is necessary and feasible to prepare and submit an EOT claim.

Scheduling analysis

After the identification and preliminary analysis of a delay, if EOT claims are to be presented, a scheduling analysis should be conducted to detect the causal link between the delaying events and delay to completion.

i. General process of scheduling delay analysis

The following steps are commonly conducted in a scheduling analysis.

The first step is to review the original as-plan schedule, to detect the schedulers' intention, verify the information contained in it, its logic, constraints and assumptions, and to review the updated schedule or as-built schedule to ensure the schedule is correctly updated.[235]

The second step is to endeavour to isolate and quantify each delaying event by: 1) identifying each delaying event, factor or circumstance affecting the construction activities, 2) identifying the delayed activities, 3) obtaining and refining the as-planned intention, 4) verifying and detailing the as-built progress, 5) determining the impact on construction and the overall project completion based on various forensic delay analysis methods, 6) examining productivity losses, acceleration attempts and the significance of concurrency.[236]

The final step is to comprehensively study all analysis results, and summarise them in a comprehensive analysis report.[237]

In the meantime, employers can also conduct scheduling analysis to defend themselves against EOT claims by showing there is no causal link between the delaying events and the delay to completion, or demonstrating the contractors'

[233] Bramble, supra note 14, section 10.02

[234] Bramble, supra note 14, p.10-4; Burr, supra note 11, Chapter 9

[235] Bramble, supra note 14, p.10-6

[236] Bramble, supra note 14, p.10-7

[237] Jyh-Bin Yang, et al, Review of delay analysis methods: a process-based comparison, *The Open Construction and Building Technology Journal*, 2009

failure to mitigation against delay, the contractors' responsibility in a concurrent delay, and the contractors' failure to segregate the employers' delay from their own delay.[238]

ii. Common delay analysis methods

When scheduling analysis is conducted, the methods below are commonly chosen based on the circumstances of the project and the characteristics of each method.

1) As-planned vs As-built

This method involves a comparison between the original planned schedule and actual progress. It can identify a possible delay but cannot accurately detect the true causes of the delay or the consequential impact on final completion. Its accuracy is significantly constrained by many factors, e.g. the as-planned schedule should be sufficiently complete and detailed; its logic and assumptions should be reasonable and realistic; the as-built records must be reliable, and the actual works sequences and activities should, by and large, follow those established by the as-planned schedule.[239] It is a straightforward analysis method that can be used at any stage of performance; it is helpful in delay identification and preliminary analysis and can be used for relatively simple projects for analysis in the initial stages of a complicated project, or for analysis of a straightforward but significant delay.[240]

2) Impacted As-planned

This method revises the as-planned schedule to reflect the impact and effect of increased or decreased works or additional events. It does not require careful, prepared as-built records and therefore is relatively simple to conduct. However, its accuracy also depends on many factors. The baseline schedule should be reliable and sufficiently detailed to enable adjustments. Significant or excessive changes, or a failure in the robustness of the assumed logic will undermine its accuracy. It therefore tends to be criticised for being insufficiently grounded in fact.[241]

3) Collapsed as-built

This method is the opposite approach to the Impacted As-Planned method, and is also known as the "but for" analysis method. The basic process is to first establish an as-built schedule with updated logic, and then remove the delaying events from the as-built schedule in reverse chronological order in order to demonstrate their alleged impact on the progress and the completion date of the works, The net result is that once all employer-caused delaying events have been removed from the schedule, a new theoretical completion date is identified which the contractor would have achieved but for that delaying event for which

[238] Supra note 237
[239] Keating, p.8-047
[240] Farrow, Delay Analysis-Methodology and mythology, *SCL Paper*, 2001
[241] Keating, p.8-048

the employer is responsible.[242] In effect, it simulates what the as-built schedule would have looked like if the delay event had not occurred.[243]

This method can clearly reveal the relationship between each individual delaying event and any delay to completion.[244] However, in practice, its accuracy is also restricted by many factors.[245] It needs highly reliable as-built records and an adequate as-built schedule, and needs to re-establish an assumed logic based on complicated factual records, a difficult and controversial process. Furthermore, it can neither identify the period of potential concurrent delay, nor reflect the results of mitigation measures including acceleration, re-sequencing or the redistribution of resources.[246] In this sense, the application of this method does not benefit contractors but, rather, favours employers.[247]

4) Windows Analysis

The method is also referred to as a time slice or snapshot analysis; it is a retrospective dynamic analysis. The process is to break a project down into manageable periods, or "windows", and then update the as-planned schedule with as-built information in each period to reflect the actual status of the works in that period, enabling the analyst to consider and establish the critical path and the effect of delaying events in each window. Any difference in completion times, which are generated at the start and end point of each window, indicates a delay in the period of that window. This method can be used where there is both an effective as-plan baseline schedule and a regularly upgraded progress schedule covering the whole progress of the works.[248] Its advantage is that it attempts to analyse the cause of delay contemporaneously and with a firm base of as-built records and can, therefore, be very effective and reliable if the baseline schedule is effective and correctly updated.[249] However, its accuracy may be undermined by the fact that the future effect of delaying events cannot be fully revealed within a certain window due to a lack of sufficiently detailed records after the period of that window.[250]

5) Time Impact

This is a dynamic and prospective analysis method, in effect an enforcement of the impacted-as-planned method. The general process is to first update the as-plan schedule in terms of the as-built progress up to the alleged delaying event, and then introduce the delaying event in the updated schedule to establish

[242] Keating, p.8-054

[243] David Barry, Beware the dark arts！ Delay analysis and the problems with reliance on technology, *SCL Paper*, 2009

[244] Keating, p.8-055

[245] Farrow, supra note 240

[246] Keating, p.8-055

[247] David Barry, supra note 243

[248] Keating, p.8-052

[249] David Barry, supra note 243

[250] Keating, p.8-053

the likely impact on completion time in terms of the actual status of the works at the point at which the delaying event arose.[251]

It is submitted that this is an appropriate method to use at any stage of the works, and can meet the requirements of most standard-form contracts in order to facilitate the timely settlement of EOT claims. Therefore, it was especially advocated for use in complex disputes by the *SCL Protocol*, but its application in post-contract disputes is questionable.[252] Furthermore, it requires high-quality and detailed as-built information and frequently updated schedules with robust logic; the remaining planned sequence of the works must reflect the contractor's known future intentions, and information surrounding the delaying event under claim should be complete.[253]

iii. Choosing forensic delay analysis methods and implementation approaches

The preceding section indicates that each method follows a different methodology, has advantages and disadvantages, and requires different application circumstances. In practice, when analysis methods are chosen, the factors below should be considered.

Firstly, the choice of method depends on contractual provisions. If the contract establishes a strict timeframe within which claims should be presented and settled, prospective analysis methods such as Impacted as Planned and Time Impact analysis should be used. Conversely, if the contract requires decision-makers to perform a review and adjustment of the completion time by the end of project, retrospective analysis methods such as collapsed as-built, as-planned vs as-built, and time slice methods could be employed.

Secondly, the choice depends on the stage of the project when the analysis is made. Prospective methods are more commonly used in the initial stages of the works, while in the final or post-contract stages, retrospective methods should be used. In a complex project, or for significant delaying events that have a long-term ongoing effect, both prospective and retrospective methods can be comprehensively used; for instance, prospective methods may be used more for interim claims while final claims should be supported by retrospective analysis.

Thirdly, the choice depends on the nature of the claim. If only EOT is claimed, the most straightforward method, such as as-planned vs. as-built, or theoretical methods which are not supported by as-built information, such as the Impacted as Planned method, may be accepted. In contrast, where both EOT and costs are claimed, methods supported by actual as-built information are generally more acceptable.[254]

Fourthly, the choice of method depends on the nature of the project. Simple methods such as as planned vs as-built, or Impacted as Planned are more suitable in simple or

[251] David Barry, supra note 243
[252] Idem
[253] Idem
[254] Farrow, supra note 240

small projects. Collapsed as-built is suitable for projects with fewer simultaneous paths of activity, such as tunnel or road projects.

Fifthly, the decision depends greatly on the level of progress management, schedule updating, records capture and the file system of a project. With higher levels of management, methods requiring as-built information may be more available; otherwise, simpler methods such as the Impacted as Planned method can be used.

Finally, the choice of method depends on the approach to claim and dispute resolution preferred by the parties. For instance, if an employer likes to resolve EOT claims at the end of a project, a simple analysis approach needs to be conducted; if he prefers to review and resolve EOT claims at a certain fixed point, a Windows analysis method should be employed.[255]

C. Non-forensic delay analysis methods

Although scheduling analysis is very helpful in analysing EOT claims, it is not considered a compulsory element[256] as its application is always constrained by circumstances. In many situations, multiple events contribute to frustrate progress while no significant event is found to have delayed the project. In such circumstances, it is suggested that less robust or non-schedule-based methodologies, such as global impact or apportionment methods, should be applied to demonstrate entitlement to EOT.[257]

Global impact method

The global impact method is a simple way to indicate the potential impact of delaying event(s) which have already occurred. Where one or multiple delaying events occur, the process uses historical information to predict a rough and global prediction of the new completion date, and thereby determine the duration of EOT. For instance, it can be used for a situation of variation: the EOT can be roughly calculated by multiplying the total amount of work and the time required for a unit amount of the work, or can simply rely on the actual total time spent by the contractors on that additional work.[258]

Obviously, this method is not a forensic schedule analysis: it needs neither a critical path schedule, nor detailed as-built information, precise logic inference or arithmetic calculation. The analysis is conducted based on analysts' hindsight, experience and common sense only. It is based on the assumption that all delays are caused by events for which the employer is responsible and ignores the timing and actual effect of each delay event – and its interaction with other events – and concurrent or dominant delays. As it cannot effectively demonstrate the cause and effect of delay, it is not contractually or legally supportable.[259]

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[255] Supra note 239
[256] Keating, p.8-062
[257] Farrow, supra note 240
[258] Nurul Huda Muhamad, et al, supra note 12
[259] Farrow, supra note 240

Nevertheless, as a quick and simple approach, it is popular in construction project practice where the parties are used to acting flexibly and in a non-adversarial way in claims or where they are eager to solve disputes swiftly in an amicable way. Despite its lack of precision on entitlement, it merits consideration due to its fast and cheap approach to resolving delays in today's environment. In the meantime, it may also be adopted by courts where neither proof of scheduling analysis nor sufficient as-built evidence is provided by the litigants to facilitate a forensic analysis. The courts therefore have no option but to determine the case based on global analysis relying on a general impression.

Dominant Cause and Apportionment approaches

Other non-forensic delay analysis methods are the dominant cause method and the apportionment method, which differ significantly. These two approaches are used for delays caused by multiple events for which both contractors and employers are responsible.

In the US, the apportionment approach is broadly used in concurrent delays. The concept of apportionment offsets the responsibility which should be borne by each party – only the remaining period of delay after the offsetting will be compensable. If the claimed delay and concurrent delay cannot be apportioned, some courts refuse to award both EOT and costs as there is no way to separate the delays, while others may award EOT but no costs.[260] It is noted that some courts may also refuse to apportion delays where the employer substantially contributed to the delay. Nevertheless, it is commonly held by courts that where a delay could be apportioned but was not in a contractor's claim, all delay damages claimed by them may be refused.[261]

In the UK, the concept of apportionment is used where many events jointly result in delay, which may or may not constitute concurrent delay, as in the UK concurrent delay has a relatively strict definition and is mainly used for the apportionment of loss in costs incurred by delay.[262] The apportionment has some variants in the early stage; for instance, some commentators suggest the Devlin approach – that if two causes operate with approximately equal efficiency, the contractor is entitled to EOT. Amongst all apportionment approaches, the dominant cause approach is especially preferred by courts and practitioners in practice. This states that "if there are two causes, one the contractual responsibility of the defendant and the other the contractual responsibility of the plaintiff, the plaintiff succeeds if he establishes that the case for which the defendant is responsible is the effective, dominant cause".[263] This method was adopted by the arbitrator but refused by the English Court of Appeal in *H Fairweather v London Borough*. Under such an approach, recognition of the dominant cause is a question of fact, dependent on decision-makers' subjective discretion, general impression and common sense. For instance, this method was

[260] Pramble, p.11-78
[261] Idem
[262] Burr, supra note 11, p.20-023
[263] Knowles, supra note 54, p.95

supported by an early case, *Leyland Shipping,* in which it was commented, "Which cause is dominant is a question of fact which is not solved by a mere point of order in time, but is to be decided by applying common sense standards."

In a later Scottish case, *Johan Doyle v Laing*, the court favoured the dominant cause approach, and iterated that "the question of causation must be treated by the application of common sense to the logical principles of causation", and suggested that if the dominant cause approach could not be applied, then apportionment might be appropriate. This position was endorsed by the later Scottish *City Inn* case which approved both approaches. It was held that if two causes are operated by the contractor and employer respectively, and no cause could be described as the dominant cause, EOT claims will not necessarily fail, and it will be open to decision-makers to apportion the delay to completion between the two delaying events based on fair and reasonable standards.[264] It was further held that the exercise of apportionment was similar to the apportionment of liability on account of contributory negligence or contribution among joint wrongdoers; therefore, relative culpability in the cause of delay and the significance of each factor in causing delay should be taken into account.[265]

In summary, in the UK, the concept of "apportionment" in EOT claims means allocating liability for delay between the parties, and the criteria for apportionment are the degree of culpability and the significance of delay effect caused by the respective parties, which is a question of fact. In practice, without forensic scheduling analysis, it is very difficult, if not impossible, to precisely assess this. Thus, decision-makers must be allowed to take a fairly broad approach, relying on subjective impressions as long as these are reasonable and fair in apportioning responsibility for delays.

The application of the apportionment approach was strongly resisted by modern English law. However, as its application has no strict requirement for progress and records management, it is widely used in construction practice. Therefore, it is also an important practical and traditional delay analysis approach for consideration.

3.3.4 Impact of delay analysis methodologies on EOT claims analysis

The function of delay analysis and its relation with causation

As discussed above, in the analysis of an EOT claim, the core factor is the identification of causation. While this is alone insufficient to accomplish a claim analysis, it must be conducted together with and based on delay analysis. It is submitted by the author that in EOT claims analysis, these two works should be conducted independently. On the one hand, causation in law is a process of logical reasoning; in essence it is a subjective work,[266] and that is why it is commonly

[264] Idem, p.99
[265] Keating, p.8-028
[266] D'Onofrio, Guidelines for scheduling delay analysis, *Construction Law Journal*, 2019(35)

accepted that it should be based on common sense.[267] To decrease its subjectivity and render more certainty in the conclusion, it must use a related scientific tool rather than depending solely on artificial mental processing. Delay analysis is that tool – it provides analytical proof to help the analyst generate and test the conclusion of proof. On the other hand, as discussed in Section 3.2.3.3.2 above, the process of establishing causation for EOT claims is not a one-off action. It should contain various steps, such as delay events identification, test of criticality, compensation and concurrency. Each step should be conducted based on delay analysis through a schedule analysis. Therefore, delay analysis is a significant factor in the process of establishing causation as it provides factual evidence as necessary.[268] Furthermore, based on causation, the analyst may reach a conclusion in relation to the attribution of delay liabilities between the parties of a contract; however, quantifying the EOT requires the technical process of delay analysis.

However, in turn, delay analysis cannot be conducted independently of considerations of causation. Where delay analysis is conducted, it must be based on some subjective process and assumptions, for instance, the choice of critical paths or the assumption of a programme. It merely generates a theoretic modelling result based on isolated information and often cannot appropriately reflect the reality of a project.[269] Therefore causation, which is normally conducted based on analysts' common sense,[270] should be incorporated into the analysis to rectify the obvious errors. Furthermore, it should always be remembered that delay analysis is a technical process that provides factual evidence for an analysis. It can help to provide factual causation but cannot recognise or attribute legal liability between the parties of a contract; therefore, legal causation must be considered for that purpose.

In summary, delay analysis, like causation identification, plays a significant role in EOT analysis. Its methodology has a significant impact on analysis. Generally, from the perspective of the delay impact determination and analysis type, it is categorised by the *2nd Protocol* as prospective/retrospective analysis and cause & effect/effect & cause analysis. Their impact on EOT analysis is discussed below.

Impact of prospective and retrospective analysis

Prospective analysis is conducted against the occurrence of delaying events or delay to progress contemporaneously and contains Impacted As-Planned and Time Impacted Analysis. This approach is widely advocated by industry protocols, such as the SCL Protocol and the CIOB Guide in the UK, in order to maintain effective project control.[271] "It requires, as the Protocol does, a decision-maker should put himself in the position of the contract administrator at the time the event occurred, and then shut his mind the subsequent course of events, invites a highly artificial

[267] Andrew Burr, Society of Construction Law Delay and Disruption Protocol, 2nd ed: from "snark" to "Bookjum", *Construction Law Journal*, 2019, 35(1)

[268] Keating, 8-064

[269] Manoj Bahl, The crystal ball, or the microscope: deciding upon a prospective, or retrospective, approach to delay analysis, *Construction Law Journal*, 2019,35(1)

[270] Chaudhary, supra note 63

[271] Burr, supra note 11, p.14-015

exercise which removes delay analysis from the real world and puts it into an abstract realm of prediction if not conjecture."[272] The basis for this methodology is to impact a specific and anticipated delay onto a programme to model the theoretical effect of the delay on the project completion date.[273] It has obvious advantages and, provided that the parties have sufficient as-plan and as-built information, "it should not be too difficult to make a reasonable assessment of the cause and effect of delays to progress as they occur and to manage the possible knock-on effect upon completion."[274] The strength of its application is that it can offer parties immediate certainty over a contractor's claim, and consequential rights and obligations concerning time.[275] Furthermore, most importantly, it can meet the requirements of almost all standard-form contracts to request a contemporary requirement EOT award to avoid triggering the Prevention Principle in English law. However, it has been widely criticised as it normally determines EOT on a theoretical basis and based on a predicted effect rather than the actual effect of claimed events. For instance, Ramsey J in *Bluewater v Mercon Steel Structures*[276] observed that the contractor had not properly analysed how much delay to the works was caused by the delaying event; its delay analysis was a purely theoretical exercise and did not consider what actually happened. Crucially, in prospective analysis, unless later events that might interfere with the impact of a compensation event are considered, the method cannot fully prove the causal link between the compensation event and the delay, as it excludes those later events and, as a consequence, may generate a result that is inconsistent with known reality.[277]

If the delay to progress cannot be analysed contemporaneously, it is likely to result in a dispute which has to be solved by retrospective analysis in a time-distant stage. Retrospective methodologies include Time Slice (Windows), as-planned v as-built (Windows), Retrospective Longest Path, and collapsed as-built analysis. These consider subsequent events and other issues affecting the progress of works to determine the actual impact of delays on the works and whether the events in question caused delay to completion, as a matter of fact, when the progress of the work as a whole is considered.[278] Although retrospective analysis has the advantage of enabling decision-makers to determine a more practical EOT with the help of hindsight, it is not likely to enable the analyst to detect the effect of mitigation measures such as acceleration or re-sequencing the works and, therefore, is of no benefit to the contractor. In a retrospective claim, courts in Common Law countries commonly adopt the view that a more scientific approach to the causation of delay is generally desirable.[279] However, given the courts' preference for retrospective analysis, since they are commonly interested in what actually delayed completion

[272] Julian Bailey, supra note 20
[273] Manoj Bahl, supra note 269
[274] Burr, supra note 11, p.14-018
[275] Julian Bailey, supra note 20
[276] Supra note 101
[277] Lucinda Robinson, supra note 232
[278] Manoj Bahl, supra note 269
[279] Burr, supra note 11, p.14-019

rather than artificial predictions, where compensation events are left to be resolved later or referred to a tribunal, contractors should be wary of presenting hypothetical evidence when the facts are known, and should use retrospective techniques instead.[280]

Despite heated debate between prospective and retrospective analysis in the academic arena, there is no consensus on which analysis is preferred by practitioners in the construction industry;[281] the choice will depend on the contractual, factual and legal factors of a given project. Since these factors are often unique to a project, a lack of a common approach and symmetry in choosing and undertaking delay analysis often results.[282]

Furthermore, it is noted that different types of delay analysis approach would significantly influence the results of delay analysis, although it was held in *Walter Lilly* that:

> The debate about "prospective" and "retrospective" approaches to delay analysis was also sterile because both delay experts accepted that, if each approach was done correctly, they should produce the same result.

For instance, Marshall illustrated that, where there are parallel paths of activity in a project, if delay to progress were to occur on these different paths from time to time, the critical path would shift between paths accordingly. At different times, the critical path would be different, therefore which moment is chosen for the basis of the delay analysis plays a key factor in delay analysis by determining different contemporaneous critical paths, and in turn generating different conclusions.[283] Given that the timings for conducting prospective and retrospective analysis are different, the difference between results cannot simply be overcome by being "done correctly"; therefore analysts should choose the delay analysis approach with appropriate caution.

Impact of cause & effect and effect & cause analysis

Cause & effect analyses include methods which start with the identification and description of an event (a cause) and then seek to establish its impact (the effect), including Impacted As-Planned, Time Impacted, and collapsed as-built analyses.[284] In effect, this type of method is a modelling analysis. The model of the analysis may be a static or dynamic programme; the analysis result is achieved merely by inputting the claimed event. Its inference approach adopts a typical deduction one; it attempts to test the causation of delay through a sufficiency test by utilising a certain predetermined programme.[285]

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[280] Lucinda Robinson, supra note 232

[281] Burr, supra note 267

[282] Manoj Bahl, supra note 269

[283] John Marshall, Delay analysis: backwards or forwards-does it make a different? *SCL Paper*, 2016

[284] 2nd Protocol, 11.4

[285] Anders S. Axelson, Let's get metaphysical: mitigating the credibility crisis in forensic delay analysis, *Construction Law Journa*l, 2020(36)

The advantage of this method is that if contemporary records are available and the programme is properly established and updated, it can reasonably assess the contractor's contractual entitlement to EOT against each individual employer risk event, satisfy requirements of many standard-form contracts regarding contemporary EOT awarding, and also satisfy the legal requirements of many jurisdictions to relate each delaying effect to a cause.[286] However, its disadvantage, like that of perspective analysis, is that it is a purely theoretical analysis based on theoretic calculations rather than facts and, therefore, may depart from the facts to some extent. Furthermore, the result is based on an isolated event rather than other delaying events which may be parallel, concurrent with or more dominant than the claimed event; therefore, the result may be one-sided and fail to detect the true reason for the delay.[287] Another weakness is that this type of analysis can only be used with a programme that requires numerous assumptions regarding future works; its degree of accuracy depends on these assumptions, which is rather difficult to guarantee in practice. This may undermine the reliability of the results of the EOT analysis, giving it low credibility in project practice and proceedings, and giving rise to extensive doubt and criticism. Therefore, it may be appropriate for use where the delay is caused by discrete employer events.[288] Even then, it cannot normally be simply used in a purely theoretic way, but has to be adjusted or supplemented by common sense about the reality of the project.[289]

In contrast, effect & cause analyses include methods that identify the critical delay (an event) and thereafter seek to establish what might have caused that delay, including time slice (Windows), as-planned v as-built (Windows) and retrospective longest path analyses. In effect, their inference approach adopts a typical induction one, they attempt to test the cause of delay through "but-for" tests by comprehensively assessing all the facts occurring in a project.[290]It is recommended by the *2nd Protocol* that such analysis is more forensically reliable where an EOT claim is assessed after completion of the works, or significantly after the effect of the claimed employer risk event, as it can take all potential causes of the delay into consideration with the advantage of hindsight.[291]

Their strength is that the analysis can consider all factual events and entire scenarios and, therefore, better feedback on the reality of a project when a delay occurs. Their higher reliability is more readily accepted by employers and courts. However, such methods also have inherent disadvantages. Theoretically, a critical path can be established based on a certain subjective logic and the assumption of a plan which is expressed by a programme.[292] Regarding the completed progress of a project, no plan may be applied at all; a bundle of records of as-built progress information may be artificially described by practitioners as a form of a graphical as-built progress

[286] Burr, supra note 11, p.14-199
[287] Manoj Bahl, supra note 269
[288] 2nd *Protocol*, 11.4
[289] Refer to the case *Water Lilly*
[290] Anders S. Axelson, supra note 285
[291] 2nd Protocol, 11.4
[292] Manoj Bahl, supra note 269

programme. A programme should have an inherent logic connecting all completed activities as it is almost impossible to guarantee that all activities will progress logically and systematically.[293] It will be almost impossible to identify a pure objective as-built critical path through a retrospective analysis based on a bundle of factual progress information.[294] The underlying problem of this type of analysis is that it attempts to analyse the delay based on the true realities of a project rather than utilising a modelling approach to conduct a theoretic analysis. However, its final conclusion still depends on the concept of the critical path, which is a pure concept in the ambit of programme and modelling analysis. Therefore, in essence, it attempts to use a modelling analysis concept to conduct a non-modelling analysis, and its logicality and credibility are therefore undermined to some extent. Furthermore, like the weakness of the retrospective analysis, to concisely assess contractors' EOT entitlement, analysts have to speculate a counterfactual scenario, including how successive or parallel delays may have accrued across the programme and how the contractor and other parties would have responded to the circumstances, which will be rather difficult to conduct without consideration of a planned programme.[295] Therefore, although this type of analysis tries to make its conclusion as objective as possible, its application includes extensive subjective factors, such as the identification of interactions among as-built activities and the determination of the as-built critical path, and still requires the input of analysts with common sense and knowledge of the project.[296] In the practice of a project, facts and common sense should always supersede the logic and basic concept of CPM; given that the facts have already been clearly expressed, blindly following logic and ignoring the facts could be seen as illogical and lacking common sense.[297]

Given that no analysis type is perfect in all circumstances, it is recommended that the decision on analysis methods should take account of the purpose of the analysis. If the contractual procedures for interim EOW awards have not been followed by the parties, then the purpose of delay analysis should be to demonstrate what should have been awarded had the procedures been followed. In this case, a cause & effect analysis such as a time impact analysis would be the appropriate option. If the purpose is to determine which party was responsible for the actual period of delay to completion, then an effect & cause analysis such as the longest path analysis may be appropriate.[298] However, the pre-condition is that a detailed and accurate as-built programme has been recorded and maintained.[299]

3.3.5 International approaches to delay analysis

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[293] Keating, p.8-055

[294] Ian Carwright, Breach of contract requirement to award contemporaneous time extension, the butterfly effect and, by the way, there is no such thing as an as-built critical path, *Construction Law Journal*, 2022(38)

And it is described by the 2nd *Protocol* about the Longest Path Analysis that "*A limitation to this method is its more limited capacity to recognize and allow for switches in the critical path during the course of works*".

[295] Axelson, supra note 296

[296] Manoj Bahl, supra note 269

[297] Chaudhary, supra note 63

[298] John Marshall, supra note 283

[299] Keating, p.8-055

In practice, other jurisdictions of English law hold a similar attitude to the UK and apply similar delay methods as the UK as discussed above.

Particularly, the approaches and methods of delay analysis in the SCL Protocol, which advocates a prospective analysis and contemporary awarding of EOT, are accepted by jurisdictions in English law.

For instance, regarding analytical approach, the modern approach seen in *Kan v Sopov*[300] demonstrates that modern Australian courts are not satisfied with merely impressionistic approaches to delay analysis, but are looking for the sort of detailed and logical analysis implemented by modern software tools.[301] Furthermore, the SCL Protocol is widely accepted by jurisdictions such as Australia, Hongkong and Malaysia. For instance, in *Mirant v Ove Arup,*[302] which originated in Hongkong and the Philippines, the guidance of the Protocol in relation to critical paths was taken into consideration by the court. In the Australian case *Alstom v Yokogawa,*[303] a novel resources-based analysis method was rejected not on its merits but because it was not confirmed by the Protocol as a recognised method of delay analysis.

In the US, the current thinking about delay analysis is generally consistent with the principles held by their UK colleagues.[304] Forensic scheduling methods are in high demand for delay analysis, and practitioners and courts in the US are more likely to take an analytic and scientific approach to conduct the analysis and try to repel subjective impressions as much as practice.[305] Generally, the comparison between English and US law can be summarised as below:

1) As in the UK, US practitioners stress the criticality of delay to completion. US cases make it clear that the delays must lie on the critical path; specifically, they have to cause a delay to the completion date. For instance, in *Santa Fe, Inc.*,[306] the Board found the claimed concurrent delays were not on the critical path because they did not delay the completion of the project.

2) Practitioners in the US place more emphasis on the significance of inherent logic and the reaction between activities of a programme, and created the concept of the "schedule", distinct from the concept of the "programme" in the UK. Where there are multiple delay events, US courts seem more willing than those in England to examine those events in detail and, if possible, allocate the delays to the appropriate party, thus eliminating or diminishing the period of concurrency.[307]

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[300] Supra p.157

[301] Robert Fenwick Elliott, East meets West: delay analysis- a view from Australia*, SCL Paper*, 2012

[302] *Mirant Asia-Pacific Construction (Hongkong) v Ove Arup and Partners International Ltd* [2007] EWHC 918 (TCC)

[303] *Alstom Power Ltd v Yokogawa Australia Pty Ltd* (No.7) [2012] SASC 49 (Australia)

[304] Richard H Lowe, et al, et al, A review from across the pond: An American perspective on the SCL delay and disruption protocol, *SCL Paper*, 2007

[305] Livengood, John, Comparison of English and US law on concurrent delay, *The construction Lawyer*, 2008 (1)

[306] *Santa Fe, Inc.,VABCA* No's 1943-1946, 84-2 BCA 17,341 (1984) (USA)

[307] Livengood, supra note 305

3) The underlying reasoning in UK projects is to avoid breaches of the Prevention Principle; therefore, prospective analysis and contemporary EOT awards are recommended, strengthened by the requirement for timely EOT awards by standard-form contracts. It is also held that where an EOT is assessed, analysts should take the position when the delaying event occurs to assess the entitlement to EOT which should have been awarded to contractors rather than the amount of EOT needed by them.[308]

   In the US, the Prevention Principle is not applicable. US projects award EOT to avoid the doctrine of constructive acceleration if no EOT is appropriately awarded to the contractor.[309] The awarding of EOT ensures that compensable delay is fully compensated, and courts and commentators therefore normally emphasise the requirement that contractors should prove that a delaying event actually delayed the project before they are entitled to an EOT or compensation;[310] therefore, a retrospective analysis is often more appropriate.[311]

3.3.6 Summary

Based on the above, the proof used to establish the causation of EOT claims includes factual and analytic proof. Factual proof is first-hand and discrete proof and is essential to support EOT claims. The analytic proof is second-hand but collective and compiled proof and is, therefore, of great help in EOT claims analysis. It covers diverse approaches, the most reliable of which is forensic scheduling delay analysis, which includes two stages: delay identification and pre-analysis, and formal forensic delay analysis. The latter can be conducted through diverse methods or approaches. However, it is found that in some circumstances traditional non-forensic analysis approaches are also helpful in solving EOT claims despite not being contractual or precise.

Finally, no matter how advanced a delay analysis technique is, it attempts to proximately imitate the fact of delay and determine EOT. In practice, it is almost impossible to completely reproduce the facts, due to many practical constraining factors. Therefore, in any event, it cannot act as a substitute for the factual evidence. To have an in-depth EOT analysis, delay analysis should be carried out strictly in conjunction with day-to-day work in the project including progress management and monitoring, schedule updates, and capture records.

3.4 EOT-related damages analysis

[308] Refer to the *Protocol* and the case *Water Lilly*.

[309] Ian Cartwright, Breach of contract requirement to award contemporaneous time extension, the butterfly effect and, by the way, there is no such thing as an as-built critical path, *Construction Law Journal*, 2022(38)

[310] Richard, supra note 304

[311] Ian Cartwright, supra note 320

As discussed in Section 3.3, in Common Law countries there is a substantial difference between claims for EOT and those for delay damages: they have different standards of burden of proof, and follow different frameworks to establish a chain of causation. Since this research primarily focuses on EOT claims, a brief introduction only to delay damage is provided below.

3.4.1 Principle of damages

In Common Law, the term damages was derived from the concept that the contracting parties are strictly liable for breaches of contractual obligations.[312] A breach of contract brings about an entitlement to damages for the innocent party to put him in the position in which he would have been had the contract been performed pursuant to contract terms. The aim is to protect the innocent party's "expected interest" or "performance interest".[313] In cases of breach of contract, diverse measures can be used by the courts to bring the claimants back to the position they would have been in if the contract had not been breached, while damages are limited to financial awards only.[314]

3.4.2 EOT-related damages analysis

Contractor's EOT-related damages

If a delay is caused by the employer, contractors may be entitled to claim EOT-related damages, the grounds for those damages are that the employer's risk event(s) simultaneously fall within both aspects of entitlement to time and costs as defined by the contract or law.

Normally, contractors' EOT damages include 1) direct costs and 2) time-related costs incurred by prolongation. Time-related costs increase as a result of increased duration, when more time elapses than was originally allowed for in the contractor's tender price.[315] Therefore, typical heading of delay damage claimed by contractors normally include items such as 1) increased preliminaries or site overheads; 2) increased or lost contribution toward head-office overheads; 3) lost profit; 4) increased costs resulting from inflation; and 5) increased financial costs.[316]

General process

As discussed in Section 3.2 above, to claim EOT-related damages, parties bear the burden of proof to prove their entitlement. Specifically, if contractors claim delay damages, they need not only to establish the chain of causation between the employers' time and cost risk event and the final completion date, but also to isolate

[312] Michael, W. Galligan, Choosing New York Law as Governing Law for International Commercial Transactions p.19, http://nyiac.org/nyiac-core/wp-content/uploads/2013/04/NY_Law_as_Govering_Law1.pdf

[313] McKendrick, *Contract Law, Text, Cases, and Materials*, 4th edition, p.812

[314] Idem, p. 813

[315] Christopher Ennis, Entitlement to time-related costs in prolongation claims-what needs to be considered? *SCL Paper*, 2018

[316] Keating, p.9-046

the loss caused by themselves from any caused by the employers. If they fail to do so and present claims in a global approach, it is harder to accept the claims but they may not necessarily fail, depending on the courts' attitude to global claims. If the court allows them, the burden of proof to defend the claim may be transferred to the employers.[317]

General methods of delay damage assessment

In Common Law, following the principle of damages, whether damages should be awarded is restricted by the burden of proof and the "but for" test. Furthermore, the magnitude of damages is further restricted by the doctrine of the remoteness of damages: losses are recoverable only if they satisfy the test of remoteness, which is implemented by the test of foreseeability.[318] Therefore, principles such as the doctrine established by the English case *Hadley v Baxendale*[319] are well established to quantify damages.

Damages can be assessed by diverse methods;[320] for instance, they may be quantified in terms of the original contract rate. If no contract rate is available, the market rate may be used for assessment. They may also be assessed based on *quantum meruit*, or by adapting the formula approach to assess overhead costs. Another base for the assessment of damages is a quota of the budget/assessment of construction works issued by the industry association or government authorities. Additionally, contractors may also present claims through global or total costs claims; in such cases, the assessment should be the total expected income that could have been received by the contractor, less the actual income received.[321]

It is noteworthy that if loss and expense are caused by concurrent delay or intervening events, damages may or may not be awarded, depending on the provisions of the contract or law, under which different approaches, such as the "but for" test, dominant case or apportionment approaches, may be applied.[322]

3.5 Factors determining the establishment of causation of EOT claims

As discussed in Section 3.2, where EOT claims are proved, causation has to be established based on the basic framework provided under heading 3.2.3 above. To achieve that, many scholars in Common Law jurisdictions have provided conclusions about the compulsory steps to be followed. These essentially include testing whether a delay is excusable, critical and compensable; additionally, concurrency and float should also be taken into consideration as they also affect entitlement to EOT. All these constitute compulsory factors in determining an EOT claims analysis.

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[317] Christopher Ennis, supra note 315

[318] Chang Lu, *A comparative study of liability arising from the carriage of dangerous goods between Chinese and English Law* (dissertation for PhD), 2009, p.344

[319] (1854) 9 Ex. C.R. 341

[320] Refer to Burr, supra note 11, Chapter 21

[321] Keating, p.9-064

[322] Refer to Burr, p. 20-037

3.5.1 Excusable or non-excusable delay

As discussed above, the starting point for a consideration of the required test of causation in any EOT or loss and expense claim should be the construction of the relevant express contractor terms.[323] Therefore, the starting point for establishing the chain of causation for EOT claims should be the occurrence of employer time risk event(s). Whether an event constitutes an employer's time risk event or not is a question of contract or law and rests with the time risk allocation provided by the contract or law. Specifically, in the first step of establishing causation in Section 3.2.2.3 above, if an employer's time risk event is identified as a factual causation of a delay to progress, that delay amounts to an excusable delay, which may bring about a further delay to completion and, therefore, may result in an EOT. Otherwise, it will bring about a non-excusable delay, the chain of causation is broken, and no EOT should be awarded. In this sense, the taxonomy of excusable/non-excusable delay plays a significant role in EOT claims analysis, as it directly determines whether the establishment of a causation of claims can be continued.[324] Therefore, upon a delay to progress occasioned by a delaying event, the first task for analysts is to refer to the relevant express or implied terms of contract or law to determine whether such delay is caused by an employer risk event. This constitutes the starting point of the EOT claims analysis.[325]

3.5.2 Compensable or non-compensable delay

In accordance with Section 3.2 above, the chain of causation for EOT-related claims is not the same as that for claims for EOT only, a modified chain of causation for the former should be established as Section 3.2.3 above. In that chain of causation, the starting point is the occurrence of the employer's time and cost risk event. It means that only events for which employers, as per the contract or law, bear both the risk of delay and additional costs, enable a chain of causation of claims to be started. Without the occurrence of such an event, contractors are not likely to be awarded EOT-related damages.[326]

Following the step of establishing a causation chain for delay damages, if an employer's time and costs risk event is found to be a factual cause of a delay to progress, such delay to progress should be compensable and, therefore, is known as compensable delay. In contrast, if a delay to progress is caused by an event for which the employer does not bear both risks of time and costs, it is a non-compensable delay.[327] In this sense, the classification of compensable/non-compensable delays

[323] Vincent Moran, supra note 72
[324] Lucinda Robinson, supra note 232
[325] M.D' Onofrio, supra note 266
[326] Idem
[327] Idem

directly determines whether contractors can prove their entitlement to EOT-related damages.[328]

The rationale for the above is that the contractual grounds for time and delay damages differ.[329] For instance, in the JCT contract in the UK, the grounds for loss and expense are the provision of Relevant Matter, while the grounds for EOT are the provision of Relevant Events. If contractors intend to claim EOT-related damages, the delaying event relied upon by them must fall within the scope of both Relevant Events and Relevant Matters. In summary, the starting point of causation for EOT-related damages is still the risk allocation in respect of both time and costs as provided by the contract or law. Analysts should determine this by reference to relevant express or implied terms in the contract or applicable law.

3.5.3 Critical or non-critical delays

As discussed in Section 3.2.2, the second step in establishing the causation of EOT claims requires that a delay in progress must satisfy the test of criticality. If so, the establishment of the chain of causation can be continued; otherwise, it will be broken. A delay to progress on a critical path which has a negative impact on the completion of the whole works is called a critical delay; otherwise, it is a non-critical delay. Therefore, the categorisation of a delay as critical or non-critical is another compulsory factor in EOT claims analysis to determine whether the causation of EOT claims can be established.[330]

The underlying rationale is the principle of the critical path method. In a critical-path-based schedule, the critical path is the longest unbroken linked sequence of activities until the completion date. Any delay to progress on it has to cause a delay to completion unless that critical path is subsequently changed before completion.[331] In contrast, an activity which only causes a delay on an uncritical path merely has an impact on the total float of the schedule. Before the total float is eliminated, the existing critical path will not be affected; therefore, it has no impact on final completion, and no EOT should be awarded.[332] In this sense, identifying the extent to which an event prevents works from being completed by a scheduled date requires the identification of the part of the works that have to be carried out sequentially on the critical path, and whether, or to what extent, the critical path was adversely affected by all the changes imposed upon it, regardless of liability.[333]

In essence, the criticality analysis is a typical “but for” test. In a CPM general schedule, impact on a non-critical path cannot satisfy the test, as “but for” it the contractor would still fail to complete the project by the scheduled time, since after these non-critical delays some other supervening events may occur on the critical

[328] Chaudhary, supra note 63
[329] Knowles, supra note 54, section 6.1.9
[330] Chaudhary, supra note 63
[331] Burr, supra note 11, p.1-028
[332] Idem
[333] Idem, p.14-008

path, breaking the chain of causation between the delaying events and the delay of completion; thus, no EOT should be awarded. In contrast, "but for" a delay on the critical path, the contractor could have completed the project on time. Here, the "but for" test is satisfied, the factual causation is established, and the contractor is, therefore, entitled to EOT.

3.5.4 Concurrent delay

As discussed in Section 3.2, in establishing causation in EOT claims, consideration should be given to concurrency. A detailed discussion of concurrent delay is given in Section 3.2.3.D.a above.

3.5.5 Ownership of float

The above discussion on the establishment of causation in EOT claims is based on the common practice in construction projects that no party to the contract exclusively owns the float; therefore, until the total float is used up no EOT will become due to the contractors, and only an employer's delay on the critical path will lead to EOT. However, as discussed in Section 3.3.3.A above, if one party exclusively owns the float pursuant to the contract or law, the parties' entitlement to delay damages may in practice also be affected by a non-critical delay. Therefore, if there is a dispute over ownership of float, analysts should make their consideration on the additional impact of the float, with reference to the relevant express or implied terms of contract or law to make an additional analysis.[334]

3.6 Factors concerning legal and contractual obligations and procedures

In practice, even though the causation chain for an EOT claim has been established, the contractor may still not be awarded an EOT if the parties fail to comply with relevant legal obligations and contractual provisions. Therefore, the test as to whether relevant legal or contractual requirements or procedures have been met by the parties should be further conducted in an EOT claims analysis. In particular, the factors below should be taken into consideration by analysts and decision-makers.

3.6.1 Failure to establish causation – global claims

As discussed in Section 3.2, it is a legal requirement in Common Law that any claimant should bear the burden of proof to demonstrate and prove their case by establishing a causation chain in the case. A global claim does not comply with that principle and, therefore, may be inadmissible. For a detailed discussion, refer to Section 3.2.3.D.c above.

3.6.2 Absence or incorrect application of EOT mechanism

[334] Ian Duncan Wallance, Blinding with Science? The SCL Protocol, as revised: a critique, *Construction Law Journal*, 2019 (35)

In English law, if no EOT mechanism is relied upon by the employer to extend the EOT, an employer-caused delay may amount to a breach of the Prevention Principle, as first established in *Holme* v *Guppy.*[335] As a result, the time for completion becomes at large, the contractor is entitled to finish the works within a reasonable time and the employer loses their right to charge liquidated damages. The underlying rationale is that upon an employer's prevention, there must be an EOT mechanism providing the express contractual power for the employer to award an EOT. If there is no express power in the contract, the employer has no right to unilaterally extend the time to its own benefit because of its own delay.[336]

Furthermore, in English law, it is held that even where there is an EOT contract mechanism, if it is improperly operated by the CAs, due to their inaction, negligence, mistake, impartiality, or the improper influence or collusion of employers, the completion time may also become at large.[337] Thus, in English law, it has become common practice for contractors to demonstrate their EOT claims by alleging the time is at large as no timely EOT has been awarded for an employer-caused delay. Therefore, in the event that employers or CAs fail to provide a timely or proper EOT against an EOT claim, whether the time of completion should become at large should be considered by analysts. If it should, then the analysts should change their EOT assessment methods and quantify the "reasonable time" within which the contractor is obliged to finish the remaining works, and then determine the quantity of EOT. It is no longer a question of law but one of fact.[338]

It is also noted that the Prevention Principle applies only in English law; no such doctrine is applied in the US,[339] and even in the UK its application depends on the courts' interpretation of the contract.[340] It may be operated by recognising implied terms to a contract, and cannot cut across an express contractual term agreed by the parties.[341]

3.6.3 Failure in mitigation

In many legal systems, the law commonly imposes a fixed duty of mitigation on the innocent party. Its effect is that the party in breach is not obliged to pay a sum representing the entire loss, but only such sum as represents the loss after mitigating

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[335] *Holme* v *Guppy* per Parke B at 1196

[336] Keating, p.8-020

[337] *Miller v London County Council*

[338] Burr, supra note 11, p.6-143

[339] John Bellhouse， Good faith, Estoppel and Abuse of Right: the Prevention Principle. CIArb March 2017 Conference-Civil-Common Law Divergence and Convergence: The Construction industry case study

[340] Refer to the case *North Midland Building Ltd. v Cyden Homes Ltd.* [2017] EWHC 2412 (TCC), and Philip Harris, Extension of time and concurrent delay following North Midland Building Ltd v Cyden Homes Ltd. *Construction Law Journal*, 2018 (34)

[341] Herbert Smith Freehills, principle is not an overriding principle of law: express terms allocating risk of concurrent delay still prevail, https://www.lexology.com/library/detail.aspx?g=b20172b2-aa69-4774-b46a-509b98880125

steps have been, or should have been, taken.[342] Therefore, in analysing and determining an EOT claim, consideration in this regard may, pursuant to the applicable law or contract, need to be made.

3.6.4 Failure to comply with contractual procedures

Notice of claim by the contractor

Many contracts provide a time bar clause stipulating that the contractor's entitlement to EOT depends on, amongst other things, timely notice of the occurrence of delaying events. Under such contracts, if contractors fail to comply strictly with procedures for serving timely notice of an employer delaying event, they may lose their entitlement to EOT.[343] In practice, a time bar clause is a convenient instrument commonly used by employers to defend themselves from EOT claims. The enforceability of such clauses has an "all or nothing" effect: they may directly preclude a contractor's entitlement to EOT and therefore compliance with time bar clauses is an important factor that should be considered by analysts.[344]

Timing of submission and award of an EOT

Most standard form contracts stipulate that an EOT claim should be submitted and approved soon after an employer delaying event has occurred,[345] some contracts[346] may empower CAs to have a final review of their entitlement to EOT after completion of the works. There are two types of EOT claim analysis: prospective analysis extends the completion date to a future date after the assessment date, and retrospective analysis extends the date retrospectively.

Therefore, the timing of the EOT award has a significant impact on EOT claims analysis methods. If an EOT claim is submitted during the performance of the works, prospective analysis must be undertaken, while if the EOT is reviewed at the end of the project or an EOT claim is submitted and considered by a tribunal long after the claimed events occurred, retrospective analysis should be employed.[347]

3.7 External environment of EOT claims analysis

In addition to the factors determining or affecting EOT claims analysis, EOT claims are prepared, presented and settled in a certain legal, contractual and project performance environment, and this too will affect the approach to and results of the claims analysis. Amongst others, EOT claims are particularly affected by the following environmental factors.

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[342] Chappell, supra note 6, p.126

[343] Seb Oram, Extension of time and damages for delay- recent developments, *SCL Paper*, 2012 (11)

[344] John Bellhouse and Paul Cowan, Common Law "time at large" argument in Civil Law context, *Construction Law Journal*, 2007 (8)

[345] Keating, p.8-038

[346] E.g. JCT contract

[347] Idem

3.7.1 Legal environment

Any EOT claim should be submitted and settled in a specific legal environment. The analysis of the EOT claim will be affected by legislation, litigation and legal culture.

Firstly, as a civil legal action, the legislation in the legal system provides the legal grounds for the EOT claims analysis in terms of risk allocation and the interpretation of contractual provisions, through legal provisions and legal principles. It also provides management mechanisms in the construction industry such as the supervision system and a dispute resolution system so that actions such as claims in construction are managed in a more orderly and efficient manner.

Litigation also has a significant impact on EOT claims analysis as it aims to solve diverse detailed practical problems and therefore is pertinent and helpful in EOT claim analysis in that it provides precedents and underlying legal principles.

Finally, any practitioners and analysts of EOT claims are affected by particular legal cultures. In different legal cultures, practitioners may adopt different behaviours or approaches to analyse and determine claims. For instance, practitioners from Western jurisdictions tend to strictly follow contract provisions and procedures, have a relatively strong litigious mentality and analyse the subject matter well. These are helpful skills for practitioners attempting an in-depth and precise analysis of EOT claims. In Eastern countries, however, practitioners commonly have an anti-litigious attitude, and a relatively weak sense of following contractual terms, and this obstructs claims from being analysed and settled precisely.

3.7.2 Contract circumstances

Any EOT claim is made under certain contractual terms; therefore, its analysis is also severely impacted by certain contractual circumstances. In practice, the contract usually specifies risk allocation, contractual grounds, procedures, and assessment approaches for claims. Additionally, through EOT, CA and dispute resolution mechanisms, it establishes the parties' roles and rights to make claims, thus affecting the quality of and approach to claims analysis. In practice, under a contract which sets up the diverse mechanisms above, and establishes a balanced risk allocation and contract relationship between the parties, the parties are empowered to assess and determine claims independently and fairly, and the quality of the claim analysis is assured. If this is not the case, it will be significantly undermined.

3.7.3 Project performance circumstances

All EOT claims derive from the performance of construction projects, and the circumstances of project performance will also affect the quality of and even the approach to claims. Specifically, the levels of project management and the parties' involvement in claims have a significant impact on EOT claims.

Involved parties in EOT claims

The parties to claims generally include contractors, employers, CAs, the tribunal of dispute resolution, and judges. The parties' relationships and roles will affect the quality of and approach to assessment.

In construction projects, if the contracting parties have a balanced relationship and the employer's power is constrained by the mechanisms of CAs and fast-track dispute resolution such as DAB, EOT claims are likely to be analysed fairly. However, in projects where the employer has a dominant contractual position and acts aggressively, claims are mainly determined by employers rather than an independent third party and EOT claims are, therefore, not likely to be analysed or assessed carefully and professionally. The parties' relationship is also important in the approach adopted to analyse claims. Where parties have a relatively collaborative relationship, EOT claims are more likely to be settled between the parties, who may not need a high level of quality in the claims analysis. Conversely, in projects where the parties have an adversarial relationship, claims are more likely to be analysed strictly.

It is noteworthy that the expert witness plays an important role in EOT claims analysis as particular expertise is necessary in schedule analysis. However, this does not mean that a delay analysis report provided by an external expert witness in schedules will solve all problems: such expert witness reports are normally provided at the end of projects and the schedule is established and analysed retrospectively; thus their quality is greatly constrained by the level to which records have been maintained and schedules updated.

Project management level

Lastly, project management level also has a significant impact on EOT claim analysis. The rationale is that the scheduling analysis, as discussed above, is the most reliable instrument to establish causation of EOT claims but should be always supported by good management in schedule establishment and updating, progress control and monitoring, contemporaneous record capture and file management. Therefore, the project management level determines the quality and the selection of delay analysis approaches.

3.8 Conclusion – Framework for EOT claims analysis

In effect, the process of EOT claims analysis is one of delay liability identification and allocation. In practice, upon an employer-caused delay, the contractor cannot simply allege that, because the delay is caused by the employer, an EOT and related financial compensation should therefore be awarded. He needs to meet the burden of proof and establish a chain of causation between the cause and effect to demonstrate his entitlement. Therefore, the core module of EOT claims analysis is the establishment of a causal chain. In particular, the contractor should establish this in three steps: an employer time-risk event has occurred; the event has resulted or is likely to result in a delay to progress; the delay to progress has resulted or is likely to

result in a delay to completion. Where both time and EOT-related costs are claimed, a modified causal link should be established. In practice, these steps are manifested by compulsory tests in EOT claims analysis, that is, tests of whether the delay is excusable or critical and, where EOT-related costs are claimed, a test of compensability. Where there is concurrency or dispute over the ownership of the float, specific analysis should additionally be performed in terms of legal principles and industry practice.

Throughout the process, analysts should endeavour to relate each heading of the delay to completion and/or the financial loss related to each delaying event; otherwise, claimants may lose their entitlement unless the global claim approach is accepted by the applicable law or courts.

In the process of establishing a causal chain, claimants should provide convincing proof at each step to meet the burden of proof. Thus, proof constitutes a module of EOT claims analysis. In practice, various types of evidence and proof can be presented. Factual proof is of decisive significance in supporting EOT analysis; analytic proof, such as delay analysis is an essential instrument for analysing and detecting the causality of delay. Delay analysis may also be conducted in traditional ways which are primarily based on common sense and inference. Given the complexity of modern construction projects, scientific approaches of forensic delay analysis, normally based on schedules using CPM, are recommended for addressing complicated EOT claims. Forensic delay analysis comprises different methods, each with its own advantages, weaknesses and scope of application. Analysts should choose prudently and apply them to the analysis in terms of circumstances and merit of claims. For some claims, different methods can be combined for a thorough investigation of causality. Additionally, attention should be paid to claims which are determined some time after the occurrence of the delaying events. Cause-effect analysis, which employs a modelling approach will be more appropriate to determine EOT entitlement, while effect-cause analysis, which accounts for the remaining project progress and adopts a common-sense approach will be more appropriate for determining the contractor's financial entitlement. Forensic delay analysis also contains essential steps, including the identification of delay to progress and preliminary analysis, scheduling analysis and analysis report drafting.

Due to different requirements in the level of burden of proof and the grounds relied upon to claim EOT and damages, if delay damages are claimed an extra damages analysis should be conducted – in addition to delay analysis – based on the principles and methods of damages assessment.

Even though the chain of causation is established, the contractor's entitlement may still be undermined by the parties' failure to comply with the relevant legal/contractual obligations or procedures. Consideration should also be given to this aspect, which therefore constitutes an extended module of the framework.

Besides the modules above, consideration should also be given to environmental factors in EOT claims analysis, including external factors at the level of law, contract and project performance to support EOT claims. On the one hand, these factors affect the quality of and determine approaches to EOT claims analysis; on the other, they should be improved to provide a more suitable external application environment for EOT claims analysis.

Based on the above, briefly, the framework of EOT claims analysis consists of modules of work or factors to be considered, as below:

a. Core module: Establishment of the causation of claims. This is the core module of the framework, comprising compulsory steps of analysis work, including testing whether a delay is excusable, critical and/or compensable, and essential factors determining EOT entitlement, i.e. concurrency and ownership of float.

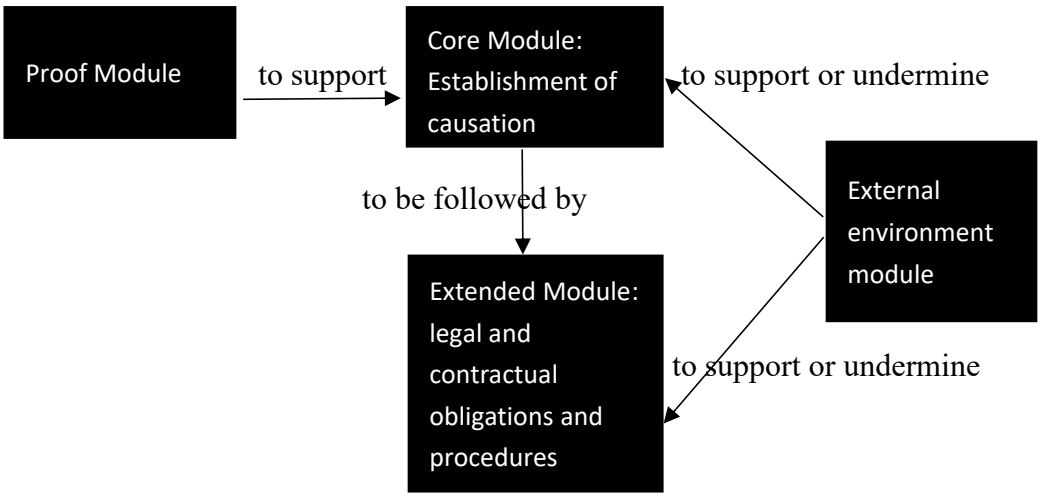
b. Extended module: Factors affecting EOT entitlement. This module adds to the core module, including factors that may still affect entitlement to EOT after the causation of claims has been established. It includes legal or contractual obligations and procedures where a failure to comply by one or more parties may undermine the EOT entitlement.

c. Proof module. This module includes types of proof for EOT claims to meet the obligation of burden of proof and to support causation establishment; specifically, it includes factual and analytic proof.

d. External environment module. This module includes external environmental factors that generally affect EOT claims and their analysis, including factors concerning legal, contractual and project performance.

Specifically, the constitution of the EOT claims analysis and the relationship between the modules are shown in the diagram below:

Diagram 3: Framework of EOT claims analysis



The modules above thus constitute an entire framework for EOT claims analysis, including compulsory modules – establishment of causation, proof, legal and contractual obligations and procedures, and modules to be considered – the environmental module. The factors within each module, therefore, constitute the key concepts in the comparison of EOT claim analysis in the UK and China. The subsequent comparison work in the following chapters will be conducted on each key concept (factor).

Chapter 4

Chinese and English law on EOT claims analysis

4.1 Introduction

This chapter aims to identify the role played by the legal systems in the UK and China in relation to EOT claim analysis in terms of the framework factors established in Chapter 3. It starts with a comparison of the legal environments in the two jurisdictions to enable readers to understand the underlying reasons for the similarities and differences between the two jurisdictions, and then compares concepts of causation, proof, legal obligations, procedures and external environment both at the level of black-letter law and litigation.

4.2 Legal environment

4.2.1 Comparison of legal systems

A. Introduction

England is a Common Law jurisdiction and its legal system is a typical Common Law system. In contrast, despite being defined by the government of China as a "socialist legal system", the modern Chinese legal system is primarily based on the model of Civil Law.[348] Therefore, by and large, the differences between English law and Chinese law reflect those between Common Law and Civil Law, although Chinese law also has unique characteristics that distinguish it from Western Civil Law.

Numerous studies compare two legal systems. The topics pertinent to EOT claim analysis are shown below.

B. Comparison of two legal systems

History and underlying jurisprudence

Historically, Common Law derived from the process of unifying discrete and inconsistent local laws, and referred to the law commonly used and universally valid throughout England.[349] The Common Law legal system is characterised by a system of precedents in legal principles, rules developed by judges on a case-by-case basis and unified legal remedies in equity.[350] Subsequently, a large number of statutory instruments and by-laws were promulgated in the commercial field, creating a

[348] https://www.loc.gov/law/help/legal-research-guide/china.php, last visited on 15th Feb. 2019

[349] Bao Lu, *Jurisprudence and comparative law,* University of International Business and Economics press, 2nd edition, 2011，p.65

[350] Jaeger, *FIDIC- A Guide for Practitioners*, Springer, 2009, p.4

scenario in which traditional case law and statute law co-exist in the Common Law legal system in England.[351]

From an underlying philosophical perspective, the empiricist mindset played a significant role in English society historically and Common Law was created based on and elaborating on a utilitarian and analytic jurisprudence. Scholars admitted only man-made laws while ignoring the natural law held by traditional European legal philosophers. It was believed that the task of jurisprudence was to analyse a real and detailed law system but neglect its values, while the task of law was to adopt a micro-perspective to solve specific problems, and therefore constitute a systematic body of scientific analysis and research. This school of law had a fundamental impact on the Common Law legal system and determined a straightforward approach to dealing with matters based on their individual characteristics.[352]

In contrast, the Civil Law system is a legal system derived from the continent of Europe including France and Germany, and within the intellectual framework of Roman law. Its primary feature is a referable legal system codified into core legal principles and rules. This legal system provides the primary legal source for society.[353]

From an underlying philosophy perspective, jurisprudential scholars in Civil Law commonly hold a mindset that approaches the part from the whole and focus on settling problems from a macro perspective through establishing a system of general legal principles and rules. They believe that any issue in a society can be addressed by this pre-set system through a deductive approach and that the function of the legal system is to provide a pre-set ordered system to ensure that society can always run smoothly in a fair and just manner. The law functions to establish the legal results in the event of a breach of the pre-set law, unlike the Common Law system, where the law functions to protect individuals' rights and provide remedies to the innocent party.[354]

Source of law

In England, besides the unwritten constitution, a series of written forms of law constitute a relatively complete and dynamic developing legal system, which includes judicial decisions in case law, equity, statute law, regulations and delegated or subordinate legislation, international treaties and custom.[355] In all these laws, case law, which is established and defined by Supreme Courts[356] whose function is to create and define the law, is the primary feature of the legal system in England as it fundamentally constituted the basis for establishing and developing Common Law historically, and still plays a primary role in the modern legal system. Additionally, equity and statutory law also form part of the substantive law. A substantial volume

[351] Bao Lu, supra note 349, P.71
[352] Idem, p.12~13
[353] Idem, p83
[354] Idem, P.80
[355] Bunni, supra note 14, p.35
[356] Idem, p.36

of statutory law was promulgated in particular fields in recent decades, amongst which the *Housing Grants, Construction and Regeneration Act 1996,*[357] *Arbitration Act 1996* and *Civil Procedure Act 1997* are particularly relevant to construction law. Furthermore, in judicial practice, customs, textbooks and legal writing can also be taken into consideration by the courts if it "is recognised by Courts as being reasonable and in conformity with statute law" and therefore constitute a source of law.[358]

In contrast, the source of law in a Civil Law system is a different scenario. A fundamental feature of the Civil Law system is that the statutory law, codified and promulgated by legislation or other secondary organisations, is always the primary source of law. In Civil Law systems, judges have no right to create law; they have to strictly follow the codified law, and their function is normally limited to applying and interpreting the principles and provisions of the existing terms to the facts. As to custom and authoritative legal writing, attitudes towards these vary from country to country, but some scholars believe that their function is gradually diminishing along with an increasing codification of law.[359]

The role of the contract

In the Civil Law system, since the task of the law is to establish rules and order for a society, people are likely to believe that the law can solve any dispute in the social arena, and the contract is merely a supplement to the law. Furthermore, almost all types of contracts are listed by a codified law, so many contract provisions are implied or incorporated into a contract by law.[360] Therefore, in the Civil Law system, although the principle of freedom of contract is also respected and applied[361] in accordance with the basic principle of *pacta sunt servanda* or the sanctity of contract, the contract has a relatively weak position when it conflicts with the law. A contract should be consistent with the law and, therefore, there is much less freedom of contract. As the contract is deemed an instrument to extend and elaborate the law in relation to a particular field of business, it often results in a contract that is much shorter and more general than the one in a Common Law system.[362]

In contrast, in the Common Law system, the freedom of the contract is largely respected and applied,[363] and the law has minimal intervention in the formation of the contract. This is because, in Common Law, the task of the law is to resolve specific legal issues and protect individuals' rights but not to establish a network of legal rules covering all aspects of society. Therefore, there are very few existing laws

[357] Jaeger, supra note 350, p.4
[358] Idem, p.38
[359] Idem, p.30~31
[360] Refer to https://www.quora.com/What-are-the-differences-in-Contract-Law-between-Civil-Law-jurisdictions-and-Common-Law-ones
[361] Fuchas, Good faith: An Anglo-German Comparison, *ICLR*, 2015, p.419
[362] https://ppp.worldbank.org/public-private-partnership/legislation-regulation/framework-assessment/legal-systems/common-vs-civil-law
[363] Idem

from which to seek recourse in allocating risk or forming a contract. Under such circumstances, parties must establish exhaustive contract provisions to address each potential eventuality, resulting in a contract that is much more detailed and complicated than those in the Civil Law system.

4.2.2 Unique features of Chinese law compared to Western law

The Chinese legal system belongs to the Civil Law legal family, thus the comparison in the above section can, of course, be read as a comparison of the legal systems of the UK and China. However, it is notable that the modern Chinese legal system was established and developed only in recent decades. Its establishment and development were not only influenced by the Continental European legal systems but also greatly impacted by and modelled on international conventions such as CISG[364] and the UNDROIT principles which aim to reconcile and harmonise the difference between Common Law and Civil Law systems. Therefore, it is to some extent a hybrid of these two legal systems as it has adopted many legal concepts or principles from both Common Law and Civil Law systems.[365] For instance, it adopted the concept of *force majeure* from French law, the principle of impossibility of performance from German law, and the concept of fundamental breach of contract and strict liability from English law. Moreover, China has a long history and a unique political and social structure, which have significant political and cultural impacts on the legal system. All these create unique features in the Chinese legal system, which should be particularly stressed in the comparative study of this research.

4.3 Proof of EOT claims in the UK and China

4.3.1 In the UK

Approaches to delay analysis

As discussed in Chapter 3, in exploring whether a delay can bring about EOT and in quantifying it, claimants should establish a factual causation between the delay event and the effect. To achieve this, practitioners in the UK commonly adopt forensic schedule analysis techniques, based primarily on the schedule and using CPM to study how actual events in a project interacted in the context of a complex schedule and their potential impact on the final completion date.

Technical proof, rather than proof by inference, has been gradually accepted by courts in the UK over the last 30 years.[366] It has gradually become common for parties in proceedings relating to EOT claims to employ scheduling experts to provide expert witness testimony on delay analysis, as illustrated by the delay

[364] Anonymity 1, The influence of the United Nationals Convention on Contracts for the International sale of Goods on the Chinese Contract Law: damages for breach of contract, p.6, https://tomaszjanyst.files.wordpress.com/2013/02/cisgchinesecontractlaw.pdf

[365] Grace Li, The PRC Contract law and its unique notion of subrogation, *Journal of International Commercial Law and Technology*, 2009(1)

[366] Burr, supra note 11, p.15-001

analysis provided by an expert in the recent leading case, *Walter Lilly*, or in *Brompton Hospital v Hammond*, where the judge stated:

> It was plain from the evidence called at the sub-trial on behalf of the employer, in particular that of the employer's expert, who, of course, is an expert, ------. On the evidence of [experts from both parties] the establishment of the critical path of a particular construction project can itself be a difficult task if one does not know how the contract planned the job.

Forensic scheduling techniques are used to prove and calculate the effect of casual events.[367] In practice, many methods were developed by practitioners to be applied in different situations of progress analysis. The courts may also like to accept a method that takes into account the circumstances and information available; for instance, judges in the *City Inn* case preferred to see proof based on an as-planned vs as-built analysis rather than a collapsed as-built analysis based on a retrospective schedule analysis. Nevertheless, it has been found that there is no perfect delay analysis method which can be used in all situations, and some commentators have criticised that courts in the UK have failed to conduct in-depth research and conclude in each specific circumstance which the delay analysis method should be recommended, accepted or rejected.[368] It was established in *John Baker v London Portman*[369] that when assessing the effect of delay events, no particular delay analysis method should have to be employed but the analysis should be logical and conducted methodically rather than based on a general impression. Despite this vague attitude of the courts towards any particular delay analysis method, it is clear that courts in England today prefer a critical path analysis, although this was not recognised in the Scottish case *City Inn*.

Furthermore, courts in the UK have recently recognised and stressed the need for sufficient information and a timely updated schedule to ensure the accuracy of a scheduling analysis. For instance, it was held in the *Brompton Hospital* case that "the accuracy of any of the methods in common use, critically depends upon the quality of the information upon which the assessment exercise was based". Moreover, in *L & C Europa*,[370] the judge stated, "There are no updated schedules in the record that might demonstrate the relationship of the alleged delay to other work at the site, or the timing and impact of alleged delay on overall completion of the contract------", and therefore rejected the testimony provided by the contractor.

Prospective or retrospective analysis

In the UK, practitioners recognise that delay analysis methods can be categorised into two approaches: retrospective or prospective. It is advocated by the Protocol that prospective analysis, employing the time-impacted method, should be the most appropriate approach in all cases. Following the judge in *Walter Lilly*, the result

[367] idem, p.15-003
[368] Idem, p.15-007
[369] *John Baker Construction Ltd v London Portman Hotel Ltd* 83, B.L.R. [1996] 12 Const.
[370] *L & C Europa Contracting* [2004], ASBCA

should not have differed if both approaches were carried out correctly, although he preferred the prospective approach, as retrospective analysis can only be conducted at the end of the period, with the result that EOT cannot be awarded by CA in a timely manner, leading to a "wait and see" approach which was strongly criticised by the *SCL Protocol*.

Both positions are hotly debated in the UK and it seems that no consensus in this regard has yet been achieved. In *Leighton Contractors v Stelux Holdings,*[371] it was held that the method (windows slicing) stressing prospective delay regardless of actual delay would have been of limited relevance to the facts found by the arbitrator. In essence, theoretical delay analyses which do not relate to the facts of a particular project have been criticised by courts in the UK and run counter to rules established historically. For instance it was held by Lord Mcanaghten in *Bwllfa and Merthyr v Pontypridd*:

> Why should he listen to conjecture on a matter which has become an accomplished fact? Why should he guess when he can calculate? With the light before him, why should he shut his eyes and grope in the dark? [372]

The position in *Walter Lilly* regarding retrospective analysis was challenged by a recent case, *Fluor v Shanghai Zhenhua,*[373] which held that the result produced by two types of claim may not necessarily be the same; therefore some form of retrospective analysis is still required. This indicates that, although the current overriding position of the UK courts is to prefer prospective analysis, this is not an absolute position.

4.3.2 In China

Approaches to delay analysis

As discussed above, despite computer-based scheduling techniques already being widely used for planning in construction projects in China, forensic scheduling delay analysis is rarely used in litigation in China in relation to EOT claims. While the courts have not expressly shown reluctance to accept the technical proof produced by scheduling analysis,[374] very few Chinese judges adopt such techniques when they analyse delay and determine EOT cases, and very few litigants submit proof that is strictly proved or supported by forensic scheduling analysis. Most factual evidence is submitted discretely and commonly lacks a strict logical interaction with other pieces of evidence. The reasons for this situation can be concluded to be the following:

a. Judges' mindset

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[371] *Leighton Contractors (Asia) Ltd v Stelux Holdings* [2004] HKCFI804

[372] *Bwllfa and Merthyr Dare Steam Collieries(1891) Ltd v Pontypridd Waterworks Co* [1903] AC 426

[373] *Fluor Ltd v Shanghai Zhenhua Heavy Industry Co, Ltd*, [2018] EWHC 1 (TCC)

[374] In the case of *Zhejiang Huanyu Construction Ltd.,* the counterclaim of delay damages by the employer based on a construction planning was rejected by the court of first instance not because of the approach of claim demonstration, but for the reason that the planning had not been updated and therefore could not reflect the real fact of delay.

Chinese people commonly have a holistic and integrated mindset. Judges are likely to produce a comprehensive impression based on discrete information but are not inclined to use analytic methods to break down cases to understand them.

b. Judges' guiding ideology

Unlike in English law, where the courts' primary interest is to provide remedies in individual cases and protect individuals' rights, the primary purpose of Chinese law is to maintain overall fairness and balance in society, as shown in a statement made by the SPC in the *Jiangsu agricultural reclamation*[375] case:

> In the process of determining construction dispute cases, judges' concern needs to be focussed on balancing the parties' interests, imposing sanctions on unlawful acts, regulating the order of the construction market, ensuring construction quality, and not placing the parties' interests in a significant imbalance. (Translation)

Therefore, with this guiding ideology, even where proof is insufficient or unauthentic, judges may still *zuo qing* award some extent remedies to either party in consideration of fairness and to maintain a balance between the interests of the two parties.

c. Lack of knowledge and planning experts

As stated in *Brompton Hospital* above, scheduling analysis requires practitioners with special expertise or, at least, a thorough knowledge of construction management and planning. Unfortunately, in China, no *ad hoc* courts have been established for construction dispute cases; all such cases are determined by generalist civil courts, and no judges are appointed or trained specifically in the field of construction. Therefore, judges commonly experience difficulty in understanding or conducting a scheduling analysis.

d. Lack of judicial authentication institution

In China, judicial authentication in planning and scheduling is a blank sheet. In the construction arena, judicial authentication institutions have been established and authorised by government to conduct cost and quality authentication. To conduct this authentication work, in accordance with Chinese Civil Procedural Law, authenticators must have the relevant qualifications as approved by the government. Since, to date, no authenticators have been approved to conduct authentication in scheduling and planning, litigants have no way of seeking professional services in this regard. It was held in *Jiangsu Real Estate Investment Co., Ltd.*[376] that an authentication report in relation to progress analysis provided by a cost authentication

[375](2015)苏民终字第 00102 号
[376] (2017)最高法民申 5047 号

institution should not be admissible as the authenticator had not shown he had sufficient capacity and legal qualifications to conduct the analysis.

Given the absence of a common scheduling analysis application, the Chinese courts tend to determine cases based on impressions derived from proof of inference. In a delay dispute, the usual approach adopted by Chinese courts is summarised below:

a. Identify and recognise delay events for which contractors can be relieved from liability. If contractors cannot prove the causation between events and delay, courts may refuse, or *zuo qing* accept it to some extent in the interests of fairness and to maintain a balance between the interests of the parties.

b. Simply calculate the aggregate time of delay caused by each event in order to calculate the EOT or the total time for which the contractor is relieved from liability.

c. Where both parties are found to be at fault, if, based on impressions, the party bearing dominant liability can be identified, courts may *zuo qing* apportion the liability between the parties based on its impression and discretional power. If neither party can be determined to have dominant liability, the courts may determine that both parties jointly share the liability and lose their respective entitlement to compensation from the other.

Retrospective or prospective analysis

The concepts of prospective and retrospective analysis do not exist in China. By studying case reports provided by the SPC in recent years, it is found that – in almost all cases – both the courts and the litigants analysed delay retrospectively; therefore it seems that courts do not reject the retrospective analysis method.

The attitude of the Chinese courts towards prospective analysis is unclear. In *Zhejiang Huanyu,*[377]where work was suspended, the employer used the contractor's construction planning as the baseline for a prospective analysis and concluded that the contractor had delayed the works for 234 days. The analysis was rejected by the court of first instance because delay in progress could not represent delay in completion, and was further rejected by the SPC because the construction planning was the contractor's work arrangement tool but could not act as the criterion to determine whether progress had been delayed. However, the contractor's claim for EOT caused by the employer's delay in arranging payment was also rejected by the SPC because the contractor failed to provide a progress analysis to prove precisely how the works were affected by lack of payment. In this case, it is apparent that the courts preferred a retrospective analysis. However, in *Zhejiang Joyou,*[378] where the contract period was 22 months and for diverse reasons the contractor suspended the works from the 21st month, and the contract was terminated by the employer. The courts of first and second instance, based on the contractor's production rate over 21 months, predicted the number of days' delay caused by the contractor, and based

[377] (2015)最高法民一终字第 9 号
[378] (2014)最高法民申字第 348 号

their calculation of delay damages on this. The method of predictive delay analysis was challenged by the contractor, who contended that the courts had breached the principle that no trial should be applied where there is not complain. The appeal was rejected by the SPC. In this case, all courts initiatively accepted prospective analysis. The courts' attitude in this regard is thus somewhat inconsistent and unclear, but may become clearer when more cases are demonstrated and determined through scheduling analysis.

4.4 Establishment of causation in EOT claims in the UK

4.4.1 Test of excusable or non-excusable delay

In the UK, in accordance with the principle that no person can gain advantage from their own non-performance,[379] no EOT should be awarded to contractors against a contractor-caused delay, nor should the contractor be relieved from their duty to pay delay damages, as such delay is non-excusable. Furthermore, because of the strict liability approach applied in English law,[380] delay caused by any other events or circumstances which – while not amounting to contractors' fault or breach of contract but where the risk has been allocated to the contractors – should also be non-excusable. Namely, whether a delay is caused by the contractors' fault or lawful conduct, as long as liability for the delay has not been exemplified by express or implied terms of contract, the delay is non-excusable, and no EOT should be awarded. Therefore, determining whether a delay is excusable is a question of delay risk allocation.

In English law, under a construction contract, delay risk allocation can be allocated in terms of two sources: express contract terms and implied terms imported by Common Law.

Express contract terms

Early construction contracts in the UK were usually quite simple and had no EOT mechanisms or risk allocation terms; these were adopted by standard forms of contract at a later stage as a result of the Prevention Principle and the legal doctrine of time at large.

In practice, in an employer-caused delay, employers may not charge damages:

> It is a principle very well established at Common Law, that no person can take advantage of the non-fulfilment of a condition the performance of which has been hindered by himself; and also that he cannot sue for a breach of contract occasioned by his own breach of contract, so that any damages he would otherwise have been entitled to for the breach

[379] *Roberts v Bury at 326*

[380] Refer to McKendrick (supra note 313), p.22, the strict liability means it is not usually necessary to prove fault in order to establish the existence of a breach.

> of the contract to him would immediately be recoverable back as damages arising from his own breach of contract.[381]

The underlying rationale is that a delay occasioned by employers' breach of contract amounts to an employer's prevention and will trigger the Prevention Principle, in accordance with the principle laid down by *Comyns' Digest*, Condition L (6.),[382] where the right to delay damages was lost. In such cases, employers have no right to terminate the contract; contractors have the right to continue the performance, and for that purpose, they are entitled to further time.[383]

However, in employer-caused delay, contractors cannot be automatically awarded a period of EOT by employers[384] as "there is nothing to shew that they (contracting parties) entered into a new contract by which to perform the work ------ ending at a later period",[385], and "the claim for liquidated damages must fail since the employer could not rely on the original date of complete, nor on a power to extend the completion date. In the absence of such a power, there could be no fixed date from which the liquidated damage could run."[386] Under such circumstances, if no express contract provisions provided a power for the employer to extend the time, "the plaintiffs (contractors) were therefore left at large",[387] the contractors are entitled to complete the remaining works within a reasonable time, creating an embarrassing situation for the employers.

Furthermore, in practice, the application of the Prevention Principle and time at large have a stark effect on employers as they have an all-or-nothing effect on damages. In the Victorian era, courts commonly had a clearly hostile attitude to liquidated damage clauses. The principle was applied to construction delays in that, whether the contractor was at fault and whether their responsibility for the delay was both culpable and substantial, as long as there was prevention by the employer, no matter how insignificant the effect of the employer's prevention on the delay, the employer would lose all contractual entitlement to liquidated damages.[388] In essence, the problem was caused by the lack of a mechanism to distinguish between contractor delay and employer delay.[389] Under such circumstances, to avoid the negative impact of the Prevention Principle and the situation of time becoming at large, and to protect employers' entitlement to liquidated damages against contractors' delays, and also to set a definite completion date,[390] it was of significance to set up contractual

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[381] Supra note 379 at 326

[382] *"so the performance of a condition shall be excused by the obstruction of the obligee: as if a condition be to build a house; and he, or another by his order, hinders his coming upon the land."*

[383] It is held by the case of *Wells v Army* that: "*in the contract one finds the time limited within which [a party] is to do his work. This means, not only that he is to do it within that time but it means also that he is to have that time within which to do it*"

[384] Keating, p.280

[385] *Holme V Guppy* (1838) 150 E.R. 1195 per Parke B at 1196

[386] *McAlpine v McDermott LJ*383

[387] idem

[388] Ellis Baker, et al, The Development of the Prevention Principle in English and Australian Jurisdictions, *ICLR*, 2005, p.202

[389] Idem, p.203

[390] Keating, p.279

provisions and mechanisms to empower the employer to extend the time for completion in delays caused by employer's prevention.[391]

Therefore, from the beginning of the last century, standard forms of construction in the UK started to include such provisions and EOT mechanisms[392] to empower the employer or CAs to extend time against employer-caused delays. EOT mechanisms normally include the grounds for and procedure of EOT. The grounds for EOT further rest with delay liability exemption provisions, which exhaustively enumerate the events or circumstances for which the employer should take the risk or is responsible, so achieving a clear delay risk allocation between the parties. Delay caused by factors at the employer's risk is called "employer's delay" and is excusable/inculpable. Any delay not caused by events or circumstances falling within the scope of the exemption provisions is inexcusable/culpable, and the contractor is not entitled to EOT.

Implied terms

Normally, the content of delay risk allocation depends on contract terms. Where express contract terms are silent, reference may be made to implied terms provided by Common Law in relation to the application scope of the Prevention Principle.

As to the scope of employer's prevention, in early cases, when the courts were hostile to the concept of liquidated damages,[393] they commonly moral standards in taking a fault-based approach to compute liability for delay. Employer's prevention was limited to cases of the employers' fault only, which included employers' morally blameworthy conduct, a deliberate breach of contract and other breaches providing or achieving certain conditions. For instance, in *Robert v Bury*, the basis of the Prevention Principle was put to the employer's breach of contract.[394] As time elapsed, from the middle of the last century, the courts started to extend the scope of prevention to neutral events which could not amount to an employer's breach of contract but still resulted in the prevention of the contractor's performance. For instance, it was concluded by Lord Denning in *Trollope & Colls Ltd v North West Metropolitan Hospital Board* that prevention could be constituted by the employer's legitimate conduct, such as ordering extra work, as long as it rendered it impossible or impracticable for the other party to finish his work within the scheduled time. The newest position of English law, as stated in the 11th edition of *Keating,* is that the application of the Prevention Principle does not necessarily depend on a breach of contract by the employer; it can be applied to any of the employer's actions which prevent the completion of works in any way, even if these actions were permitted by the contract.[395]

[391] *Phillimore LJ* (1972) 1 BLR at 127
[392] Ellis Baker, supra note 388, p.198
[393] Idem, p.197
[394] Idem, p.199,
[395] Keating, p.277

Typically, it is implied by modern English law that the employer shall be responsible for delay caused by events such as: 1) the employer has failed to provide uninterrupted possession of,[396] or access to,[397] the site to contractors; 2) the site is not reasonably free from rubbish and other debris to enable contractors to work; 3) the design provided by employers is impracticable;[398] 4) the employer has failed to provide information, plans or drawings to contractors at the proper time;[399] 5) the employer has improperly interfered in the contractors' performance;[400] 6) the employer has ordered extra works which necessarily prolong the completion;[401] 7) the employer has failed to provide the necessary structures or conditions for the contractors to finish the works;[402] 8) the employer has delayed in providing essential instructions.[403]

Furthermore, in relation to time of construction, it is an implied term that contractors should have reasonable time to finish the work[404] and a right to further EOT for work conducted in a later phase after an existing EOT.[405]

As discussed in Section 4.2.1 above, the doctrine of hardship is not recognised by English law; therefore, allocation of the risk of delay caused by hardship is a question of contract. Upon delay caused by the frustration of contract, the contract will be automatically determined, while the determination of related damages is again a question of contract.

Notably, if the delay is caused by events which are covered neither by express contract terms nor by implied terms imported from law, the contractors will lose entitlement to EOT, but the employer has no right to award time either.[406]

4.4.2 Test of criticality of delay

In English law, in accordance with the principle of causation of damages,[407] the factual causation of an event alone is insufficient to create legal liability; the plaintiff must demonstrate that the damages are not too remote from the factual causation. Following this principle, an excusable delay is not necessarily sufficient to lead to an EOT entitlement. To achieve EOT, contractors must demonstrate that the excusable delay is likely to cause, or indeed has caused, a delay to the progress of works, and has inevitably resulted in a prolongation of the final completion date.[408] Specifically,

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[396] *Hounslow v Twickenham Garden, and Holme v Guppy*

[397] *See Ductform Ventilation v Andrew's Weatherfoil*

[398] John Starr, et al, Express or Implied? Clarification On Implied Terms In Construction Contracts, *Mondaq Business Briefing*. 2011（11）

[399] *Neodox v Swinton, and Roberts v Bury*

[400] *Russell v Sa da Bandeira*

[401] *Doddv Churton*

[402] *Perini Pacific v Greater Vancouver Sewerage*

[403] *Peak v McKinney*

[404] *H & E Taylor v P & W Maclellan*

[405] John Starr, supra note 398

[406] Murdoch, *Construction contracts- Law and management*, 4th edition, Taylor & Francis Group, 2010, p.197

[407] Keating, p.389-340

[408] Manoj Bahl, supra note 269

contractors need to demonstrate that the event resulting in an excusable delay also has a critical effect on the final completion date and leads to an overall delay to it; if so, the delay is a critical delay.

As discussed in Chapter 3, the parties need to employ modern scheduling analysis methods through analysis of the general programme using Critical Path Analysis Methods (CPM) to create a delay analysis;[409] any delay on the critical path will inevitably lead to a delay to the final completion date and constitute a critical delay. It was held in *Haney v United States (1982)*:

> The critical path method is an efficient way of organizing and scheduling a complex project-----many subprojects may be performed at any time within a given period without any effect on the completion of the entire project. However, some items of work are given no leeway and must be performed on schedule; otherwise, the entire project will be delayed. These latter items of work are on the "critical path", A delay, or acceleration, of work along the critical path will affect the entire project.

Therefore, in English law when analysing an EOT claim, the second compulsory step is to test the criticality of the delay. In effect, this further restricts the harsh all-or-nothing effect of the Prevention Principle.

As discussed in Section 4.3.1.1, due to early courts' hostile attitude to liquidated damages, the Prevention Principle was applied even if the employer's delay was insignificant and the contractor had by its own delays prevented itself from completing by the due date.[410] Despite broad criticism and debate, this rigid attitude was still strictly followed until the second half of the last century, as seen in the leading case of *Peak v McKinney.* It was held in *Rapid Building v Ealing Family* that:

> Somewhat startled to be told in the course of the argument that if any part of the delay was caused by the employer, no matter how slight, then the liquidated damages clause in the contract, clause 22, becomes inoperative------. It ought to be possible for the employers to concede that there is a dispute as to that period (the squatter-related delay) and then deduct the 24 days from the total delay------ and claim liquidated damages for the balance. But it was common ground before us that this is not a possible view of clause 22 of the contract in the light of the decision of the Court of Appeal in Peak's case, and therefore I say no more about it.[411]

As time went on, this inflexible position was gradually softened by courts in the modern time which were less hostile to liquidated damages provisions[412] and some restrictions were gradually imposed to the application of the Prevention Principle.

The first restriction was the courts' increasingly harsh requirements in the causation of delay. It is most important that the application of the Prevention Principle should

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[409] Keating, p.282
[410] Idem, p.277
[411] *Rapid Building Group Ltd V Ealing Family housing association* (1984) 24 BLR 5
[412] Ellis Baker, supra note 388, p.197

satisfy the condition precedent that the employer's prevention is the true causation of delay. Therefore the criticality of delay has to be taken into consideration in the EOT entitlement: as critical delay is the only true causation of delay to completion, it has to limit the occasions on which it applies that principle.[413] For instance, it was held in *Royal Brompton v Hammond*:

> In order to make an assessment of whether a particular occurrence has affected the ultimate completion of the work, rather than just a particular operation, it is desirable to consider what operations, at the time the event with which one is concerned happens, are critical to the forward progress of the work as whole.

Therefore, to meet the judge's requirement, a test of criticality of the delay must be conducted, through a critical path analysis.

4.4.3 Consideration of concurrent delay

The other restriction to the application of the Prevention Principle is concurrency, and this may also impact entitlement to EOT. It is held that the Prevention Principle should not be applied to concurrent delay as the delay would have occurred anyway even without the employer delay event.[414] This rule was confirmed in the recent *Sega Cruises v Fincantieri* case, which held that when the owner's delay occurred there were several items of outstanding work for which the contractor was responsible, so he could not rely on the period of concurrency to disentitle the owner from claiming liquidated damages as a remedy for delay.[415]

In effect, the remedy to concurrent delay is a matter of contributory liability in breach of contract. Early courts in the UK, criticised by some commentators[416] for their lack of scheduling analysis capacity and their hostility towards liquidated damages, took a broad interpretation of the Prevention Principle[417] and took a generous attitude to contractors on concurrent delay. It was held in *Wells v Army*:

> The fact that delay has been caused by matters for which the contractor is responsible will not deprive the contractor of his right to claim an extension of time for delay caused by a Relevant Event.

This rule was largely endorsed by many subsequent cases; for instance, it was held in the leading case *Peak v McKinney* that an EOT should be available in cases where delay has been caused partly by the fault of both contractor and employer.

Eventually, a dominant approach for deciding concurrent delay in the UK – the *Malmaison approach* – was established in the *Henry Boot case*:

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[413] John Bellhouse, supra note 339

[414] Keating, p.278

[415] David Spires, 2018 case law review, https://www.watsonburton.com/lib/liDownload/1386/Construction%20newsletter%20-%20delay.pdf?CFID=29821200&CFTOKEN=75588966

[416] J.Bidgood, S.Reed & J Taylor, Cutting the knot on concurrent delay, *Construction Briefing*, 2007(2)

[417] Livengood, supra note 305

> ------ it was agreed that if there are two concurrent causes of delay, one of which is a Relevant Event, and the other is not, then the contractor is entitled to an extension of time for the period of delay caused by the Relevant Event notwithstanding the concurrent.[418]

However, due to its generosity to contractors, the debate around the *Malmaison approach* continues, and various approaches including dominance, the but-for test, apportionment, burden of proof, and the Devlin approach have been advocated by different cases or commenters.[419] Among them, the Devlin approach and the burden of proof approach primarily focus on loss and expense, and will be discussed hereinafter in relation to damages.

The dominant cause approach means that, if "there are two causes, one the contractual responsibility of the defendant and the other the contractual responsibility of the plaintiff, the plaintiff succeeds if he establishes that the cause for which the defendant is responsible is the effective, dominant cause".[420] However, whether a cause is dominant is a question of fact, and needs to be determined based not only on time evaluation but also common sense. Since it cannot be used in circumstances where there is no single dominant cause and is incompatible with the "but for" test,[421] it was rejected in *H Fairweather*.[422]

In contrast, the courts in Scotland made a significant attempt to change the position of the courts in England in relation to concurrent delay through *John Doyle v Laing* and *City Inn,* both of which were believed to be inconsistent with traditional English law. The former preferred the dominant approach and held that, if that approach could not be applied, the apportionment approach might be appropriate.[423] The latter held:

> Where there are concurrent causes of delay, none of which can be described as dominant, the delay should be apportioned between the Relevant Events and the contractor's risk events.[424]

Scottish law's position on concurrent delay received widespread criticism in England as not being good English law[425] and was then decisively rejected by the courts in England in the recent leading case *Walter Lilly*, in 2012, which held that apportionment was inappropriate in concurrent cases since it violated the longstanding principle associated with "Relevant Events":[426]

> Where there is an extension of time clause such as that agreed upon in this case and where delay is caused by two or more effective causes, one of which entitles the Contractor to an extension of time as being a Relevant Event, the Contractor is entitled to a full extension of time.

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418 *Henry Boot Construction (UK) Ltd v Malmaison Hotel (Manchester) Ltd.* [1999] 70 Con. QBD (TCC)

419 Knowles, supra note 54, p.94~100, and p.352

420 Idem, p.95

421 Keating, p.354

422 *H Fairweather & Co.Ltd v Wandsworth LBC* [1987] 39 B.L.R

423 Knowles, supra note 54, p.98

424 Keating, p.284

425 Jeremy Winter, Global Claims and John Doyle v Laing Management- Good English law? Good English practice? *SCL Paper*, 2007

426 Livengood, supra note 305

Through *Walter Lilly*, English law seems to have reached a consensus[427] on the aspect of liability allocation in concurrent delay:

> It is generally accepted that under the standard form of contract, a contractor is entitled to an EOT where delay is caused by matters falling within the clause notwithstanding the matter relied on by the contractor is not the dominant cause of delay, provided only that it has at least equal "causative potency" with all other matter causing delay.[428]

"Causative potency" is considered by commentators as "a lower-level test, a simple hurdle to prove that the delay is not of minimal importance".[429]

Apparently, this approach to determine the parties' liability in concurrent delay has diverged widely from the formula to allocate damages-related liability, and contrasts with the test of causation applicable under any delay-related loss and expense. The application of such a generous EOT award approach in England is said to be due to the reasons below:

a. The application of the *Malmaison* approach was a result of the early courts' hostility to liquidated damages provisions.

b. The *Malmaison* approach derived from the Prevention Principle in b. England, the principle indicated that if an event occurs for which the employer should be responsible and which constitutes an act of prevention, an EOT should be awarded to the contractor irrespective of the insignificance of the employer's act.[430] It is noted that this logic was not followed by subsequent Common Law, it is held by commentators that the law now holds that the Prevention Principle is not applicable to the situation of concurrent delay,[431] as it is a "rule of interpretation" but not a "rule of law".[432] It was held by Justice Hamblen in the *Adyard* case that:

> The rational of the [prevention] principle is ---. That necessarily means prevention in fact, not prevention on a notional or hypothetical basis.[433]

However, an expressed contract term to confirm this effect may be more appropriate.[434] In the recent *North Midland* case, the contract stipulated that no EOT would be awarded against a Relevant Event that was concurrent with the Contractor's delay. It was argued by the contractor that the clause was against the Prevention Principle, but Justice Fraser argued:

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[427] Idem

[428] Keating, p.283

[429] Livengood, supra note 305

[430] Idem

[431] Keating p.372

[432] Eric Webb, Concurrent delay in international construction: do you really want to go back to Kansas, Construction law Journal, 2017(33)

[433] *Adyard* [2011] B.L.R. 384

[434] Max Twivy, The Prevention Principle after North Midland v Cyden Homes: Time for change?, *SCL Paper*, 2019

> The Prevention Principle did not apply here and this case concerned merely with the correct construction of the amended clause specifically agreed between the parties---[435]

c. The application of the simple approach of *Malmaison* was due to an inability to prove claims and a lack of authentic delay analysis methods.[436] It is purported that if an authentic and exhaustive scheduling analysis is conducted, the concurrency will be less or even diminished.[437] While in cases of concurrent delay English courts do not tend to follow a detailed factual analysis through detailed CPM analysis to apportion the delay, they specifically refused to segregate delay based on the degree of culpability[438] as seen in the *Walter Lily* case:

> The test (apportionment) is primarily a causation one, it, therefore, follows that, although of persuasive weight, the City Inn case is inapplicable within this jurisdiction.

This indicates the courts' reluctance to follow a form of detailed delay analysis to provide sufficient "causation" to allocate delay responsibility.

d. The last reason for the application of the *Malmaison* approach was due to the English courts' approach to contract interpretation.[439] They tended to interpret the contract very literally and follow the *Contra Proferentum* rule. Therefore, when the provision of a Relevant Event was interpreted, they tended to strictly follow the wording of the contract to award EOT for events falling within the scope of Relevant Events, but did not like to reduce the EOT in the case of a contractor's delay as no wording in the contract suggested that effect.

Nevertheless, the application of the *Malmaison* approach was limited by judicial practice to some extent. Specifically, it was held by the *2nd SCL Protocol* that, no matter how insignificant the concurrences, all should have an impact on the critical path; otherwise it could not amount to concurrency. Following this principle, an employer delay on a non-critical path will not entitle the contractor to an EOT. This was recently illustrated in the *Saga Cruises* case which rejected the contractor's claim for EOT based on the *Malmaison* approach. It was held that the contractor's approach was too broad:

> The contractor should not be entitled to the benefit of a Relevant Event if it was already delayed, such that the Relevant Event actually had no impact. When the owner's delay occurred there were already items outstanding that were the responsibility of the contractor, so the contractor could not rely on a period of

[435] *North Land Building Ltd v Cyden Homes Ltd* [2017] EWHC 2412 (TCC)
[436] Bidgood & Taylor, supra note 416
[437] Livengood (supra note 305), and Burr, supra note 11, p.18-008
[438] Livengood, supra note 305
[439] Keating, p.284

> concurrency to disentitle the owners from claiming liquidated damages as a remedy for delay. [440]

From the case above, it is seen that where concurrent delay occurs, the *Malmaison* approach cannot be used as a blanket rule without evaluating the timing of events and the true effect of a delay event. The causative effect of each concurrence on the final completion date should be separately evaluated.

4.4.4 Consideration of ownership of float

As discussed in Chapter 3, besides excusable critical delay, an employer's delay on a non-critical path may also claimed by contractors contending that employers have engrossed the float and therefore used up the contractors' time contingency, leaving the contractors less time to finish a non-critical activity or causing them to miss a scheduled target of early completion of work. In effect, the focus of the dispute is the ownership of the float. If the contract has explicitly established that the contractor owns the free float, his claim will be justified. However, in practice very few standard forms of contract do so; therefore, the parties are always placed in dispute.

In practice, many positions were held in different cases: some held that the total float belongs to the employers, while others that it belongs to the contractors. Still others held that it belongs to the first party to claim it. It is submitted that in English law, in the absence of an express agreement to the contrary, the float is owned by neither party.[441] In *Ascon v Alfred McAlpine*, it was held that the benefit of float should be shared by all contracting parties. It was further concluded in *Nicholas Carnell* that since in most standard-form contracts the programme is not a contractual document but merely a planning tool, neither party should be constrained by the programme target or the time contingency as determined by the contractor. If the employer's conduct causes the contractor to use up some or all of the float without causing delay to the works, it may result in a disruption but will not entitle the contractor to an EOT.[442]

4.5 Establishment of causation in EOT claims in China

4.5.1 Test of excusable or inexcusable delay

In China, as in the UK, the law and contract provide different remedies against different types of delay. Whether a delay carries an entitlement to EOT depends purely on time risk allocation. However, unlike English law where time risks are mainly allocated by the contract, in China the law has much greater power to directly allocate delay risk.

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[440] *Saga Cruises BDF Ltd v Fincantieri SpA* [2016] EWHC 1875 (Comm)

[441] Burr, supra note 11, p. 16-074

[442] Chappell, supra note 6, p. 191

In Chinese law, construction time risk is mainly allocated by CCL and supplemented by judicial explanations issued by the SPC. The various remedies available against different delays are detailed below.

a. Delay caused by contractor's fault

It was held by Article 28 of the SPC's interim opinion determining cases of construction project contractual dispute (2014) that:

> If a delay in delivering a construction project is caused by the contractor, he shall bear the liability of breach of the contract.

b. Delay caused by employer's prevention

Regarding employers' breach of contract preventing the contractor from completing the works within the scheduled time, in Articles 259, 278 and 283 CCL directly establishes that delay caused by the later inspection of the completed works, or the employers' failure to provide the necessary assistance, raw materials, equipment, sites, funds or technical materials and information at the contracting time and pursuant to contractual requirements will entitle the contractor to EOT. Furthermore, pursuant to Articles 257, 258, 284 and 285, where employers fail to respond to contractors in relation to errors in the drawings, changes in the work requirements or plans, or fail to provide appropriate working conditions, or where the works are suspended by the employers' fault, contractors shall be entitled to damages. It also indicates that contractors shall be awarded EOT against these events where necessary.

Unlike English law, where prevention is a general concept to catch all prevention actions that may be made by employers, and the content of prevention is also well established in Common Law, in Chinese law there is no general concept of prevention. Among the prevention actions recognised by English law, only some are held by Chinese law to entitle the contractor to EOT. Even a delay caused by variation is not recognised by the law as a source of EOT. Moreover, the general and simple wording used by Chinese law in this regard leaves remarkable legal gaps and loopholes requiring contract drafting and litigation to fill the gap.

Therefore, besides litigation, the SPC issued diverse judicial explanations, guidance and clarifications to questions raised by the lower courts. Regarding time and delay damages, detailed risk allocation and remedies are provided. For instance, Article 15 of SPC's explanation of the problems of applying the law to determine construction contract disputes (1)(2008), Article 22 of SPC's interim opinion regarding determining cases of construction project contract dispute (2014), Article 7.3.33 of the Minutes of the 8th National Meetings for Courts to Determine Civil and Commercial Cases (Civil Part) (2016) expressly allow the courts the right to award EOT to the contractor for unjustified additional quality tests, late payment, or employers' failure to cooperate.

Furthermore, Article 14 of the SPC's interpretation of problems of applying the law to determine construction contract disputes (1) (2004), Article 5 of the SPC's interpretation of problems of applying the law to determine construction contract disputes (2) (2019), Article 7.3.32 of the Minutes of the 8th National Meetings for Courts to Determine Civil and Commercial Cases (Civil Part) (21 November 2016) further confirm that employers are liable for delays caused by their failure to accept work on time, their delay in providing appropriate conditions for commencement, their failure to provide the site, funds, equipment or technical information as agreed.

The above further supplemented and extended the scope of employers' prevention, filling the legal gap to a great extent and thus making the Chinese EOT mechanism more consistent with principles of fairness and the balance of interests between the parties. However, it is noteworthy that the above stipulations can only be used by courts in judicial practice: they have no legal effect as to the law and, therefore, whether they have any binding effect on the parties in construction is questionable.

c. Delay caused by hardship

As in the UK, time risks caused by hardship in China are also a matter of contract. However, in some cases of hardship, the courts can be relied upon to award EOT or relieve the contractor's liability for delay. For instance, in *Jiangsu agricultural reclamation*, a delay was caused by suspensions imposed by the local government due to middle school national examinations, extremely low temperatures, and the stoppage of local water supply networks and the national power grid. It was held by the Jiangsu High Courts that these causes of delay were neither caused by the contractor nor avoidable by it, therefore an EOT should be awarded.

d. Delay caused by *force majeure*

It is noteworthy that in delay caused by *force majeure*, pursuant to Article 117 of CCL, each party should be exempted from liability to the other; therefore contractors should receive EOT automatically. However, in accordance with the SPC's judgement, one party should not be exempted from the duty of delay caused by a *force majeure* event that occurred after that party had already caused a delay. For instance, in *Beijing Construction v Tianjin Jingfa*,[443] it was held by the SPC that the delay was further prolonged by inclement weather after the project ran into winter, which could have been avoided if the project had been completed before the winter. Thus the liability for the delay caused by the weather should still be borne by the parties in the proportion of liability borne by them before the *force majeure* occurrence.

Unlike in the UK, if both the law and contract are silent on delay risk allocation, the contractor is unnecessarily liable for the delay. The courts, which have a high degree

[443](2013)最高法民申字第 1632 号

of discretionary judicial power, may follow general principles of good faith or fairness or even the principle of changed circumstance to allocate liability, so as to balance the parties' interests.

Another matter to be noted is that, in accordance with Chinese law, an employer's delay risk does not always bring about an express EOT for the contractors. It may be that upon some employer's prevention as particularly specified by the law or contract term no EOT is awarded but the contractor is relieved from delay damages. For instance, in the *Jiangsu agricultural reclamation* case*,* it was decided by the court of first instance that for 25 days' delay caused by the doors and windows supplied by a third party, 25 days were directly deducted from the contractor's factual work time instead of 25 days' EOT, but the contractor was relieved of liability for that period.

4.5.2 Test of the criticality of delay

Despite no explicit wording provided by Chinese law regarding the requirement for the proximity of cause and effect when damages are considered, the requirement can be implied by the wording of Article 113 of CCL: "If either party fails to perform its obligations under the contract or does not perform its obligations as contracted and thus causes losses to the other party, the amount of compensation for the loss shall be ------", which indicates that damages must be established based on a necessary relationship between the act of breach and the loss. Although Chinese law has not established a specific test for proof of causation, and it is unclear whether the courts accept the "but for" test in civil cases, causation is broadly understood by practitioners as a necessary condition for damages of breach and is the key standard for liability computation. For instance, it was held by the SPC in *Harbin Kaishengyuan*[444] that:

> The evidence provided by the defendant for the loss caused by the plaintiff, through unlawful occupying the site of the project, is indirect evidence, cannot sufficiently prove a necessary causation existing between the direct loss claimed by himself and the defendant's act; therefore the claim was not accepted by the court of first instance. (Translation)

As for EOT, the High Courts indicated in *Heilongjiang Province*[445] that a construction delay is a prolongation in construction and must cause a loss to the employer. An EOT is an agreement by the employer to extend the time of completion against the contractor's application of exemption from liability. The courts commonly hold that delay is the condition precedent of EOT: while it unnecessarily brings about EOT, the claim must be made based on necessary contractual and factual grounds. To prove an EOT claim, the contractor must demonstrate the true causation of delay and demonstrate that the events for which the employer is responsible have indeed resulted in a delay to the project. For instance, in *Wuhan*

[444] (2017)最高法民终 730 号

[445] He Tao, *Construction projects engineering contract cases determination reference- Heilongjiang Courts judicial reference,* People's Courts Press, 2018, p.213

Tianheng,[446] a design change in B# building was issued by the employer to change the official building to a commercial and residential building. The contractors' claim for EOT, caused by the design change, failed as it was found by the court that the design change was fundamentally caused by the contractor's own problem of poor-quality foundation excavation work.

As discussed in Section 4.3.2 above, a reliable approach to demonstrating the causation of delay to compute liability involves analysing the criticality of the employer's delay on the final completion time based on a general schedule employing the CPM method. In modern China, the general work schedule and CPM method have been widely adopted in planning almost all construction projects. It was also found that some practitioners started to use the concept of criticality to claim or defend cases of EOT in litigation and, in some cases, the courts also follow this logic to determine a case. For instance, in *Chengdu Dading* v *Chengdu fourth construction*,[447] after the contractor finished the main construction of a building, the employer delayed engaging many nominated subcontractors and suppliers to finish the ancillary works. This disrupted the contractor's work plan; the contractor repeatedly wrote to the supervisor alleging that the critical path was altered by the changed circumstances and therefore claiming EOT. It was held by the SPC that the employer should bear the main liability for the delay but the contractor should also take partial responsibility due to its failure in its obligation of coordination. In another case, *Jiangsu Real Estate* v *Jiangsu Yancheng*, where a large number of variations in design were issued by the employer between finishing the main structure and final completion, against the contractor's claims for EOT, the employer claimed that the variations fell on non-critical paths and, therefore, had no effect on the final completion time. An authentication institute, commissioned by the courts, provided a report indicating that the effect of the large number of variations had changed the critical path, and therefore had a direct effect on final completion. It was accepted by the courts of first and second instance as well as the SPC, which held that the employer should take the responsibility for delay in that period. Conversely, in *Zhejiang Huanyu v Tangshan City North-South Real Estate*， it was held by the court of first instance that a delay in progress does not necessarily affect the critical path and therefore does not necessarily bring about a delay in final completion. The contractor's claim for EOT due to a delay in progress caused by the employer was dismissed.

Notwithstanding the above, it seems that the criticality of delay has not yet been clearly recognised by Chinese courts as a significant criterion in the analysis and determination of EOT claims. In many cases, the courts simply refused EOT claims made by parties who attempted to use the test of criticality of delay. For instance, in *Guangxi fortune world Asset v Guangxi Guigang Gangnan*,[448] the contractor failed to complete the civil work for the main structures and the employer failed to obtain

[446] (2014)最高法（2004）民一终字第 112 号
[447] (2016)最高法民终 476 号
[448] (2011)最高法民申 866 号

approval from the government for the design of fire-fighting systems, therefore also causing a delay in installation. It was alleged by the employer that the fire-fighting system was independent of the contractor's other works, and before the installation of the fire-fighting system the contractor's other works had not yet been completed, thus the delay was not caused by the fire-fighting system work but was a consequence of the contractor's delay on other works. That argument was rejected by the courts of first and second instance and the SPC. It was held by the courts that the liability for the delay should be fully attributed to the employer because the approval of the fire-fighting system is a compulsory legal obligation: without it the installation of the system cannot be started. In this case, it was apparent that the completion of the fire-fighting system, which was an independent and ancillary structure, might be a key milestone in the final completion, but it would not constitute an overall critical path affecting the overall progress of the project. The critical path should be the construction of the main structures. In fact, before the commencement of the installation of the fire-fighting system, the contractor was still working on other elements, indicating that the critical path had not changed to include the installation of the fire-fighting system, which was still on a non-critical path. Therefore the contractor, not the employer, should bear liability for the delay. Apparently, all courts in this case did not include the critical path analysis in their analysis.

In *Tianjin Dasun v Fujian Yongtai*,[449] upon EOT being claimed by the contractor against a variation in parapets and Herringbone steel, the determination of the courts of first and second instance was upheld by the SPC – that these works were insignificant in cost and thus should have no effect on the final completion, and no EOT was allowed. The approach taken by courts had no basis in the logic of schedule analysis, let alone a criticality test, but was merely based on impression and inference.

In another case, *Tianjin Haitai* v *Zhejiang Zhongcheng,*[450] the contractor alleged that there was a significant variation in 17# building, therefore an EOT should be awarded. The employer contended that the variation was not on the critical path, it should have no impact on the critical milestone of completion to the top of the building and, therefore, had no impact on the time of final completion. It was held by both courts of first instance and the SPC that the variation had **more or less impact** (emphasis is added) on progress; therefore, the employer could not avoid liability for the delay. Apparently, the courts made a determination based on impression and inference rather than a reliable delay analysis to test the criticality of the employer's delay.

In studying cases at the SPC in relation to EOT claims in recent years, it is found that courts seldom consciously adopted a criticality test; in many cases, they were merely interested in discovering whether there were events for which the employer was responsible, and then decided whether to award an EOT to the contractor or at least relieve the contractor from the liability for delay to some extent, regardless of

[449](2015)最高法民申 201 号
[450](2017)最高法民申 3700 号

whether these events had indeed had an effect on the final completion time and, if so, to what extent the delay had been occasioned by these events. Simultaneously, in a project where there is an employer-caused delay, if faults were also found on the part of contractors, the courts were likely simply to recognise that both parties had responsibility for the delay, rather than to precisely allocate the liability between them.

For instance, in the *Tianjin Haitai* case above, it was determined by the court of first instance that as the employer was at fault for failing to make the advance payment and regular interim payments on time, and in instructing variations, the contractor had the right to adjust the progress and claim an EOT. However, due to a lack of evidence, the court could not define the length of the EOT; therefore claims by both parties were rejected respectively: the employer had no right to receive delay damages and the contractor had no right to receive damages arising from the prolongation. The decision was appealed by the employer, who contended that a reasonable EOT to which the contractor was entitled could have been precisely evaluated through delay analysis; the rest of the liability for delay could also have been calculated and should be borne by the contractor. The appeal was rejected by the SPC.

In *Gansu Hongqi v Qinghai Gospel*,[451] EOT was claimed by the contractor for multiple events. Both the court of first instance and the SPC made their determination based on the criteria of whether the contractor had followed contractual procedures to claim the EOT and whether that delay had indeed existed. For instance, it was alleged by the contractor that variations to expand the kitchen on the first floor of the building took 60 days, and variations in updating access to the basement took 62 days. Both courts allowed 60 and 62 days' EOT to the contractor. In fact, the two works were very unlikely to fall on the critical path of the project as neither would necessarily have constrained other works. Even had they fallen on the critical path, they would not necessarily have caused a commensurate delay to the final completion. This indicates that the courts' approach to EOT claim analysis and EOT determination in this case was to identify the employer-caused delay, and then calculate the total EOT by simply adding the time of each employer-caused delay without considering the criticality or even logical sequence of each delay.

4.5.3 Consideration of concurrent delay

Regarding concurrent delay, Chinese law has not yet provided specific rules. Nevertheless, in essence, it is a question of attributed liability in breach of contract, and can be addressed through the principle established by Article 120 of CCL that "where both contracting parties have breached the contract, each party should bear its own liability respectively".

Furthermore, it was established by Article 177 of CRCL:

[451] (2015)最高法，民一终字 249 号

> Where two or more than two parties bear the obligation as requirement by law, if it is possible to quantify the liability, parties shall bear the obligation as per the quantification result; if it is difficult to quantify the liability, parties shall equally share the obligation.

As discussed above, the concept of concurrent delay has strict definitions in the UK: the narrow definition means two delays that start and finish at the same time; the broad definition refers to two or more events that concurrently impact critical paths and therefore delay the final completion. In China, there is no unified definition of delay provided by the law or standard forms of contract; the interpretation of concurrent delay in China is rather more open and much broader than that in English law. Having researched reports of recent cases determined by the SPC, no concept of "concurrent delay" was even referenced by the courts; however, many cases refer to the situation of "mixed fault by parties",[452] which originates in Article 120 CCL and means a delay or loss caused by both parties in construction projects.[453] It can be understood as a concept akin to "concurrent delay": the parties' wrongdoings do not need to occur at the same time or necessarily impact the critical path; as long as there is delay caused by each party, respectively or jointly, it amounts to a "mixed fault by parties". For instance, in *Hulun Buir Lianhua v Guangsha,*[454] it was found by the court that, as the employer delayed providing construction planning permits and licences, caused a suspension of material transportation works, frequently delayed providing design drawings, ordered about 300 variations and increased the burden to the contractor, the contractor should pursuant to the contract be entitled to EOT. However, the contractor failed to claim EOT as per the contractual procedure. Furthermore, it was found that the contractor was also at fault for disordered management, re-performance of works, defective quality, and a suspension ordered by the government due to use of defective steel bars, failure to submit a delay analysis and claim EOT on time and therefore misleading the employer. Given these circumstances, the court of first instance concluded that the delay was caused by the fault of both parties; therefore, in accordance with the principle of Article 120 of the CCL, the parties should bear their own liability.

Apparently, the scope of delay caused by the mixed fault of both parties is far broader than the concept of "concurrent delay" in Common Law countries, as it does not need a strict logical relationship between the employer-caused delay and the contractor-caused delay. Therefore, given the imprecise scope of breach, it is unnecessary, and also difficult, to provide a precise remedy, and does not call for a perfect and logical analysis instrument to calculate that remedy. One of the reasons for this is that Chinese courts seldom conduct delay analysis based on CPM programmes. Without a scheduling analysis, it is very difficult, if not impossible, for the courts to discover the true relationship between delays caused by both parties, recognise whether two or more delays are concurrent, and provide corresponding remedies.

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[452] 双方互有过错

[453] Refer to： https://baijiahao.baidu.com/s?id=1561316301691058&wfr=spider&for=pc

[454]最高法（2013）民一终字第 1 号

Having studied recent cases determined by the SPC, three approaches appear to be provided by the courts against delays caused by the mixed fault of both parties.

a. Apportionment

Where both parties have liability for delay, based on the available evidence, the courts will first conduct a qualitative analysis of the extent of each party's fault and liability for the delay and then, if possible, identify who bears the main responsibility for the delay, to determine the percentage of delay damages to be shared by the parties.

For instance, in *Hulun Buir Lianhua v Guangsha*, it was determined by the court of first instance that, as both parties had liability for the delay, pursuant to Article 120 of CCL they should bear their own liabilities respectively. As the employer, following the judgement made by a separate proceeding, had already paid damages to the contractor, and taking account of the fact that the contractor was more at fault than the employer, and as it was difficult to quantify the loss and default taking consideration of all the circumstances, the court *zuo qing* determined that the contractor should compensate 60% of the loss suffered by the employer.

In *Zhejiang Dadi v Tanghua and others,*[455] it was found that the main contractor *Zhejiang Dadi* illegally sublet highway work to an individual *Tanghua*, who had no qualifications to conduct that work. Delay was caused by the subcontractor's poor performance, the main contractor's poor management and delay to resume the works after termination of the subcontract. It was held by the courts of first and second instances that the main contractor should take the main responsibility for the delay, and therefore bear 90% of the delay-caused loss, the subcontractor was also at fault for entering into an illegal subcontract, therefore bore 10% of the loss.

In *China State Construction v Kunshan Chaohua,*[456] it was found by the court of first instance that the employer had problems including subletting the earthworks for foundations to a third party resulting in a delay to the contractor's subsequent work, and there was a delay by a nominated subcontractor in installing fire-fighting systems. Therefore, the employer should take main responsibility for the delay; the contractor had problems including a lack of workers, subletting works to 11 subcontractors without prior approval and poor management and therefore should take secondary liability for the delay. Taking into account the extent of the fault of each party, the court of first instance *zuo qing* determined that the employer should bear 60% of the delay-related loss, and the contractor take the remaining 40%. Interestingly, it was held by the SPC that the employer's act was the dominant cause of delay, and the employer should therefore accept 90% of the delay liability; the contractor, who also had defaulted to some extent, should bear 10% of the liability.

[455]（2011）安徽省高院，皖民四终字第 00100 号

[456] (2014)最高法，民一终字第 310 号

b. Parties bearing their own loss

When the courts establish that either party has fault or responsibility for delay to final completion, and the evidence provided by the parties is insufficient for the court to recognise the extent of each party's liability, the court is unlikely to support either party's claim for compensation for delay-related loss and the parties, therefore, have to bear their own loss.

For instance, in *China Construction Engineering Bureau 3rd v Shaanxi Xiyue villa,*[457] it was held by both the court of first instance and the SPC that both employer and contractor bore responsibility to some extent for the delay in completion of the project. The employer had failed to arrange sufficient payment on time; the contractor also had problems with poor management and performance, as well as re-performance of the works. It was held that both parties had jointly rendered a delay to the completion; therefore, the courts supported neither the contractor's claim for loss of idle construction resource, nor the employer's counterclaim for liquidated delay damages – each party had to bear its own loss.

In *Tianjing Haitai*, as discussed above, it was concluded by both the court of first instance and the SPC that the contractor had delayed the completion of the works but the employer had delayed arranging advance and interim payments on time. Both parties were in breach of contract, and the evidence provided by them could not enable the courts to precisely quantify the EOT that should be awarded as they were unable to precisely allocate the parties' responsibility for and fault in the delay in completion. Therefore, after a comprehensive consideration of both parties' performance, the courts did not support the claims raised by either party requesting the counterparty to bear liability for the delay.

c. The employer takes sole liability

In some cases where the date of completion had already passed, the employer ordered new variations to the contractor. It was held by some courts that the employer should take full liability for the delay because the employer's act was deemed a confirmation of EOT.

For instance, in *Henan 6th construction v Henan Qijun,*[458] where the contractor failed to complete a sales and service centre by the completion date of 26 December 2003, the employer issued variations on 18 December 2003 and in March 2004, and the project was completed in May 2004. It was held by the courts of first, second and third instance that the employer had no right to receive delay damages from the contractor as its act of issuing variations after the completion date was deemed to allow the contractor to continue the works. In fact, the time had already been extended by the employer.

Interestingly, this judgement coincided with the Prevention Principle in English law that, regardless of the contractor's delay, since the employer had ordered variations

[457] (2007)最高法，民一终字第 10 号

[458] (2011)郑州中院，郑民再终字第 120 号

after the date of completion, he had to allow the contractor to finish the additional work in a reasonable time thereby losing his entitlement to liquidated delay damages. The case also aligns with the special status of concurrent delay in English law, under which the variation has a concurrent effect with the contractor delay events occurring after the completion date. As discussed above, heated debate in English law continues in this regard. The 11th edition of *Keating* proposed that an EOT of commensurate length should be awarded immediately after the existing completion date, and the contractor should take responsibility for the remaining time after the EOT. However, this argument has not yet been recognised by the courts and it was recently held in *Carillion Construction Limited*[459] that whether the EOT should be awarded continuously is a question of contract. Nevertheless, the remedy in English law is that, regardless of the contractor-caused delay, an EOT with a length at least commensurate to that of the delay caused by the variation after the completion date should be awarded to the contractor following the *Malmaison* approach. The contractor is thus relieved of liability for delay damages for that period of delay. However, whether such an approach is commonly accepted by courts in China is as yet unclear since the case cited here was determined by a relatively low-lever local court only.

d. Summary

Essentially, the approaches in (a) and (b) above seek to follow the approaches established by Article 177 of the GRCL regarding the allocation of responsibility in civil juristic acts. The apportionment approach above was established by courts based on the first approach of the GRCL; however, the grounds relied upon are not the precise quantification of the delay liability, which could only be achieved by employing authentic delay analysis methods, but a subjective approximate percentage of liability allocation as determined by the courts through an impressionistic qualitative analysis and common sense. The second approach was adopted by the courts based on the second approach of the GRCL. While in practice the loss suffered by both parties cannot be equally shared through the approach adopted by the courts, the effect of a shared obligation can be approximated by eliminating the parties' right to claim liability for delay from each other. In practice, due to the growing complexity of construction, there are few projects where contractors or employers can completely avoid delay. In a comprehensive project, it can always be found that the delay is caused by mixed faults from the parties involved. The normal remedies will be the approaches provided in Sections (a) and (b) above plus the approach to EOT quantification discussed in Section 3.2.2. However, it is found that the quantification conducted by Chinese courts usually relies neither on the schedule analysis nor on calculations based on logic relations and taking account of the necessary criticality, but simply aggregating the length of excusable delay. It again cannot ensure a precise remedy for the parties.

[459] *Carillion Construction Ltd v Devonport Royal Dockland* [2003] BLR 79

This reflects how, in China, the EOT analysis methods employed by the courts are still somewhat undeveloped. The absence of an authentic delay analysis method hinders the courts' ability to precisely allocate delay liability and determine remedies; in fact, the courts merely provide an approximate justice to parties. This is, on the one hand, caused by the judges' underdeveloped judgement skills and expertise in construction cases and, on the other, by the legal culture discussed above: courts are not good at scientific analysis and break-down analysis; their concern is mainly to reconcile parties' interests rather than to provide absolute justice or precise remedies to individuals, and people are content with an approximate or even implicit justice.

4.5.4 Consideration of ownership of the float

In China, because little scheduling analysis is used in litigation, very few disputes about the ownership of the float – which should be established in the CPM schedule – come to lawsuits; therefore courts' attitude to it is unclear, leaving a legal gap in this regard.

4.6 EOT-related damages

4.6.1 In the UK

Relation between EOT and damages

In the UK, damages caused by delay are two-fold: damages to the employer and those to the contractor.

In case of delay, if the contractor's entitlement to EOT is established, this has the direct result that the contractor is relieved from the employer's delay damages; if it is established that time has become at large, the contractor is relieved from liquidated damages but retains the burden of unliquidated damages.[460]

However, if claims are made under the contract, the establishment of EOT entitlement has no necessary relationship to damages to the contractor. In some events, EOT may coincide with damages to be awarded to the contractor, while the contractual and legal grounds for awarding time or loss and expense differ.[461] Therefore, to claim costs of prolongation caused by EOT, claimants should further test the compensability of delay by reference to the contract provisions and law.

Principle of damages calculation

In English law, theoretically, every breach of contract will give rise to an entitlement to damages for the innocent party; however if no loss has resulted from the breach, the claimant will be entitled to nominal damages only.[462] Therefore, to claim damages, the claimant has the burden of proof to demonstrate that the defendant's

[460] Seb Oram, supra note 343
[461] Christopher Ennis, supra note 315
[462] Idem,

act of breach has indeed brought about loss to him; he is required to show what part of the claimed loss has been solely caused by the defendant in order for substantial damages to be recovered.[463] In English law, the standard of proof in civil cases is limited to "the balance of probabilities".[464] To achieve that, causation has to be established, as discussed in Chapter 3, and the primary approach is "but for" test.

Besides burden of proof, the level of damages is further limited by the doctrine of remoteness of damages: loss will be recoverable only if it satisfies the test of remoteness. Specifically, in the law of tort, loss must satisfy the test of foreseeability; in contract law, the test of remoteness is applied against the background of the circumstances existing not at the time of breach but at the time of making the contract.[465]

In the scope of contract law, a well-established principle for assessing damages for breach of contract derives from *Hadley v Baxendale*, from which two rules were established: the first that "damages in breach of contract are only those which flow naturally from the breach",[466] and the second that damages which are not directly caused by the breach may also be recovered provided that (a) there were special circumstances surrounding the contract that was brought to the attention of the defendant, or (b) the terms of the contract provided for the situation in question.[467] Therefore, in the sense of EOT claims, in accordance with the first rule, the parties' direct costs caused by delay should be recoverable, and in terms of the second rule, the parties' indirect costs caused by delay may also be compensable depending on the terms of contract, or such items may have been reasonably contemplated and foreseeable at the time when the contract was formed.[468]

EOT-related damages and test of the compensability of delay

As a general principle, if a delay in completion is caused by the employer, the contractor is also entitled to damages under two headings: actual loss suffered, and profit of which the contractor has been deprived.[469] Similarly, in accordance with the rules established by *Hadley v Baxendale,* the first type of damages should be recoverable, but the recoverability of the second type is a question of fact and depends on the foreseeability of the events when the contract was formed.

In English law, claims can be made through two approaches: under Common Law or based on the provisions of the contract. In the first type of claim, the contractor can claim any direct loss or lost profit, but must establish causation between employer-caused delay and his loss and demonstrate that the loss is not too remote. However, in the second type, the contractor cannot rely on delay events for which an EOT is awarded to claim loss and expense. The EOT has no necessary relationship

[463] Keating, p.353
[464] Supra note 45
[465] Chang Lu, supra note 318, p.344
[466] Idem
[467] Chang Lu, supra note 318, p.345
[468] Burr, supra note 11, p. 21-010
[469] Murdoch, supra note 406, p.308

with loss and expense although some events that trigger EOT are the same as those triggering the reimbursement of losses and expenses. This is coincidental; the recoverable losses and expenses caused by the delay solely depend on the contract provisions, such as the Relevant Matters stipulated by the JCT contract.[470]

If delay damages are claimed under Common Law, the following items of damages can usually be claimed-：

a. Immediate costs

These are costs incurred by unexpected prolongation, including increased costs caused by changed working conditions, acceleration, lost productivity, costs of idle equipment, deterioration and the replacement of materials, price inflation in materials and salary and site overheads. Notably, in accordance with *B Sunley v Cunard White Star,* the costs of idle equipment will only be compensated based on the costs of depreciation and maintenance rather than the current hire price in the market.

b. Head-office overheads and profits

If the project is prolonged by the employer's fault, the contractor is also entitled to compensation for head-office overheads and profits because "the contract is making a smaller contribution to these business expenses than it should, or that the organisation is being tied up so as to prevent it from earning the necessary contribution to head-offices expenses elsewhere".[471]

In practice, to avoid the onerous burden of proving the actual amount of head-office overheads and profits, contractors in the UK are likely to use a formula approach to calculate and present the amount, and this is generally acceptable by courts unless it is used recklessly without consideration of the true facts and circumstances.[472]

It is noteworthy that the above is merely applied to delay that is purely caused by the employer's breach of contract. If delay is caused by *force majeure*, neutral events or is a concurrent delay, the contractor's delay damages will not be recoverable[473] due to the principle of burden of proof and the "but for" test, unless the contractor can prove the particular loss caused by the particular employer breach.[474]

4.6.2 In China

Relationship between EOT and damages

In China, delay may also bring about damages for both parties. In accordance with Articles 107, 112 and 113 of CCL, if a delay is caused by the contractor, he should

[470] Christopher Ennis, supra note 315
[471] Murdoch, supra note 406, p.231
[472] Idem
[473] Keating, p.353
[474] *SCL protocol*

not only accept liability for the delay but also continue performance (it provides a *de facto* EOT with liability to the contractor), take rectification measures, and pay damages to the employer. Conversely, if it is proved that the contractor has no responsibility for the delay, he is at least relieved from liability for damages to the employer. If it is found that the delay is caused by the employer's breach of contract, he may also receive damages from the employer and in both situations the contractor is entitled to an EOT free of liability.

Therefore, in China, at the level of law, whether an EOT free of liability is granted is a condition precedent to whether to relieve the contractor of his duty to pay damages, while whether the employer needs to pay damages to the contractor depends on whether the employer has breached the contract. In practice, if the contractor merely wishes to be relieved from employer delay damages, he needs only to rely on a liability exemption clause to justify the delay, while if he wishes to claim damages from the employer pursuant to Article 113 of CCL, he needs also to prove that the delay was caused by the employer's breach of contract. In this sense, as in the UK, an EOT will not necessarily bring about contractor delay damages; however, the EOT is a necessary, but not sufficient, condition of contractor's damages. Therefore, as in the UK, to claim prolongation costs caused by an EOT, claimants should also further test the compensability of the delay by reference to contract provisions or the law.

Principle of damages

In China, the primary principle of damages applied in contract law is found in Article 113 of CCL:

> If either party fails to perform its obligations under the contract or does not perform its obligations as contracted and thus causes losses to the other party, the amount of compensation for the loss shall be equivalent to the loss actually caused by the breach of contract and shall include the profit obtainable after the performance of the contract, but shall not exceed the sum of the loss that might be caused by a breach of contract and has been anticipated or ought to be anticipated by the breaching party at the time making of the contract. (Translation)

In accordance with the above, it can be concluded that:

a. Despite a lack of express wording, this indicates that loss will not be recoverable if it is not caused by the counterparty's breach of a contractual obligation, and therefore causation needs to be established to substantiate the damages.

b. Loss will not be recoverable unless it satisfies the foreseeability test.

c. The full compensation approach shall be followed to assess the damages; generally, punitive damages are not allowed.

d. Generally, obtainable profit is recoverable, while its magnitude is a question of fact and depends on the judges' discretional power.

Therefore, in general, Chinese principles of damages assessment, while rather rudimentary, are similar to those in the UK, *inter alia* those established by *Hadley v Baxendale*.

Contractors' damages

Following the principles of Article 113 of CCL, if an employer's delay brings about a loss to the contractor, the contractor is entitled to receive compensation for the actual loss – which should be foreseeable at the time of contract formation – and expected profit. Therefore, as in the UK, upon a delay caused by the employer's breach of contract, unless otherwise stipulated by the contract, the contractor is entitled to damages under two headings: compensation for direct loss and compensation for lost profit. However, unlike English law, Chinese law, as well as the general principle, expressly enumerates the employer's acts which may entitle contractors to delay damages. Among others, Articles 257, 258, 259, 278, 283 and 284 of CCL, and the SPC's judicial guidance and interim opinion towards construction contracts in 2004, 2014 and 2019 as well as "The minutes of a meeting of civil and commercial trails" in 2016 are relevant.

In practice, because employers generally focus primarily on timely or even early completion, few focus on charging *yuqi weiyuejin.*[475] The primary and eventual function of almost all contractors' EOT claims is not to receive an EOT only, but to demonstrate an entitlement to EOT and then to further claim damages caused by employers' delay, or claim damages caused by related measures, such as acceleration, to mitigate or rectify employers' delay where contractors' EOT can be established but no EOT has been awarded. Nevertheless, the condition precedent to claim both headings of loss, i.e. loss arising from EOT or acceleration, is a sound substantiation of the entitlement to EOT.

However, no express stipulations can be found from litigation practice or judicial guidance to support acceleration claims. By studying the available case reports issued by the SPC in relation to EOT, it is found that very few disputes were raised by litigants in this regard. Nevertheless, as claims of acceleration are also a question of costs, these may be addressed more often through mechanisms of variation, and because in China the practice of cost estimate authentication is more developed and common in construction projects, disputes rarely occur in this regard and few are submitted to litigation.

Regarding the contractor's damages resulting from an EOT, this is also a question of a cost estimate. To prepare and evaluate this, practitioners must follow the principle of damages detailed in Section 4.6.2.2 above. In many cases, authentication institutions were engaged by litigants and courts to make cost estimates. It is also helpful for all parties and courts to reach a reasonable settlement or determination.

[475] Means the agreed anticipated fine against breach, it is an akin liquidated damages for delay in completion.

In studying recent case reports in relation to EOT claims issued by the SPC, the following salient points were found:

a. Normally, courts allow direct costs as claimed by the contractor for labour, equipment, materials, HSE measures and price inflation of materials. However, the contractor needs to support claims with evidence, and these costs are normally calculated on a *quantum meruit* basis. For instance, in *Railway Bureau 22nd v Anhui Ruixun,*[476] the project was suspended from January 2004 to March 2005. The contractor requested compensation for loss for idle resources. From July to 6 December 2014 there were monthly and daily records of idle resources signed by supervisors; at other times there were monthly records only but no daily records. The courts only allowed costs for the period from July to 6 December 2014.

b. As the courts tend to use a *quantum meruit* basis to calculate delay damages, management fees, overhead costs and lost profit, while allowed by CCL, are seldom supported by the courts. For instance, in the *Anhui Ruixun* case above, the increased management fees and lost profit were rejected by the court of first instance because they could not be ascertained.

   In the *Kunshan Chaohua* case, where the project was delayed for various reasons, the contractor claimed additional site and head-office overheads and travelling expenses. The SPC only allowed the direct costs of building rental and salaries for guards and workers, but refused other items because these expenses were regular expenses for the contractor and were not a direct loss caused by the delay.

Obviously, in terms of EOT-related damages, the UK courts have a much more open attitude: they not only allow claims for items such as overheads and costs,[477] but also allow some items, such as overheads, to be proved by formula. In China, the courts have taken a cautious and even dogmatic attitude to parties' damages claims, requiring hard evidence for each item. Items of compensable loss are normally limited to these direct costs and expenses which can be calculated on a *quantum meruit* base. Management fees, overheads and lost profits are rarely, if ever, allowed by courts in China. This draconian attitude is in sharp contrast to their relaxed attitude to delay analysis and EOT determination.

4.7 Factors of compliance with legal and contractual obligations and procedures

4.7.1 Failure to bear burden of proof and provide causation

In the UK

[476] (2014)最高法，民一终字第 56 号

[477] Refer to the case of *Walter Lilly*

In the UK, claimants bear the burden of providing evidence for every element of their cases, including damages that flow from the alleged breach. It was held in the *John Doyle* case:

> The claimant has the burden of providing both the fact and the amount of damage before he can recover substantial damages. This follows from the general rule that the burden of providing a fact is upon him who alleges it and not upon him denies it, so that where a given allegation forms an essential part of a person's case the proof of such allegation falls to him.[478]

This, in EOT claims, contractors bear the burden of proving liability, causation and the amount of damages incurred. The burden is on the contractor to establish the proximate cause between the employer's events of delay and damages. If loss caused by breach cannot be isolated from that attributable to other factors, recovery may not be accepted by courts.[479] For details, please refer to Chapter 3 regarding global claims in the UK.

While many claimants may breach legal requirements, that breach is typically manifested by global claims, the definition and impact of which has been discussed in Section 3.6.1 of Chapter 3. In practice, in EOT claims, it mainly takes the form of total time or total cost claims, although commentators claim that these concepts are distinct.[480]

Total-time claims are those in which the EOT is calculated by reference to the time required, to ensure that the total time allowed under the contract, including any EOT, is not less than the total time actually spent on the project. Essentially, such claims are made in the following circumstances:

> …in which all delay for which the claim is made is alleged to be caused by matters at the employer's risk, there is no prima facie evidence that any of the delay is caused by the contractor, but the contractor is simply unable to say how much time has been caused by each event for which the employer is liable".[481]

In practice, total-time claims are normally presented by contractors through as-plan *v* as-built analysis, in which decision-makers' attention is drawn to the inference that the only reasons for the difference between the plan and the actual progress are those caused by the employer's risk. Alternatively, they may be submitted by as-plan impacted analysis, in which only the impact rendered by the employer's risk event to the planned schedule is analysed.[482]

A total-cost claim has the same rationale as a total-time claim: it is one in which all cost for which the claim is made is alleged to be caused by matters at the employer's

[478] Jeremy Winter, supra note 425
[479] Burr, supra note 11, p.21-009
[480] Burr, supra note 11, p.21-009
[481] Idem, p.19-002
[482] Andrew Archer, Global claim-global confusion?, *Construction Law Journal*, 2017(33)

risk, since the contractor cannot exactly quantify each heading with evidence; therefore a global claim is made.[483]

Apparently, such approaches to EOT claims are not consistent with the principle of burden of proof, which requires the plaintiff to establish a clear chain of causation to prove proximity between the cause and effect. In such circumstances, in accordance with English law, the justification of that claim approach is a question of law, while time extensibility is a question of fact.

Traditionally, courts in English law were not in favour of this because it: 1) tends to ignore other explanations for delay for which the employer is not responsible; 2) may deny the employer the opportunity to examine the precise evidence; and 3) may shift the burden of proof from the contractor to the employer, or even the court.[484]

With the passing of time, the courts were sympathetic to contractors in cases including *J Crosby v Portland* and *London Borough v Stanley Hugh Leach*, and it was held that such claims could be allowed as long as the contractor could prove that it was impossible or impractical to separate the consequences of each event, and if it could be ensured that there were no delay events for which the employer had no responsibility. More sympathy was evoked by the *John Doyle* case, where the judge felt that the whole matter of global claims should be treated with common sense: even if there were delay events for which the employer was not responsible, if such events were trivial and insignificant, the global claim would not fail in its entirety.[485] That position was endorsed by the later leading case *Walter Lilly*, which established a far more generous way to allow global claims: it was held that the contractor does not even need to demonstrate the impracticability of separating the consequences of each event, and the global claim would not necessarily fail simply because events for which the employer is not responsible contribute to it. However, it was held that events for which employers are not responsible should be omitted from the global claim, leaving the loss attributable to events from which the contractors are entitled to recover loss, and it was re-confirmed that contractors bear the burden of establishing that the losses they have incurred would not have been incurred without the employer's breach.

Both *John Doyle v Laing* and *Walter Lilly* indicate that courts in the UK have recently taken a much more open, flexible and practical attitude, not only to global claims but also to the standard of burden of proof.[486] In particular, the *Walter Lilly* case established that a global claim will not necessarily be rejected if the causal link cannot be established by the claimant because it was impracticable or very difficult for him to relate every penny of loss to each event giving rise to the claim. To win a claim of loss and expense resulting from delay and disruption, contractors merely have to prove on the balance of probabilities that：1) events triggering the entitlement to compensation for loss and expense have indeed occurred, 2) such events have

[483] Anneliese Day, supra note 161
[484] Idem
[485] Anneliese Day, supra note 161
[486] Julian Bailey, supra note 20

resulted in delay and/or disruption, 3) such events have resulted in loss and/or expense. Furthermore, it was clearly indicted by paragraph 467 of the judgement that in accordance with the contract (JCT) the "details" to support the claim shall be as "reasonably necessary" only.

Interestingly, as regards the basis for the calculation of compensation, although the contract states that the loss and expense shall be "ascertained", the judge in *Walter Lilly* decided that "it is necessary to construe the words sensibly and commercially that would resonate with commercial parties in the real world", indicating that "ascertain" does not necessarily mean proving the precise loss in the work; it can be a likely loss.

This flexible attitude to the level of burden of proof is especially significant and useful to the contractor in proving general items, such as preliminary costs and overheads, which are extremely difficult, if not impossible, to support by detailed proof or to precisely ascertain based on a *quantum meruit* basis.

Nevertheless, in the UK, the above does not deny the need for causation in EOT claims analysis. The causation link is still significant in proving damages and UK practitioners are still not encouraged to make wide use of global claims to recover damages caused by delay.[487] It was stressed in *Walter Lilly* that a contractor must still prove its claim as a matter of fact and, in particular, it must demonstrate three things on a balance of probabilities. This could still be a difficult task in the absence of direct causal links.[488]

In China

In China, the general rule is that claimants bear the burden of proving claims;[489] furthermore, their proof should demonstrate the causation of their claims.[490] Therefore, theoretically, claimants have similar legal obligations to their colleagues in the UK to demonstrate EOT claims by providing sufficient proof to establish the causation of claims, i.e. they should at least provide relevant proof and ensure this proof establishes a causation between an employer delay event and the contractor's loss.

A. Burden of proof

Generally, the courts in China request that claimants provide the necessary proof to demonstrate their claims; otherwise, the claim may fail. For instance, in *Zhejiang Joyou v Leshan Jianwei*, the contractor contended that they should not take responsibility for the delay due to diverse employer's delay events. This was rejected by the courts because the contractor had failed to provide evidence to prove it.

[487] Keating, p.339
[488] Anneliese Day, supra note 161
[489] Article 64 and 65 of *Civil Procedural Law of PRC*.
[490] Chang Lu, supra note 318, p.337

However, in practice, courts in China require a rather low level of burden of proof due to their rather generous and even permissive attitude towards the global claim, which is commonly adopted in China.

This permissive attitude is due to the fact that scientific scheduling analysis methods are not commonly employed in the construction industry in China. As EOT claims in China are commonly settled by the parties in a retrospective, global manner at the end of projects, almost all EOT claims are presented to the courts through a form of global claim. Under such circumstances, with complicated interactions between multiple delay events and without a strict scheduling analysis, it is extremely difficult for the parties or the courts to identify clear causation between specific delay events and the contractor's loss. Therefore, in global claims, in practice, contractors merely need to provide proof of the employer's delaying events and their own loss. They take a simple impressionistic approach to establish the relationship between them. Furthermore, unlike in the UK, claimants in global claims in China are not required to demonstrate the impossibility of isolating damages and relating them to employer delaying events; therefore, the standard of the burden of proof borne by claimants is much lower than that in English law.

Furthermore, in practice in China, global claims normally cause the burden of proof to be transferred to employers. Usually, when delay damages are claimed by employers in China, they merely need to prove that the contractor had indeed delayed completion of the works by proving the true commencement and completion dates. However, to defend global claims, employers bear the burden of proof in proving the delay has indeed been caused by the contractor's risk event. Moreover, as the all-or-nothing effect of global claims has not been recognised by Chinese litigation practice, to lessen their liability and increase the likelihood of receiving delay damages, employers need try their best to enumerate contractor delaying events as much as possible.

For instance, in *Jiangsu Guangxia v China State Construction Engineering Bureau 2nd,* [491] where a project was delayed by various events, it was held by the court of first instance that the employer had no right to receive liquidated delay damages from the contractor as they had failed to prove a delay in the completion of commercial and residential buildings, although it held that buildings 1# and 2# were caused by the contractor. In the *Tianjin Haitai* case, the court neither awarded EOT to the contractor nor allowed the employer's claim for liquidated damages because the employer failed to prove that the contractor had caused a delay in completion.

Notwithstanding the low level of burden of proof to demonstrate pure EOT claims, contractors in China have to bear a strict burden of proof in EOT-related cost claims. They have to prove that they have indeed suffered loss, and normally courts accept first-hand proof or calculation through a *quantum merit* basis only. As discussed in 4.6 concerning EOT-related damages, courts normally allow compensation against direct loss only; management fees and overheads are not likely to be accepted.

[491] (2017) 最高法, 民终 428 号

Furthermore, courts are unwilling to allow evidence deriving from calculation by formula; however, they may accept t calculations by cost quota as issued by relevant government authorities. For instance, in *Shanghai Ou'gang v Zhejiang Shunjie,*[492] one authentication institute, assigned by the court of first instance, used a local cost quota to calculate EOT-related costs including site overheads, costs of demobilisation, idle equipment and labour. The report was accepted by the court of first instance, but the employer appealed that the costs had not been supported by evidence by the contractor and therefore should not be admissible. The appeal was rejected by the courts of second instance because the standards relied upon by the authentication entity were admissible. However, this determination has been challenged by scholars[493] because in accordance with Article 25 of the document of SPC's diverse stipulations regarding proof of civil litigation cases:

> If the litigant, who bears the burden of proof for events in the case under trial, fails to------ submit relevant documents with the result that authentication cannot be made based on fact, he shall bear the legal result of failure in the burden of proof.

Pursuant to 47.1 of the same document, the evidence may include various types; all evidence including the authentication should be examined by courts and both parties, and should pass the prior examination. Therefore, even though the courts have ordered an authentication institution to examine the costs and time caused by delay, the claimant still bears the burden of proof in submitting relevant records and proof to the authentication institute to prove the loss has indeed occurred. As the contractor failed to do so in this case, the authentication entity therefore made a calculation based on a theoretic method to infer the amount of costs. In this sense, the court's determination is questionable.[494]

B. Causation establishment

In China, pursuant to Article 66 of Several provisions of the Supreme People's Court on evidence in civil procedures,[495] in civil proceedings, "judges shall make a comprehensive examination and judgement of all evidences from the degree of connection of each evidence with the fact of the case and the relations between the evidence". Furthermore, pursuant to Article 9 of the PRC's Judicial explanation regarding Tort Liability Law, where a plaintiff claims damages, the act of tort must have a necessary causation with the plaintiff's loss. Therefore, in EOT claims, claimants should support their claims by connecting all the evidence and establishing causation between the alleged delaying events and their loss, otherwise, the case may be rejected by the courts.

For instance, in the *Fujian Yongtai* case, it was held by the court of second instance that the contractor's delay in completion was a fact. As to his assertion that the delay

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[492]（2008）沪高民一（民）终字第 106 号

[493] Zhu Shuyin，*Aggregation of Trail Views on Cases of Construction Projects*, China Legal Publishing House, 2018, p.879

[494] Zhu Shuyin, supra note 493, p.879~882

[495] (法释〔2001〕33 号)

was caused by the employer's failure to pay, according to the principle of "he who asserts must prove", he should prove that the employer's action in late payment had indeed brought about a delay in completion. It was held by the SPC that this allocation of the burden of proof was appropriate: it stated that because the contractor failed to prove that the delay was caused by a delay in payment, it was inappropriate to contend that the employer had delayed the project.

In practice, contractors sometimes successfully demonstrate the causation between employer-delaying events and delay; this renders the courts more likely to determine in favour of the contractors. For instance, in the *Chengdu Dading* case, as discussed above, after many employer-caused delays, the contractor continued to submit EOT claims for each delay event. Although some were rejected by the supervision, it established an overwhelming impression on the courts, and it was held by the court of first instance and the SPC that the employer should bear the dominant responsibility for the delay over all the lifecycle of the project. The contractor merely bore the responsibility for failing to provide effective coordination.

Unfortunately, because of the factual difficulty described in the third paragraph of Section 4.7.1 above, very few contractors address EOT claims in this way. From studying case reports determined by the SPC in relation to EOT claims, it was found that almost all the cases were comprehensive claims under different headings in terms of time and costs and occasioned by different events. In almost all these cases, the contractors exhaustively enumerated all kinds of employer delay events, which may or may not have had a logical relationship or interaction with one another, to demonstrate that the delay in completion was solely caused by the employer. Without exception, they formed total time claims. However, they commonly simply listed the employer-caused delays but presented little analysis to demonstrate detailed causation between the delaying events and the delaying effect. Some contractors did not even mention delay in progress but merely listed employer delay events which might result in delay, and then alleged the employers should be liable for the delay.

Given the frequency of global claims in China which fail to establish causation, the courts in China react inconsistently: they may simply reject the claim as the contractors have failed to fulfil the burden of proof, or *zuoqin*g accept it to some extent based on common sense or concerns of fairness and balancing the interests of the parties. For instance, in *Ningxia Xinhenan v Ningxia First Construction,*[496] it was stipulated by the contract that a delay payment would entitle the contractor to an EOT. The contractor contended that the liability for delay in completion should be allocated to the employer due to its failure to pay promptly. This argument was rejected by both the court of first instance and the SPC because, despite the contract provisions, it failed to quantify the extent of the EOT and also failed to prove the EOT or provide any proof, such as an as-built progress table, for the courts to determine it. Therefore, the employer should not take all the responsibility for the delay but, taking account of the fact that the employer had indeed delayed payment

[496] (2017)最高法，民再 324 号

to the contractor which must have affected progress to some degree, therefore *zuo qing* allocated responsibility for the delay in a proportion of 30:70 to the contractor and employer respectively.

In the *Gansu Hongqi* case, the contractor claimed many discrete EOTs by enumerating multiple employer-caused delays in progress. As no detailed substantiation of these EOTs was provided, the courts had to analyse each EOT claim. Some were rejected; for instance, the contractor contended that EOT should be awarded for the disruption caused by decoration work conducted by other contractors. While the courts agreed that the disruption would have caused some delay, the contractor's contention was rejected because he failed to raise the claim at the time of performance and demonstrate it in front of the courts. As to the variation updating elevator access work, given that the parties agreed on the variation without agreeing on a timescale, the courts *zuo qing* awarded 30 days' EOT. Regarding a variation for work on heating, the contractor claimed 72 days' EOT, but this was rejected by the courts because the contractor's argument was insufficient to prove the variation had led to delay. While taking into account that delay had indeed occurred to some extent, the court *zuo qing* awarded 30 days' EOT again.

All these cases indicate that the position of judges in China is extremely inconsistent in relation to the causation of claims: some make determinations based on whether causation of claims has been established although no concept of causation has been stressed by courts in China yet; others do not care about causation but tend to determine cases based on common sense and seek to reconcile the parties. Nevertheless, it is clear that when EOT is qualified and determined, they commonly lack a sense of forensic scheduling analysis, but tend to quantify EOT based on common sense and individual impressions.

4.7.2 Time bar clauses for EOT claims

In the UK

In the UK, the time bar is a long-argued topic in construction claims. Almost all standard-form contracts require contractors to provide notice when a delay occurs or is likely to occur in order to retain their entitlement to EOT. The notice of claims derives from the implied duty of notification, which has a mitigating effect on the party in breach. In practice, it can give an early warning to employers to take necessary measures against potential problems in order to avoid or mitigate loss or delay, and can also allow CAs to keep contemporaneous records for claims analysis.

The first position of the UK courts was that if a time bar clause applied to claims, it should be expressly stipulated by the contract that timely notice was a condition precedent of entitlement to compensation; otherwise it would not be applicable;[497] here, *Bremer Handelsgesellschaft mbh v Vanden Avenne-Izegem* is relevant.

[497] Knowles, supra note 54, p.112

In many cases, the application of a time bar clause was accepted by the courts; however, it also received widespread criticism as its application would allow employers to benefit from their own wrongdoing simply because contractors failed to comply with procedures, and such a situation would be counter to equity as held in the case *Parkin v Thorold*: "------ it holds it to be inequitable to insist on such form, and thereby defeat the substance". These arguments have long baffled practitioners, and many contractors have used the Prevention Principle to defend their rights against claims. Such arguments were rejected by an Australian case, *Turner Corporation v Austotal*. However, another Australian case of *Gaymark v Walter* took a much more sympathetic attitude toward the contractor, holding that the time bar clause conflicted with the Prevention Principle; therefore, even though no notice of claim was made, the employer had no right to liquidated damages since the delay was of its own making.[498] Such an attitude was strongly criticised by commenters in the UK and was held not to be sound English law; the case of *Steria v Sigma* is relevant.

However, recently the courts' attitude has become much more flexible in the UK: in *Obrascon Huarte Lain v Gibraltar* (2014), Justice Akenhead held that a time-bar clause in a FIDIC contract should be interpreted broadly:

> …no reason why this clause should be construed strictly against the Contractor and can see a reason why it should be construed reasonably broadly, given its serious effect on what could otherwise be good claims for instance for breach of contract by the employer.

In particular, he held that the onus of proof was on the employer to establish that the notice was given too late. In the meantime, he interpreted that an EOT could be claimed either when it was clear that there would be a delay or when the delay has at least started to be incurred; thus a larger window for the contractor to raise notice was created. He also held that in the absence of express stipulations of the form of notice, any form – such as minutes of a meeting – can be considered as notice.

Therefore, regarding the enforceability of time bar clauses, it seems that the courts in the UK currently take a rather flexible attitude to interpret these in a wider and more practical way.[499]

In China

In China, in accordance with Article 119 of CCL, a party to a contract is obliged to take necessary measures to avoid the loss growing; otherwise he is not entitled to compensation for the larger loss. In this sense, where a delay will occur on the employers' responsibility, the contractors shall serve a prior notice within reasonable time to mitigate the loss.

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[498] Idem, p.119

[499] Krisanthi Seneviratne & Gladstan Michael, Disputes in time bar provisions for contractors' claims in standard form of contracts, *International Journal of Construction Management*, 2018 (Sep.)

Following this principle, and also affected by the FIDIC contract, construction contracts in China now also commonly include time bar clauses requiring contractors to give notice of claims within a certain timescale. However, their enforceability also depends on the court's interpretation. It was found that Chinese courts are very inconsistent in this regard: in some cases, they follow a strict approach; in others, out of considerations of fairness and to maintain a balanced relationship between the parties, they allow EOT even though the contractors have failed to submit a claim or notice of a claim.

For instance, in *Jiangxi Guangxia*, due to a series of employer events, the project was delayed; however, the SPC did not allow the contractor EOT as he failed to follow the contractual procedures to claim it. In *Anhui Ruixun*, works were suspended from November 2006 to April 2009, but the contractor failed to submit a claim for EOT-related damages in that period as per the contract, which clearly stated that timely submission of claims was a condition precedent to compensation; therefore his claim was rejected by SPC because there were no legal grounds for it.

However, judges in other cases have adopted a relatively liberal attitude. In the *Kunshan Chaohua* case, the SPC followed the same approach as taken by Justice Akenhead in *Obrascon Huarte* in the UK, and held that the notice of the claim and the claim could be submitted in a flexible form. In this case, it was found by the court that delay-related loss occurred at different stages of the project. Although the contractor failed to submit claims and related documentation within 28 days of the events under claim, he stated his claim many times at regular site meetings, and submitted reports to the supervisor and employer, pointing out the delay events and requesting EOT, and also reported that a loss in costs had occurred. The SPC affirmed that the employer was well aware of the contractor's intention to claim and, therefore, could not contend that damages should not be recovered simply because the contractor failed to follow the contractual procedure as this was against the principle of fairness.

Apparently, this inconsistent position was recognised in the courts, and judicial interpretations were promulgated by the SPC and the high courts of some provinces. At the beginning of 2019, the SPC issued its judicial explanation regarding construction contract disputes, in which a more liberal attitude was shown in Article 6:

> Where litigants agreed that EOT shall be confirmed by the employer or supervisor or other manner, and the contractor fails to obtain confirmation of EOT, but can prove that he has applied for EOT from the employer or supervisor and the events for EOT are in line with the contract, if the contractor asserts that EOT relied on this reason, the People's court shall support it.
>
> Where litigants agreed that in a failure to submit an application for EOT within an agreed timescale, no time will be extended, it shall be dealt with as per the agreement, except if: 1) the employer agreed to extend the time after the timescale, 2) the contractor can reasonably plead his failure to do so. (translation)

Interestingly, the SPC's interpretation differs from English law. It holds that employers have the right to unilaterally award EOT beyond contractual provisions, while in English law employers have no right to do so. The other point is that if contractors can justify their failure to submit a claim promptly, they still have the opportunity to avoid a time bar clause being enforced against them. It seems that this position was taken in the newest 2017 edition of the FIDC contract in this regard. Therefore, both points give contractors a greater chance to defend themselves from the application of a time-bar clause.

4.7.3 Failure to award or improper award of EOT

In the UK

In English law, it is held that even though, against the employer's prevention, an EOT mechanism has been established by the contract, if the mechanism is not properly performed by the CA, the completion time may still become at large, the contractor is entitled to finish the works within a reasonable time, and the employer will lose their entitlement to liquidated damages, and may be entitled only to unliquidated damages. It was held in *Miller v London County Council*:

> The power to extend the contract was not in this case exercised within the time limited by the contract, the owners are not in the position to claim liquidated damages.

Furthermore, if the employer extends influence to or colludes with the CA in awarding EOT and therefore causes a delay in awarding EOT, it may also render the CA's decision null.[500] It was reported in an arbitration case under the FIDIC contract that the contract expressly stated that the EOT award by the CA should be subject to prior approval by the employer. The CA was effectively prevented from discharging his duty to award the EOT as the employer never gave approval. As a result, it was held by the tribunal that the contractor should not be obliged to complete the works by the completion date but merely needed to do so within a reasonable time.[501]

However, upon employer's prevention, within what "reasonable time" the EOT should be awarded, and after an extension within what "reasonable time" the contractor should finish the remaining works, are always debatable topics in the UK, and to a large extent are questions of fact.[502]

Therefore, in English law, both the employer and the CA need to act prudently and actively to award EOT without delay. A "wait and see" approach may lead to a risk that the employer will lose their entitlement to liquidated damages.

In China

In China, there is no legal rule regarding when the EOT should be awarded, and no remedies are provided against failure to award EOT on time or correctly. Since few

[500] Burr, supra note 11, p.6-140
[501] P. Cowan, supra note 355, p.592
[502] Max Twivy, supra note 434

disputes about delay in awarding EOT have been raised in the courts, the courts' position in this regard is unclear. Given this legal gap, resolution may depend on the contract. However, given that in practice employers always take an overwhelmingly predominant position in contract negotiation and formation, such contract stipulations are not easy to establish in China. Therefore, employers and supervisors in China tend to "wait and see" where EOT claims are analysed, causing great difficulty to contractors who always need a timely EOT to update their schedules and arrange work reasonably.

4.7.4 Mitigation

In the UK

In the UK, the principle of mitigation of loss can be stated thus: a party cannot recover: 1) damages resulting from the other party's breach of contract if it would have been possible to avoid any damages by taking reasonable measures; and 2) damages which it has avoided by taking measures even if such measures were greater than what might be considered reasonable; however, the cost of taking reasonable measures to avoid potential damages is recoverable.[503]

However, "it does not impose on the plaintiff an obligation to take any step which a reasonable and prudent man would not ordinarily take in the course of his business".[504] The innocent party, faced with different ways of mitigating, does not have to act reasonably in exercising a choice.[505]

Notably, the burden of proof is on the defendant to prove any failure to mitigate.[506] If he succeeds, the effect will be:

> There cannot be both extensions to the full extent of the employer's culpable delay, with damages on that basis, and also damages in the form of expense incurred by mitigation, unless it is alleged and established that the attempt at mitigation, although reasonable, was wholly ineffective.[507]

In China

Chinese law also recognises the principle of mitigation. In accordance with the primary legal principles of good faith and fairness, both the party in breach and the innocent party have a duty of mitigation to the counterparty. Specifically, where the contract is not performed or imperfectly performed, the party in breach shall first take necessary measures to mitigate the effect of the breach.[508] If the performance is prevented by *force majeure*, the affected party is obliged to notify the other party to reduce and mitigate the loss to that party.[509] Where the contract is breached by one

[503] Chappell, supra note 6, p.125
[504] *British Westinghouse v Underground Railways*
[505] *Strutt v Witnell*
[506] Keating, p.9-025
[507] Chappell, supra note 6, p.127
[508] CCL, Article 107
[509] Idem. Article 108

party, the innocent party shall take reasonable measures to prevent the loss mounting; failure to do so will render the enlarged loss not recoverable, while reasonable costs arising from mitigation measures are recoverable.[510]

Given the above, China has generally followed the same principles of mitigation as the UK; however their depiction is somewhat general and may, therefore, result in a lack of clarity, therefore the courts need to further interpret them when they are applied to construction claims; for instance, how to analyse the reasonableness of the measures and the reasonableness of the cost of mitigation.

4.8 External environment of EOT claims analysis

4.8.1 Legal environment

As discussed in Section 2 of this chapter, China has a unique legal system and therefore constitutes a legal environment distinct from that in the UK, which has a great impact on EOT claim analysis. Given that fundamental underlying reasons determine the similarities and differences in almost all factors under comparison, a particular comparison in this regard is dispensed with here but is amplified by the other comparisons.

4.8.2 Legal position of the CA

Contract administrator in the UK

Generally, in English law, CAs have two primary functions: as the employer's agent and as a decision-maker.

The role of the employer's agent is the primary function of a CA; when acting in this role, normally the extent of his powers should be expressly stipulated by the contract. As a general rule, courts take a rather restricted attitude to awarding implied powers to a CA. Particularly, it is a well-established principle in English law that the CA merely has the right to execute the contract but no right to change, increase or omit terms of the contract.[511] In the case of EOT claims, contract administrators shall strictly follow procedures in making claims and determine claims based on risk allocation as established by the contract, but they have no right to create an obligation to either party and no right to award EOT under Common Law. However, it is also the case that employers shall be responsible for CAs' acts, such as fraudulent misrepresentations or any fraud committed while carrying out their duties within the assigned scope.[512] CAs are personally responsible to third parties when they act beyond their authority.[513]

[510] Idem, Article 119
[511] Murdoch, supra note 406, p.250
[512] Keating, p.478
[513] Murdoch, supra note 406, p.250; and Keating, p.14-055

Where a CA, empowered by the contract, exercises judgement and reaches decisions on various matters, he acts as an independent decision-maker but not an employer's agent. To perform that duty, CAs normally act as quasi-arbiters where they are requested to make decisions on claims and disputes between the parties. Their decisions should be based on their expertise and professional discretion, and they should act fairly and impartially[514] although the extent of their power and the effect of their decisions rest with the contract. When this role is enacted, it was held in *Chambers v Goldthorpe* that a CA cannot be sued for negligence by the employer. However, this was overturned in *Sutcliffe v Thackrah*; therefore it seems that when this role is acted, CAs still have a duty of care to employers and have no immunity from negligence claims. Nevertheless, courts in the UK do not suggest that CAs have a voluntarily assumed duty of care to contractors to ensure their decision is fair to the contractor as there is no normal or collateral contract relationship between them.[515] Although it was held in *AMEC v Secretary of State for Transport* that when acting as decision-makers CAs do not need to act based on the rules of natural justice, pursuant to *John Mowlem v Eagle Star*, if a CA "colludes with the employer instead of exercising independent judgement, or deliberately misapplies the contract, [this] may result in a liability to the contractor under a tort known as wrongful interference with contract".[516] Therefore, in English law, where a CA makes a decision in an EOT claim, although he does not need to follow the rules of natural justice, he still has a duty of care to the employer to not overvalue the EOT or damages to the contractor, and he also needs to base his decision on his sole discretion, and not deliberately misapply the contract.

Contractor administrator in China

In China, theoretically, the CA in a construction project is the supervisor.[517] The legal position of supervision was established in Chapter 3 of *Construction Law*, which stipulates that employers must use a supervision system in certain construction projects, such as public and large and middle-size projects. Supervisors have the right to represent employers in monitoring contractors in aspects of quality, time and costs. Specifically, the supervisor's work scope is defined as quality, progress and cost control; management of the contract and information; and coordination between construction parties.

Regarding progress management, the SPC's *Judicial Explanation of Construction Contract*[518] specified that disputes around the quantity of works between construction parties should be solved based on a site visa signed by the supervisor, and EOT should be confirmed by the same visa. Therefore, at the level of the law, in projects where the supervision system is applied, EOT should be supported by a visa certified by the supervisor.

[514] Murdoch, supra note 406, p.263
[515] *Pacific associates v Baxter*
[516] Murdoch, supra note 406, p.265
[517] 监理
[518] Article 14 and 19 of editions 2004 and 2019 respectively

However, compared with English law, the legal position of supervisors in China is rather vague. *Construction Law* merely imposes duties but does not empower supervisors. Pursuant to Article 32, supervisors merely act as representatives of the employers; therefore, unless the contract stipulates otherwise, they have no role as independent decision-makers. Pursuant to Articles 34 and 35, supervisors need only to conduct work assigned by employers in an objective and fair way and not to collude with contractors to undermine the employers' interests. In effect, supervisors merely work for and are responsible to employers; they are a third party between the employers and contractors and have neither direct legal relations with nor any obligation to act fairly to contractors. In any decision which may undermine contractors' interests, contractors have no right to sue supervisors, even under the law of tort. Since supervisors have not been empowered with the role of independent decision-maker, their decisions have no binding effect on employers, and are subject to be opened, reviewed and amended by employers. In this sense, at the level of the law, regarding EOT claims, a decision may be provided by supervisors but in essence, it depends on the employers' discretion and willingness. This commonly results in a situation where employers act aggressively and dominate the process of EOT claims analysis and determination, and supervisors are inactive in claims determination and act for the benefit of employers.

4.8.3 Dispute resolution

In the UK

In the past, upon a dispute in construction, practitioners had two options: litigation or arbitration. It was criticised that both these proceedings were costly and time-consuming and, therefore, highly inefficient for the industry.[519]Therefore, in accordance with the *Housing Grants, Construction and Regeneration Act 1996*， a compulsory fast-track dispute resolution mechanism of adjudication was established and is commonly used in construction projects in the UK. It enables disputes such as EOT claims to be analysed and settled more swiftly and professionally. Furthermore, because an adjudicator can overture the CAs' decision, the adjudicators' determination has a legally binding effect on the contracting parties. It also exerts indirect pressure and constraint on CAs, compelling them to analyse and decide claims more fairly and reasonably.

In China

Comparatively, China has not established a mechanism for adjudication or any other fast-track dispute-resolution mechanisms. Although mediation is recommended by the law of China, since no express legal provision defines its operation mechanism or the legal effect of its result, it is rarely applied in the construction industry. Therefore, in disputes about EOT claims, other than a costly and long-term process of litigation or arbitration, there is no authentic independent authority from whom practitioners can seek recourse and, therefore, most of claims are unilaterally

[519] Michael Latham, *Constructing the Team*, 1994,

determined by employers only. This imposes very few constraints on employers to analyse and determine claims fairly and carefully.

4.9 Conclusion

This chapter has explained how EOT claims analysis is performed by law in the UK and China respectively, in terms of legal environment, proof of EOT claims, and substantial and procedural law.

China and the UK have distinct legal environments for EOT claims analysis due to the distinct differences in their legal systems, legal resources, jurisprudence, legal principles, as well as their legal culture and the general public's mindset and behavioural modes. These differences have a fundamental impact on almost all aspects of EOT claims analysis in relation to litigation, legislation, contract drafting and project performance. Comparatively, China has many inherent practical legal problems in EOT claims, such as lack of pertinent law, a low-quality judiciary, and practitioners who lack a sense of contract law and analytical modes of thinking and commonly have an anti-litigious mindset – all these greatly hinder claims from being carefully and scientifically analysed and settled.

Regarding proof in EOT claims, the courts in the UK request a relatively high burden of proof: claimants should not only provide factual proof, but also establish a connection between all proofs and therefore provide analytic proof such as scheduling analysis to establish a causation of claims. In China, however, the courts commonly stress only factual proof, little analytic proof of scheduling analysis is adopted, and the judges' determination is based more on simple analysis and personal impressions and inferences.

As regards approaches to EOT analysis, the UK courts have established a clear framework with some compulsory steps. Demonstration of EOT claims is mainly realised by establishing a causation of claims based on relevant proof. For that purpose, English law courts always insist on adopting a logical and scientific approach to break down and analyse claims and try to avoid decisions based on impressions and inferences. Furthermore, it has been found that in recent years courts in the UK, in order to adapt to the increasing complexity of modern construction and make determinations with commercial sense, are attempting to change their traditional dogmatic approach to EOT claims and take a rather more liberal and practical position on general matters such as global claims and ascertaining EOT-related damages, offering some leeway for practitioners to make their claims in a more practical but unscientific way where it is difficult to establish strict causation or scientifically analyse claims.

Comparatively, in China, due to a lack of relevant law pertinent to the detailed situation of delay, EOT claims are mainly analysed and determined by courts in accordance with a few general legal rules and discretional power. There is no common recognised standard or approach to analysing EOT yet, and the judges' determination of cases shows substantial inconsistency. In effect, therefore, there is

no relatively stable framework in EOT claims analysis approaches yet. As scheduling analysis methods are seldom employed by litigants or the courts, the entitlement to EOT is likely to be determined based on inference and impression. Nevertheless, generally, compared with their rather vague position and generous standards of the burden of proof in entitlement to EOT, the Chinese courts maintain a draconic and conservative attitude to quantifying and awarding EOT-related damages.

To comply with legal and contractual obligations and procedures, a failure to meet the burden of proof and establish causation is very likely to lead to invalid claims in the UK, while in China the courts merely stress the obligation to provide factual proof only. Regarding the enforceability of time-bar clauses, courts in both jurisdictions have recently taken a relatively sympathetic attitude to the contractor, while Chinese courts give significantly more leeway to contractors. Finally, the English legal system provides a sound external environment for EOT claims analysis through the common use of analytic thinking modes, fast-track dispute resolution mechanisms, and an independent CA role. Comparatively, China has not achieved substantial development in these aspects yet.

Chapter 5

Contract provisions regarding EOT claims analysis

5.1 Introduction

As discussed in Chapter 3, factors determining or affecting EOT claim analysis are not only provided in law, but also established by contract. This chapter therefore offers a further analysis of how these factors determine or affect EOT claim analysis under standard forms of contract used in the UK and China in terms of concepts of the EOT claims analysis framework detailed below.

5.2 Role of the construction contract in EOT claims analysis

5.2.1 In the UK

As discussed in Section 3.2.1 of Chapter 3, the English legal system has no pre-set web of legal provisions which covers all the potential events across society. Legal rights, obligations and remedies are mainly established by contract. The applicable law has minimum intervention in contract formation and performance, and this is generally limited to: 1) providing implied terms incorporated into the contract, 2) providing contract interpretation.

Therefore, in frameworks for EOT claims analysis, compared with China, the construction contract plays a more important part in the UK. Specifically, among other factors, the construction contract normally provides:

a. programme and progress control mechanisms

b. delay risk allocation

c. procedures for claims submission and settlement.

Based on relevant contract procedures, it may also determine or affect the factors below to a great extent:

a. delay analysis approach;

b. basis, criterion and proof for EOT and compensation for cost assessment.

5.2.2 In China

China is a Civil Law country and, as outlined in Section 3.2.1, the primary task of the law is to establish a predetermined set of rules which can be applied across society. Comparatively, the law has much more power to intervene in contract formation and performance; in many cases, it directly establishes the mandatory formation of contracts as well as the contracting parties' rights and obligations in private contracts. The law is not only a basis to be relied on to interpret contracts but also governs all contracts within its jurisdiction; contracts must be consistent with

the law and are merely instruments to supplement and amplify the law. Therefore, compared with the UK, in China, the contract has a lower decisive role in EOT analysis.

However, the freedom of the private contract is still recognised in China to the extent that it is not against the law. Furthermore, as Chinese law is a hybrid of the Common Law and Civil Law systems, and because of the great influence of the FIDIC contract on the domestic construction industry, standard-form construction contracts in China have followed the many formations and principles established by standard-form construction contracts in the UK; therefore, the role played by the construction contract in EOT claims analysis cannot be underestimated.

Specifically, in China, other than delay risk allocation which is mainly determined by the law and merely supplemented by the contract, the construction contract plays almost the same role as the contract in the UK in each factor of an EOT claims analysis framework. Therefore, the following research will focus on the factors in the EOT claim analysis framework.

5.3 Standard forms of contracts in the UK and China and development of EOT mechanisms

In the modern construction industry, it is common practice to use standard-form contracts in procuring construction projects. These save the parties time and reduce disputes over specific terms during negotiation, ensure an equitable distribution of risk, and formalise relatively common contractual provisions, thus strengthening industry contractual practice.[520] Their common usage also gives the domestic construction industry a relatively unified practice in EOT claims. It is, therefore, feasible to conduct this research by focusing on standard-form contracts as they can to a great extent determine the unified practice of construction within a jurisdiction.

5.3.1 In the UK

Types of Standard forms of contract

In past years, diverse standard forms of construction contracts were provided by different entities for different types of projects and procurement methods. As time has passed, JCT and NEC contracts are now dominant in the UK. The JCT contract still holds a primary position in the construction market despite a decrease in its application. According to the *National Construction Contract and Law Survey* in 2015,[521] the application of the JCT contract decreased from 60% in 2011 to 39% in 2015, while that of the NEC contract saw an increase from 16% in 2011 to 30% in 2015. It is said that the reason for the increased application of the NEC contract was, at least in part, because it was mandated for public-sector projects by the Cabinet

[520] Murdoch, supra note 406, p.101~103

[521] Fergus Aitken, NEC vs JCT, *Construction Frameworks for Yorkshire & Humber*, 2018

Office in 2008. Application of the FIDIC contract also increased, from 3% in 2011 to 7% in 2015, even though it is not primarily intended to be used in the UK.

JCT

Of all standard forms of contract, the JCT contract is the longest-standing in the UK, used since 1909.[522] Over this time, practitioners have become highly familiar with its philosophy and provisions, and it therefore has a dominant influence in the UK construction industry.

The JCT contract is a typical traditional construction contract, assuming a conflictual relationship between contracting parties. Additionally, it is characterised by the broad use of traditional contract terminology, and a high degree of certainty over its legal meaning as a result of exposure to and tests by legal challenge over a considerable period. It contains detailed provisions expressed in lengthy sentences and many defined terms and cross-references, and is not particularly easy for users to understand. However, it contains limited details of processes and a timetable for project management and, therefore, is easy to operate.[523]

The JCT contract was frequently updated to keep abreast with the constant development typical of the construction industry. At the time of writing, the newest version is the 2016 edition of the JCT contract.

Compared with the 2011 edition, the 2016 edition makes discrete but light modifications in diverse provisions, to bring all its content up to date.[524] Notably, as regards EOT claim mechanisms, creating a timeframe for information to be provided and assessed strengthens communication and increases focus on the timing of claims,[525] thereby providing more certainty around potential claims.[526]

NEC contract

The New Engineering Contract, known as the NEC contract, is used for engineering projects only, although drafted for both building and engineering projects.[527] The first version was published in 1993 as a response to growing discontent with contractual procedures and the prevailing adversarial atmosphere in the construction industry in the UK.[528] It is said that the purpose and philosophy of the contract are:

a. flexibility;

b. clarity in language by using common words and the present tense;

[522] Murdoch, supra note 406, p. 104
[523] Fergus Aitken, supra note 521
[524] Idem
[525] Helen Johnson, JCT 2016-What's changed? 2016, https://www.kennedyslaw.com/thought-leadership/article/jct-2016-whats-changed
[526] Idem
[527] Chappell, supra note 6, p.418
[528] Murdoch, supra note 406, p.114

c. stimulating good management and dispute avoidance through contractual procedures that contribute to better management practice and a forward-looking co-operative team spirit.[529]

The NEC was significantly amended in its third version in 2005, known as NEC3, and was further updated in 2006 and 2013 respectively with minor modifications and supplements, and finally updated to the current version of NEC4 in 2017. It is suggested that NEC4 embraces the digital changes in the construction industry, *inter alia* BIM.[530] It follows the same structure and philosophy as NEC3 and is, therefore, an evolution but not a revolution.[531] It stresses providing further stimulus to good management and has inspired an increased use of the NEC contract in new sectors and markets.[532]

Specifically, amongst other changes, the main supplements or modifications regarding EOT claims include: 1) changing or adding terminology, especially increasing the term of the "dividing date" in clause 63.1 for the time limit for claim analysis; 2) refinements to the provisions regarding programme and early warning, i.e. the provision of treated acceptance of the programme is added to solve the impasse of the lack of an available programme for delay analysis; an early warning provision provides default periods for early warning meetings to help parties mitigate risks quickly and efficiently; 3) adding the option of a period of negation for potential disputes and identifying opportunities to save cost and increase programme efficiency.[533]

FIDIC

FIDIC forms of contract are a set of standard forms of contract used primarily for international projects. To suit different procurement modes, they cover diverse forms of contract in their red, silver and yellow book contracts. Since they are provided by FIDIC rather than a domestic UK institution and are mainly applied in the international market, they are not a domestic standard form of contract in the UK. However, as they originated from the domestic ICE contract in the UK and were updated simultaneously with the latter until the 6th edition of the ICE contract, and therefore strictly follow English legal principles and terminologies in the provisions regarding drafting, it is not uncommon for them to be used in UK projects; therefore, they can be categorised as a standard form of contract established under English law. Furthermore, as they provide a template for standard forms of construction contract in many countries, including China, they essentially link standard forms of contract in English law and Chinese law and, therefore, should be particularly explored in this research.

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[529] Idem

[530] Refer to Foreword of NEC4

[531] Preface of NEC4

[532] Matthew Smith, Overview of NEC4, 2017, http://m.klgates.com/files/Publication/1f243bc9-a1ea-414b-b245-af60b3a9da2d/Presentation/PublicationAttachment/c2fe868f-c125-40b2-b618-b75e86f603cf/NEC4_slides.pdf

[533] Jonathan Shaw, NEC3 to NEC4: Key Changes to the Engineering and Construction Contract, 2018, https://www.fgould.com/uk-europe/articles/nec3-to-nec4-key-changes-to-the-engineering-and/

Historically, FIDIC contracts have experienced several updates. The first edition was issued in 1957 as an international counterpart to the 4th edition of the ICE contract. More recently, the 4th edition, issued in 1987, was reprinted in 1989 and 1992 to follow the 6th edition of the ICE contract. The 5th edition contracts were published from 1999 with radical changes – the rearranging structure and re-writing of the provisions – although the principles had not been radically changed, and from then on FIDIC contracts started to diverge from the developments of the ICE contract. In this edition, various contracts were published for different types of projects, hence it is known as the FIDIC rainbow suit of 1999. The newest edition of the FIDIC contract has been used since 2017, and is called the FIDIC rainbow suit 2017. This research covers only the Red Book contract, the typical contract in the FIDIC contract family. This new edition follows the structure of the previous edition but its provisions are significantly expanded, and some new mechanisms such as communication, advance warning and dispute avoidance are added.

Following the development routine above, in terms of EOT claims it has undergone radical developments as below:

a. From the 3rd edition, delay caused by non-disclosure of information became compensable; the contractor was requested to submit a programme.

b. From the 4th edition, the procedure and timing of claims were expressly established; the engineer was requested to act as a quasi-arbitrator to determine claims and disputes; the parties were requested to attempt amicable settlement of disputes before dispute resolution; DRB was introduced in dispute resolution.

c. From the 5th edition, the engineer's quasi-arbiter role was precluded; the timeframe for claims and determination became much clearer; a strict time bar clause for claims was established, and adjudication (DAB) was introduced into dispute resolution, replacing DRB.

d. In the 6th edition, the engineer's quasi-arbiter role is resumed; procedures for management and claims are given greater emphasis; additional timeframes for claims are established; time bars for claims are enforced, and employers' counterclaims should also follow procedures for claims and be subject to a time bar; communication and dispute avoidance are encouraged; DAB is replaced by DAAB.

5.3.2 In China

FIDIC contract and standard-form contracts in China

In China, there was no standard form of construction contract before the 1980s. After the country entered the market economy, some forms of construction contract were developed. In the mid-1980s, China started to use funds from international entities such as the World Bank to develop infrastructure projects and, following their requirements, the FIDIC contract was mandatorily used in these projects. From that

time, Chinese practitioners became aware of modern construction contracts, and came to understand and accept the essential philosophies, terminologies, principles and mechanisms of by FIDIC contract.[534] Therefore, the FIDIC contract has had substantial influence on the Chinese construction industry in the fields of project management and contract drafting.[535] Based on templates and concepts derived from the FIDIC contract,[536] a DMCC[537] was published by the Ministry of Construction and popularised in a range of domestic projects from the 1990s. With the passing of time, very few foreign funds are now used in domestic construction projects, but some projects continue to use the FIDIC contract. Today, it is popular for projects to use the domestic DMCC as a template for contract drafting in China.

DMCC

As discussed above, the current DMCC is a standard form of construction contract drafted through broad reference to the provisions and structure of the FIDIC Red Book contract. From its first edition, the DMCC has to date undergone four updates: the changes, *inter alia* as regards EOT claims, are briefly summarised below.

a. The 1st edition (GF-91-0201) was published in 1991, highly influenced by the planning economy.[538]

b. The 2nd edition (GF-1999-0201) was issued in 1999. It generally followed the structure of the 4th edition FIDIC Red Book and adopted many of the latter's rules and philosophies while diverging from the FIDIC contract in several areas.[539] This edition introduced a definition of the concept of a "claim" and established a clear procedure and timeframe for a claim.[540]

c. The 3rd edition (GF-2013-0201) was issued in 2013. The structure was changed to correspond with the 5th edition of the FIDIC Red Book and some important provisions and mechanisms were expanded. It was intended to adjust and create a more balanced business relationship between the parties, and emphasised references to the law and other industry documentation, to expand the field of its application. Regarding EOT claims, it followed the 5th edition of the FIDIC Red Book by establishing a strict time bar clause for claims, increasing the parties'

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534 http://www.baidu.com/link?url=O__qUVNMqmByNQoQOlarHYoH63DqmxdlZgFacOcGn5miAFbt4U7X00W-cJFCYqV4PVXqKq8f-O5D7L7ZJgvSEallYQdNUU0z0cypEBi0EXq&wd=&eqid=8556e1ac0001f255000000065cdad77a

535 Idem

536 https://baike.baidu.com/item/建设工程施工合同/2158025?fr=aladdin

537 建筑工程示范合同文本

538 Ou Haiyan, *A comparative study on standard building Contract-in the perspective of China and England*, Law Press, 2010, p.37

539 He Baizhou, *Adaptability study of FIDIC condition of Contract to Chinese contractual environment*, Chinese Construction Industry press, 2008, p.14~24

540 Ou Haiyan, supra note 549

agreement and the supervisor's determination of disputes, and added a quasi-adjudication mechanism to dispute resolution.[541]

d. The 4th edition (GF-2017-0201) was issued in 2107 based on the 3rd edition. The structure and most provisions were unchanged except for insignificant modifications and supplements in aspects of defect liability, retention money and day-work.[542]

5.3.3 Summary

A general comparison of standard form contracts in the UK and China is provided in Table 1 below. Each standard form contract has its own philosophy, features, advantages and disadvantages, and therefore results in different approaches to EOT claims analysis. Furthermore, these contracts are not fully independent from one other; they have inherent underlying interactions. Generally, we can conclude the following:

The standard form of construction contract in the UK has two types: the traditional contract and the other is the new style of contract. The traditional contract is represented by the JCT contract, under which the parties' relationship is adversarial; therefore, in essence, this is an adversarial contract. This type of contract broadly adopts legal terminology and cross-references between clauses, creating a precise legal document that is easy for the parties to use in litigation. This fits the litigious legal culture in the West but may result in lengthy and costly dispute-resolution processes.

In contrast, the new style of contract is represented by the NCE contract, which aims to create a partnership or co-operative relationship between the parties and is, therefore, a non-adversarial contract. It features plain language and clear timeframes for project management and is, therefore, a useful management manual for the contracting parties but not a precise legal document to be used by the parties to make claims or defend their rights in litigation.[543]

The FIDIC contract, through a broad use of legal terms, stresses the parties' obligations, liabilities and entitlements. Under this contract, the parties' interests strictly conflict with each other and their relationship is purely adversarial, as was recently reinforced by strict time-bar clauses of claims. However, it has recently taken steps towards the new style of contract in terms of management orientation and mutual communication by increasing provisions regarding the management schedule and timeframes as well as dispute avoidance. In this sense, under the FIDIC contract, the framework for delay and EOT claims is a hybrid of the above two types of contract. On the one hand, it allows claims to be resolved promptly; on the other, it

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[541] https://baike.baidu.com/item/建设工程施工合同/2158025?fr=aladdin

[542] http://www.baidu.com/link?url=SyE3CGgy131hQfRMox_hj-GuaDrL0Ano5LAP0eoUk5CEw7r6X8xF4U6dImyp-pr3gSByb0TxtYxpYWhV-BHdga&wd=&eqid=be458fac00058aa8000000065cdaf04a

[543] Murdoch, supra note 406, p.115

provides sufficient legal grounds for the parties to seek recourse to litigation to resolve unsettled claims.

The current edition of the DMCC generally follows an old (5th) edition of the FIDIC Red Book, characterised by an adversarial relationship between the parties and strict procedures for claims. Compared with recent developments in standard form contracts in the UK, *inter alia* the FIDIC contract, the DMCC appears somewhat out of date with developments in the modern construction industry, and obsolescence makes the claims analysis framework established by the DMCC inappropriate; therefore, further comparison research is conducted on factors and concepts in EOT analysis frameworks in the rest of this chapter to reveal the points which require improvement.

Table 1: General comparison of standard form contracts in the UK and China

Contract name	Application states	Newest version	Legal source	Contract source	Application scope	Adversarial or partnership	Management -oriented	Level of ease of understand -ing	Level of legal certainty
JCT	UK	2016	English law	Standard form contract in 1870	All types of project	Adversarial	no	low	high
NEC	UK	2017	English law	NEC	Engineering and others	Partnership	yes	high	low
FIDIC	International	2017	English law	ICE	Engineering	Adversarial	yes	mid	high
DMCC	China	2017	Chinese law	FIDIC	Engineering and others	Adversarial	no	mid	mid

5.4 Involved parties and decision-makers for claims

JCT

In the JCT contract, the parties' relationship is a traditional "master-and-servant" one. It seems that the JCT realised its shortcomings in this field, and made an improvement in the newest edition of 2016 by adding Schedule 8 (item 1), allowing the parties shall work with each other cooperatively and collaboratively, showing good faith, and a spirit of mutual trust and respect. However, the provision is still limited to a general spirit only; due to a lack of supporting concrete measures, it is unlikely to have a concrete effect on changing the longstanding contractual relationship.

Under this contract, the parties involved in EOT claims assessment may include the employer, contractor, Architect/CA and Quantity Surveyor. Throughout the assessment process, the Architect/CA (referred to as "the Architect" hereinafter) plays a core role, not only coordinating all parties involved, but also assessing and determining claims.

Pursuant to the JCT contract, the Architect is an independent professional person nominated by the employer or agreed upon by the parties.[544] He has two roles: an administrative role as the employer's agent and the role of independent certifier – a decision-maker, granting certification and providing an "opinion" or "decision" by exercising his judgement, opinion or skill.[545] In performing this role, the Architect should act independently based on his own discretion rather than carrying out the employer's instructions or wishes. The employer should not impose undue pressure on or collude with the Architect to exercise such duty. Regarding EOT claims, since the Architect is required to give an opinion on EOT,[546] and decide whether to provide EOT[547] or deduct EOT;[548] the Architect is apparently empowered to act as an independent decision-maker to make a sole determination of whether and to what extent to adjust the completion date. Additionally, he is requested to decide EOT according to the relatively subjective and vague criterion that his decision should be "fair and reasonable",[549] which thus confers on him a rather wide discretionary power to analyse and determine EOT. Furthermore, pursuant to Section 2.28.5 of the contract, after the completion date and before the date of practical completion, the Architect has a greater discretional power to cross-review past EOT, comprehensively analyse the effect of Relevant Events, and determine a new completion date regardless of whether the Relevant Events had been considered by himself or notified by the contractor in the past. In these circumstances, the contract indicates that the Architect can even award an EOT without a claim having been submitted by the contractor. Clearly, this mechanism, on the one hand, provides ample scope, opportunity and time for the Architect to thoroughly analyse the delay effect of the Relevant Events, allowing a justified, fair and reasonable EOT decision; on the other, it gives the Architect maximum power to adjust the completion time in the case of Relevant Events to avoid time becoming at large as per English law.

NEC

In contrast, the NEC contract endeavours to foster a collaborative teamwork relationship between the parties involved. Unlike the JCT, since its early editions the NEC contract aimed for parties to work in a spirit of mutual trust and cooperation,[550] a spirit concretely embodied in a set of processes requiring the parties to work

[544] Section 1.1 of SBC/Q 2016
[545] Murdoch, supra note 406, p.258
[546] Section 2.28.1 of SBC/Q 2016
[547] Section 2.28.2 of SBC/Q 2016
[548] Section 2.28.3 of SBC/Q 2016
[549] Section 2.28.1 of SBC/Q 2016
[550] NEC4, Clause 10.1

collaboratively to resolve problems promptly and proactively through giving early warnings and notice of compensation events. Using such mechanisms, EOT claims are likely to be solved more swiftly through the mutual agreement of the parties.

In the NEC contract, EOT claims must involve the following parties: the client (the employer in past editions), contractor, project manager and supervisor. Surprisingly, unlike other standard-form contracts, no express duties or authority are defined by NEC4 for the project manager and supervisor: their authority can be found in the detailed provisions of the contract. However, from a comprehensive study of the contract, the project manager has a similar role to that of the Architect in the JCT contract in acting as a CA, and the supervisor has a duty to monitor the contractor's work in terms of technique and quality. In practice, the project manager is the decision-maker for EOT claims which are submitted by notification of compensation events. Specifically, the project manager is obliged to proactively notify compensation events caused by himself or the supervisor, and instruct the contractor to submit a quotation.[551] Upon notification of compensation events submitted by the contractor, he is also empowered to decide whether or not to extend the completion date, or accept that an EOT should be given and therefore further instruct the contractor to submit a quotation.[552] On receiving the quotation, he is obliged to assess it and accept it or request an alternative quotation[553] or revised quotation[554] and then accept one of these; if he is not satisfied with these quotations, he is obliged to provide his own assessment of the compensation events and decide on EOT.

Based on the above, it can be concluded that:

a. In determining EOT, the project manager acts as an independent decision-maker and should not be influenced by the employer; he is empowered to exercise his own discretion to analyse and determine EOT.

b. The project manager has a more onerous burden than the Architect in the JCT contract. For instance, he is obliged to notify compensation events caused by himself and decide on EOT; he is also required to carefully consider quotations provided under the contract and strictly follow the timeframe for the assessment and decision of compensation events (otherwise it may be deemed that he has accepted the contractor's quotation),[555] If he believes the contractor quotation is inappropriate, he bears the burden of providing his own assessment.

c. The project manager has been empowered with relatively extensive discretional power; for instance, he can proactively notify compensation events caused by himself and determine EOT where no EOT is claimed by the contractor, and if there is no effective programme available for EOT

[551] Idem, 61.1 and 61.2
[552] Idem, Clause 61.4
[553] Idem, Clause 62.1
[554] Idem, Clause 62.4
[555] Idem, Clause 64.4

analysis, he can provide one himself for assessment. However, such discretional power is significantly constrained and much less than that enjoyed by the Architect under the JCT contract. For instance, the project manager has no right to award EOT for compensation events which are not caused by himself or the supervisor or are not notified by the contractor; he must follow the objective criterion in EOT claims analysis that the EOT should be assessed based on a reasonable and up-to-date programme;[556] and he has no right to review past EOT decisions or make retrospective adjustments to the completion time at the end of the project.[557]

FIDIC

As discussed in Section 5.3 above, FIDIC is a typical adversarial contract, characterised by a distinct risk allocation, which provides clear contractual grounds and clear procedures for parties to make claims. It reduces claims to a pure zero-sum game, in which one party's failure means the other's win. Although many provisions regarding communication and dispute avoidance were added in the recent 2017 edition of the FIDIC contract, these do not fundamentally change the inherent adversarial relationship between the parties.

In the FIDIC suite of contracts, the typical contract is the Red Book contract for civil works, in which the parties involved in the process of management include the employer, contractor and engineer. The engineer is an independent legal person or entity appointed by the employer;[558] in accordance with the claims procedure,[559] he is also the decision-maker for claims. However, this role is not completely equivalent to that of the Architect in the JCT contract and the project manager in the NEC contract. Historically, following the principles of the ICE contract, the engineer in FIDIC was conferred with the role of quasi-arbiter when requested to make a decision.[560] This contract arrangement was widely criticised as it was unrealistic in practice, and in many Civil Law and Islamic Law countries the role of the independent engineer did not align with the applicable law or local construction practice.[561]

Therefore, in the 5th edition of the Red Book, the engineer's role was substantially altered and it was expressly defined that the engineer should merely act as a skilled professional and was deemed to act for the employer.[562] However, the role of the quasi-arbiter in making decisions in disputes between the parties was deleted and transferred to the DAB; he is now merely requested to make a fair determination of the claim.[563] In such cases, in the absence of clear authority conferred by the FIDIC

[556] Clause 63.5 of NEC4
[557] Idem, Clause 66.3
[558] Clause 3.1 of FIDIC Red Book 2017
[559] Idem, Clause 20
[560] Idem, Clause 2.6
[561] Bunni, supra note 14, p.182
[562] Clause 3.2 of FIDIC Red Book 2017
[563] Idem, Clause 3.7

contract, it is unclear whether the engineer has independent discretional power to assess and determine claims.

However, the position of the 5th edition in this regard was amended again by the recent Red Book of 2017, which clearly states that, when carrying out his duties in the agreement or determination of any matter or claim, the engineer "shall act neutrally between the parties and shall not be deemed to act for the employer."[564] Moreover, the new role of mediator was conferred on the engineer: in disagreements or claims, he is requested to consult with parties, separately or jointly, to achieve agreement.

Given the above, the engineer's new role may have the following impact on EOT claims analysis:

a. The engineer's independent role in deciding claims is resumed; however, the applicability of that role is still questionable.

b. Under the recent FIDIC contract, the engineer – who is merely requested to follow the rather general and vague requirement to "act neutrally" and make a "fair determination" – has considerable discretional power to analyse and determine EOT claims. Under such circumstances, if the engineer is influenced or even controlled by the employer, in practice, claims may not be carefully and reasonably analysed or determined.

c. The problems above, *inter alia* the impracticality of performing the role of independent decision-maker, may be mitigated to some extent by the engineer's new role of mediator. Under the new role, claims are not likely to be thoroughly or strictly analysed; more traditional analysis approaches, such as global or apportionment approaches, may be more likely to be employed.

DMCC

Like the JCT contract, the DMCC is a typical traditional contract under which parties have an adversarial relationship. When a claim is processed, the parties involved include the employer, contractor and supervisor.

The role of the supervisor is equivalent to that of the engineer under the FIDIC Red Book. The supervisor is appointed and paid by the employer, given the powers authorised by the employer and, following legal provisions, represents the employer in inspecting, examining, verifying, testing or accepting matters in relation to construction, and issuing related instructions to the contractor.[565] Although, pursuant to clause 4.4 – like clause 3.7.2 of the FIDIC Red Book 2017 – the supervisor is empowered to "prudently make a fair determination as per the contract" where parties cannot reach agreement or determination upon certain issues, unlike the

[564] idem
[565] clause 4.1 of DMCC 2017

FIDIC Red Book, the DMCC does not include claims in the ambit of agreement and determination by both parties; therefore, no power is expressly conferred on the supervisor to decide claims. Conversely, for claims, unlike the FIDIC Red Book, clause 19.2 provides that in claims submitted by the contractor, the supervisor is merely obliged to conduct an investigation and analysis of the claim, submit a report to the employer for a decision, and then communicate the decision confirmed by the employer to the contractor. The contract clearly indicates that, in claims, the supervisor has the right only to provide factual findings, analysis and recommendations to the employer, while the ultimate decision-maker in claims is the employer rather than the supervisor.

Therefore, under the DMCC, the process of EOT claims analysis and determination is dominated by the employer; the supervisor takes a passive and obedient position to support the employer. Under such circumstances, it cannot be ensured that EOT claims can be fairly or swiftly analysed and determined.

Summary and comparison

A brief comparison of the parties' relationships and the various decision-makers in EOT claims between standard form contracts is shown in Table 2 below.

Furthermore, in accordance with the above, the differences in the relationship between the parties involved and the decision-makers have two main impacts on EOT claims analysis:

a. The relationship between the parties involved may decide the efficiency of EOT claims settlements. Under traditional contracts such as the JCT and FIDIC contracts, the parties were not encouraged to work jointly to identify delay and solve problems promptly; therefore issues were more likely to develop into EOT claims and even disputes. Recently, the FIDIC contract has started to encourage reciprocal agreement and mediation, which may mitigate that effect to some extent but the function needs to be tested in practice. Notably, under the typical traditional contract, the JCT contract, the parties may have more time to consider claims, and EOT claims can then be more carefully and reasonably analysed.

   In comparison, the new style of contract – the NEC – encourages teamwork and partnership between the parties, and delay and EOT claims may be solved more swiftly and efficiently. However, fairness and reasonableness may be prejudiced to some extent as the parties may have insufficient time to investigate and analyse a claim.

b. Under the contracts used in the UK, decision-makers are independent from the contracting parties. They have the right to analyse and determine EOT claims fairly and reasonably way; therefore, the contractor is more likely to receive an EOT following an employer-caused delay. It seems that such contractual arrangements aim to avoid the effect of the Prevention Principle.

In contrast, under contracts used in international markets, although the engineer is empowered to analyse and determine claims by exercising his discretion under the FIDIC contract, this role is not likely to be realised. Under the DMCC in China, the ultimate decision-maker in EOT claims is the employer and, in this situation, it is likely that EOT claims can neither be carefully analysed nor reasonably or swiftly determined.

Table 2：Comparison of parties' relationships and decision-makers in EOT claims between standard form contracts

No.	Contract Name	Type of relationship between contracting parties	CA	CA's role in claims	Level of discretional power of CA in claims	Decision-maker in claims	Criteria for claims assessment
1	JCT 2016	Adversarial	Architect	To grant or deduct EOT	Has relatively high discretional power	Architect	A subjective and vague criterion that the decision is "fair and reasonable"
2	NEC4	Partnership and collaboration	Project Manager	To coordinate parties and determine EOT	Has relatively high discretional power, but is constrained to some extent	Project Manager	An objective criterion that EOT should be assessed based on a reasonable and up-to-date programme
3	FIDIC Red Book 2017	Adversarial but with a stress on cooperation	Engineer	Mediator, decision-maker in EOT and quasi-arbiter	Has great discretional power	Engineer	A rather general and vague criterion to "act neutrally" and make a "fair determination"
4	DMCC 2017	Adversarial	Supervisor	To investigate and analyse claims, provide recommendations to the employer, not notify EOT to the contractor.	Has no discretional power	Employer	No clear criterion

5.5 Delay risk allocation

JCT

The JCT suite of contracts is characterised by a list of Relevant Events giving grounds for EOT and a list of Relevant Matters for delay-related loss and/or expense claims. Therefore, delay risk allocation under the JCT contract is a relatively closed system operated by the employer and the Architect. The Architect has the right to award EOT for events on a certain list only. However, the contractor is unnecessarily

limited by these lists in claiming EOT and or financial compensation. For some events beyond these lists, he can seek the recourse of Common Law to claim that the completion time has become at large.

There is, therefore, a danger that the employer may delay the works in a way that does not fall under the list of Relevant Events[566] and therefore eliminate the right to liquidated damages. To reduce this risk, and based on the experience of the past hundred years, the JCT contract endeavours to exhaustively include all types of delay events caused by the employer in the list of Relevant Events, supplemented by a catch-all provision,[567] to avoid triggering the Prevention Principle.

In effect, the current list of Relevant Events contains four types of event, as below:

a. Common delaying events caused by the prevention, impediment, fault or breach of the employers or their personnel, such as deferment in giving possession of the site, or incorrect instructions by the Architect;

b. Delaying events occasioned by the employer but allowed by the contract, such as variation of or increased works;

c. Events causing frustration of the contract, such as *force majeure*, specified peril, civil commotion;

d. Certain hardship or neutral events, such as exceptionally adverse weather, government actions, or a named specialist being insolvent.

Such a delay risk allocation system is characterised by the points below:

a. Delay risks are allocated thoroughly and generously, on the one hand empowering the Architect as far as possible to extend the completion time against events for which the contractor has no fault and therefore to avoid triggering the Prevention Principle, and on the other hand maintaining a balanced risk allocation between the parties.

b. The description of some Relevant Events uses relatively subjective and vague wording, for instance, “exceptionally adverse weather” and *force majeure*, thus giving discretional power to the Architect to take account of relevant Common Law or practice in analysing and determining claims.

c. Since the JCT contract is mainly used in building works, risks around geology, the ground and adverse physical obstructions, which commonly feature in engineering works, are not stressed or particularly allocated.

d. Risks of time and financial compensation (loss and expense) are separately allocated. The principle expressly indicates that EOT will not necessarily bring about financial compensation to the contractor. The grounds for EOT and financial compensation are distinct.

[566] Chappell, supra note 6, p.23
[567] SBC/Q 2017, Section 2.29.7

e. Compared with generous criteria for risk allocation in terms of time, the JCT contract takes a relatively strict line on risk allocation in delay damages incurred by the contractor. It only compensates for events that fall under Relevant Events and Relevant Matters.[568] Through the divergence between the two lists, the JCT clearly established that delay caused only by Relevant Matters, occasioned by the employer's default or increased works, will be compensable. However, delay caused by neutral events may be awarded EOT but is non-compensable.

NEC

Like the JCT contract, the NEC contract also follows a collective risk allocation approach. All risks of costs and time that should be borne by clients are covered by a single list of compensation events,[569] and the contract provides a unitary ground for contractors to claim and project managers to determine EOT.

Like the JCT contract, the list of compensation events also tries to thoroughly enumerate all types of detailed events against which time and costs could be adjusted, through considerable provisions and supplemented by a catch-all risk clause.[570] The list also contains four types of event: those events caused by the client's default; delay or loss caused by employer's lawful actions; neural events; events of frustration of contract. However, there is a significant difference between the risk allocations established by JCT and NEC contracts. The NEC contract is characterised by the following points.

a. Plain language is commonly used to describe compensation events; the criteria are objective and easily operated by the parties. For some events, detailed assessment criteria are provided to identify the scope within which events are compensable, e.g. adverse weather and physical conditions.

b. The NEC provides much more broad and detailed risk allocation because it aims to be used in a wide range of projects including engineering and building works as well as other projects which adopt new procurement modes and management technologies.

c. Compared with the JCT contract, the risks in engineering projects are stressed e.g. physical obstructions, geological conditions, employer's failure to provide appropriate working conditions or complete information, unnecessary delay caused by test or inspections.

d. The project manager or supervisor's failure to follow management procedures also constitutes grounds for EOT and contract price adjustment. It renders an onerous burden on decision-makers, but enables claims to be more efficiently resolved.

[568] Section 4.22 of SBC/Q 2017
[569] Clause 60.1 of NEC4
[570] Clause 60.1 (14) and (18) of NEC4

e. It has generous criteria for cost risks; in neutral events such as bad weather, the contractor may receive compensation in terms of time and costs.

FIDIC

Like other standard forms of contract under English law, *inter alia* the ICE contract in the UK, FIDIC is drafted on the basis of a sharing of risk between the employer and the contractor.[571] In FIDIC contracts, risks including injury or damages, non-performance, delay in performance and cost overrun are allocated.[572] FIDIC provides a complete mechanism to allocate delay risk in performance to the parties. However, it adopts a different drafting method for delay risk allocation than that taken by the JCT and NEC contracts. The grounds that can be relied on by the contractor to claim EOT are covered by one collective delay risk clause[573] and other discrete clauses.

The collective clause 8.5 stipulates that EOT should be awarded for delay caused by employer's prevention or impediment, variation, exceptionally adverse climate conditions, unforeseeable shortage in construction resources caused by government action or epidemic or increased works quantity. However, there is no express provision as to whether the related costs and/or profit should be awarded for delay caused by these events, thus leaving considerable room for dispute between the contracting parties.

More grounds for EOT and/or related costs compensation are spread across various clauses. They can be categorised into three groups:

a. Events caused by default or breach of contract of employers or their personnel, for which EOT and payment of additional costs plus reasonable profit will be awarded to the contractor;

b. Unforeseen physical difficulties and some Exceptional Events, for which the contractor may be awarded EOT and additional costs;

c. Other neutral events, for which only EOT may be awarded, including delay caused by relevant authorities,[574] exceptional inclement weather, natural catastrophes under Exceptional Events, such as earthquakes, hurricanes or typhoons.[575]

Based on the above, the features of delay risk allocation in the FIDIC Red Book are summarised below.

a. FIDIC follows an approach to delay risk allocation in the UK that comprehensively allocates all common delay risks caused by the employer's fault and supplements this with a catch-all clause to avoid breaching the

[571] Bunni, supra note 14, p.105
[572] Idem, p.106
[573] FIDIC Red Book 2017, Clause 8.5
[574] Idem, Clause 8.6
[575] Idem, clause 18.4

Prevention Principle in English law, or principles of good faith and fairness in Civil Law, and facilitate its operation in all types of jurisdiction.

b. The allocation is made based on the principle of sharing the risk, which creates a relatively balanced business relationship between the contracting parties, which is the core aim of the FIDIC contract.

c. Like the NEC contract, it follows trends in engineering contracts, in which typical risks such as physical conditions are highlighted and allocated to the employer based on the test of foreseeability.

d. Other than certain events, enumerated in the collective clause 8.5, against delay caused by different events, the grounds for EOT, costs and/or profit are clearly prescribed, making it easier for parties to analyse and determine headings of EOT claims.

e. Regarding risk allocation in terms of time, like the JCT and NEC contract, the FIDIC Red Book apportions a relatively generous allocation to the contractor. Regarding risk allocation in terms of delay damages, it is stricter than the NEC contract but more generous than the JCT contract.

DMCC

Regarding delay risk allocation, the DMCC has generally followed the principles, form and approach of the FIDIC Red Book. Specifically, it first provides a collective clause[576] enumerating a list of employer-caused delay events which will entitle the contractor to EOT, and/or costs plus reasonable profit. It then provides grounds for EOT, costs and/or profit upon the occurrence of delay caused by specific events in discrete provisions of the contract. This constitutes a system of contractual grounds for EOT claims as below：

a. Events under the collective clause, such as delayed or incorrect drawings, failure to provide appropriate conditions for the commencement of the works;

b. Other events creating an entitlement to EOT, costs and profit, including late provision of licence or permission, failure to pass quality tests due to employer's fault;

c. Events creating an entitlement to EOT and costs, including refusing to receive correspondence, delay caused by archaeological finds, failure to make the site available, work conditions and lack of basic information;

d. Events creating an entitlement to EOT only, including delay to participating in trial operation, additional trial operation;

[576] DMCC 2017, clause 7.5

e. For delay caused by *force majeure*, EOT will be awarded, costs will be shared by the parties, the employer shall bear the cost of workers' salaries and the costs of acceleration, maintenance, clearance and recovery.[577]

A cross-study of the systems of contractual grounds for EOT highlights the following points.

a. The risk allocation tries to follow the principle of shared risk to maintain a balanced business relationship between the parties. To this effect, it provides a broad delay risk allocation.

b. Like the FIDIC Red Book, common risks in engineering projects are particularly emphasised, and the test of foreseeability in English contract law is adopted.

c. Risks of unique problems in construction projects in China are particularly stressed, such as delay in ordering commencement, delay in providing permits, licences and other conditions for the commencement of works, delay to test and acceptance works, early taking-over in sections of works and delay in payment.

d. The DMCC attempts to reflect the relevant legal provisions and the SPC's judicial interpretation in relation to risk allocation in construction projects, for example in delays in the provision of information, work conditions, payment and *force majeure*.

e. The strong merit of DMCC's delay risk is that it provides a clear remedy in terms of time, costs and/or profit against each delaying event, making it easily operated.

f. However, compared with standard forms of contract under English law, DMCC's risk allocation has significant room for improvement; for instance:

   i. DMCC's risk allocation generally follows that adopted by the 5th edition of the FIDIC Red Book, which was designed for traditional procurement where the design is provided by the employer. While the intention is for DMCC to be used for all project types and procurement modes, when parties adopt the EPC or other contract modes, the risk allocation must be tailored by parties involving significant effort.

   ii. The structure of risk-allocation provisions has not been carefully designed; some events, including delayed test and employer's breach of contract, repeatedly appear in different provisions, with different remedies proposed in different provisions that contradict each other.

   iii. Against some delay events, such as variation, no risk allocation is provided.

   iv. Upon each delaying event, DMCC prescribes three possible remedies: EOT, costs, and/or reasonable profit. However, against delaying events other than

[577] Idem, clause 17.3.2

force majeure, it is difficult to infer the logic or principle of the drafter who selected the options; the remedy options are designed somewhat arbitrarily.

v. The wording and criteria relied on to identify delaying events are rather general, subjective and vague. For instance, for many events, the contract stipulates that "if delay is caused by the reason of the employer/contractor"; on *force majeure* it stipulates that "parties should share the loss in expense". However, the employer should bear the cost of looking after the works and recovery. Thus, these clauses have a low degree of legal certainty and are likely to lead to disputes between the contracting parties.

Summary

In English law, each standard form of contract, based on the project type and procurement mode, has established a thorough delay risk allocation method against events caused by the employer, neutral events and *force majeure*, to avoid the effect of the Prevention Principle. In the meantime, other than in the NEC contract, the principle of strictly separating risk of time from risk of costs has been well established and followed.

In contrast, the DMCC in China generally follows the principles of and approaches to delay risk allocation adopted by English contracts in the FIDIC Red Book. It also attempts to make a detailed and balanced risk allocation in terms of time and costs to meet the principles of good faith and fairness. However, comparatively, the DMCC fails to provide a risk allocation framework with clear principles, a reasonable structure and the necessary legal certainty; therefore there is considerable scope for improvement.

The approaches to delay risk allocation adopted by standard form contracts are briefly compared in Table 3 below:

Table 3: Comparison of delay risk allocation in standard form contracts

	Projects mainly applied for	Types of provision for risk allocation	Available options of remedies for employer risk events	Criteria to distinguish options of remedies	Wording describing risk events	Level of operation difficulty	Level of legal certainty
JCT	Building	Collective	Separate remedies for time and cost	No loss or expense for neutral events	Precise and objective	low	high
NEC	Engineering	Collective	Uniform remedies for both time and costs	Costs and time for all employer risk events	Plain language	low	relatively low

FIDIC	Engineering	Collective provisions supplemented by discrete provisions	Time and cost, or time only	Costs for employer's fault only	Precise and objective	low	relatively high
DMCC	Engineering	Collective provisions supplemented by discrete provisions	time only, time and costs, time and costs and profit	Drafting criteria are rather vague	Rather general, subjective, and vague	high	low

5.6 Instruments and bases for EOT assessment

JCT

As a traditional contract, old editions of the JCT contract did not recognise the significant role of the schedule in time management. Before the 2016 JCT suite, it merely stipulated that contractors should provide architects with a master programme for the execution of works, and submit revised or amended master programmes after any adjustment to the completion time. Since the concept of the programme is a rather broad term, it encompasses all types of work plan, including simple bar charts or Gantt charts, as long they indicate the contractors' intended sequence of works; however, it may ignore the underlying logic, relevant constraints and progress information.[578] The use of such programmes in delay analysis are likely to result in inaccurate or impressionistic decisions.[579]

It seems that the JCT had recognised its weakness in this regard. The position was improved in the 2016 JCT contract by revisions to Section 2.9 which stipulated that the programme submitted by contractors must contain and identify the critical paths,[580] and thus clearly established that CPM networks should be exclusively used for the programme. The current position of the JCT is that authentic schedule analysis should be used in processes of time management and delay analysis. However, the mechanism of the programme is still incomplete, since there is no provision regarding the timeframe within which a submitted baseline or updated programme should be accepted. Architects' inaction in this regard may cause a project to have no programme agreed upon for progress monitoring, or delay identification and analysis.

Based on the above and taking into account that the programme has no binding contractual effect in the JCT contract, it seems that under the JCT contract, the programme is neither a compulsory nor an exclusive grounds for EOT claim analysis.

[578] Burr, supra note 11, p.1-025
[579] *John Barker v London Portman Hotels*
[580] SBC/Q 2016, section 2.9.1~3

Furthermore, the requirements for contractors' submissions to support EOT claims are rather general: they are merely requested to notify Relevant Events by describing "the material circumstances, including the cause or causes of the delay, and identify the Relevant Event",[581] and for each event, they are requested in a general way to "give particulars of its expected effect, including an estimate of any expected delay in the completion of the works or any section beyond the relevant completion date",[582] but no express provision indicates that a programme must be submitted to prove the expected delay effect. Thus a broad EOT analysis approach, instruments and proof may be adopted to detect the delay effect of a Relevant Event, even though the scheduling analysis method is the most powerful persuasive evidence that the contract is evolving other than how the contractor planned.[583]

Other than using authentic scheduling analysis, pursuant to Sections 2.28 and 2.29 of SBC/Q 2016, architects are allowed to assess the effect of Relevant Events and determine EOT based on their personal opinion[584] and to make judgements based on common sense and impressions as long as that judgement is reached fairly and reasonably,[585] and the completion date determined by them is *fair and reasonable* having regard to any Relevant Events, whether notified by contractors or not.[586] Furthermore, the wording stating that EOT should be considered with regard to any Relevant Events provides a broader basis for EOT assessment. Additionally, when the architects deliver their determination, they are not obliged to provide detailed explanations except needing to attribute EOT to each Relevant Event heading;[587] therefore, they do not need to analyse EOT logically and accurately but may base their decision on a superficial impression as long as it seems "fair and reasonable".

NEC

In contrast, under the NEC contract, a greater emphasis is placed on the use of the programme for progress management and EOT analysis, and the basis for EOT analysis is stricter and more limited.

Compared with the JCT contract, NEC4 established a relative mature and complete mechanism to establish, update and apply the programme. It clearly states that contractors must, within a certain timeframe, submit an initial programme which contains not only the planned or agreed orders, timings, and key dates of works, but also the float, time risk allowances, constraints to contract provisions, assumption of dates on which conditions can be meet, measures of works, and construction resources deployed.[588] It therefore clearly establishes that a network using CPM with a comprehensive logic link should be used for progress management and any

[581] Idem, section 2.27.1
[582] Idem, section 2.27.2
[583] Chappell, supra note 6, p.211
[584] SBC/Q 2016, Section 2.28.1 and 28.28.3
[585] *John Barker v London Portman Hotel*
[586] SBC/Q 2016, Section 2.28.4.5.1
[587] Idem, 2.28.3
[588] NEC4, clause 31.2

adjustment of the completion date. It also establishes that contractors are obliged to update and submit the programme within a certain interval or upon request by the project managers, to reflect the current progress within each period and provide guidelines for the remaining works. Furthermore, to avoid the scenario where project managers delay unduly in replying to the submitted programme, NEC4 includes a "treated acceptance" regulation, under which the submitted programme will be treated as accepted where project managers fail to respond within a certain timeframe.[589]

As discussed in Chapter 3, the mechanism of the programme offers the possibility to use logic scheduling analysis to identify delay and analyse EOT. This possibility may be realised by the compensation events mechanism of NEC4 which clearly recognises the mandatory application of the programme in demonstrating and assessing the effect of compensation events and determining EOT. Specifically, contractors should submit quotations or revised quotations for compensation events in terms of time with details of the assessment through incorporating the delay impact into the accepted programme.[590] If they fail to do so, or to submit a quotation or programme or if the programme is not accepted by the project managers, it will amount to a basis for the latter to reject the quotation.[591] When a delay to completion date is assessed showing that the duration of time until the planned completion date is shorter than that shown on the accepted programme,[592] and when the delay effect of a compensation event is assessed by the project managers themselves, they may need to assess the progress and establish a programme for the remaining work where there is no available accepted programme or where the programme submitted by contractors is inappropriate, and use it for the assessment of the compensation event and to determine the EOT. [593]

Therefore, when an EOT claim is analysed under the NEC contract, scheduling analysis is an essential instrument used by both contractors and project managers. In particular, EOT should be determined based on a logical and accurate analysis rather than a rough impression. When the assessment of a compensation event is notified by project managers, details of the assessment should be provided;[594] an EOT decision may be challenged by the contractor if it lacks authentic analysis.

Notably, where the effect of a compensation event is too uncertain to be forecast reasonably, project managers may instruct contractors to use certain assumptions in preparing quotations, or may do so themselves to assess the compensation event.[595] However, this stipulation does not prejudice the requirement for an accurate and logical analysis of compensation events since project managers have to make as realistic assumptions as possible; otherwise, clients will suffer since, pursuant to

[589] Idem, clause 31.3
[590] Idem, clause 62.2
[591] Idem, clause 64.1
[592] Idem, clause 63.5
[593] Idem, clause 64.2
[594] Idem, clause 64.3
[595] Idem, clause 61.6

clause 66.3, if a compensation event is overestimated, it will not be revised, while if the compensation is underestimated it would, pursuant to clause 60.1 (17), amount to a new compensation event and contractors would be entitled to be awarded a new compensation date.

FIDIC

In the past, the FIDIC contract followed the same position as the JCT contract in terms of programme. It merely included a general requirement for a programme, without specifying a CPM network or how to update it. It, therefore, led to disputes in terms of the form, information contained, and reasonableness of the programme, and resulted in a lack of consensus over the programme to be used for time management and EOT analysis.

It seems that these practical problems were recognised by FIDIC, and a significant improvement is made by the recent FIDIC contract of 2017 which provides a complex programme mechanism regarding formation and updating. Specifically, contractors are obliged to submit for approval an initial baseline programme, which should contain all the information in a modern CPM schedule, such as a logically linked sequence and timing of activities, critical paths, float, resources, constraint conditions and assumptions.[596] They are also obliged to submit an updated programme when the programme fails to comply with the contract or ceases to reflect actual progress, or is otherwise inconsistent with the contractors' obligations.[597] Furthermore, it provides a "deemed acceptance" regulation for the engineer's acceptance of the submitted programme, i.e. the engineer's failure to respond to the submitted programme within a certain timeframe will be deemed as acceptance.[598]

Furthermore, in the new edition of the FIDIC contract, the programme is not only used for progress management but should also be used for delay analysis. For instance, in a revised programme, contractors are obliged to present actual progress to date in each activity and reflect any delay in such progress and the effects of such delay on other activities (if any). Moreover, the report supporting the revised programme should also clearly identify any significant change(s) to the previous programme and be submitted with proposals to overcome the effects of any delay(s).[599] Additionally, contractors are obliged to submit a monthly progress report to describe the as-built progress, which should contain various documents, *inter alia* a comparison of actual and planned progress with details of any events or circumstances which may adversely affect the completion of the works pursuant to the programme, and measures being (or to be) adopted to overcome delays.[600] Obviously, this process of preparing and accepting a revised programme, and the

[596] FIDIC Red Book 2017, clause 8.3
[597] Idem
[598] Idem
[599] FIDIC Red Book 2017, clause 8.3
[600] Idem, clause 4.20

comparison of actual and planned progress, are essentially a process delay analysis carried out during the planned performance time of a project.

Therefore, under the FIDIC contract of 2017, as in the NEC4, a well-prepared, updated and managed programme will not only provide a sound instrument to meet the requirement for forensic scheduling analysis for EOT claims but also provide persuasive proof of progress information to support an EOT claim analysis. Furthermore, its updates and monthly reports are in fact a process of delay identification and preliminary analysis, as discussed in Section 3.4.3.2.2 above and therefore constitute an essential element of EOT claim analysis.

Regarding the base for EOT claims analysis, the FIDIC contract, like the JCT contract but unlike the NEC4, does not expressly limit the scope of proof and approaches to be relied on, but provides a relatively generous criterion according to which the engineer should analyse and determine the EOT claim. It merely requires that contractors provide a fully detailed claim containing a detailed description of the events or circumstances giving rise to the delay, a statement of the contractual and/or legal basis of claims, all contemporary records, and detailed supporting particulars of EOT claims. Therefore, a broad scope of evidence, as long as it includes detailed supporting particulars and grounds, can be used by contractors to analyse and support their claims. Engineers are, therefore, also allowed to rely on this evidence, which may fall beyond the scope of the programme and even include impressions or inferences, to assess the delay effect, and "based on contractual and legal basis of the claims",[601] to provide a "fair" determination of EOT pursuant to the contract and taking due regard of all relevant circumstances.[602] Thus, engineers in FIDIC contracts have relatively high discretional power and can use all types of evidence, bases and grounds to analyse and determine EOT, and the criterion for them to analyse claims (that the determination should be "fair") is somewhat subjective, moderate and even vague.

Notwithstanding the relatively broad base and subjective criterion relied on by engineers to determine EOT, it seems that under the new edition of FIDIC 2017, given the emphasis placed on programme mechanisms, scheduling analysis will play a significant role in EOT claims analysis. It also seems that FIDIC has recognised the need for CPM in EOT assessment; for instance, against a significantly decreased quantity of works, it expressly states that the effect of EOT deduction should be analysed through taking account of any favourable effect on the critical path of the Programme.[603]

DMCC

The DMCC still follows the style of the older editions of the FIDIC contract in terms of programme and the basis for EOT analysis.

[601] Idem, clause 20.2.6 (b)
[602] Idem, clause 3.7.2
[603] Idem, clause 8.5

Specifically, in the DMCC, the programme is an essential part of construction organisation planning and should be submitted by contractors for approval by supervisions and employers within 14 days of signing the contract.[604] No detailed requirements regarding the formation of the programme or the information contained within it are expressly defined; contractors merely need to follow the rather vague requirement that it should be made in line with legal requirements and the general practice in construction projects.[605] There is no such legal requirement in Chinese law and it is very difficult, if not impossible, to detect any agreed practice around programmes in China. This clause, therefore, has little practical meaning, and it is unclear whether a logically linked network should be compulsorily used in projects. The DMCC also provides that a revised programme should be submitted where the programme is not consistent with contractual requirements or actual progress, while no detail is provided in this regard. It stipulates that employers and supervisors should respond to the submitted initial/revised programme within a certain timeframe, but no sanction or solution is provided where employers and supervisors fail to respond; therefore, parties always lack an agreed programme against which to manage work progress.

The above reveals that the programme has not been effectively stressed by DMCC; the contract, on the one hand, fails to guide parties to use modern scheduling techniques to efficiently manage time, while on the other is unable to provide a reliable contemporaneous progress records system for EOT analysis or an instrument by which to conduct scheduling analysis and determine EOT claims.

Furthermore, the DMCC clearly states that the programme is only a basis for controlling progress;[606] any acceptance of the programme by the employers will not relieve the contractors of their liabilities or obligations.[607] Thus, the programme merely reflects the contractors' intentions and may not constitute a concrete and reliable base from which to assess EOT claims, which would affect the parties' obligations and liabilities. Therefore, the function of the programme in EOT claims analysis is greatly underestimated, it is therefore unnecessary to discuss whether it should be used as a primary instrument to that effect.

As to the basis and criterion for assessing EOT claims, other than a very simple but vague requirement that contractors should submit claims containing detailed reasons for claims with necessary records and documented proof,[608] and that supervisors should "prudently make a fair determination",[609] no other stipulations are made in this regard. It therefore places minimum constraint on decision-makers in analysing and determining EOT claims. These contractual circumstances offer the parties scope to adopt broad approaches, including precise mathematics or computerised techniques, or common sense and impressions, to assess EOT.

[604] DMCC 2017, clause 7.1
[605] Idem, clause 7.2.1
[606] Idem
[607] Idem, clause 7.2.2
[608] Idem, clause 19.1 (2)
[609] Idem, clause 4.4

Summary

Based on the above, regarding the function of the programme in EOT analysis and the criteria used by decision-makers in determining EOT, it is found that among standard-form contracts in the UK, the JCT contract represents one extreme and the NEC the other. Despite recent improvements in the JCT contract, to the effect that the CPM schedule should be used in progress management and therefore increased scheduling analysis is recommended to assess EOT, historically the programme has not been established as a mandatory or primary instrument of EOT claims analysis; the Architect is allowed to rely on a broad base of evidence, including common sense, and a relatively subjective criterion in determining EOT. In contrast, the NEC established a complete mechanism of a baseline and updated programme, and established that precise scheduling analysis should be used as the primary instrument for EOT analysis; thus decision-makers must determine EOT based on more objective criteria.

In this regard, the FIDIC contract has historically swung between these two extremes. In the past, it followed a similar position to the traditional JCT contract, while recently its position has significantly changed and it attempts to follow the approach of the NEC4 in terms of programme and, in effect, makes the process of updating programme preparation part of the delay analysis process. However, recent improvements in stressing the CPM schedule have not precluded other traditional bases relied on by decision-makers to analyse EOT, and these are still used to determine EOT following relatively subjective criteria.

The DMCC is comparatively outdated in this regard: the function of the programme in progress management and EOT claims analysis has not been fully recognised, and the application of scheduling analysis in EOT claims has not been encouraged. The contracting parties still rely on traditional approaches, e.g. impression or inference, to analyse claims, and decision-makers are allowed to determine EOT based on rather subjective criteria.

Specifically, a comparison of the various standard-form contracts in relation to instruments and basis for EOT claims is shown in Table 4 below.

Table 4: Comparison of instruments and bases for EOT claims analysis

Contract name	Should CPM be compulsorily used for programme?	Should CPM programme analysis be the primary instrument and proof for EOT analysis?	Is there provision to avoid no programme being available?	Are other bases used to determine EOT	Is there a mechanism to update the programme to provide as-built information and preliminary delay analysis?	Is there a requirement for contractor's supporting documents	Should contractors compulsorily support EOT claims through scheduling analysis?	Criteria to determine EOT
JCT 2016	Yes	No	No	Rather open, a broad approach and range of proof can be used	No	General	No	Rather open and subjective, determination can be made based on common sense and impressions.
NEC4	Yes	Yes	Yes	Determination of EOT primarily depends on scheduling analysis	Yes	Must submit quotations supported by scheduling analysis	Yes	Objective, depends on logical analysis of compensation events
FIDIC 2017	Yes	Yes	Yes	Rather open	Yes	General	No	Engineers are allowed to determine EOT based on all types of proof and even common sense and impressions.
DMCC 2017	No	No	No	Rather open	No	General	No	No express criteria or constraints for employers to determine EOT.

5.7 Burden of proof, causation and global approach to analysis

JCT

Compared with the relatively generous criteria provided for architects in conducting EOT analysis, the JCT contract has relatively strict standards in burden of proof. In particular, when contractors notify a delay, they should describe the material circumstances including the causes of the delay, and identify which Relevant Event has caused the delay.[610] For each delay event, they are also obliged to submit particulars of its expected effects, including an estimate of any expected delay in completion beyond the completion date.[611] Therefore, in EOT claims, contractors have an onerous burden of proof to support their claims: they are obliged to clearly reveal the cause and effect of each delaying event and, among diverse delay events, to relate each Relevant Event to each heading of delaying effect. Such a contractual arrangement is strictly in line with the principle of burden of proof as discussed in Section 3.3.1.2, and clearly precludes the application of the global approach in EOT claims despite being very difficult, if not impossible, to achieve in practice.

Correspondingly, architects also have to follow the above approach to clearly identify the causation between each delaying effect and each delaying event, clearly attribute each EOT to each Relevant Event, and notify their EOT decision to that effect.[612] This precludes the application of the global approach to EOT claims analysis by decision-makers. Even though after the completion date, architects are allowed to review all past Relevant Events and make a retrospective adjustment to completion time,[613] they still need to clearly attribute each period of EOT to each Relevant Event.

Notably, under all other standard-form contract, a same procedure applies for compensation claims for both time and costs; therefore, no significantly different level of burden of proof of causation between EOT claims and costs claims is expressly imposed by these contracts. In contrast, the JCT contract strictly follows the principles discussed in Section 3.3 of this research, and stipulates different mechanisms for EOT claims and loss and expense claims, with the level of burden of proof for delay damages claims much higher than that for EOT claims.

Under the JCT contract, claims for loss and expense mean claims for monetary compensation resulting from Relevant Matters[614] which cause an adverse impact on the progress of the works.[615] Where loss and expense are claimed, contractors should submit an initial assessment of the loss and expense incurred and any further expected amounts, together with such information as is reasonably necessary to enable the

[610] SBC/Q 2016, Section 2.27.1
[611] Idem, Section 2.27.2
[612] Idem, Section 2.28.1.3.1
[613] Idem, section 2.28.5
[614] Idem, clause 4.22
[615] Idem, clause 4.20

architects to ascertain the loss and expense incurred.[616] They should also update their assessment and provide supplementary information at monthly intervals.[617] Upon the contractors' assessment, the architects should notify their own ascertainment, each ascertainment should be made by reference to the information supplied by contractors and in sufficient detail to enable contractors to identify the difference between it and the contractor's assessment. Clearly, when loss and expense are claimed, the contractors have to bear a more onerous burden of proof, while architects have to meet higher criteria in claims analysis and assessment.

As to the harsh burden of proof imposed on contractors in loss and expense claims, courts in the UK recently tried to interpret these clauses generously and the leading *Walter Lilly* case greatly relieved the standard. It held that global claims for loss and expense would not necessarily fail and that contractors did not even need to justify their failure to separate each heading of expense and loss. It also held that contractors did not need to resubmit information that the architects already knew from their involvement in the project but only such additional information as may be necessary to enable architects to form their opinions.[618] Regarding the assessment of claims, it held that the "ascertainment" of loss and expense does not necessarily require proof of precise loss but could be likely loss, since all practitioners were living in the real world and it was necessary to construct the words (of the contract) sensibly. Although *Walter Lilly* addressed clauses in the JCT contract, the judge's reasoning is likely to apply equally to any similarly drafted contracts[619] and therefore represents a tendency of English law in this regard.

NEC

Under the NEC contract, both contractors and project managers face an onerous burden of proof to substantiate EOT claims.

Specifically, contractors should notify each event if they believe it is a compensation event; failure to do so will result in that event not being considered a compensation event and no adjustments can be made to completion time or price.[620] After the confirmation of a compensation event and requests for quotations by project managers, contractors are obliged to submit quotations for each compensation event, which should contain proposed changes to the price and any delay to the completion date and key dates as assessed by themselves with details of their assessment. If the accepted programme for the remaining work is changed by the compensation event, the change should be incorporated into the accepted programme to support the quotation and therefore form an action of scheduling analysis.[621] Thus, against each compensation event in relation to delay, contractors should submit a separate quotation comprehensively analysing the cause and effect to assess its delay effect as

[616] Idem, clause 4.21.1 and 2
[617] Idem, clause 4.21.3
[618] Anonymity 3
[619] idem
[620] NEC4, clause 61.3
[621] Idem, clause 62.2

well as its impact on loss and expenses.[622] Under such circumstances, contractors are not allowed, or at least not encouraged, to claim and assess EOT through a global approach by comprehensively considering the effects of diverse events at once.

Correspondingly, project managers also bear an onerous burden in the process of EOT claims analysis. They are obliged to notify each compensation event arising from themselves or the supervisors to contractors and request a quotation,[623] thus they have no chance to globally assess the delay effect of multiple compensation events. They must then evaluate all details including the programme provided by the contractors against the quotations for each part of the compensation.[624] If they do not accept the contractors' assessment, they have to provide their own assessment supported by a programme provided by themselves,[625] and notify contractors of the assessment giving them the details.[626] In this mechanism, in effect, the burden of proof has been transferred from the contractors to the project managers.

FIDIC

Under FIDIC Red Book rules, contractors also bear an onerous burden of proof. Within a strict timeframe, they must notify the engineer of the event or circumstances giving rise to delay[627] and submit full claims containing a detailed description of the event or circumstance, a statement of the contractual or legal grounds, contemporary records and detailed supporting particulars.[628] The contractors are obliged to provide exhaustive factual and analytic proof to support the claims; failure to do so will mean they have to accept the engineers' EOT decision which may be prejudiced by an absence of contemporaneous records or investigation.[629] Correspondingly, the engineers also have an onerous burden in assessing claims by verifying the contractors' detailed claim reports, investigating contemporary records[630] taking due regard of all relevant circumstances,[631] and notifying their determination in detail with reasons and detailed supporting particulars.[632]

However, it is noteworthy that the FIDIC contract takes a rather vague position on the level of causation to be established to demonstrate EOT and whether a global approach can be used for claiming and analysing EOT. The global approach has not been expressly banned. While taking into account that contractors are requested to notify their intention to claim on an event or circumstances within a very short period (28 days), contractors are not likely to notify a claim that contains many events as it would carry a high risk for them. However, they are given the chance to do so if

[622] Idem, clause 4.21.4
[623] Idem, clause 61.1
[624] Idem, clause 64.1
[625] Idem, clause 64.1 and 64.2
[626] Idem, clause 64.3
[627] FIDIC Red Book 2017, clause 20.2.1
[628] Idem, clause 20.2.4
[629] Idem, clause 20.2.7
[630] Idem, clause 20.2.3
[631] Idem, cause 3.7.2
[632] Idem

multiple employer-caused events occur within the same period and jointly cause a delay in completion. Furthermore, they are also allowed to notify a claim caused by a "circumstance" which has caused or is likely to cause a delay and/or increased costs: this "circumstance" may refer to broad scenarios, which may include the situation that multiple events jointly result in a delay. Therefore, under the FIDIC contract, EOT can be claimed and analysed through the global approach provided that the events occur in the same period. Moreover, pursuant to the mechanism of the revised programme established by the FIDIC contract of 2017, in effect each revised programme is a process of comprehensive retrospective scheduling delay analysis which is conducted within a certain period; therefore, it has to cover multiple delay events which occur within that interval and also provides a convenient basis from which to analyse and determine EOT claims globally.

DMCC

In comparison, the DMCC merely imposes a rather general requirement for the burden of proof in claims. Specifically, contractors are generally requested to submit notice of a claim when they are aware or should be aware of the occurrence of delaying events, and submit a claim report with a detailed reason for the claim supported by necessary records and proof.[633] This general description makes clear that contractors should bear the burden of proof to support their claims, but the level of the burden of proof remains unclear.

Similarly, this contract also takes a rather vague position on what causation should be established and whether the global approach can be used for claims demonstration and analysis. Like the FIDIC contract, in this regard, contractors should promptly submit a notice of claim upon the occurrence of delaying events, and submit a detailed claim report subsequently; therefore submitting a global EOT claim that covers multiple events carries a high risk, while it seems that the contractor is allowed to submit a claim caused by multiple events which occur within the same period.

Summary

A comparison of the level of burden of proof and causation required by standard forms of contract is shown in Table 5 below.

Generally, regarding the burden of proof for EOT claims, normally all standard forms of contract in the UK and China provide that contractors should produce details with substantiating proof. Contracts under English law normally impose an onerous burden of proof on contractors to support their claims and an onerous burden on CAs to assess claims. The contracts used in the UK, including the JCT and the NEC, strictly follow the principles discussed in Section 3.3 in terms of burden of proof and establishment of causation, and impose a rather high level of burden of proof on contractors, *inter alia* for loss and expense claims. The NEC may even transfer such

[633] DMCC 2017, clause 19.1 (1) and (2)

burden from the contractors to the CAs. Similarly, they also request a clear cause and effect analysis between each delaying event and delaying effect in demonstrating EOT claims; thus in principle the global approach of claim and analysis is precluded, or at least not encouraged.

Comparatively, the FIDIC contract is vague on the establishment of causation and the approach to the global claim. Contractors under the DMCC merely bear a general level of burden of proof and are not obliged to prove causation between case and effect; decision-makers also do not have an onerous duty to assess claims.

Table 5: Comparison of burden of proof and causation in EOT claims

Contract name	Level of burden of proof for contractors	Level of burden for CA to assess claims	Should claimant relate each delaying event to each delay effect?	Is a global approach to claims and analysis allowed?
JCT 2016	Is onerous in claims of time and very onerous in claims of loss and expense	Is onerous in claims of time and very onerous in claims of loss and expense	Yes	No
NEC4	Onerous	Onerous	Yes	No
FIDIC 2017	Onerous	Onerous	No	Yes
DMCC 2017	General	General	No	Yes

5.8 Non-scheduling proof

Besides the programme, other first-hand proof – *inter alia* contemporary records – which are captured and filed pursuant to related contract mechanisms, also have a significant effect on supporting EOT claims and influencing the analysis. Comparatively, standard forms of contract provide different levels of proof, as below.

JCT

The JCT contract has no particular contract mechanisms to regulate record-keeping, progress meetings, progress reports, etc. Therefore, there is no basis on which the parties can rely to compulsorily generate and provide contemporary records, based on which EOT claims can be analysed. Thus, except otherwise specified by the contract particulars or the architect, in the context of regular progress the parties are not likely to hold sufficient as-built progress information and contemporary records, commonly and officially shared by the parties, to efficiently analyse EOT claims although they

are not strangers to the project. When EOT claims are analysed, the parties may have to particularly search for diverse, relevant, first-hand, hard proof to support the claim.

NEC

NEC4 has no particular mechanism regarding records. However, besides the revised master programme, the early warning mechanism (called the "risk registration system" in previous editions)[634] can, through notification of risk of delay, Early Warning Meeting or Early Warning Register, provide a sound basis for the parties to jointly identify a delay to progress, analyse the cause and effect of delay, agree on solutions, review the effect of the past solutions and agree with new measures. Therefore all contemporary information, including as-built progress, parties' agreement and intentions, can be clearly revealed and recorded. It can provide the necessary information to help the parties conduct an EOT claim analysis if the risk of delay is developed into a compensation event.

FIDIC

Comparatively, the FIDIC 2017 edition offers a well-designed contemporary record system, established through diverse contract mechanisms, on which parties can rely to have sufficient contemporary records to conduct an EOT claims analysis.

Firstly, like the NEC4, FIDIC 2017 also establishes a mechanism of advance warning[635] through which parties can promptly realise the risk of delay and devise solutions. Secondly, contractors are required to provide daily records which should contain the construction resources used for each activity at each location.[636] Thirdly, the contractors are obliged to submit monthly progress reports covering a broad area of contemporary progress information, such as the programme, detailed descriptions of progress, photograph and video progress records, list of variations, comparison of as-built progress and as-planned progress with details.[637] Fourthly, the parties are required to participate in management meetings to discuss arrangements for future works and Relevant Matters which may affect progress, and the record of the meeting should be issued to attendees accordingly.[638] Fifthly, after receiving claim reports, the engineers shall initiate a negotiation between the parties to reach agreement; the parties' intentions and relevant records can also be revealed. Lastly, proof may also be found from records of meetings or site visits made by the DAAB.[639]

DMCC

The DMCC follows the same style as the JCT contract in this regard. Unless particularly requested by particular conditions of the contract or the

[634] NEC4, clause 15
[635] FIDIC Red Book 2017, clause 8.4
[636] Idem, clause 6.10
[637] Idem, clause 4.20
[638] Idem, clause 3.8
[639] Idem, clause 21.3

supervisor/employer,[640] contractors are not required to submit daily records or monthly progress reports. When the revised programme is submitted, they are not required to provide a delay analysis by comparing as-built and as-planned progress. There is no mandatory requirement for regular progress or management meetings, and no mechanism for early warning or DAAB site visit meetings. Therefore, the parties are not guided or encouraged to monitor or discuss progress in the conventional way and are also not guided by formal contractual mechanisms to capture and keep contemporaneous records and as-built information. This inevitably results in relatively high pressure to prove when EOT claims are analysed.

Summary

A brief comparison of non-scheduling proof in standard forms of contract is shown in Table 6 below.

Regarding contemporary records, some contracts may provide different levels of record or information generated and shared by the parties. Of the standard forms of contract, the approach taken by the FIDIC 2017 edition, which seems to follow the principle of record-keeping as established by the SCL *Protocol*, is particularly recommended. It provides a relatively complete system of contract mechanisms, based on which the parties can more conveniently access relevant contemporaneous records and information for EOT claims analysis.

Table 6: Comparison of non-scheduling proof

Contract name	Is there a system of records or information generated and shared by parties for EOT claims
JCT 2016	No
NEC4	Yes
FIDIC 2017	Yes
DMCC 2017	No

5.9 Procedure for claims

5.9.1 Prospective/retrospective claims

JCT

Under the procedure for claims under the JCT contract, claims for EOT should only be submitted prospectively, while claims for delay-related loss and/or expense can be submitted both prospectively and retrospectively. In contrast, EOT claims can be analysed and determined both prospectively and retrospectively.

[640] DMCC 2017, clause 1.6.4

Specifically, where it becomes reasonably apparent that the progress of the entire works or a section thereof is being or is likely to be delayed by a Relevant Event, or that the contractors have incurred or are likely to incur direct losses and/or expense as a result of a delay in gaining possession of the site or that progress has been or is likely to be materially affected by any Relevant Matter, the contractors should forthwith notify the architects of the circumstances including the cause of delay and identification of the Relevant Event, and/or the likely effect of the Relevant Matters in terms of progress and loss and/or expense. Subsequently, the contractors shall submit particulars of the estimate of any expected delay, and/or assessment of loss and/or expense incurred and any further amount likely to be incurred. In effect, a claim for EOT against events which have already occurred during the performance of the works is purely prospective since the claimed EOT relies on a delay to progress, regardless of whether it has occurred or is likely to incur, but not a delay to completion. However, claims for loss and/or expense may contain two types of claim: a retrospective claim for that which has already been incurred and a prospective claim for that which is likely to occur.

Correspondingly, against claims for EOT during the performance stage of works, the parties have to adopt prospective analysis methods as discussed in Section 3.4.3 to analyse the Relevant Event's likely effect on the final completion date. Against claims for loss and/or expense in the performance stage of works, the parties should use the methods in Section 3.5.2.3 to ascertain the loss which has already occurred, and estimate that which is likely to be incurred. Since both completion time and loss and/or expense are subject to retrospective review by the architects, the determination of these claims has only a tentative effect on the parties. Thus, precision and accuracy of analysis in these claims may not be highly sought after by the parties.

Since the expected delay effect may be jeopardised by factual uncertainties or the parties' incorrect assumptions or expectations, the JCT contract establishes an additional claims review mechanism which allows architects, within 12 weeks of the completion date, to review all past EOT and all Relevant Events, regardless of whether these were notified by contractors, and thus to adjust the completion date. Moreover, contractors are entitled to submit documents for the adjustment of the contract sum within six months after the Practical Completion Certificate is issued. Architects and Quantity Surveyors are allowed to analyse and ascertain loss and/or expense within three months of receiving documents submitted by contractors. Therefore, decision-makers are allowed to retrospectively assess EOT and ascertain loss and/or expense for a substantial length of time, which offers convenience and leeway for them – with the advantage of hindsight and full knowledge of the project – to thoroughly review and revise their past decisions in order to ensure that the adjustment of the completion date and the final payment is fair and reasonable.

Therefore, under the JCT contract, various parties, *inter alia* decision-makers, are required to conduct claims analysis both prospectively and retrospectively; therefore, almost all common delay analysis methods can be employed to analyse the delay. Furthermore, since both contractors and architects have ample time to notify a delay,

submit particulars or assessments or notify decisions, the parties have sufficient time to collect information and contemplate claims, and the completion date and payment are very likely to be adjusted fairly and reasonably.

NEC and FIDIC

In contrast, contractors under both the NEC and FIDIC contracts must submit and analyse EOT claims contemporaneously or prospectively. Decision-makers are required to analyse and award EOT claims contemporaneously; there is no contract provision for a retrospective post-completion review of EOT and/or related monetary compensation.

Specifically, in accordance with the NEC contract, contractors are required to notify a compensation event that has happened or is expected to happen to project managers within eight weeks of becoming aware of the event.[641] The project managers must reply to the notification within one week and state whether it is a compensation event and whether contractors should submit quotations.[642] Upon receiving such requests for quotations, the contractors must submit them within three weeks, and the project managers must reply within two weeks.[643] If the project managers notify that they will make the assessment, this must be provided within a further three weeks.[644] Failure to do so will be treated as acceptance of the contractors' quotations.[645]

Pursuant to the 2017 edition of FIDIC, the contractors must submit a notice of claim and detailed claim report within 28 days and 84 days respectively after they became aware, or should have become aware, of the event or circumstance which would cause delay.[646] Upon submission, and after consultation with the parties has failed to reach agreement within 42 days,[647] the engineers should provide a determination within a further 42 days.[648] However, unlike in NEC4, the engineers' failure to follow the timeframe to provide a determination will be deemed to be an automatic rejection of claims.[649]

Clearly, under these two contracts, both contractors and decision-makers have an onerous burden to swiftly recognise and analyse the delaying effect occasioned by the claimed events within a short time. Moreover, as there is no wording allowing an EOT which has been awarded to be retrospectively reviewed and revised, the parties run the risk of overestimating or underestimating EOT claims. In such circumstances, it is suggested by *Keating* that the impasse can be solved on the basis of a wholly prospective analysis.[650] In practice, it can be solved by the effective operation of supporting contractual mechanisms in these two contracts. For instance, as

641 NEC4, Clause 61.2
642 Idem, clause 61.4
643 Idem, clause 62.3
644 Idem, clause 64.3
645 Idem, clause 64.4
646 FIDIC Red Book 2017, clause 20.2.1 and 20.2.4
647 Idem, clause 3.7.1 and 3.7.3
648 Idem, clause 3.7.3
649 idem
650 Keating, p.290

commented by Justice Akenhead in the *Walter Lilly* case, the parties are not strangers to the project and may access all the contract information and other available information which will assist them in assessing the claims. With the help of the supporting mechanisms provided by the current edition of the contracts, they enable the capture of sufficient information from early warnings, monthly updates of the programme, monthly progress reports and mediation before claims are notified.

DMCC

Under the DMCC, parties are also required to submit and address EOT claims in a prospective or contemporaneous way. Generally, the DMCC follows the claim procedure of the 5th edition of the FIDIC Red Book: contractors are obliged to submit notice of a claim within 28 days after they become aware of or should have become aware of the occurrence of the claimed event, and within a further 28 days they must submit a claim report.[651] After receiving the claim report, within only 14 days and 28 days respectively, the supervisors must submit their investigation to the employers, and the employers must notify the contractors of their decision on the claim. The employers' failure to follow this timeframe will be deemed acceptance of the claim.[652]

Therefore, under the DMCC, following a delaying event, within a very limited time, all parties must identify, notify and submit claims, conduct an investigation, prospectively ascertain the expected delaying effect, and quantify an EOT which cannot be retrospectively adjusted. However, there are no additional progress mechanisms, such as established by NEC4 or the FIDIC 2017 edition, that can be relied upon by the parties to promptly realise a delay and capture contemporaneous information. On the one hand this creates a significant burden – or even impossibility – in precisely ascertaining the events' delaying effect and quantifying the EOT; on the other, it creates a significant risk of underestimating or overestimating the EOT. As a result, the mechanism has little operability or practicability in practice.

To make matters worse, given the impractical contractual arrangement, to avoid the risk of overestimating EOT and that of deemed acceptance of a claim caused by failure to respond, in practice many employers resort to not seriously analysing claims but simply rejecting them. Given this situation, and the lack of efficient alternative dispute resolution systems available in China, contractors have no channel on which they can rely to solve claims and disputes swiftly. Therefore, EOT claims remain pending for resolution, and the intention of the DMCC contract drafters that claims should be settled promptly remains unmet.

Summary

A brief comparison of approaches to processing claims is provided in Table 7 below.

Based on the above, it is found that drafters of all standard forms of contract have recognised the significance of contemporaneous settlement of EOT claims. Furthermore, drafters in English law have also realised the weakness of prospective

[651] DMCC 2017, clause 19.1
[652] Idem, clause 19.2

analysis; they therefore take two approaches to ensure that EOT claims can be efficiently and reasonably proved and determined. Both approaches are initiated by a contemporary or prospective analysis: the JCT adopts a post-interview adjustment mechanism through retrospective analysis, while NEC4 and the 2017 edition of FIDIC provide additional progress control mechanisms to give the parties sufficient information to analyse and determine claims within a short time.

The DMCC only allows prospective or contemporaneous analysis, since it has neither a retrospective analysis mechanism nor strong progress control mechanisms for the parties. Potential inaccuracies in the EOT determination cannot be mitigated later and, in practice, this discourages employers from carefully analysing claims and prudently determining EOT. Its mechanisms therefore have substantial scope for improvement.

Table 7: Comparison of approaches to processing claims

Contract name	Method of claims and analysis allowed	Are retrospective reviews and adjustments of EOT allowed?	Time for processing claims	Is there any supporting mechanism to supply information to process EOT claims?
JCT 2016	Prospective	Yes	Long	No
NEC4	Prospective	No	Short	Yes
FIDIC 2017	Prospective	No	Shorter	Yes
DMCC 2017	Prospective	No	Shortest	No

5.9.2 Time bar for claims

JCT

The JCT contract follows a traditional approach in English law in that it is reluctant to strictly interpret clauses regarding the timing of serving claims as time bars to an award.[653] In the event of a current or potential delay to progress, the contractors shall forthwith give written notice to architects, indicating the Relevant Event and providing particulars of its expected effects as soon as possible thereafter.[654] Where there is a deferment of possession of the site and/or delay to progress caused by any Relevant Matter, the contractors shall submit an application for loss and/or expense as soon as practically possible to the architects, and submit information as requested by the architects.[655] There is no clear timeframe within which contractors have to submit notice of a delay and supporting particulars or information; they have some flexibility in this respect. Even if it is determined by a decision-maker in the dispute resolution that the contractor has indeed failed to submit notice and/or particulars within a

[653] Keating, p.286
[654] SBC/Q 2017, Section 27.1
[655] Idem, section 4.23

"reasonable" timeframe or "as soon as practically possible", as there are no express contractual sanctions for such failure, the timing of the submission of the claim is not a condition precedent to award of EOT and loss or expense.[656] Furthermore, even in the case of Relevant Events and Relevant Matters which had not been notified or applied by contractors, the completion of time and loss or expense still may be adjusted by the Architect through a retrospective review within 12 weeks of the completion date. Therefore, under the JCT contract, claims will not be time barred due to the contractor's failure to comply with the claims procedure.

NEC

The NEC establishes an express time bar clause where the contractor has failed to notify a compensation event within eight weeks of becoming aware that the event has happened.[657] However contractors are given significant leeway by the contract itself and the relevant authorities. Firstly, no time bar is applied for compensation events arising from project managers or supervisors giving an instruction or notification, issuing a certificate or changing an earlier decision.[658] Secondly, to rely on the time bar clause, the employers have to bear the burden of proof in proving that contractors had indeed failed to comply with the timeframe for notification; however the start time for calculating the timeframe, that is, when the contractor became aware of the event, is somewhat subjective. Thirdly, the time period for notification is eight weeks, compared with 28 days in the FIDIC contract and DMCC, and thus quite a long period. Lastly, as no express format is required for the notification, in accordance with *Obrascon Huarte Lain SA v Her Majesty's Attorney General for Gibraltar*, the notice can be served in any form; therefore verbal notice in a meeting, or notification through early warning, revised programme or any other occasion may be treated as notification of a compensation event.

FIDIC

Among the standard form contracts, FIDIC takes a distinct position on time bar clauses and has changed its position dramatically over the past 20 years.

In the 4th edition of the Red Book, contractors were requested to serve notice of intention to claim EOT within a timeframe of 28 days,[659] although it was not expressly stated that compliance with such timing was a condition precedent of award.

The position changed dramatically in the 1999 FIDIC suite of contracts which required contractors to serve notice of a claim within an express timeframe for all types of claim.[660] In particular, as regards EOT claims, notice of a claim should be served within 28 days of the contractors becoming aware, or of when they should

[656] Keating, p.286
[657] NEC4, clause 61.3
[658] Idem
[659] FIDIC Red Book 1987, clause 44.2
[660] FIDIC Red Book 1999, clause 20.1

have become aware, that the completion of the works would be delayed.[661] It is expressly stated that failure to do so will lead to no EOT or additional payment being awarded, and the employers will then be discharged from all liability in connection with the claim.[662] The draconic time bar clause places substantial risk on contractors and may be contrary to legal principles of good faith and/or fairness in many countries; it has therefore received widespread criticism. In particular, in the *Obrascon Huarte Lain* case, Mr Justice Akenhead interpreted the clause broadly, as discussed in Section 3.5.3 of this research, and therefore provided a substantial extent of leeway.

Surprisingly, FIDIC's harsh position in this respect is further reinforced by the recent 2017 edition of the FIDIC contract, in which compliance not only on the timing of the notice of claim but also on the timing of the submission of the detailed claim report constitute conditions precedent for the award of EOT and additional payments, and are subject to a notice of invalidation or claim report by the engineer.[663] Furthermore, in a suspected countermeasure by FIDIC against the decision in *Obrascon Huarte Lain,* the 2017 FIDIC contract states that a monthly progress report indicating delay will not constitute notice of a claim.[664]

However, it seems that FIDIC has responded to the widespread criticism by providing a challenge mechanism to relieve the all-or-nothing effect of the time bar clause. It allows contractors to justify a late submission and also allows employers to challenge a deemed valid notice.[665] Upon a challenge from the parties, the engineers shall determine whether a late submission is justified, and shall take that determination into consideration in the final award of the overall claim.[666] Specifically, when justification of a late submission is assessed and determined, the circumstances to be taken into account by the engineer include: 1) whether or to what extent the employer would be prejudiced by acceptance of the late submission; 2) any evidence of the employer's prior knowledge of the event or circumstance giving rise to the claim, the contractual and/or any other legal basis of the claim which the contractor may include in its supporting particulars.[667] Thus, with these relief mechanisms, the contractor is also given a chance to escape from the effect of the time bar clause provided that he can successfully demonstrate a justification for late submission. Therefore, under the new FIDIC suite of contracts, parties may need not only to analyse the contractor's entitlement to EOT *per se*, but also to the justification of late submission of notice or claim reports.

DMCC

Under the DMCC, the procedure for claims generally follows the time bar clause of the 1999 edition of the FIDIC contract: contractors are obliged to submit notice of a claim within 28 days after they became aware or should have become aware of the

[661] Idem, clause 8.4
[662] Idem, clause 20.1
[663] FIDIC Red Book 1999, clause 20.2.2 and 20.2.4
[664] Idem, clause 4.20
[665] Idem, clause 20.2.2 and 20.2.4
[666] Idem, clause 20.2.5
[667] idem

claimed event; failure to do so will deprive them of their entitlement to claim for EOT and/or additional payment.[668] Clearly, the contractor's strict compliance with the timeframe for notice of claim has been depicted as a condition precedent to EOT and/or additional payment.

This contractual time bar clause was first established by the DMCC in its 2013 edition[669] and remains unchanged in the newest edition of 2017. The clause is clearly counter to the primary legal principle of good faith and fairness in China, and also to the principle to maintain a balanced business relationship between the parties which is commonly upheld by courts in China.[670] As a result, it has received widespread criticism. In its defence, the SPC argued in 1999 that unless compliance with a claim procedure is expressly stated to be a condition precedent to the award of claims, it should not be applied. However, pursuant to the SPC's explanation, contractors may also be relieved from the clause if they can justify their failure to comply with the time bar clause, although the criteria for such justification are unclear and the decision therefore rests with judges' discretional power.

Summary

A brief comparison of the application of time bars in different contracts is shown in Table 8 below.

When a claim or delay is notified, standard forms of contract in English law vary as to whether the contractor has a mandatory obligation to strictly comply with a pre-set timetable. To create a management-oriented contract, the NEC and FIDIC contracts adopt different levels of time bar clauses; however, English law practitioners commonly keep a rather reserved attitude to these. Both the NEC contract and the courts in the UK provide substantial leeway for contractors to be discharged from the harsh effects of time bar clause. In contrast, the FIDIC contract has taken the rather radical approach of strengthening the application of time bar clauses in recent years. However, faced with widespread criticism, it also follows the trend of mitigating the all-or-nothing effect of time bar clauses by introducing a complicated relief mechanism. Nevertheless, how the time bar clause is applied depends on the interpretation of the contract by the applicable law or local courts.

The harsh time bar clause adopted in recent editions of the DMCC is transplanted from an older edition of FIDIC contract, and is clearly against legal principles and culture in China. It also lags behind international trends in this regard and has substantial scope for improvement.

Table 8: Comparison of application of time bar clauses by standard forms of contract

Contract name	Is the time bar clause a condition precedent to EOT?	Level of effect of time bar	Is there leeway for contractors to be relieved from time bar clause?

[668] DMCC 2017, clause 19.1 (1)
[669] DMCC 2013, clause 19.1(1)
[670] Refer to Section 3.4.3 of this dissertation

JCT 2016	No	Not applicable	Not applicable
NEC4	Yes	Not strict	Yes
FIDIC 2017	Yes	Strict	Yes
DMCC 2017	Yes	Strict	No

5.9.3 Failure to award on time

JCT

Comparatively, the JCT contract offers rather generous terms to architects in compliance with the claims procedure. They are required to provide a decision on an adjustment of the completion date as soon as reasonably practicable, but in any event within 12 weeks of receipt of particulars from the contractor; where the period from receipt to the completion is less than 12 weeks, they shall "endeavour" to do so prior to the completion date.[671] After the completion date, within 12 weeks of the practical completion date they shall review all Relevant Events and make a comprehensive adjustment of the completion time.[672] In the case of applications for loss and/or expense, they are obliged to provide the ascertained amount within 28 days and 14 days respectively of receipt of initial assessment and information and subsequent update.[673] Within six months after the Practical Completion Certificate is issued, they are obliged to conduct a final adjustment of loss and/or expense.[674] Throughout the process, the architects have sufficient time to conduct their duty. They are obliged to make an independent decision within the timeframe based on their professional ethics, but not compelled by any sanction to follow the timeframe. Thus, a contractor's claim for EOT will not succeed simply because of the architects' failure to award on time as no contractual remedy has been provided to this effect; the remedy is, therefore, a question of law.

NEC

In line with the strict claims procedure, the NEC4 contract also imposes a strict procedure on project managers to respond to contractors and determine compensation. Upon notification of the compensation event, within one week they must notify their decision as to whether the claimed event is a compensation event and/or request a quotation; after receiving quotations, within two weeks they must notify their decision of acceptance or request revised quotations or make their own assessment.[675] Failure to do so or a consequent failure to reply the contractor's notification of that failure within two weeks will be treated as an acceptance of the quotations.[676] Where a compensation event is assessed by the project manager themselves, they shall provide

[671] SBC/Q 2017, Section 2.28.1.2
[672] Idem, section 2.28.5
[673] Idem, Section 4.21.4
[674] Idem, section 4.25.1
[675] NEC4, clause 61.4
[676] Idem, clause 62.6

determination within three weeks; failure to do so and a consequent failure to reply to the contractors' notification of that failure within two weeks will also be treated as an acceptance of the quotation(s).[677]

In the event of the project managers' failure to respond promptly to contractors and determine claims, the above procedure imposes a clear sanction on project managers and clients, and offers a straightforward contractual remedy to contractors. It therefore enables EOT claims to be settled contemporaneously to avoid the impasse of time becoming at large.

FIDIC

Because the FIDIC contract is more commonly used in the international environment, its emphasis is not to avoid the situation in English law that time may become at large when an EOT mechanism is not correctly operated, but on how to proceed with the settlement of EOT in a fast-track way.

Therefore, the 2017 edition of the FIDIC contract also sets up a strict procedure and timeframe for engineers to respond to the contractor's submission and provide determination. They are obliged to provide initial notice within two weeks of a notice of claim;[678] after receiving the detailed claim report, they must initiate and finish the process of mediation within 42 days.[679] If no agreement is reached, they are obliged to notify their determination within a further 42 days;[680] failure to provide determination within that timeframe will be deemed as a rejection of the claim,[681] and then the contractor is entitled to refer the claim to a dispute resolution mechanism.

DMCC

Comparatively, the procedure for the employer to process the claim is rather simpler under DMCC. Upon receiving a claim report, supervisors are obliged to submit an investigation report to the employers within 14 days, and employers must issue their determination to the contractor within 28 days. Failure by the employer to do so within the timeframe will be deemed as an acceptance of the claim report. As discussed, at first glance this clause imposes a substantial risk on employers, while in practice it may make them more likely to reject a contractor's claim out of hand.

Summary

A brief comparison of the procedures for processing EOT claims under standard forms of contract is shown in Table 9 below.

Under traditional contracts in English law, decision-makers are driven more by the relatively advanced professional ethics system in the UK and the legal risk of time becoming at large, rather than by contractual sanctions in endeavouring to swiftly

[677] NEC4, clause 64.3 and 64.4
[678] FIDIC Red Book 2017, clause 20.2.2
[679] Idem, clause 3.7.1 and 3.7.3
[680] Idem, clause 3.7.3
[681] idem

analyse claims and provide determination. In contrast, under management-oriented contracts like the NEC4 and FIDIC contract of 2017, decision-makers are obliged to strictly follow a timeframe in analysing claims and making an award. However, driven by different concerns, different sanctions and remedies are provided against failure to award on time; pressure is placed on the CA to process EOT claims promptly.

The DMCC follows the approach of management-oriented contracts in order to overcome the common situation in China that employers delay unscrupulously in processing and determining claims. However, its practical effect is rather dubious given employers' dominant position in construction projects in China. In litigation practice, very few cases suggest the courts' recognition of the deemed acceptance of claims. Therefore, the clause requires further consideration for effective application in practice.

Table 9: Comparison of procedures for CA to process EOT claims

Contract name	Level of procedure	Result of failure to award within timeframe
JCT 2016	Complicated but general	No contractual sanction and remedy is available
NEC4	Complicated and strict	Treated as an acceptance of the contractor's quotation
FIDIC 2017	Complicated and strict	Deemed a rejection of claim
DMCC 2017	Simple and strict	Treated as an acceptance of claim

5.9.4 Delay avoidance and mitigation

JCT

The JCT contract imposes an express contractual obligation of mitigation on contractors, who are obliged to constantly use their best endeavours to prevent the completion of the works being delayed beyond the relevant completion date.[682] If a delay has already occurred, they must do all that may be reasonably required by the architects to proceed with the works.[683]

Therefore, contractors are obliged to prevent potential delay and mitigate the effect of a delay which has already occurred. However, the extent of mitigation is limited by the words "*that may reasonably be required to the satisfaction of the Architect*". Therefore, without express instructions from the architects, contractors may be discharged from their duty to mitigate. Furthermore, when employers assert that contractors have failed to fulfil the obligation of mitigation, they only need to prove that contractors have failed to follow the requests of the architects. The burden of

[682] SBC/Q 2017, Section 2.28.6.1
[683] Idem, section 2.28.6.2

proof to challenge the reasonableness of the requirement lies with the contractors, and the analysis and determination of it will be a question of fact.

NEC

Despite no express terms for mitigation, in the event of delay the NEC also imposes a duty of mitigation on contractors; failure to mitigate will jeopardise the award of claims. Specifically, upon request by the project managers, contractors are obliged to submit advance warning in order to prevent delay or mitigate the delay effect in advance. The contractors' failure to do so will mean that the award is analysed as if the mitigation measures that should have been taken – given the advance warning which should have been submitted – have indeed been taken, therefore the effect of the mitigation which should have been taken shall be deducted from the actual delay effect.[684] Furthermore, the assessment of the effect of a compensation event is based on the assumption that the contractor has taken all necessary mitigation measures against a delay by reacting competently and promptly, and has spent the costs and time reasonably incurred.[685] Thus, in the event of a delay, not all the time and costs incurred by the contractor are recoverable, only the net time and costs which would have reasonably been incurred if the contractor had acted swiftly and effectively to mitigate the delay.

The above clause is straightforward to operate, but the extent of the net amount of EOT and the costs which should have incurred, and what constitutes acting "competently and promptly" are still disputable, and should be determined by taking account of the facts and circumstances.

FIDIC

The 2017 edition of the FIDIC contract also establishes an obligation on contractors to avoid and mitigate delay, while not directly imposing sanctions on them for their failure to do so.

Specifically, contractors are requested to provide advance warning to engineers of any known or probable future events or circumstances which may adversely affect the progress of the works.[686] When the revised programme is submitted, they must also submit proposals to overcome the effect of any delay(s) on the progress of the works.[687] After a delay has occurred, two types of remedy may be applied. If the delay is caused by a contractor risk event, the engineers may issue a revised programme and instruct contractors to expedite the works at their own cost. Conversely, where the delay is caused by an employer risk event, the engineers may instruct contractors to mitigate that delay by accelerating the works, the costs to be borne by the employer.[688]

[684] NEC4, clause 63.7
[685] Idem, clause 63.9
[686] FIDIC Red Book, clause 8.4
[687] Idem, clause 8.3 (v)
[688] Idem, clause 8.7

There is no express contractual sanction for the failure to provide mitigation. However, in the case of employer-caused delay, the contract prescribes that EOT assessment shall be carried out taking due regard to all relevant circumstances, which indicates that in jurisdictions where the principle of mitigation is recognised by the applicable law, the decision-maker, when determining EOT claims, may have the right to consider only the net effect of delay after deducting the effect of the mitigation which should have been conducted by the contractor.

DMCC

The DMCC imposes very few obligations for delay avoidance or mitigation on contractors and imposes no sanctions for failure to fulfil such obligations except for delays caused by *force majeure*. Specifically, there is no early/advance mechanism to defend delay in advance, the contract merely states that for delay caused by the contractor, he shall bear the delay damages.[689] If the employers intend to finish the project before the contractual completion date, the acceleration costs are recoverable, and the parties may also agree on a bonus for earlier completion in the particular conditions of the contract.

The only sanction for failure to mitigate occurs in cases of delay and/or loss caused by *force majeure.* Here, both parties are obliged to take measures to avoid or reduce the loss caused by *force majeure* and prevent its increase; the increased loss should be borne by the party who fails to take efficient measures. However, the parties may dispute whether a party has taken mitigation measures and, if so, whether they were efficient; in effect, this is a question of fact. The DMCC is silent on whether failure to mitigate an employer-caused delay should be considered in the assessment of EOT claims; while pursuant to the principle of CCL[690] the answer should be yes, how to operate it still depends on the facts.

Summary

A brief comparison of the application of the contractual obligation of delay avoidance and mitigation is shown in Table 10 below.

Generally, standard forms of contracts in English law impose a clear obligation of delay avoidance and mitigation on contractors. Some also provide sanctions for the failure to fulfil that obligation, which should be taken into account in the assessment of EOT claims. Specifically, NEC4 provides clear approaches on how to assess the EOT and additional payments taking account of mitigation, thus making the EOT claims analysis more onerous.

Other than for delay caused by *force majeure*, the DMCC has not expressly imposed a duty to avoid and mitigate employer-caused delay on the contractor; however, in accordance with the law in China, the effect of mitigation should be taken into consideration in assessing EOT claims. Nevertheless, given the lack of detailed assessment standards and approaches, in practice, parties may be led into dispute;

[689] DMCC 2017, clause 7.5.2

[690] CCL, Article 119, refer to Section 3.5.5 of this dissertation

therefore, the DMCC needs to provide more clauses to elaborate on how to conduct assessments to this effect.

Table10: Comparison of obligations of delay avoidance and mitigation

Contract name	Is there an obligation of delay avoidance and mitigation?	Is there a contractual sanction for failure to comply with the obligation?
JCT 2016	Yes	No
NEC4	Yes	Yes
FIDIC 2017	Yes	Yes
DMCC 2017	No	No

5.10 Conclusion

Through a cross-study of the EOT claims framework established by standard forms of contract in English law, it is found that all, through revisions enacted from time to time, always endeavour to establish and perfect systematic provisions to ensure that a clear risk allocation can be achieved. Decision-makers should be provided with sufficient independent and professional discretional power, time and evidence to analyse and resolve EOT claims in a swift, fair and efficient way.

For this purpose, drafters in English law adopt two types of contract: the first is the traditional contract, represented by the JCT contract, which by adopting precise legal terms and well-matched provision structures, ensuring decision-maker independent discretional power and professional ethics, and conducting a thorough risk allocation and comprehensive application of prospective/retrospective analysis and adjustment, ensures that the parties have sufficient base to raise and analyse claims, award EOT and carry out dispute resolution to protect the legal entitlements arising from EOT claims. The other is a partnership and management-orientation contract, represented by the NEC contract, which on the one hand stresses the parties' collaboration in delay identification, avoidance and mitigation and, on the other, stresses a self-contained framework of claims, containing straightforward risk allocation provisions, a clear procedure for claim submissions and awards, clear criteria for assessment, logic analysis instruments and approaches, an express scope of documentation for analysis and the sanction of later submissions and awards, whereby the parties are encouraged to, and provided sufficient facilities to efficiently resolve EOT claims under the contractual framework itself rather than resorting to costly litigation.

The FIDIC contract, which is established under English law while applied in the complex legal environments of the international market, takes a position between the two extremes of the JCT and NEC contract. On the one hand, it follows some features of the JCT contract to provide sufficient legal basis for parties to raise claims and process them to protect their legal and contractual entitlements in an adversarial way.

On the other hand, through its recent revisions, it stresses management and claim procedures, to avoid delay and to proceed with EOT claims swiftly and efficiently. However, due to the complicated legal environment, it provides few detailed criteria and approaches for claims analysis per se, but leaves these to be analysed and determined based on the circumstances, including applicable law, local industry practice, and fact.

The DMCC transplants the basic structure and philosophies from the 5th FIDIC Red Book for use in a Civil Law county – China. Regarding EOT claims, it establishes a similar mechanism to the 5th FIDIC Red Book, seeking to resolve claims swiftly. However, due to simplification in its provisions and structure, it still lacks relevant supporting mechanisms (such as delay avoidance and mitigation, contemporary progress monitoring and delay analysis, necessary records system, and detailed claim assessment criteria) to support its claims mechanism in achieving that effect; therefore, it requires improvement through further revision to a substantial extent. Furthermore, it is found that many provisions of the DMCC in terms of EOT claims are inconsistent with legal provisions, legal culture, and industry practice in China. These inconsistencies should also be taken into account in the revision.

Chapter 6

EOT claims analysis in project practice

6.1 Introduction

This chapter conducts research in the field of project practice in the UK and China. Specifically, based on the industry practice established in the UK and empirical information in China, the research compares normal practice of EOT analysis, including instruments, principles, and approaches, to analyse the status quo of EOT analysis in two jurisdictions, and reveal factors entailing improvement by China.

6.2 Practice of EOT claims analysis

6.2.1 In the UK

In the UK, delay in construction projects is a significant element in construction law as it not only relates to time management but also directly impacts parties' interests arising from delay claims. It is, therefore, the subject of considerable research, with treaties and monographs provided by diverse organisations and commenters, for instance, *Keatin*g on construction law*, Delay and Disruption in Construction Projects* on overall research into delay and disruption and the CIOB Guide, which focuses on planning and scheduling. Furthermore, EOT claims analysis is a subset of construction delay, and specific research, practice treaties and guidance are also provided on this subject, such as the *SCL Protocol* and other monographs. All these publications offer guidance to practitioners; amongst them, SCL and ICOB play a significant role in establishing consensus and offering guidance to the construction industry in the UK regarding EOT claims, therefore helping to form a framework of claims for EOT, prolongation and disruptions. Therefore, regarding the practice of EOT claim analysis in the UK, this chapter is based primarily on publications provided by these industry associations which, along with other treaties and monographs, constitute a substantial resource for industry practice in the UK in relation to EOT claims analysis.[691]

Specifically, the 1st edition of the *Protocol,* promulgated in 2002, aimed to provide useful guidance on common delay and disruption issues arising in construction projects, and focused on offering practical and principled guidance on proportionate measures for dealing with delay and disruption issues which can be applied in all construction projects.[692] Despite criticism by some commentators,[693] the *Protocol* has been widely used as guidance in projects in the UK and even in international jurisdictions,[694] and is often cited as supporting a particular method of delay

[691] *SCL Protocol*, Introduction E
[692] Idem, Introduction A
[693] David Barry, SCL delay and disruption protocol: 10 years on, *Construction Law Journal*, 2013; Burr (supra note 278); and Julian Bailey (supra note 20)
[694] Robert Fenwick Elliott, supra note 301

analysis.[695] Furthermore, to counter criticisms and comment, and align with current industry practices and English case law,[696] the *Protocol* was significantly updated in its second edition, published in 2017. The new edition retained the basic philosophy and structure of the first edition but in respect of time management particularly stresses programme and records; as for delay analysis, it no longer insists that the time impact method should be the preferred delay analysis methodology in any circumstances, but still recommends that prospective analysis should be used to swiftly resolve EOT claims. Additionally, the contemporaneous submission and assessment of EOT claims is elevated to a core principle.[697] Notwithstanding the substantial effort made by the *Protocol*, there are, as commentators have observed, still many fields to be improved. For instance, it mainly focuses on dispute resolution avoidance but ignores project management and controlling;[698] excessive emphasis on prospective analysis results in costly and complicated analysis; the definition of global claim is incomplete[699] and it holds questionable positions on the topics of floats, mitigation and acceleration.[700] Although it had already received support from courts in other English law jurisdictions,[701] few UK cases have yet followed it to determine construction cases.[702]

6.2.2 In China

In the construction industry in China, other than a collection of codes of law on construction, no independent discipline of construction law has yet been established. As a result, very few articles or books have been produced by relevant organisations or scholars on delay and EOT claims, and no consensus has yet been reached to guide or be commonly used by parties to resolve EOT claims in a relatively uniform way.

Therefore, this research relies on discrete literature provided by commentators or scholars as well as empirical information. To fill this gap, we – an investigation team on progress management in a domestic construction company – conducted a survey in 2018 about construction delay claims in China. The report is presented as Appendix 1 of this research. The survey was conducted in a typical substantial state-owned company in China which is active in all types of large to medium construction projects, and a total of 390 construction practitioners participated in it. It revealed general problems and issues in the practice of time management and EOT claims in construction projects in China and revealed common practice in addressing particular matters or problems in relation to EOT claims. Amongst other information, it provides sound empirical information to support this research.

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[695] Julian Bailey, et al, The second edition of SCL delay and disruption protocol, https://www.whitecase.com/publications/alert/second-edition-scl-delay-and-disruption-protocol

[696] Idem

[697] *SCL Protocol*, Introduction K

[698] Burr, supra note 267

[699] Julian Bailey, supra note 695

[700] Burr, supra note 267

[701] Robert Fenwick Elliott, supra note 301

[702] Julian Bailey, supra note 695

6.3 Correlation between practice, law and contact

6.3.1 In the UK

In the UK, as discussed in Chapter 3, generally, due to the primary legal principles of *rule of law* and *pacta sunt servanda*, the public commonly complies with the law and contracts have a litigious mindset, relying on the law to claim or protect individual interests.[703] In this sense, in EOT claims, they are likely to comply with the law and contract. In effect, in the UK, an EOT claim, like other activities under the construction contract, is a process to which the law and contract are applied by taking account of the facts and circumstances; the practice cannot depart from the law and the contract.

This point is illustrated by the fact that all treaties, books and articles in relation to EOT claims in the UK, without exception, are based on the current law and standard forms of contract. For instance, it is clearly declared in the *SCL Protocol* that it is a conclusion or compromise of the law and standard form contracts in the UK in relation to delay and disruption.[704]

6.3.2 In China

In China, as discussed in Chapters 4 and 5, the current legal system and standard form of construction contracts were transplanted from Western law and standard form contracts in English law respectively. However, the deep-rooted traditional culture and the unique behavioural mode and mindset of Chinese society have resulted in a substantial divergence between the writing and the implementation of the law and contracts. The public is likely to see the law and contracts negatively; especially around lawsuits and contract conflicts, the parties normally have a strong anti-litigious mindset. Regarding contractors, many have blind faith in *guanxi,*[705] which they like to adopt to influence decision-makers in construction projects and even judges. Therefore judicial justice and the sanctity of the contract are easily prejudiced and personal power, rather than black-letter law or the contract, always plays a decisive part in claims and disputes in construction projects. Employers, with their dominant position in construction projects and unconstrained by supervision mechanisms or adjudication, also tend to disregard the contract. Hence, the contract does not receive due respect and is far from a dominant base on which practitioners rely to run projects.[706]

Therefore, the Chinese legal and contractual culture shows a substantial divergence between the law, the paper contract and action. This divergence is seen also in EOT claims, and should be taken into account by research and practice.

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[703] Idem

[704] *SCL Protocol*, Introduction L

[705] A Chinese term, means personal relationship

[706] Refer to Appendix-1, section 4.3.5. iv)

6.4 Parties' relations

6.4.1 In the UK

As discussed in Sections 3.5 and 4.4 above, in construction contracts in the UK, there is normally an independent CA between the contractors and employers. In this form of contractual management, the employer has less opportunity to directly control matters which may affect parties' rights and benefits. Given the relatively balanced risk allocation provided by standard forms of contract, normally a relatively balanced business relationship is maintained between the contracting parties.

6.4.2 In China

In contrast, in China, since the legal position of the supervisor has not been established by law, although the standard form DMCC contract tries to establish a balanced contractual relationship between the parties, in reality, the employer has a dominant position in construction contracts and acts as the ultimate decision-maker of in a range of matters, including claims. Therefore, the parties have a seriously unbalanced relationship.

Pursuant to the survey report, it was detected that a primary problem in China is the employer's dominant position in construction contracts and aggressive attitude in claims. Contractors commonly complain that most employers are reluctant to comply with the contract and law; they act aggressively and arbitrarily, do not treat contractors as an equal business partner but as a subordinate, and supervisors seldom act fairly but blindly follow the employers' wishes.[707]

6.5 Burden of proof and instrument of EOT claims analysis

6.5.1 In the UK

A. Factual Evidence

As discussed in Section 3.3.3 above, programme evidence is significant in EOT analysis as it provides basic information for a scheduling analysis. However, it is found that poor record-keeping is a common problem in international construction projects and is the leading cause of construction claims.[708] In the UK, almost all standard forms of contract, as well as all treaties and books in relation to construction claims, stress the significance of contemporaneous records.

In particular, the recent *2nd Protocol* proposes a detailed system of contemporary record capture and keeping to provide factual evidence for delay claims analysis. It holds that adequate and complete records can provide robust factual grounds for progress management and delay claims assessments; hence, the significance of

[707] Appendix-1, section 3.3.2.ii.c, p13, and section 4.3.5. iii) and iv), p30

[708] James J. Arian, *Construction claims-A quantitative approach*, Stipes Publishing (US), 1993, p.255

good-quality contemporary records over the lifecycle of a project cannot be overestimated.[709]

Specifically, the *Protocol* recommends that, at the tender stage, employers should specify the record-keeping required and incorporate the price for that work into the contract price. Before the works start, parties should agree on what types of record will be kept, who will produce and check them, the frequency of updates, the distribution list, format and ownership. Records should be captured contemporaneously and the data recorded in line with activities in the agreed programme. Adequate resources should be found by the responsible parties to ensure that the records can be properly and adequately produced, checked and stored, and inconsistencies between records should be identified and notified. Employers should consider keeping independent records for progress management and delay claims analysis. When circumstances change, the parties should consider updating the record-keeping mechanism. For better practice, the *Protocol* provides Appendix B, describing the six records typically needed for progress management and assessing EOT and cost compensation claims. It includes records of the programme, progress, resource, costs, correspondence and administration. Furthermore, on the format and storage of records, it suggests that records should be produced and stored through standard document-management systems, produced electronically and collaboratively shared by parties to allow them to be easily accessed, distributed, searched, stored and retried, and parties should have prior agreement upon the content, use and ownership of records kept by BIM if applicable.

Among the records listed by the *Protocol* above, progress records are most directly pertinent to EOT claims analysis: they identify the progress of the works at a particular time, and contain contemporary raw data records and compiled records. The former include daily reports, the health, safety, environment and security issues log, obstruction data, hand-over records, geological mapping records, inspections requests or reports, site test reports, testing and commissioning records and progress photographs. These last are prepared from the raw data records and programme records, and summarise and interpret the raw data and the conclusion of progress at a particular time. They may contain weekly or monthly progress reports.[710]Such systems are widely discussed by other commentators also. For instance, Arian held that progress records should enable an analyst to reconstruct every event that happened at a particular site on a specific day; information should be recorded on a daily, weekly, monthly or other periodic basis. He suggested that modern technology affords several alternative ways of gathering and keeping site records, such as photos, audio, video and computer records.[711] Gibson held that progress records should also contain a progress charter, which contains the planning chart and progress tracking

[709] 2nd *Protocol*, Guidance Part B: 1.2

[710] 2nd *SCL Protocol*, p.73~74

[711] James J. Arian, supra note 708, chapter 12

chart accompanied by the relative narrative and supported by site diaries and photographs.[712]

The above system of making and storing records is comprehensive but costly and involves substantial effort and time. It seems that the *Protocol* has realised this disadvantage and therefore recommends that the parties should agree upon an approach that is proportionate and appropriate to the specific circumstances of the works.[713]

B. Analytic evidence and schedule

Pursuant to the *Protocol* and other treaties and monographs, it is clear that the construction industry in the UK has clearly recognised the importance of planning and scheduling in construction projects. For instance, it is clearly stated by the *Protocol* that:

> ------the contractor should prepare and the CA should accept a properly prepared programme showing the manner and sequence in which the contractor plans to carry out the works. The programme should be updated to record actual progress, variations, changes of logic, methods and sequences, mitigation or accelerations measure and any EOTs granted. If this is done, then the programme can be more easily used as a tool for managing change and determining EOTs and periods of time for which compensation may be due.[714]

Based on the above, on the one hand the programme is an approach to record keeping; on the other, it is a primary instrument used not only for progress management but also for EOT and prolongation claims assessment.

a. Progress management and monitoring

a) Programme establishment and updating

It is commonly held in the UK that the preliminary function of the schedule is for efficient time management of work. *A Practice Treatise on Time Management* (CIOB Guide) was established by CIOB in 2007, with practice applicable in projects using any kind of standard-form contract in any jurisdiction, in which the programme acts as the core instrument for the time-model against which progress can be measured and a strategy to address intervening events can be devised.[715] Pursuant to it, the time and time risk of a project can be controlled and managed through planning and scheduling. Planning is largely an experienced-based art, a group of processes requiring the contribution of all parties affected for its success. Scheduling amplifies planning, and uses mathematic calculations and logic to predict when and where work can be carried out in an efficient and time-effective sequence.[716] The schedule is a programme with computerised calculated dates and logic; its preparation must be a

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[712] Roger Gibson, *Construction delays, extension of time and prolongation claims*, 2nd edition, Taylor & Francis, 2008, chapter 10

[713] 2nd *SCL Protocol*, p.12

[714] Idem, Core Principles 1

[715] CIOB Guide, p.1

[716] Idem

quality-assured process against a standard which will ensure its integrity so it can function as a time-model.[717] A schedule should include sufficient consideration of contingencies for time risk of the various parties. It should be prepared in varying levels of detail consistent with the information available from time to time, and should be reviewed and revised at regular intervals. The schedules for all parties involved should be prepared with the same software and format. They should include a section with a short-term focus, with a high density of detail, based on resources and productivity quotients, to guide work to be carried out in the short term. It establishes that accurate as-built information and resources available must be provided for the preparation of the schedule to provide benchmarks and standards for future works and ensure the predictability and reliability of future short-term scheduling. For this purpose, progress records and quality-control information should be kept in the database.[718]

In addition to the schedule, diverse communication approaches should also be efficiently used for time management, with reports for internal and external use, specifically including contractual notices, managerial reports and informational reports.[719]

Based on the above, the CIOB provides detailed strategies and techniques for establishing and updating schedules. Additionally, the SCL *Protocol* also offers considerable guidance as to the format of the programme and procedure of programme establishment and management. Generally, it follows the same techniques as the CIOB Guidance regarding programme management. Specifically, it confirms that the programme, which is used for managing delay, disruption and related claims, should use CPM and contain all relevant activities, key interfaces and constraints, with all activities logically linked.[720] It recommends that the programme should provide sufficient detail to provide forward visibility so that delay effects and disruption events can be predicted. Contracts should have pre-set limits on the maximum duration of an activity; the arrangement of the activity should be in line with the heading of works in the BOQ with appropriate logic, and a programme narrative should be provided stating constraints, resources, reasons for use of float, and activities to be executed by the use of overtime/additional shifts. When the works are production driven, supplementary tools such as the line of s-curve should be developed. Additionally, the programme should be read in conjunction with the method statement.[721]

b) Progress management and monitoring

The *CIOB Guide* believes that construction time should be managed dynamically to manage the consequences of any change or delay events. When intervening events are impacted at the time of their initiation, the likely delay effect should be calculated in

[717] Idem, p.2
[718] *CIOB Guide*, p.2~3
[719] Idem, Chapter 5
[720] The 2nd *SCL Protocol*, p.18
[721] Idem, p.18~20

accordance with the *SCL Protocol*.[722] Generally, progress management should be conducted through project planning, risk management, schedule preparation, progress updates, record keeping, quality control and communication.[723]

Regarding progress monitoring, Burr suggested diverse methodologies for detecting changes in progress and identifying delays or likely delay to progress.[724] However, *CIOB's Guide* precludes using these static techniques – which compare data against a static baseline – in complex projects because works and resources are constantly changing.[725]

The *Protocol* does not particularly provide methodologies for progress monitoring; however, it stresses the application and update of programmes, such as the mechanisms adopted by NEC4 and the 2017 edition of the FIDIC contract, to monitor progress and analyse delay simultaneously. Specifically, it establishes a complete programme mechanism, which includes the contractor's proposed programme, the CA's accepted programme and updates to the programme.[726] It is recommended that parties should agree in the contract a fixed period for contractors to submit a proposed programme and for the CA to accept the programme. When the initial programme is submitted, it is recommended that it should strictly follow the assumptions stated in the contract and should not include any post-contract changes. After submission of the programme, the CA's failure to respond within a certain time frame will constitute deemed acceptance, as in NEC4. To counter the contractor's unduly delayed or incomplete submission of an initial or updated programme, it recommends that the relevant contract mechanisms be established to address the contractor's default, and that CAs should keep their own as-built records as well as the initial and updated programme. It stresses that timely agreement of the accepted programme cannot be underestimated: any argument about the agreement should not be allowed to continue through the works.[727] During performance of the works, the *Protocol* recommends that the contract should require the accepted programme to be updated using the agreed CPM programme software at intervals of no longer than one month. The updated programme should contain actual progress and predictions of future progress and may also include new activities or logic. It suggests that no version of any programme should be overwritten; all versions need to be saved separately to identify the parties' current intentions when EOT claims are retrospectively analysed. EOT claims can be determined based on the updated programme as it demonstrates actual progress against planned progress; however, the updated programme should indicate accurate as-built progress as agreed or opined by the CAs. Specially, where delay occurs, it suggests that the contract should contain provisions allowing contractors to

[722] *CIOB guide*, p.3
[723] Idem, p.3
[724] Burr, supra note 11, Chapter 9
[725] *CIOB Guide*, p.2
[726] 2nd *SCL Protocol*, p.18~22
[727] Idem

submit a proposed revised programme. CAs should accept it if it is reasonable although acceptance does not mean accepting or waiving a contractors' delay.[728]

In summary, the above application of the schedule, together with progress monitoring, constitutes a comprehensive process for creating a platform to manage time, monitor progress, identify delay or likely delay, and provide techniques, tools and as-built information for scheduling delay analysis; thus, its significance in EOT claim analysis cannot be underestimated.

b. Delay analysis

In the UK, another significant function of the schedule is in scheduling delay analysis. Broad delay analysis methodologies have been developed by practitioners in the UK; details are introduced in Section 3.3.3.B above. From a cross-study of monographs and treatise practice in the UK, commentators categorised these methodologies into various types.

a) Types of common delay analysis in practice

Roger Gibson categorised four types of methodology. The first is impressionistic analysis, which includes global impact analysis and net impact analysis. These traditional analysis methods can be applied just by observing and analysing a bar chart and do not need a CPM schedule. Specifically, global impact analysis, referred to in Section 3.3.3 above, is the simplest form of analysis. Its rationale is that the EOT is the total duration of all individual employer delay events, regardless of whether these events are plotted on the critical path of the works or whether they have the effect of concurrent delay. Net impact analysis is a variant of global impact analysis and follows the same methods to calculate the EOT, deducting delay caused by concurrent delay.[729] Clearly, this type of analysis is not a scheduling analysis and cannot provide authentic proof for EOT claims; however, due to its simplicity it can be used in negotiation or simple projects.

The second type is simplistic analysis, which uses the CPM schedule as an instrument for delay analysis but is limited to simple analysis methods. It contains as-planned impacted analysis, as-built bar chart analysis, and as-built adjusted analysis. As-planned analysis is referenced in Section 3.3.3.B above regarding Impacted As-Planned analysis. As-built bar chart analysis identifies the visual time difference between each activity comparing the as-plan and as-built charts. As-built analysis is similar to as-planned vs as-built analysis, as introduced in Section 3.3.3.B above, and calculates EOT based on the time difference between the as-plan and as-built CPM programme.[730]

The third type is prospective analysis, i.e. time impact analysis as introduced in Section 3.3.3.B.[731] The fourth type is retrospective analysis including collapsed

[728] Idem, p.21~22
[729] Roger Gibson, supra note 712, p.163~165
[730] Idem, p. 168~172
[731] Roger Gibson, supra note 712, p. 175

as-built analysis and windows analysis, which have been discussed in Sections 3.3.3.B above respectively.[732]

The above categorisation was made in 2005; besides scheduling delay analysis methods, it also stressed traditional impressionistic and simplistic methods which can be used for simple EOT claims analysis, and found these methods are still actively used by practitioners and therefore still have a high degree of practical meaning.

b) Scheduling analysis recommended by the SCL Protocol at different stages

Comparatively, the *1st Protocol* provides more detailed guidelines on addressing EOT at different stages of a project.

In the course of projects

During the course of projects, it was recommended that the updated programme should be used as the primary tool to guide contractors in preparing EOT claims, and to guide CAs in determining the amount of EOT. In employer risk events, contractors should insert a sub-network – which indicates the actual or anticipated effect of the employer risk event and links it into the updated programme, accompanied by such documents and records as are necessary to demonstrate the entitlement to an EOT. After receiving the EOT claim report, CAs should first determine whether the delay is caused by an employer risk event, and therefore whether to award EOT. EOT should be granted to the extent that the employer risk event is predicted to prevent the works from being completed by the contract completion date at that point. If the contractors' submission does not comply with this requirement, CAs should make their own determination of EOT based on the information available. As an EOT which is awarded based on prospective analysis is difficult to withdraw, it is suggested that CAs merely award the minimum EOT likely to be justified where they have the information available. CAs should notify their determination with detailed reasons; disagreement on EOT matters should not be left to be resolved until the end of the project. The parties should seek a quick solution through dispute resolution.[733]

The methodology above is called time-impacted analysis. It is recommended in the *1st Protocol* that this methodology be used whenever permitted and in both prospective and retrospective delay analysis. However, it should not be used where no full programme has been prepared, accepted or updated.[734] In concurrent delay caused by consequential employer and contractor risk events, it is suggested that time impact analysis should still be conducted for each event separately, strictly in the sequence in which they arose.[735]

After completion

After completion of the project, the *1st Protocol* confirmed that retrospective delay analysis should be used but still stressed the significance of accurate updated project

[732] Idem, p.176~181
[733] *1st Protocol*, Guidance Section 3. 3.2
[734] Idem, Section 3.2.11
[735] Idem, Section 3.2.12

schedules and records-keeping in performing an accurate retrospective delay analysis.[736] It suggested that methods of as planned vs as-built, impacted as-planned, collapsed as-built, and time impact analysis can be used. However, the method chosen depends on diverse factors, including contractual conditions, the nature of causative events, the value of the dispute, the time, records and programme information available, as well as the programmer's skill level and familiarity with the project.[737] Furthermore, if the contract allows EOT to be awarded against the actual delay effect to completion only, then collapsed as-built, as-planned v as-built, and time impact analysis may be suitable; conversely, if the contract allows EOT to be awarded based on the likely delay effect, Impacted as Planned and Time Impact Analysis may be more appropriate.[738] Therefore, of these various methods, it was recommended that the parties should, upon each claim or dispute, agree on the most appropriate analysis method and the party to carry out the analysis.[739]

It was held by the *1st Protocol* that the as-planned v as-built method is unable to identify concurrency or mitigation and, therefore, should be used in delay identification or as the starting point for other advanced methods.[740] The application of impact as-planned analysis should be restricted due to its highly theoretical nature.[741] The application of collapsed as-built analysis is also limited due to its inability to identify concurrency, re-sequencing, redistribution of resources or acceleration.[742] It was submitted that the time impact analysis method is based on the effect of delay events on contractors' intentions for future works in terms of the actual progress achieved at the time of the occurrence of delay events. Since it neglects facts that occurred after the delay events in question, the effects of acceleration, re-sequence, mitigation and concurrent delay can be removed; therefore, it is the best technique for assessing and awarding an EOT which contractors should have been granted at the time of the occurrence of employer risk events.[743]

In summary, the *1st Protocol*'s position is that EOT should be awarded based on the position which should have been occupied by the contractors if the remaining works were conducted as per the contractors' intention, but not based on actual progress which may contain anomalies which may undermine the entitlement to EOT. Therefore, even when an EOT claim is analysed at the end of the project, entitlement to an EOT is to be determined prospectively based on the status of the project at the time when the delay occurred but not based on the decision-maker's hindsight about later as-built progress.[744] Therefore, the decision-maker determining the claim should place himself in the position of the CA at the time at which the delay events occurred

[736] Richard, supra note 304
[737] 1st Protocol, section 4.2
[738] Idem, section 4.3 and 4.4
[739] Idem, section 4.18
[740] Idem, section 4.7
[741] Idem, section 4.8
[742] Idem, section 4.9
[743] Idem
[744] Richard, supra note 304

and ignore what happened afterwards.[745] Nevertheless, it was submitted that to insist on using prospective time impact methods in both prospective and retrospective EOT claims compromises a degree of accuracy in determining the EOT to achieve a fast-track resolution of EOT claims and keep the project moving ahead.[746]

c) The *2nd Protocol*'s updated position

Compared with the *1st Protocol*, the *2nd Protocol* has significantly updated and revised its position regarding delay analysis at different stages. The categorisation of stages at which delay analysis may be conducted has been changed to contemporaneous analysis and time-distant analysis and the approaches and principles in each stage have also changed, as below.

Contemporaneous analysis

Contemporaneous delay analysis corresponds to delay analysis in the course of the project in the *1st Protocol*, and further stresses that EOT claims should be submitted, assessed and determined contemporaneously rather than adopting a "wait and see" approach.[747] To that effect, EOT claims should be analysed through the time impact method, as provided by the *1st Protocol*. It further stresses the significance of accurately updated programmes in time impact analysis[748] and suggests that before the subset is inserted in the updated programme, it should be agreed by CAs to reduce disagreement over the EOT assessment.[749]Regarding the standard of assessment, it further expressly opined that EOT determination should not necessarily be based on the effect of actual delay but can be determined based on the effect of likely delay. The CA should not wait to see whether the contractor does indeed need an EOT.[750]

Time-distant analysis

Time-distant analysis corresponds to delay analysis after the completion of the project, as suggested by the *1st Protocol*. The *2nd Protocol* now provides a compromise to the effect that where an EOT application is assessed after the completion of works, or significantly after the effect of an employer risk event, prospective delay analysis may no longer be appropriate.[751]

Regarding methods of scheduling delay analysis, the *2nd Protocol* added two methods: time slice/window analysis and retrospective longest path analysis. Therefore, a total of six methods are available for scheduling analysis, and each has its advantages and disadvantages. Of all these methods, no single method is suggested in preference to time-distant analysis; rather, the *2nd Protocol* identifies the factors that should be

[745] 1st Protocol, section 4.19
[746] Richard, supra note 304
[747] 2nd protocol, section 4.1
[748] Idem, section 4.8
[749] Idem, section 4.8 and 4.10
[750] Idem, section 6 and section 6.1
[751] 2nd protocol, section 11.1

taken into account in selecting the most appropriate methodology for the particular circumstances.[752]

Interestingly, through three new perspectives, the *2nd* Protocol provides a new categorisation of delay analysis. The first categorisation is based on the sequence of analysis: it contains cause-effect analysis and effect-cause analysis.[753] The second categorisation is based on the perspective of criticality analysis: it includes purely prospective critical path assessment, contemporaneous critical path assessment and retrospective critical path assessment.[754] The third categorisation is based on the delay impact and includes prospective analysis and retrospective analysis.[755]

C. Discussion

Based on the above, the UK construction industry has established a relatively complete framework, pioneered by SCL and CIOB, for producing and retaining factual and analytic proof for EOT claims analysis. It is observed that the industry increasingly stresses factual contemporaneous record-keeping; it also found that the industry tries to merge regular progress management and delay analysis in the same process. This enables the parties to proactively identify and recognise delay in a timely manner, and provide sufficient progress records for practitioners and decision-makers to more reasonably and efficiently resolve EOT claims.

Regarding analytic proof for EOT claims, the industry has also developed a complete system of delay analysis methodologies. On the one hand, it contains traditional impressionistic and simplistic methodologies used for simple claims; on the other, it covers many forensic scheduling delay analyses which can be used for complex circumstances. Generally, the *Protocol* recommends a fast-track delay methodology, i.e. time impact analysis to solve EOT claims effectively and sufficiently protect the contractor's entitlement to EOT. However, time impact analysis is more appropriate when EOT claims are submitted and assessed contemporaneously; its practicability long after the event is questionable. Therefore, the *Protocol* has softened its position in this regard also, despite still insisting on a contemporaneous assessment. Nevertheless, there is a recent tendency in the UK to assess EOT relatively generously: it can be awarded based on a tentative predicted likely delay effect but not limited by the actual delay effect, and should be awarded based on the entitlement to EOT but not based on the contractors' actual requirement for EOT.

Furthermore, it is noteworthy that the *2nd Protocol* repeatedly stresses that scheduling analysis should make reference to common sense, perhaps because the SCL has realised that scheduling delay analysis is by no means an exact science[756] and may produce anomalous results if applied incorrectly. It suggests the analysis should be

[752] Idem, Introduction K 9(c)

[753] Idem, section 11.4 (a)

[754] Idem, section 11.4 (b)~(d)

[755] Idem, section 11.4 (f)

[756] Knowles, supra note 54, p. 115; and Alexandra Clough, Concurrency and the SCL delay and disruption protocol: all together now, *SCL Paper*, 2016

verified and rectified by common sense. With this position, it seems that the *Protocol* is attempting to compromise between traditional impressionistic analysis and forensic scheduling analysis.

6.5.2 In China

A. Factual evidence

a. The status quo in record-keeping

In China, the construction industry only adopted modern construction contracts and modern-style project management from the 1990s; this short-term experience has led to a relatively low level of project management, including claims management. Practitioners commonly lack legal or contractual experience; most have little or no experience of claims. Both employers and contractors commonly lack professional staff with the relevant expertise and experience to deal with schedules and claim, and very few projects have mature record-keeping and claim-management systems.[757] Moreover, as discussed in Chapter 5, the standard form DMCC contract also fails to provide a contractual mechanism for record-keeping systems to guide parties' actions in this field. Under such circumstances, it is difficult for parties to adopt a relatively uniform daily record-keeping system to maintain contemporaneous records to support EOT claim analysis and determination.

In accordance with Wang,[758] through a survey, practical problems in the record-keeping supporting delay claims include: 1) a lack of proof of commencement of the works; 2) employers and supervisors do not record verbal site instructions; 3) contractors' general programmes commonly fail to be confirmed or approved by employers or supervisors; programmes are commonly changed randomly without approval and are not officially updated or approved in accordance with the changed circumstances; 4) the parties do not focus on applying the programme to the works; no critical path is agreed or confirmed by the employers, therefore the parties lack grounds to identify the delay and assess EOT; 5) upon occurrence of the delay event, notice of claim and claim reports are not usually submitted by the contractors or confirmed by employers in a timely manner; 6) a lack of necessary supporting contractual provisions and documents; 7) failure to confirm the completion of works and late submission of completion report. Obviously, the survey results reveal that the contracting parties commonly lack both contemporary progress records and analytic proof to support an EOT claim analysis.

b. Practitioners' understanding and recommendations

Faced with the problems above, Chinese commentators and scholars have produced a considerable body of research in relation to record-keeping and proof of claims. Some

[757] Zhang Danqing, et al, Effective prevention against variation and claim in construction project-Taking a project as example, *Science & Technology Vision*, 2014 (34)

758 Wang Ben-mei, supra note 9

focus on general approaches to document control management;[759] others on establishing claim management systems and databases[760] or internal claim information platforms using web or internet techniques.[761] However, such academic research is seldom put into practice in construction projects; the approaches to record-keeping and claim management used in construction projects are still limited to the traditional ones.[762]

In contrast, other organisations and construction practitioners offer practical recommendations regarding proof and records to support the assessment and determination of EOT claims. Many practitioners understand and recommend the type of proof which should be provided for EOT claims. For instance, from the supervisor's perspective, proof supporting EOT claims should include the relevant contractual provisions, the programme confirmed by the employer or supervisor, correspondence, site records, minutes of meetings, photos and video information, supervisor's instructions in writing, proof of payment, test and check reports and a range of financial evidence.[763] From the lawyers' perspective, contractors should submit general plans and the programme for approval at the outset of project. In the course of the project, lawyers should remind parties to monitor any unusual events and produce *ad hoc* records to support or defend EOT claims. In this respect, unusual events include the contractor's or employer's breach of contract, or *force majeure*.[764] From the contractors' perspective, various daily records should be created and maintained by an *ad hoc* claim team to support claims, including 1) government policy and legal codes; 2) documents relating to invitations to tender, bids, contracts, amendments to contract; 3) correspondence; 4) minutes of meetings; 5) approved as-plan programme and as-built progress records; 6) site records; 7) photos, audio and video documents; 8) test and acceptance reports; technique identification reports; 9) costs and financial records; 10) weather records; 11) marketing information.[765] Furthermore, documents should be filed and easily accessed and cross-checked. Additionally, relevant file software and databases are recommended[766] for ease of claim records management.[767] The parties should also explore the application of BIM techniques in record-keeping for claims.[768]

Other practitioners recommend proactively searching and keeping progress records to support EOT claim analysis. For instance, it is recommended that types of progress

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[759] Shao Hua-mei, Document control management of general contract engineering, *Electric Power Survey & Design*, 2010(4)

[760] Cai Shuqin, et al, Computer aided decision models of construction claims based on Hypertext problem description, *Journal of Huazhong University of Science and Technology*, 1998 (05)

[761] Wang Yan, The study of web-based claim management system for general construction contractor, *Thesis for master degree in Wuhan University of Technology*, 2010, p.21

[762] Idem

[763] Su Cainuo, The Supervisor's management and analysis in construction variation and claim, *Science and Technology Innovation Herald*, 2013 (26)

[764] All China Lawyers Association, section 64.1 & 64.2

[765] Su Qing, Construction claim and document control management in general construction contract projects, *Office Operations*, 2012(10)

[766] idem

[767] Wang yan, supra note 761, p.22

[768] Yu Bailin, Playing BIM Technology in the role of Project management, *Anhui Architecture*, 2014 (04)

record be separately produced and filed, including 1) initial records, which should contain general planning, programme, internal progress control planning, contract provision in relation to progress, proof of commencement of works; 2) progress control and monitoring records, which should contain monthly plans and progress adjustment plans, subcontractor provisions in relation to progress control, EOT claims proof (daily progress records, site visa for claims, employer's determination in relation to progress and time, photos of suspension of works); and 3) the completion document, which should contain documents to prove the completion, actual as-built progress table and progress conclusion reports. [769] It is important to ensure that all these records are confirmed and can be jointly accessed by the employer and supervisor.[770]

c. The unique factual records of a claim – the visa

In construction practice in China, the unique mechanism of the visa is used to change the contract price and time of completion. The visa is a simple statement, submitted by contractors and confirmed by supervisors or employers, that reflects any changes or unforeseen occurrences to the description in the contract or the original drawings. Specifically, it may reflect loss arising from matters such as suspension or slow-down caused by employer risk events, errors or changes in the designs or drawings, costs and/or time for conducting additional works or removing the finished works and additional costs for unforeseen situations.[771] Normally, the visa should be confirmed by employers or the supervision site team.[772] Upon the occurrence of a delay event, a visa recording the period of delay and quantifying the direct cost impact is confirmed by the employers/supervisors. This constitutes a simple agreement between the parties and can therefore be used as a basis for calculating prolongation costs and EOT; it represents the most straightforward authentic factual proof for EOT claims. If a visa has not been confirmed and signed by the employers/supervisors, a claim or dispute is likely to arise; contractors must create, keep and provide their own records to prove claims, but their authenticity will be significantly jeopardised. In such circumstances, contractors must produce alternative authentic contemporaneous records such as visual photos, video records or minutes of meetings signed by all parties.

Therefore, the visa plays a significant role in claims: on the one hand, it is a simple cost claim *per se*;[773] on the other, it can provide the strongest convincing factual proof to support EOT and prolongation costs claims. Given its strong influence in claims, whether a visa can be signed and confirmed is always the focus of some controversy between parties. However, in practice the visa mechanism commonly cannot be properly performed by supervisors/employers: it is not unusual that it cannot be signed or confirmed contemporaneously – in fact, it is always signed

[769] Wang Ben-mei, supra note 9

[770] Idem

[771] Pan li, A preliminary analysis of management measures of construction variation and claim, *Foreign Investment in China*, 2014(03)

[772] Idem

[773] Zhang Lei, et al, Skill and art regarding visa and claim in construction project, *Information of China Construction*, 2002(09)

retrospectively and randomly, descriptions are general and vague, and many visas merely describe events but present no conclusions, therefore have little practical meaning in claims.[774]

In practice, the parties also commonly complain about the operation of the visa mechanism. Employers complain that supervisors have low professional standards and therefore provide poor-quality visas, that the content does not match the facts, that the quantity of work and time confirmed by supervisors always exceeds the actual quantity and that the content of the visa always coincides with contractual works.[775] Contractors commonly complain that supervisors are reluctant to sign a visa which may be against the employers' interest, leaving contractors with no proof to support their claims.[776] Therefore, it is recommended by practitioners that the visa mechanism should be significantly improved by enhancing supervisors' skills and professional ethics,[777] regulating the procedures for visa acceptance and confirmation, and establishing a legal basis and a schedule for the visa.[778]

B. Analytic evidence and schedule

a. Progress management and monitoring

In China, although the courts and the standard form contracts do not expressly depict the form of programme that should be used in projects, in practice the CPM schedule has been widely used to manage progress in construction projects. For instance, since 2004, the China State Power Group Corporation, a giant state-owned power development and operation company, has developed guidelines for time management in all power construction projects, arguing that the schedule established by P3 series software should be uniformly used to manage progress in all construction projects.[779] It showed that the schedule should be a dynamic process, encompassing planning, performance, inspection and monitoring, analysis and adjustment, and should be continually updated.[780] In construction projects, the schedule should be updated each month, and the contractors' internal working schedule should be updated each week.[781] The schedule should be accompanied by monthly or weekly progress reports and should include progress and problems in the past as well as planning for the next month.[782] The company should conduct project progress coordination meetings to solve progress problems.[783] This guidance creates a practice of schedule and progress management in power construction projects in China, represents the general position of the Chinese construction industry in this regard, and is generally in line with

[774] Chen Weihua, To strengthen the cost estimate engineer's role in variation and visa management in construction projects, *Science & Technology Information*, 2011(05)
[775] idem
[776] Refer to Appendix-1, p.13 and 19
[777] Chen Weihua, supra note 774
[778] Pan li, supra note 771
[779] China Guodian Corporation, Article 9
[780] Idem, Article 14
[781] Idem, Article 15
[782] Idem, Article 17
[783] Idem, Article 18

approaches and methods of progress management recommended by colleagues in the UK as indicated above.

In the meantime, similar practice has also been adopted in other construction industries or leading construction project development companies. For instance, the National Grid Corporation issued a *project time and progress management methods for transmission line projects (trial)* in 2011,[784] which follows a similar approach to progress management as above, stressing adjustments to the critical path in changed circumstances and weekly progress meetings. Therefore, theoretically, practitioners in China have recognised modern progress management approaches and seek to establish progress management systems like those recommended in the UK.

However, many elements of project practice prejudice the effect of progress and schedule management. For instance, in many projects, the parties pay little attention to the schedule; employers/supervisors give no response to the general schedule submitted by contractors; contractors' performance does not comply with the schedule, updated schedules and revised critical paths are not confirmed by employers/supervisors.[785] From our team's investigation, in many projects, due to the employer's dominant position, the contract time is established arbitrarily and is insufficient, leaving contractors unable to prepare a reasonable schedule, with the result that the submitted schedule often has little practicability and therefore cannot be relied upon to guide progress management and delay analysis.[786] Moreover, when employer delay risk events occur, employers commonly like to delay and even refuse to resolve EOT claims.[787] As the parties commonly lack specialists in schedule analysis, the schedule cannot be accurately updated.[788] Therefore, due to a lack of ability to systematically establish, optimise or dynamically manage schedules,[789] in projects in China the schedule often becomes a mere scrap of paper and with little practical value.

b. Delay analysis

Traditional approaches and academic research

Due to its relatively short-term experience in modern construction contracts, China has not established a comprehensive delay analysis system at either the academic or practical level. Nevertheless, practitioners have explored and recommended various straightforward methods. For instance, some recommend methods of network analysis (akin to the as-planned v as built method) and dynamic analysis (akin to the time impact analysis method).[790] Others use methods such as: 1) global CPM analysis

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784 http://www.baidu.com/link?url=pme6o2X-mJMZKp-_D44E0fs-c_NkGNRTU4Us-bSm6xwYErKWjfiLhSQ73D2qptBjDq3g4KhPN3bmZ1cXFpV7_gGoUBHwYBBdvASTx8ixKRIUwAOb-Ohj3JlfoC949Yie&wd=&eqid=b3a0e5090002fac0000000065d01907a

785 Wang Ben-Mei, supra note 9

786 Appendix-1, section 3.3.1.i.c.b) and 3.3.2.ii.b

787 Idem, section 3.3.2.ii.c

788 Appendix-1, section 3.3.2.ii.f

789 Draft Committee of textbook for National the first-class Architect' qualification examination, p.146

790 Lv Sheng-pu，et al, Calculation methods for claims of multi-event interference delays, *China Civil Engineer Journal*, 2005 (11)

(similar to the retrospective longest path analysis), Gantt-chart analysis methods (a simple comparative analysis made on each line of a Gant chart), proportion analysis methods[791] (used where a delay is caused by increased work when EOT is calculated by multiplying the original contract time by the ratio of the cost of the additional work to the total original work;[792] or where delay occurs in a specific section of work when EOT is calculated by multiplying the original contract time by the ratio of the cost of the impacted work to the total original work,[793] or calculated by the average time of delay across all sections[794]), and the direct analysis method (in which EOT is determined by the parties' prior agreement before a variation is carried out, or determined by the actual period of delay to progress).[795]

Other scholars have attempted to conduct delay analysis through pure mathematic models. For instance, Wu provided a fuzzy network method (through applying fuzzy set theories to establish a fuzzy network model, inputting relevant variables to that model, and then achieving a fuzzy critical path and fuzzy time for completion) for EOT calculation.[796] Yao recommended use of an ameliorative algorithm for a shapely value method (to allocate delay responsibility to the parties through shapely value and fuzzy comprehensive evaluation principles) to calculate the parties' culpability in the delay and determine EOT,[797] and Zhang provided an EOT mathematical model for delay caused by multiple events.[798] However, these research results have had little practical impact on the practice of construction projects due to their idealisation and vagueness for practitioners.

Scheduling delay analysis in China

Since the end of the last century, when Chinese practitioners became involved in international construction projects, they started to understand and introduce CPM scheduling analysis methods from the UK and US, and introduced common delay analysis methods such as as-planned *vs.* as-built, impacted as planned, collapsed as-built, and windows analysis to China.[799] However, due to the low quality of progress and schedule management, as discussed in the section above, it is difficult for practitioners to adopt complicated scheduling methods against delay claims. Furthermore, due to the lack of a fast-track dispute resolution mechanism in China, most EOT claims have to be resolved by parties through amicable negotiation or mediation.[800] During negotiation, parties are not likely to be limited by contract

[791] Zhang Yin-hong，How to assess construction extension of time claims, *Construction Economy*, 2012(07)

[792] idem

[793] Wu Feng-xian, The construction claims analysis and the basic principle of reason, *A dissertation for master degree in Qingdao Technological University*, 2016, p.14

[794] Yao li, Research on claim analysis of construction project, *A dissertation for master degree in Shengyang University of Technology*, 2010，p.35~36

[795] Idem, p.36

[796] Lv Sheng-pu，supra note 790

[797] Yao li, supra note 794, p.36~39

[798] Zhang Li-xia, Study on contractor claim analysis of construction project (a dissertation submitted for Doctor Degree), 2005, P.75~77

[799] Zhang Hong-xi, Discussion on the analysis methods of contract progress and delay, *Hydroelectric Power*, 2003(04)

[800] Appendix-1, section 4.3.19

provisions but are more focused on compromise; this precludes the application of methods which are more precise but also more complex and more expensive.

Specifically, our team's investigation shows that most practitioners understand that the CPM schedule should be employed to analyse EOT claims;[801] however, in practice, parties have no uniform methods to be used for delay analysis but choose their methods depending on the circumstances. Nevertheless, the investigation shows a tendency for both employers and contractors to prefer methods which are simple and straightforward but imprecise. For instance, the methods commonly used by parties – as-planned impact, as-planned v as-built, and collapsed as-built – are limited in global impact. Contractors prefer global impact methods and also like to use as-planned impacted and as-planned v as-built methods, while employers prefer as-planned v as-built and the global impact method. The time impact method is also understood and used by some practitioners but is not a common practice, while the window method is seldom used, perhaps because both methods entail a relatively high level of record keeping and schedule updates.[802]

6.5.3 Summary

As discussed above, the construction industry in the UK has in-depth research and has developed a relatively comprehensive practical works system encompassing record keeping, schedule producing and updates, and scheduling analysis of delay. This system can provide relatively scientific guidance to practitioners in construction projects for progress management and EOT claims, and can, therefore, increase efficiency and fairness in the industry. Comparatively, in China, although practitioners have understood and accepted the principles of the UK system, their application is limited for complex reasons; in practice, the parties still use impressionistic and simple scheduling delay analysis methods, leaving substantial scope for improvement in the future.

6.6 Concurrent delay

6.6.1 In the UK

In the UK, as discussed in Chapter 4 regarding concurrent delay, the *Malmaison* principle is applied in practice. This suggests that in the event of concurrent delay, where the employer is responsible for one event and the contractor for the other, EOT should be awarded regardless of the contractor delay.

However, practitioners may still have many practical problems in applying this principle in areas of definition and delay analysis. Therefore, the recent *2nd Protocol*, which follows the basic principle above,[803] provides clarification and states its

[801] Idem, section 4.3.11
[802] Idem, section 4.3.12
[803] 2nd *Protocol*, section 10.12

position towards pending legal debates in this field to provide more clarity and certainty.[804]

Specifically, it firstly stresses the establishment of concurrent delay. It follows *Keating* in arguing that true concurrent delay – where two or more delay events for which the contractor and employer are separately responsible occur at the same time – is a rare occurrence. Therefore, the notion of concurrent delay used in common practice should merely satisfy two conditions precedent: 1) events causing concurrent delay do not need necessarily to occur at the same time; however their delay effects should be felt at the same time;[805] 2) each event should have an independent effective delay effect on the final completion.[806] On the pending legal debate in the UK about whether consequential delay followed by a prior delay caused by the other party constitutes concurrent delay, the Protocol states that there is no concurrent delay.[807] However, if the end time of the consequential delay exceeds that of the prior delay caused by the other party, the consequential delay will become an effective cause of delay to completion,[808] Therefore, it is understood that only the overlapping period of both delays amounts to concurrent delay, while the remaining time, before or later the overlapping period, is a delay for which the party who caused it is solely responsible. In effect, it is akin to the "first past the post" approach in some contracts in Australia.[809]

As to delay analysis of concurrent delay, as pursuant to the *2nd Protocol* the criterion for establishing concurrent delay is based on events' delaying effect rather than the time of each delaying event occurrence, delay analysis should be carried out separately for each delay event.[810] Additionally, in considering compromise between various debates, the Protocol recommends a common sense approach to delay analysis regarding the establishment of concurrent delay by adding an imprecision margin to analysis.[811]

Based on the above, the Protocol provides relatively clear guidance on analysing EOT claims, but does not offer a conclusion on how to treat concurrent delay in the UK. It is predicted that debates will continue in construction due to the increasing complexity of the processes and parties involved in construction projects.

6.6.2 In China

[804] Idem, section 10.15
[805] Idem, section 10.4
[806] Idem, section 10.5
[807] Idem, section 10.10
[808] Idem, section 10.13
[809] Knowles, supra note 54, p.97
[810] 2nd *Protocol*, section 10.14
[811] Idem, section 10.11

In China, concurrent delay is often called delay caused by multi-event interference.[812] Four principles or approaches have been identified by commentators, as below.[813]

The first is the principle of responsibility for the initial event, akin to the "first past the post" approach discussed above. Some commentators believe it has logical reasonableness but fails to consider the different significance of events. It also breaches the fairness principle, and is not in line with the legal principle laid out by the CCL that where both parties breach the contract, each party should bear its own responsibility.

The second is the principle of against contractors' interest, which means that as long as it is found that the contractor is responsible for a period of delay, he should bear all responsibility for that delay, regardless of the employer's default. This principle in effect runs counter to the *Malmaison* approach adopted in the UK. It was recognised by some older textbooks in China but was widely criticised for being against the fairness principle.

The third is the approach to responsibility sharing: it is held that responsibility for delay should be shared by the parties in accordance with their culpability. In effect, it is akin to the apportionment approach applied in the *City Inn* case in the UK. It is believed that this approach matches Chinese legal principles most closely; however, it is difficult to precisely identify parties' culpability despite many attempts to provide a mathematical model to precisely calculate parties' culpability in concurrent delay.[814]

The fourth is the approach of generosity in EOT and strictness in costs, following the *Malmaison* approach in the UK. It suggests that against concurrent delay EOT should be awarded to contractors generously way, but cost compensation for prolongation should be provided prudently. Often, contractors should be offered EOT only and no costs compensation given. It is suggested by Chinese commentators that this is the most practical approach for a delay which has already occurred. Although not awarding EOT may entitle employers to delay damages, in fact, delay damages have no practical meaning in China as they are nominal compensation only and employers cannot recover actual loss resulting from delay; therefore, employers are recommended to award EOT to contractors to allow them to finish the rest of works and therefore avoid a much greater loss. In contrast, contractors always hold more information on the performance of the works and therefore always have an advantageous position in claims. They can also recover additional costs through other mechanisms such as variation or price adjustment; therefore, costs to them should be awarded prudently or not at all based on principles of fairness.[815]

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[812] Yang Deqing, Study on the principle of delay claims with multi-event interference, *China Civil Engineering Journal*, 2003 (03)

[813] Idem

[814] Zhu Jianguo, el al, Calculation on construction delay responsibility sharing with multi-event interference, *Journal of Southeast University (Natural Science Edition)*, 2012 (01)

[815] Idem

Yang has clarified that, in practice, no fixed method has yet been accepted by practitioners,[816] and this position was proved by our team's investigation,[817] which shows that in concurrent delay half of employers prefer the apportionment approach, perhaps because aligns with Chinese legal principles or because it also matches the practice unique to Chinese construction projects that parties' culpability for delay can be agreed or determined by impressionistic analysis through amicable negotiation or compromise. The other half of employers prefer not to provide any costs and/or EOT because in many projects employers act aggressively and, in some projects – *inter alia* public service projects, employers are more constrained by costs than time.

6.6.3 Discussion

In concurrent delay, projects in the UK and China adopt distinct approaches. In the UK, scheduling analysis is the basic instrument used to identify whether there is concurrent delay, and this is determined by identifying whether these delays have an independent delaying effect on the critical path, and by analysing the concurrent delay through separate analysis of the delaying effect of each delay. Concurrent delay is addressed by Chinese practitioners in a more open but less accurate way: there is no strict standard against which to identify and establish concurrent delay; as long as delay events, for which the contractor and employer are separately responsible, occur at about same time, concurrent delay has been established, regardless of whether these events have independently delayed the critical path and the final completion. Furthermore, in concurrency there is no need to analyse the effect of each delay event and, therefore, no need to rely on complicated and precise scheduling analysis, as responsibility for delay and EOT can be determined based on common sense and impressions. This distinction may be because scheduling analysis is rarely applied in China or due to common compromised negation custom in construction projects in China.

6.7 Float

6.7.1 In the UK

As a result of statements in the *2nd Protocol*,[818] contract parties in the UK frequently dispute ownership of float. The Protocol confirms that where contractors own the float, they may be entitled to claim EOT if an employer risk event brings about a delay to the contractors' planned completion date, even though it does not delay the contractual completion date. In contrast, if the employer owns the float, and if an employer delay occurs first and uses up the total float, the contractor may find itself in a critical delay and have to pay liquidated damages as a result of a subsequent contractor delay, which would not have been critical had the employer delay not occurred first.

[816] Yang Deqing, supra note 812
[817] Appendix-1, section 4.3.13
[818] 2nd Protocol, section 8.1

Against this impasse, the Protocol provides some useful guidance. It firstly recommends that ownership of float be determined by the meaning of the contract. If this indicates that an EOT will be granted only if the employer delay delays completion beyond the contract completion date, it means that the float is not owned exclusively by the contractors, and the total float has to be used up before an EOT is due. In contrast, if the contract indicates that an EOT will be awarded whenever an employer delay delays the contractors' planned completion date, the total float should not be available for the benefit of the employers to cover employer risk events.[819] If the contract fails to expressly indicate either meaning, the current legal position in the UK should be applied, i.e. an EOT will not be due unless the employer delay is critical, and the float is not for the exclusive use or benefit of either party.[820]

6.7.2 In China

In China, there has been much discussion about ownership of float.[821] Some practitioners have introduced principles established by the UK and US, while scholars have offered mathematic models to determine the parties' ownership of the float.[822] Nevertheless, to date, Chinese practitioners have not agreed or recognised a general principle of ownership of the float to be used in project practice, and very few cases in litigation indicate a principle in this regard. However, some commentators provide useful recommendations like those provided by the SCL *Protocol*; for instance: 1) parties should agree contract provisions regarding the definition and ownership of float as well as how to deal with non-critical delay, 2) parties should reasonably agree and include necessary time allowances in the general programme, 3) upon changed circumstances, the parties should agree and revise the arrangement of the float dynamically.[823]

6.7.3 Discussion

Regarding ownership of float, the construction industry in the UK has established a relatively clear principle, and the *Protocol* also provides a useful practical guidance to practitioners. While disputes in this regard have not yet been stressed by Chinese practitioners, this may be because the CPM schedule is still not used as the primary instrument for delay analysis, as illustrated by the fact that in many cases where EOT is assessed, the parties and judges do not focus on distinguishing critical and non-critical delay, as discussed in Chapter 4. However, it is expected that such disputes will arise more frequently as scheduling analysis is used more in China, and UK principles and practices in this regard should be transplanted to China, since the standard form DMCC contract in China takes the same position as English contracts

[819] Idem, section 8.2

[820] Idem, section 8.4 and 8.5

[821] Yin Fu-lei, et al, Discussion about the ownership of float in extension of time claims, *Gansu Science & Technology*, 2010(12)

[822] Liu Yingjie, et al, Research on delay claims based on total float allocation, *Water Resources and Power*, 2010 (02)

[823] Yin Fu-lei, supra note 821

that EOT should be awarded against a delay to completion rather than to the contractor's planned (earlier) completion.

6.8 Prolongation costs analysis

6.8.1 In the UK

As discussed in Chapter 4, the UK courts have a rather strict attitude to awarding cost compensation against prolongation in relation to EOT claims. This position has been endorsed by the practice guidelines provided by the *Protocol*.

Specifically, the *Protocol* firstly re-states the legal position in the UK that there is no absolute linkage between an entitlement to an EOT and entitlement to cost compensation. Entitlements should be determined purely by the contract; so-called neutral events are those for which employers bear the time risk and contractors bear cost risk. The *Protocol* specifies that the process of EOT analysis will not necessarily be the same process of prolongation costs analysis: the former can be analysed both prospectively and retrospectively, while the latter can only be conducted retrospectively based on the actual loss incurred by the contractor. Therefore, the two analyses may produce different results.[824]

The *Protocol* stresses the current legal principle in the UK that cost compensation caused by EOT should be determined based on the loss and expense actually incurred; recoverability should be determined by the contract and causes of delay, and mainly take the form of additional time-related resources.[825] When compensation is assessed, it requires the actual cost of remaining works on site for the additional time to be quantified; the contractors' tender allowance should not be taken into consideration.[826] Contractors bear the burden to prove the actual additional costs, although they may be relieved of this duty by a pre-set rate of compensation agreed by parties.[827] In essence, Regarding the basis for assessing prolongation, the *Protocol* maintains a relatively conservative attitude by preferring to use the contract price or a *quantum meruit* approach and precludes the application of theoretic approaches such as a tender allowance or diverse formula approaches to calculate overhead costs.

Surprisingly, the *Protocol* recommends a relatively generous standard for compensation against employer delay which erodes the total float. The *2nd Protocol* recommends that cost compensation should be awarded to contractors if an employer risk event prevents the contractor from meeting its own planned early completion, provided that the contractor's plan had been clearly notified to the employer.[828] In effect, the recommendation is debatable as it runs counter to Common Law.

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[824] 2nd *Protocol*, section 12.2 and 12.3
[825] Idem, section 20.1
[826] Idem, section 21.2
[827] Idem, section 20.1~20.4
[828] Idem, section 13.1 and 13.2

Following current English law, the *Protocol* recommends a strict standard for cost compensation against concurrent delay, holding that contractors cannot recover cost compensation against concurrent delay unless they can separate the loss and/or expense arising from the employer risk event from that which flows from the contractor risk event.[829] In fact it is difficult, if not impossible, to accomplish this task as it is difficult to quantify and allocate indirect costs to parties. Therefore, the *Protocol* further recommends that a careful scheduling analysis relating to the cost analysis should be made to overcome such hardship, such analysis to be coordinated with the EOT analysis.[830] In fact it is still a hard task as it requires a high standard of record keeping and programme update management.

6.8.2 In China

In China, as discussed in Section 3.4.4.2.4 of this thesis, the courts are normally reluctant to award prolongation costs to contractors against employer delay. In practice, from our team's investigation, most employers prefer to award EOT only against employer-caused delay and are reluctant to provide compensation for additional time-related costs; few like to provide compensation for lost profit.[831]

Nevertheless, compensation for prolongation is hotly debated among practitioners in China, who have concluded the principles below:[832]

a. The principle of actual costs – all claims should be assessed based on the actual loss incurred by contractors, including direct and/or indirect loss, and claims should be supported with proof.

b. The principle of compliance with contract –not all actual loss should be necessarily compensated; the calculation should be adjusted with reference to the relevant contract provisions, loss and expense caused by the contractor's own default and any contractor risk events should be deducted from the compensation. The assessment should follow the relevant rates, calculation methods and approaches provided by the contract, if any.

c. The principle of reasonableness –the calculation should follow standard Chinese accountancy rules (e.g. the method of depreciation and the content of indirect cost), and common industry usage, which can be unanimously accepted by the parties, arbitrators and/or the courts.

Regarding prolongation costs which are compensable, commentators believe these should normally include: 1) direct costs incurred by the suspension or slow-down of works, 2) lost productivity, 3) price inflation due to prolongation, 4) site and

[829] Idem, section 14.3
[830] Idem, section 14.4 and 14.5
[831] Appendix-1, section 4.3.14
[832] Gao Li-jun, Basic principles and methods for calculation of costs claims in construction, *Tunnel Construction*, 2006 (10)

head-office overheads,[833] 5) additional costs for special measures, 6) additional financial costs.[834]

6.8.3 Discussion

Regarding compensation for prolongation-caused loss, the UK construction industry strictly distinguishes this from pure EOT analysis, and has established a complete independent theory and practice system, including principles and methods, to assess it. In China, practitioners also address compensation through an independent process other than pure EOT analysis, and have developed some general principles and practice which are largely the same as those recommended in the UK, and also follow draconic standards in awarding prolongation costs. However, it seems that in project practice it is much more difficult for Chinese contractors to recover prolongation loss than their colleagues in the UK, indicating a need for improvements in this field to more precisely safeguard contractors' interests.

6.9 Global claims

6.9.1 In the UK

The admissibility of global claims is the subject of heated debate in the UK due to the claim approach commonly applied in practice.[835] As discussed in Chapter 3, the recent leading case *Walter Lilly* provides a generous leeway in this approach and therefore, together with other authorities, indicates an apparent lenient trend towards global claims. However, the *Protocol*, despite accepting the position that decision-makers are not obliged to dismiss a claim simply because it is made on a global basis, still takes a rather conservative and even reluctant attitude to the global approach. It argues that the global approach could be avoided to a large extent by maintaining accurate and complete records; therefore, if global claims made due to the lack of such records should not be permitted, claims or part of claims can be merely made on a global basis where the financial consequences of the various causes of cost compensation are impossible to distinguish.[836] Furthermore, even when a global approach is permitted, it is recommended that contractors still clearly enumerate employer risk events which have occasioned the delay and loss and/or expense, and should also endeavour to relate each head of cost compensation to each causative delay event, or justify the impossibility or impracticability of doing so.[837] Obviously, the *Protocol* still holds the traditional legal position in the UK before the *Walter Lilly* case – that claimants do not even need to justify the impossibility. Furthermore, interestingly, the *Protocol* recommends that when a global claim is heard, the burden of proof should not be transferred to the decision-makers, and the

[833] Liu Xiao-qiong, A preliminary research of calculation of cost claim caused by construction delay, *China New Technologies and Products,* 2013(05)

[834] Zhang Yin-hong, supra note 791

[835] 2nd Protocol, Section 17

[836] Idem, section 17.1 and 17.2

[837] Idem, section 17.2 and 17.3

contractors need to bear the all-or-nothing effect of global claims.[838] Therefore, contractors are discouraged from adopting the global approach but need to follow the regular approach of EOT claims by fulfilling the burden of proof and establishing a clear causation link between the causative events and the loss and/or expense.

6.9.2 In China

In China, global claims are very popular in project practice; the parties commonly take a generous and even encouraging attitude to this approach.

In fact, employers in China are commonly reluctant to deal with EOT claims contemporaneously, but like to deal collectively with all claims at once within a certain interval or even at the end of the project.[839] From our team's investigation, about 60% of contractors prefer to submit global claims within a certain interval, and about 85% of employers like to deal with claims together at the end of the year or the entire project.[840] Under such circumstances, employers do not normally require contractors to relate each employer delay risk event to each head of cost compensation to precisely determine the contractors' entitlement to compensation, but like to achieve a rough compromise with the contractors in light of a series of events.

6.9.3 Discussion

Global claims are a convenient approach commonly preferred by contractors in the UK and China. In the UK, they are not encouraged by the construction industry despite courts recently taking a more open and flexible attitude to them; contractors are still requested to run the substantial risk of failing in their claims due to their failure to establish the causation of claims. In contrast, in China, claims are much more often submitted and resolved globally, on the one hand due to employers' aggressive behaviour and, on the other, to contractors' poor record keeping management and capacity to establish causation in claims. This practice prejudices the parties' due entitlement and leaves substantial scope for improvement.

6.10 Compliance with contract

6.10.1 Time bar on claims

In the UK

Pursuant to Chapter 5 and the *Protocol*, a time bar clause on EOT claims is commonly applied in standard form contracts in the UK,[841] aimed to ensure that contractors submit claims when causative events arise and to assist in efficient cash-flow

[838] Idem, section 17.4 and 17.5

[839] Wang Chang-cheng, Analysis of claims on water and hydropower project cost and construction time, *Northwest Hydropower*, 2010(01)

[840] Appendix-1, section 4.3.10

[841] 2nd Protocol, section 3.1

management.[842] However, its enforceability in practice is much debated. As discussed in Chapter 4, its enforceability depends on contract provision as well as legal interpretation. In practice, clearly drafted time bar clauses have generally been enforced in the past under the FIDIC contract and NEC3,[843] although recent English cases law suggests a generous attitude towards contractors in limiting their enforceability.[844]

Interestingly, the *Protocol* makes no suggestion regarding the enforceability of time bar clauses. Nevertheless, from consideration of fast-track solutions to EOT claims, the *Protocol* recommends that irrespective of whether a time bar is a condition precedent to entitlement to EOT or cost compensation, contractors should always notify delay as soon as practicable, to allow appropriate mitigation measures to be considered by the parties and thus limit the impact of delay events.[845]

In China

As discussed in Section 4.7.2.2, although the courts in China have an inconsistent approach to enforcing time bar clauses, the SPC recently offered a generous position to contractors.

In construction projects in China, almost all contracts contain a time bar clause, but the majority of Chinese employers are not likely to strictly enforce them upon the contractor's failure to comply with a claims schedule. [846] This unique situation is because in China people commonly lack a sense of strictly following a contract schedule;[847] both employers and contractors like to solve claims in a time-distant and global way and mainly through amicable negotiation and compromise.[848] Under such circumstances, employers commonly do not insist on contractors strictly following the schedule of claims. Therefore, the time bar clause has little practical meaning to parties in a normal situation; it may only be used by employers where the parties' relationship is seriously broken or where a delay will result in a significant loss to the employer.

Discussion

Regarding the enforceability of the time bar clause, it seems that the construction industry and Common Law have not yet reached a consensus between generous and flexible positions and the traditional, literal position of the UK. Comparatively, the construction industry in China follows a rather generous attitude in this regard in both levels of litigation and project practice. In many projects in China, the time bar clause has only nominal significance as it is against not only the principles of good faith and

[842] Jafar S. Khan, Time bars in construction contracts- a comparison between jurisdictions, https://www.klconstructionlawblog.com/2015/04/time-bars-in-construction-contracts-a-comparison-between-jurisdictions/

[843] Idem

[844] Refer to section 3.5.3.1 of this dissertation

[845] 2nd *Protocol*, section 3.2 and 3.3

[846] Appendix-1, section 4.3.16

[847] Refer to Section 3.2.1.3.2 of this dissertation

[848] Refer to Appendix-1, section 4.3.10 and 4.3.19

fairness but also Chinese traditional culture and practitioners' common behaviour. Current practice can better maintain a balanced business relationship between the parties, but does not encourage contractors to contemporaneously notify delay nor employers to resolve delay and EOT claims in a timely way. This leaves scope for further consideration and improvement.

6.10.2 Timing of EOT awards

In the UK

Since its first edition, the *Protocol* has always advocated the contemporaneous resolution of EOT claims, and avoided a "wait and see" approach on the part of the CA.

Specifically, it suggests that contractors should notify delays and submit EOT claims as soon as possible, and that each claim should be assessed immediately and in all events within one month. This can help to mitigate the delaying effect and give parties clarity about the contract completion date so that they can understand their risks and obligations and act accordingly.[849] In practice, upon the contractor submitting an EOT application, CAs under the JCT, NEC, ICE and FIDIC contracts all have to analyse the EOT prospectively and award EOT contemporaneously as all these contracts provide a certain timeframe within which the CA should act; otherwise they face the legal risk of "time becoming at large", which has been discussed in Section 4.5.4 above.

In China

In China, the biggest practical problem for contractors is that employers commonly ignore contractual procedures around awarding and like to deliberately delay or do not respond to claims.[850] One of main reasons for this is that in China there is no legal remedy such as the UK's "time becoming at large" to prevent them from to do so. Even though a contractual remedy may be provided to that effect, it is not likely to be applied due to the employers' dominant position in the contract. This practice causes tremendous practical problems for contractors. Faced with the employers' inaction, contractors have to take additional measures to accelerate the progress of works to avoid potential delay damages. If the claims are not eventually resolved, the contractors have to absorb the costs of acceleration themselves; if claims are retrospectively analysed and addressed in a time-distance way, the acceleration cost is not likely to be accurately identified and recovered as, in China, simple delay analysis methods are used which are not likely to reflect the effect of acceleration and the effort expended by contractors.

Discussion

[849] 2nd *Protocol*, section 4.1

[850] Wang Chang-cheng, supra note 839

In the UK, due to the joint pressure imposed by Common Law and standard form contracts, CAs run a substantial risk where they fail to comply with contractual timings in awarding EOT against an employer-caused delay. In contrast, in China, employers have no such pressure, which creates a significant but common practical problem for contractors, leaving scope for improvement in this regard.

6.10.3 Mitigation and acceleration

In the UK

In the UK, the concepts of mitigation and acceleration differ in terms of delay: the former is an obligation on contractors who should initially take measures to reduce or avoid enlarging the effect of an employer-caused delay. Acceleration refers to contractors, as per an agreement or employers' instruction, speeding up works to achieve an earlier completion, or to mitigate a delay which has already occurred and to achieve completion by the original completion date. These two concepts are to some extent linked: in some situations, mitigation should be conducted through acceleration.

As to mitigation, compared with some standard form contracts in the UK which impose a compulsory obligation on contractors, the *Protocol* adopts a conservative attitude and provides mechanisms to limit such obligation. It suggests that in an employer-caused delay, contractors should merely bear a general obligation to mitigate, applied within the original scope of works only, and should not spend additional money. If employers wish contractors to make additional efforts, those efforts should be additionally paid. Clearly, the *Protocol* recommends a position in line with the current English legal position in this regard, as discussed in Section 4.7.4.1.

Regarding acceleration, the *Protocol* recommends that this should be paid under the terms of the contract or agreement: employers have no right to force contractors to accelerate the works in order to save an employer-caused delay. If contractors agree to accelerate the works, they should receive payment for acceleration only but should not recover prolongation costs.[851] Furthermore, it is recommended that where no EOT is awarded against an employer-caused delay, contractors should not initiate acceleration before referring the EOT claim to dispute resolution and expressly informing their intention to accelerate, and incorporating such acceleration measures into the updated programme. It also suggests that compensation for acceleration costs should be calculated through a comparison with the prolongation costs that have been avoided.[852]

In China

In China, due to rather vague legal and contractual requirements, mitigation is rarely discussed or disputed by parties in projects. Comparatively, acceleration is the subject

[851] 2nd Protocol, section 16.1~3

[852] Idem, section 16.5~6

of heated debate and has become a focus of delay claims between the contracting parties.

Specifically, in China there are two types of acceleration: one is expressly instructed by employers and the other is constructive/substantial acceleration which is conducted on the initiative of contractors under the pressure of a limited contract period.[853] In China, contractors have two approaches to claim against an employer-caused delay: one is to claim EOT and prolongation compensation, and the other is to claim acceleration costs. Regardless of which approach is taken, the contractors' ultimate interest is not time but compensation for costs. If contractors claim EOT and prolongation costs, this is not likely to have substantial meaning for them as in practice EOT claims are always analysed within a certain interval or at the end of projects. By that time, the contractors may already have made up progress through substantial acceleration, so a retrospective EOT award is meaningless to them. Furthermore, as discussed above, even when EOT is awarded, employers commonly do not provide related cost compensation for prolongation. Therefore, contractors in China prefer to claim substantial acceleration costs by proving that they should have been entitled to EOT, but due to the employer's failure to award EOT they are compelled to execute a substantial acceleration. Conversely, employers commonly take advantage of the fact that an employer-caused delay has been remedied by the contractors' substantial acceleration or mitigation to contend that there was no factual delay caused by themselves and, as contractors should always fulfil their contractual obligations to achieve a due progress, the so-called acceleration was a regular measure. Furthermore, even where there is acceleration, because contractors cannot normally distinguish acceleration from normal measures, it is not recoverable. Therefore, disputes repeatedly occur in practice, bringing parties a new practical problem.

Discussion

As discussed above, in the UK, the *Protocol* adopts a relatively generous position to contractors to limit the obligation of mitigation, but takes a relatively strict attitude to recovering claims for acceleration and provides a clear procedure for contractors to conduct such claims. This is helpful in reducing potential disputes and solving practical problems.

In contrast, in China, the parties are likely to engage in disputes over acceleration. In essence, the rooted reasons for this are the common practice in China that there is no fast-track EOT award mechanism to compel employers to award EOT contemporaneously in employer-caused delays, and there is a lack of a clear contract mechanism including procedures and remedies to deal with substantial acceleration. In this sense, the practice recommended by the *Protocol* regarding acceleration is highly relevant to China in solving the practical problems in this regard.

[853] Yang Guang-jie, et al, Claim for hurry work of incomplete construction period under FIDIC contract conditions, *Journal of Economics of Water Resources*, 2009 (01)

6.11 Discussion and conclusion

This chapter has offered a comprehensive discussion and comparison of the factors determining or affecting EOT analysis in project practice in both countries; salient points are as follows:

a. Practitioners in the UK have a relatively unified and complete system of guidance and a common understanding about EOT claims analysis, and construction industry associations play a significant role in establishing that system. The system not only provides principles, approaches and methods of dealing with and analysing EOT claims, but also stresses daily project management including progress management, delay identification, record keeping management, schedule establishment and updating, to provide a fundamental work platform and instrument for claims analysis.

   In China no such common guidance or industry usage has been systematically established or concluded to guide practice in EOT claims; industry practice can only be detected and concluded from individual investigations or discrete literature. Generally, due to a lack of in-depth systematic research and guidance, construction projects lack well-managed daily works and work systems to support EOT analysis. Most claims have to be analysed in a superficial and compromised way.

b. In the UK, regarding the basis on which to award EOT, industry associations and practitioners are still swaying between likely and actual delay effects; in turn, EOT analysis is also swaying between logical analysis based on a methodical approach and impressionistic and simplistic analysis with reference to common sense.[854]

c. Comparatively, in China, because of the employers' dominant position in construction projects, and the lack of fast-track dispute resolution, most claims have to be settled through negotiation and compromise. Practitioners commonly do not seek to precisely analyse EOT or achieve an accurate entitlement; therefore, they prefer to use impressionistic methods or simple scheduling analysis in EOT claims.

d. Regarding EOT claims analysis, it is found that, in the UK, industry practice and guidance are consistent with the principles established by Common Law and standard forms of contract. In contrast, in China, project practice in EOT claims shows a substantial divergence from principles of law or standard form contracts. On the one hand, this is because of the unique legal and social culture in China in which the public has a relatively low compliance with law and contracts as well as an anti-litigious sense; on the other, the law and contracts are too general or vague to address broad practical problems in construction projects and do not suit the unique traditional culture in China.

[854] Knowles, supra note 54, p.112~113

e. Regarding approaches to settle EOT claims, the UK construction industry focuses on providing fast-track claims resolution to enable parties to conduct the remainder of the work more efficiently, and is characterised by a strong endorsement of prospective delay analysis through time impact analysis used in both the contemporaneous and post-contract stages, although this is criticised as a costly and impractical way to resolve post-contract cases.[855] In contrast, China's construction practitioners prefer to negotiate time extensions based on a bundle of events in a global and time-distant way. The UK's practice is helpful in solving practical problems such as disputes of acceleration, re-sequencing or prolongation costs, and therefore has a substantial relevant value also to China.

Therefore, along with rapid development in the overall construction industry in China, to reduce disputes and protect parties' due entitlement, and to ensure that projects are performed more fairly and efficiently, the construction industry has substantial scope for improvement through continuously assessing project practice with reference to the practice which has been established or recommended in the UK, to establish a unified domestic industry practice in relation to EOT claims analysis.

[855] David Barry, supra note 693

Chapter 7

Discussion of the comparison results and establishment of a framework for EOT claims analysis in China

7.1 Introduction

This chapter aims to establish a framework for EOT claims analysis for construction projects in China. The framework is proposed based on a review and re-statement of the status quo and problems as revealed by the comparative study in previous chapters, then reviewed, tested and finalised by a specialist consultation meeting.

7.2 Status quo and problems disclosed by comparison work

In Chapter 1, the status quo and problems in EOT claims analysis in China were briefly introduced. After an in-depth comparison and analysis conducted in Chapters 3–6, the status quo and underlying problems are assessed and re-stated below.

7.2.1 In law

Legislation

In China, a typical civil-law jurisdiction, legislation not only provides fundamental legal principles for practitioners to draft and perform contracts, and for courts to determine cases, but also provides detailed legal rules through tiers of code law in relation to construction activities. However, the law is rather general and vague; it is not sufficiently detailed or pertinent to solve practical problems; thus, very few legal rules can be relied upon by judges and practitioners to resolve matters such as EOT claims. In cases of construction claims, judges must use their individual discretion to determine cases, resulting in an inconsistency in judicial determinations and thus legal uncertainty.

In China, the law allocates delay risk through legal rules and judicial explanations. The legal risk allocation reflects principles of good faith and fairness, but the vague wording and unrealistic expectation to specify all delay risk results in remarkable legal gaps.

The *Civil Procedure Law of the PRC* provides relevant civil procedures in legislation. It stipulates the principle of burden of proof and admission of evidence, and establishes the mechanism of judicial authentication, thus providing the necessary legal procedures for EOT claims cases.

The relationship and role of the parties involved in EOT claims are also determined by the law to a large extent; however, the law has no concrete solution to maintain an equal business relationship between employers and contractors, and fails to establish an independent role for supervisors in controversial matters in construction projects,

thereby allowing employers to take a factually dominant position and act aggressively and arbitrarily. The law also fails to recognise professional qualifications in planning and scheduling, and therefore no high-quality authentication firms in this field are available to provide external professional services for EOT analysis.

In China, only arbitration and litigation are applied in dispute resolution; no fast-track dispute resolution has been recognised in law. Since arbitration and litigation are costly and time-consuming, practitioners must resolve EOT claims primarily through amicable negation and compromise. This means claims commonly cannot be analysed and determined promptly and accurately.

Litigation

Due to lack of pertinent law to address EOT claims, the courts do not recognise *stare decisis*, and in the absence of a system publishing judicial determinations in China, the analysis and determination of EOT claims have to rest with the judges' individual judgement and discretional power. Since few judges are well trained and have sufficient experience and expertise in the construction business, claims are mainly analysed by judges based on impressions and common sense, and the consistency of judicial determinations has also deteriorated.

Nevertheless, based on the SPC's recent judicial determinations in relation to EOT claims, their general position on diverse factors can be concluded as follows:

Regarding causation, although Chinese law has not established a specific test for proof of causation, and it is unclear whether the "but for" test is accepted by the courts for EOT claims analysis, in some cases judges have held that, to prove an EOT claim, contractors have to demonstrate the true causation of delay and that an employer risk event has indeed resulted in the delay. Therefore, analysis of criticality through scheduling analysis is accepted by some judges in China. However, in litigation practice, the approach of proving causation is not strictly conducted by litigants and judges; in concurrent delay and global claims in China, normally the link of cause and effect in relation to delay is not required to be established to determine EOT.

Regarding delay analysis methods and the criticality of delay, scheduling analysis is not commonly used by litigants and courts to prove and determine EOT claims. The criticality of delay has not been clearly recognised by the courts as the fundamental criterion by which to award EOT. In EOT claims, judges show considerable inconsistency in their analysis. If the contractors cannot establish a causation link, judges may refuse the case, or *zuo qing* accept claims to some extent in order to maintain a balance between the parties' interests. They may also completely ignore the criticality of each individual delay and award EOT based on the total time of all employer-caused delay. If both parties are at fault, they may simply *zuo qing* apportion the culpability based on an impression and then award EOT, or simply hold that parties should share the loss; therefore, no party can receive compensation from the other party.

As to the timing of the analysis, most EOT claim cases are presented in a time-distant manner and therefore determined by the courts retrospectively. The Chinese judges' position on prospective analysis is unclear and inconsistent.

Regarding concurrent delay, there is in China no strict concept of true concurrent delay; judges are more often requested to deal with delay caused by mixed fault because scheduling analysis is not commonly used in litigation to explore the interaction between concurrent delay events. Therefore, the parties do not call on precise and logical tools to analyse true concurrency and its impact. Judges normally adopt one of three approaches: apportionment based on the parties' culpability; if culpability cannot be recognised, parties bear their own loss; or employers take sole liability.

In terms of burden of proof, in most EOT cases referred to the courts, the contractors attempt to simply enumerate employer delay events, regardless of the logical relationship between events and whether these events have resulted in critical delay. Most EOT claims in litigation are presented in the form of a global claim. The judges do not reject this approach to claims: when claims are assessed, they commonly do not care about the cause and effect of a delay. Even if the contractors cannot clearly establish a causation link, judges may *zuo qing* allocate a percentage of delay responsibility based on an impression and award some degree of compensation. Nevertheless, Chinese courts emphasise the burden of proof in proving compensation for costs, and request that all such compensation claims should be supported by direct evidence to show the contractors have indeed suffered from the loss as claimed.

Regarding prolongation costs, Chinese judges take a harsh attitude: compensable costs are limited to direct loss and expenses which can be straightforwardly proved or calculated by *quantum meruit* only; indirect costs are not normally recoverable.

Chinese judges adopt an inconsistent position to the application of time bar clauses on EOT claims. The recent SPC judicial interpretation adopted a rather generous position to contractors.

Regarding the timing of the award, neither legal sanctions nor remedies are provided against the employer's failure to follow the timing in awarding EOT; in fact, they are allowed to adopt a "wait and see" approach for EOT claims.

On mitigation, pursuant to the CCL, contractors have a general obligation to mitigate delay and loss; however, in litigation practice, failure to mitigate does not seriously jeopardise a contractor's EOT claim.

7.2.2 In contract

In China, construction contracts on the one hand embody the law in many areas of construction and, on the other, supplement gaps in the law. Many construction contracts are based on the standard form of the DMCC, which follows the form of an English construction contract and establishes a contractual mechanism for EOT claims with its own distinct features.

The current edition of the DMCC has largely transplanted the structure, philosophy, terminologies and provisions of the 5th edition of the FIDIC Red Book and added its own distinct features. It is a traditional contract; the parties' relationship is adversarial and it is generally unable to meet current international trends in construction contracts, and requires improvement in various fields.

Under the DMCC, the parties involved in EOT claims include employers, supervisors and contractors; as the employers are the ultimate decision-makers, claims cannot be fairly and carefully analysed.

Regarding delay risk allocation, DMCC tries to allocate each detailed delay risk in construction and provide remedies in terms of time, costs and/or profit for each. This risk allocation is more appropriate for use in traditional procurement modes only, and its legal certainly is substantially jeopardised by its disordered structure and vague wording.

The DMCC offers no detailed requirements as to the form, content, and update mechanisms of the programme. The function of the programme in progress management and EOT claims analysis has not been fully recognised. No express provisions limit the scope of the basis on which the decision-makers analyse and determine the EOT; rather, open and subjective criteria are used.

There is a rather general requirement for the burden of proof for claims; no provisions define the level of burden of proof borne by contractors or require contractors to relate each causative event to each heading of compensation. Global claims are therefore not precluded.

The DMCC contains no provisions to encourage parties to hold meetings to facilitate efficient progress management and delay identification, and has few contractual mechanisms to produce or maintain records. It, therefore, offers little help in proof for EOT claims analysis.

It establishes that EOT claims should be submitted and awarded prospectively or contemporaneously only. Nevertheless, due to a lack of mechanisms for progress monitoring and delay identification, such EOT mechanisms have low practicability in the absence of supporting schedules and records.

Regarding a time bar clause, the DMCC provides a rather draconian time bar clause, whose enforceability is questionable as it does not align with Chinese culture or legal principles. It also imposes a harsh provision of "deemed acceptance" against the Employers' later determination in EOT claims, which also is difficult to enforce due to the employers' dominant position.

Other than against *force majeure*, the DMCC imposes no obligation of delay avoidance and mitigation to contractors, and is silent on whether a failure to mitigate an employer-caused delay should be taken into account in the assessment of EOT claims.

The DMCC provides various alternative approaches to dispute resolution, but as their legal effect has not been recognised by the law, they have very low practical value.

7.2.3 In project practice

In China, because of the strong influence of the unique Chinese social culture, project practice has features distinct from those in the UK, and also shows a substantial divergence from the law and contract in relation to EOT claims.

Regarding the parties' roles in claims, Chinese employers act as decision-makers in determining claims and commonly act aggressively and arbitrarily; supervisors normally work for only for the employers. The contractors occupy a subordinate position, normally obtaining awards through not only through regular contractual instruments but also good relations with and even sympathy from their employers.

As regards proof for EOT claims analysis, few mature and systematic record-keeping systems are maintained in projects; practitioners commonly have a low sense of how to claim or keep records. The unique Chinese form of proof for claims – the visa –often becomes a key piece of proof to support EOT claims in practice.

Regarding instruments and methods of delay analysis, although the CPM programme has been commonly used in construction projects, it is often not operated effectively: the parties fail to agree baseline or updated programmes, and programmes are seldom updated in a timely and accurate manner. No uniform delay analysis method is used by practitioners; due to the lack of programme and progress information management, parties prefer methods which are straightforward but inaccurate – as-planned v as-built and global impact methods are often used in practice.

As for anomalous EOT claims, no fixed practice or principle regarding the ownership of float has yet been established, nor is there any standard method or principle to address concurrent delay, although both the apportionment method and the *Malmaison* approach may be used by employers.

With reference to analysis of prolongation costs, although commentators have recommended diverse principles, in practice employers are unwilling to provide EOT-related costs and contractors find it difficult to receive compensation in this regard.

The global claim approach is comparatively popular in project practice: all parties take a rather generous and even encouraging position to it, because contractors and employers generally prefer to present and solve multiple claims in a global way.

In practice, the majority of employers do not strictly enforce time bar clauses, and few award EOT within contractual timeframes, causing substantial problems for contractors in reasonably updating programmes and arranging the remaining works. Contractors are often compelled to adopt substantial acceleration measures to make up progress; therefore, EOT claims commonly develop into claims for acceleration

costs. However, due to a lack of standards to distinguish acceleration from normal measures, disputes occur repeatedly in this regard.

7.2.4 Overall statement and evaluation

In general, the law and standard forms of construction contract in China have established a system for construction practitioners to present, analyse and determine EOT claims. However, the law lacks pertinence in relation to detailed problems in EOT claims and leaves legal gaps in many aspects such as the legal position of supervision and adjudication. The DMCC follows an older edition of the FIDIC contract and provides a basic mechanism for EOT claims; however, it has inherent problems in structure, wording and enforceability. One of the significant problems in relation to EOT claims is that the law and the DMCC, which are mainly transplanted from Western law and standard forms of contract in English law, have not taken sufficient account of the unique Chinese culture and therefore are hard to enforce in relation to EOT claims, creating a substantial divergence between the law and contract on paper and in action.

Due to the problems above, the law and contract have failed to provide a sound overall environment under which practitioners can thoroughly and fairly analyse and determine EOT claims. Furthermore, due to the lack of mature and unified systematic industry practice in EOT claims analysis and determination, practitioners in litigation and project practice have no standard principles or theory to rely on in allocating the parties' liability and determining an award, and have no guidance for processing associated works such as daily progress management and recording keeping. Therefore, EOT claims are commonly processed and analysed in a disordered way.

Specifically, at the litigation level, litigants commonly have little skill in proving cases and lack relevant proof and judges commonly lack expertise in planning and scheduling. Many judges have more interest in conciliating the parties and balancing their interests; therefore, the analysis and determination of EOT claims are often made in an impressionistic and reconciliatory way. At the level of project practice, due to relatively poor progress and record-keeping management and the common tendency to compromise in construction projects, EOT claims are often analysed and determined in an impressionistic and simplistic way.

Furthermore, as judicial determinations are not published, and are of relatively poor quality and also inconsistent, they provide no legal certainty to practitioners in construction projects. In terms of EOT claims analysis in China, therefore, litigation practice diverges substantially from project practice.

These problems collectively require the establishment of a standard framework for EOT claims analysis, not only to establish clear principles for allocating the parties' liability for delay and determining entitlement to EOT and related costs through scientific approaches to analysis, but also to regulate ongoing progress management and record-keeping management to provide proof for the reasonable analysis of claims. Additionally, improvements are needed in regulations and practitioners'

behaviour in the aspects of law, contract and project performance, to provide the necessary external environment for EOT claims analysis.

7.3 Establishment of EOT claims analysis in China

7.3.1 Proposed framework for EOT claims analysis

Based on the basic structure of the framework for EOT claims analysis presented in Chapter 3, read in conjunction with the status quo and problems in this regard in China and with reference to the advanced arrangements and experience from the UK, a framework of EOT claims analysis was initially proposed as shown in Appendix 2.

7.3.2 Assessment of the proposal

To assess the reasonableness and applicability of the proposed framework, the proposal was sent to a group of specialists for review and assessment. A total of eight specialists who are active in construction management and disputes in China are involved in the assessment, including three university professors (one has previous experience as a contractor, one is working part-time as an employer, and one works part-time as the leader of a supervision company), two senior engineers from a contractor company, one chief supervisor from a supervision company, and two arbiters (one is a lawyer and the other is an international claims specialist). Their names are listed in Appendix 3.

The assessment was held in two stages: the first stage was to review and assess the proposed framework; the second was an interview and assessment meeting.

Review and paper assessment

The proposal (contained in Appendix 2, with an introduction PPT given in Appendix 4, and an assessment table as shown in Appendix 5) was sent to specialists for review and assessed in the middle of August 2019. All specialists completed the assessment table.

To gain a better understanding, a PPT was created based on the statement of the proposal to be introduced. A total of 28 key points in the proposal statement were refined and re-marked with sequential numbers. Based on the sequence number, an assessment table with 28 questions was created, each corresponding to a sequence number in the introductory PPT, for specialists to assess, with response options of “completely agree”, “agree”, “acceptable”, “disagree to some extent” and “disagree completely”, corresponding to marks of 100, 75, 50, 25 and 0 respectively.

All specialists completed and submitted the assessment table (please see Appendix 6). The assessment and comprehensive analysis are shown in Table 11 below:

Table 11: Assessment of the proposed framework for EOT claims analysis in China

S.Q	Context of assessment	Option of assessment (Number of specialists)					Overall satisfaction level (%)
		a Completely agree	b Agree	c Acceptable	d Disagree to some extent	e Disagree	= (ax100 +bx75 +cx50+dx25+ ex0)/8
1	Reasonableness of the basic structure of the framework	6	2				93.75
	Complexity of the basic structure of the framework	7	1				96.88
2	General principles behind establishment of the framework （PPT3.1 ）	5	3				90.63
3	Proposal regarding adjustment of parties' relationship (PPT3.2)	4	3	1			84.38
4	Proposal regarding causation link and burden of proof (PPT3.3)	7	1				96.88
5	Daily factual proof to prove EOT claims (PPT3.4)	8					100.00
6	Visa for proving EOT claims (PPT3.4)	8					100.00
7	Primary instrument to prove EOT claims analysis (PPT 3.5)	4	3	1			84.38
8	Progress records to prove EOT claims (PPT3.5)	5	2	1			87.50
9	Progress monitoring and delay identification records to prove EOT claims (PPT3.5)	5	1	2			84.38
10	Traditional delay analysis (PPT3.5)	6	2				93.75
11	Scheduling analysis (PPT3.5)	6	1	1			90.63
12	Prospective scheduling analysis methods and containing methods (PPT 3.5)	6	2				93.75

13	Retrospective scheduling analysis methods, plan for containing impact and time impact methods (PPT 3.5)	6	2				93.75
14	External technical support (PPT3.5)	4	4				87.50
15	The structure of the module of factors determining EOT claims analysis (PPT 3.6）	5	2	1			87.50
16	Factor of delay risk allocation (PPT3.6)	6	2				93.75
17	Factor of criticality of delay (PPT 3.6)	6	2				93.75
18	Factor of concurrent delay (PPT3.6)	3	4	1			81.25
19	Factor of ownership of float (PPT3.6)	6		2			87.50
20	Proposal for EOT-caused costs（PPT 3.7）	4	4				87.50
21	The structure of the module of factors affecting EOT claims analysis (PPT3.8)	6	2				93.75
22	Factor of time limitation on submission claims (PPT 3.8)	6	2				93.75
23	Factor of time limitation of award on claims (PPT 3.8)	7	1				96.88
24	Factor of mitigation and acceleration (PPT 3.8)	5	2	1			87.50
25	Matters to be particularly performed by legislation (PPT3.9)	7	1				96.88
26	Matters to be particularly performed at the litigation level (PPT3.9)	5	3				90.63
27	Matters to be particularly performed at the contract level (PPT 3.9)	7	1				96.88

28	Matters to be particularly performed at the level of construction practitioners (PPT 3.9)	6	2				93.75
Overall satisfaction degree for the proposed framework (=the sum of satisfaction/29)							91.70

Based on Table 11 above, it is concluded that:

a. The specialist group's satisfaction with the overall proposed framework is high – 91.70%, indicating that the proposed framework is generally reasonable, acceptable and workable in China; however it requires improvement in various aspects.

b. Specialists are most satisfied with the comprehensive scope of the proposed framework and have the highest consensus on the proposals regarding factual proof, burden of proof and causation link. Additionally, they have a high consensus on the framework's proposals regarding employers' delay in determining EOT claims and improvements in legislation and contract-drafting in relation to EOT claims.

c. Specialists also have a high degree of consensus and satisfaction regarding the reasonableness of the structure of framework, the general principles establishing the framework and some other viewpoints and proposed solutions.

d. Although the majority of specialists are completely or plainly satisfied with the points below, their views diverge to some extent and they express some concerns:

    a) Parties' relationship: some specialists are concerned that it may be unrealistic to establish a fair contractual relationship between the parties and have an independent supervision system in China.

    b) Scheduling analysis: some specialists are concerned that the schedule has no binding effect and therefore question whether it should be a legal standard for analysing delay and determining EOT.

    c) Progress records: specialists representing contractors and supervisors question the practicality of maintaining accurate daily progress monitoring and delay identification in projects.

    d) Structure of the core modules of EOT claims analysis and the principle of the anomalous status of EOT claims: the specialists showed a substantial divergence around concurrent delay. Some were concerned that the *Malmaison* approach would not be accepted by employers. Regarding ownership of the float, specialists also showed different attitudes, those from academic or dispute resolution backgrounds all agreed with it unreservedly but two specialists from among the contractors and supervisors found it only acceptable, which shows that this question gained consensus only in academic circles and still needs a solution that can be enacted in practice.

e) Mitigation and acceleration: specialists from the supervisors and contractors were concerned that it is very difficult, if not impossible, for employers in China to pay compensation for acceleration to contractors.

e. Generally, the proposed framework met with relatively high satisfaction from scholars and arbitrators, indicating that the results of this research matched the mainstream understanding of Chinese academics in this field. It caused some concern among practitioners as some of the proposals may be seen as radical in the context of construction projects in China today; therefore some compromise is needed to suit it to the factual environment.

Interview and assessment meeting

After a review of the framework by specialists, interviews and assessment meetings were held on 27 August 2019 at the North China University of Water Resources and Electric Power. At the meeting, after my brief presentation, the specialists had a broad discussion and offered their comments, opinions and suggestions. Their content is summarised below:

a. All the specialists expressed their general satisfaction with the proposed framework.

b. Many specialists felt that delay is a crucial problem in the construction industry in China, and that the extremely chaotic claims practice calls for standard industry practice to be developed.

c. Many specialists believe that one of biggest problems for EOT claims analysis is the lack of legal grounds and case law to rely on in conducting analysis; employers also have little interest in careful analysis.

d. Many specialists stressed that, in China, EOT-related costs are an essential part of EOT claims; therefore the framework should offer more solutions in this regard, such as supplementary clauses, visas or tender rates. They also felt that good communication and a good understanding with employers are important in settling issues of costs.

e. Specialists from the supervision sector pointed out that there are no clear standards to be relied on to distinguish between delay and disruption in large projects, with the result that no EOT is awarded to contractors upon suspension or delay.

f. Specialists also expressed concerns about the legal role and capability of supervisors, and the reliability and practicability of using schedules in delay analysis.

g. Finally, it was concluded by the chairman of the meeting, Professor Shen, that EOT claims analysis should be conducted in standardised, routinised and scientific way. Unified industry usage or at least a framework is therefore needed to guide practice in construction and academic research. The framework should

be sufficiently realistic to be operated, but should not be constrained by the status quo, and should represent an advance in regulating the actions of all parties concerned in order to regulate the overall construction market.

7.3.3 Finalisation of the framework of EOT claims analysis in China

Based on the opinions provided by the specialist group, the proposed framework was revised in diverse aspects, including the role of the engineer, the function of scheduling, EOT-related costs and concurrent delay, and was eventually finalised as shown below.

The framework for EOT claims analysis in China

1. General principles

The framework for EOT claims analysis should be made by following and adopting the general principles outlined below:

a. The framework aims to provide a relatively unified procedure for parties to conduct EOT analysis, and to provide standard principles on certain debated factors determining or affecting EOT claims analysis and determination, in order to reduce disputes and increase efficiency in the Chinese construction industry.

b. The framework should, on the one hand, follow or adopt advanced international theory and experience in this field while, on the other hand, suiting the distinct environment in China.

c. The framework holds that a sound EOT claim analysis should be conducted through a proper interpretation and application of the relevant provisions of law and contract, while also being processed in an environment in which the parties have good ongoing management of progress monitoring, delay identification, schedule establishment and updates, record capture and filing.

d. The framework holds that diverse approaches may be adopted to analyse claims and determine EOT. The choice depends on the individual nature of the claim and the circumstances; however the primary approach should be the establishment of causation. Other approaches shall only be used where the causation approach is impracticable.

e. When the causation approach is conducted, the analyst should verify whether a genuine causation link can be established, based on relevant factual and analytic proof, by the claimants. Whether causation can be established depends on determining factors including delay risk allocation, criticality of delay, ownership of float and concurrent delay. Where EOT-related costs are analysed, the compensability of the delay should be taken into consideration. All these factors form a core module in the analysis and determination of EOT claims.

f. The framework holds that EOT claims analysis is a systematic work. To establish causation, it is necessary to have a sound system of proof, including factual and analytic proof. After causation is established, the contractor's EOT entitlement may still be jeopardised by the parties' failure to comply with relevant legal or contractual requirements or procedures. Finally, the entire process of analysis is conducted in certain circumstances and may be affected or even jeopardised by the external legal, contractual and project performance environment. Therefore, this framework comprises four modules: the core module – establishing causation; the extended module – legal and contractual obligations and procedures; the supporting module – proof; and a module on the external environment. The relationship between the modules is shown in Diagram 3 in Chapter 3.

g. The framework holds that EOT claims should be submitted and determined contemporaneously without delay, and analysed prospectively as far as is reasonably practical. Global claims and the global settlement of multiple claims are not recommended.

h. This framework holds that EOT claims should be analysed as accurately as possible; impressionistic analysis can be used in some circumstances but is not encouraged.

2. Basic principles of analysis – Causation and the burden of proof

In litigation practice, the courts should clearly recognise the principle that EOT claimants should clearly establish a causation link in their claims.

Contract drafters should expressly state that claimants should relate each causative event to a delay effect and should define the burden of proof to be met by claimants, and the evidence (e.g. updated schedule or other progress information) that must be submitted to support claims.

In project practice, in preparing EOT claims, contractors should carefully establish causation between the cause and effect of each delay to progress, and provide as much factual and analytic evidence as possible to establish this causation. They should avoid submitting and substantiating claims using a global approach which misses the necessary logical relationship between cause and effect.

Analysts of claims should carefully examine the cause and effect of each delay, and verify the information and evidence provided by claimants. Where necessary, they should use their own information and records as well as their knowledge of the projects to supplement gaps in information.

3. Proof modules

Evidence to support an EOT claim and establish causation normally includes factual and analytic evidence. The tiers of evidence are shown in Diagram 4 below.

3.1. Factual evidence

Factual evidence means evidence in form of raw data records which require no or little analysis; it should be captured and compiled on a regular basis, normally daily for anything which occurs on site, to record how relevant parts of the works are being carried out. These records are essential in noting the progress achieved before, during, and after the period of delay.

3.1.1. Regular factual evidence

Parties should establish contract provisions about contemporaneous record capture and keeping, specifying the records to be kept, the party responsible for keeping them, the approach to be followed in storing and accessing records, payments for record keeping and sanctions for failure to comply.

In projects where BIM is used, parties should include in the contract provisions about intellectual property, confidentiality, the parties' responsibility for erroneous information, storage of and access to records and the parties' coordination in information verification.

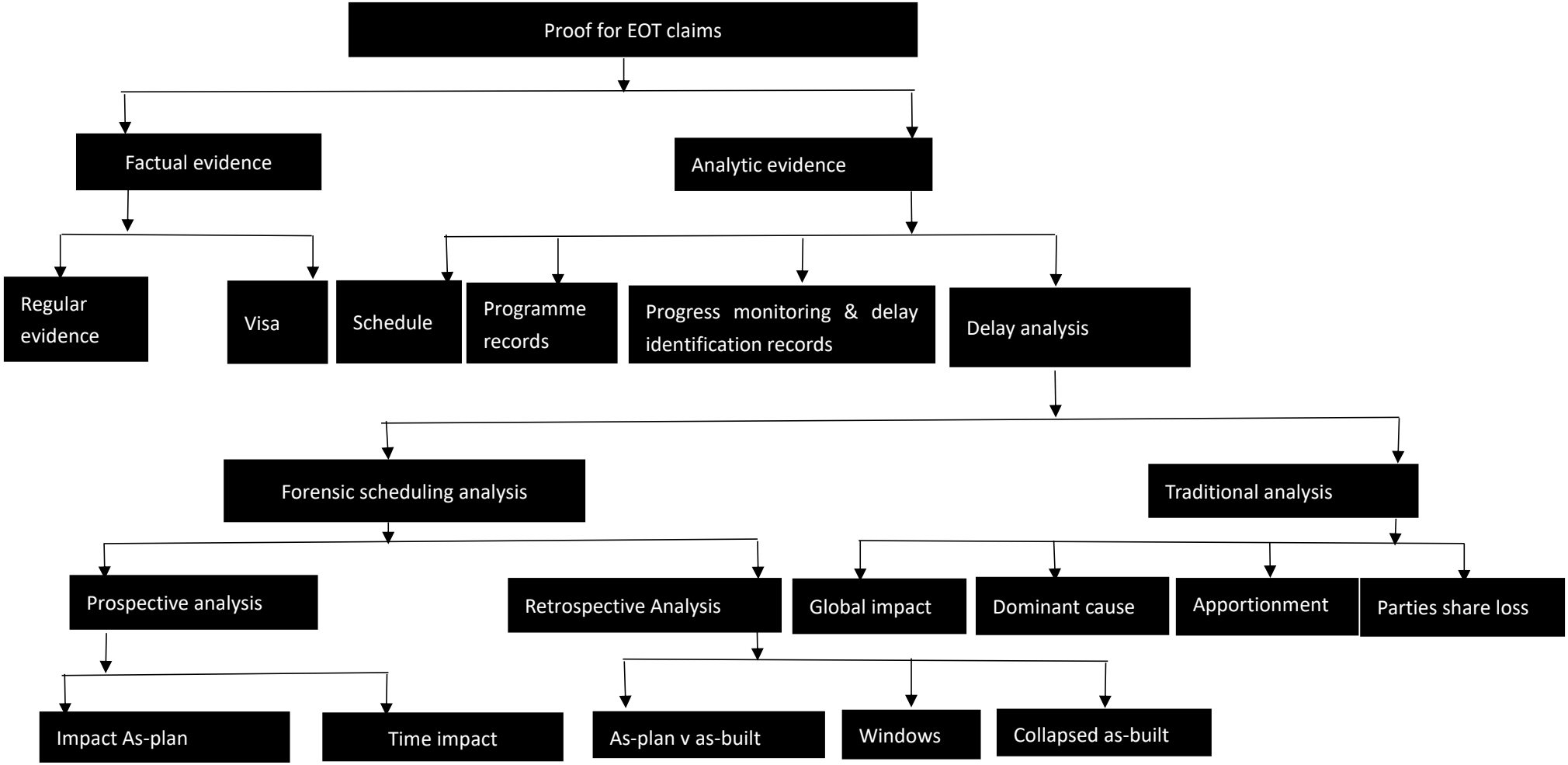
In practice, to support the analysis of EOT claims, records which should be kept include site records, resource records, costs records, correspondence and administration records and technical documents.

After the project starts, the parties should agree the form of each record and the interval within which it should be submitted, if some records need to be confirmed or signed by supervisors/employers, this should be particularly be agreed in advance.

3.1.2. Visa

In relation to the visa, the contracting parties should particularly establish provisions to specify its definition, legal effect, its difference with variation and claims, application circumstances, operation procedures and measures or remedies available if supervisors/employers refuse to sign it.

Diagram 4: Constitution diagram of proof for EOT claims



In practice, when recordable events occur, the contractors should produce the corresponding Visa as objectively and with as much detail as possible, and submit it to the supervisors in a timely manner. The supervisors should act fairly in signing and confirming it or provide their own comments to objectively reflect the facts. Th employers should respect the Visa which has been processed by the supervisors and offer additional payment and/or EOT accordingly.

In an employer-caused delay, if the employers/supervisors improperly confirm or refuse to confirm the visa, the contractors should keep their own contemporaneous factual records, such as photos, audio and/or video documents, test reports, minutes of meetings or documents from government authorities to support their EOT claim.

3.2. Analytic evidence

Analytic evidence is evidence which is compiled based on factual records with relevant subjective explanations, opinions and/or analysis. It is second-hand evidence but is very helpful for those attempting to understand the facts, underlying reasons and correlations with other material. In EOT claims analysis, analytic evidence primarily comprises programme information, progress information and delay analysis reports.

3.2.1. The primary instrument of EOT claims analysis – the schedule

The schedule is a programme that uses CPM, mathematical calculations and logic to plan when and where works are to be carried out in an efficient and time-effective sequence. It is a scientific instrument used to achieve planning targets.

Practitioners should understand the significance of the schedule in construction projects and accept its use as the primary instrument for planning, progress management, and EOT analysis and determination. The significance of the schedule cannot be overestimated; where it has been properly operated and managed, it should be applied to EOT analysis.

In litigation, courts should recognise the function of the schedule and use it as the basic instrument to analyse and determine EOT claim cases, rather than simply using impressions or common sense. Cases should be determined based on the parties' entitlements, calculated through scientific instruments of scheduling analysis, not made on inferences, impressions or *zuo qing* awards to conciliate either party.

The contracting parties should provide more detailed contract provisions regarding the programme and should expressly stipulate that CPM should be used for the programme. Additionally, the contract should define the software and format to be used, the minimum content and level of detail, the timeframe for contractors to submit the baseline programme and for employers/supervisors to accept or order a revised programme, intervals and procedures to update the programme, sanctions and remedies for contractors failing to submit an updated programme and for employers or supervisors unreasonably rejecting the updated programme.

After the projects has started, the parties should forthwith agree the key work methods and planning, and agree the critical path and significant milestones in the baseline programme. The contractors should prepare the baseline programme in a realistic way: the programme should be related to the planned construction resources; activities should be linked by a certain logic and assumptions; constraints and work methodologies should be specifically explained. The programme should contain sufficient consideration of contingencies for the time risks of the various parties and should be prepared in varying degrees of detail; it should be prepared in vary densities to consistent with the information available, however the duration of any event is not allowed to exceed certain months. Moreover, the baseline programme should not consider any changes which are beyond the scenario established by the contract. On receiving the proposed baseline programme, supervisors/employers should respond within a certain timeframe; failure to do so will amount to "deemed acceptance". If the employer/supervisors do not agree to the proposed baseline programme, the parties should negotiate and try to reach agreement within a certain timeframe. In the event of failure to agree, the supervisors/employers should order a programme which aligns as far as possible with the baseline programme proposed by the contractors.

In the course of the works, a progress analysis meeting should be held between the parties at certain intervals, such as weekly or monthly and, upon the occurrence of significant delay events, delay analysis should be conducted in joint meetings to identify the cause and effect of the delay and re-plan the remaining works. The contractors should then prepare and submit a proposed updated programme, and the procedures of submission, acceptance and remedies to the parties should follow those applied to the baseline programme. For ease of tracking the parties' intentions at each stage, the updated programme should not be overwritten but made separately.

The parties should endeavour to follow the baseline or updated programme; if either party intends to take any action which will cause a significant deviation to the schedule, they should inform the counterparty in advance, and the current programme in use should be updated forthwith.

3.2.2. Programme records

The programme record is a straightforward proof to support EOT claims analysis. It not only contains as-built information from the past thus reflecting the current status of the works, but also reveals the parties' true intentions at the time the programme was prepared for the remaining works. It includes all forms of the programme (e.g. the tender programme, proposed/accepted/ordered baseline programme or updated programme, detailed short-term work programme, supplemental detailed programme for detailed activities or sections of works) and explanatory records.

The parties should carefully establish relevant contract provisions regarding the programme as discussed in Section 3.2.1 above to ensure that programme records can be produced and maintained.

In litigation practice, when EOT claims are analysed, the courts are always advised to invest time and effort in studying the programme records available; they may also order the parties to present the necessary programme records.

After the project has started, the parties should agree the detail to be included in the programme record, such as items, forms, procedures for submission, review and acceptance. During the performance of the works, the parties should carefully produce and verify these records and update them in accordance with changed circumstances from time to time.

3.2.3. Progress monitoring and delay identification

The parties should agree contract provisions regarding progress management and monitoring, through keeping relevant progress information and as-built records, to identify, avoid and mitigate delay as early as possible. In particular, it is recommended that progress meetings should be held at certain intervals. When events occur that significantly break or disrupt the planned progress, the parties should work together to identify the delay which has occurred or is likely to occur, detect its cause and effects, devise mitigation measures, and make plans for the remaining works. All this should be recorded in the minutes of the meeting and shared by the parties. Additionally, the contract provisions should require that diverse progress reports, such as monthly or weekly progress reports, should be submitted by the contractors and verified by the supervisors/employers. Progress reports should contain comprehensive information, such as quantity of construction resources used, a general narrative of the as-built progress, milestones completed; they should quantify the main works finished, describe any significant events obstructing or disturbing progress or problems affecting future progress, propose solutions for these, plan for rest intervals, and offer a schedule analysis through a comparison of as-planned and as-built progress as well as narrative of the causes and effects of delays.

After the project has started, the parties should further agree the details above and may agree more methods or mechanisms of progress monitoring as well as delay identification and mitigation. All parties should work collaboratively to fulfil the contract provisions and agreement above; supervisors should actively coordinate the parties and promote agreement between them.

All records of the actions above constitute progress records. When EOT claims are analysed, analysts should take all relevant progress evidence into account.

3.2.4. Delay analysis method

In practice, there is no perfect or fixed method to analyse delay in all circumstances. Delay analysis can be conducted in various ways; which approaches should be used depends on diverse factors including the records available, the level of schedule prepared and updated and the analysts' expertise in scheduling analysis. Normally, based on whether the CPM programme is used as the instrument of analysis, methods can be categorised as traditional delay analysis or scheduling analysis.

A. Traditional delay analysis methods

Traditional delay analysis refers to the methods used by practitioners to analyse progress and delay before the CPM programme was introduced. It mainly uses impressions and common sense to infer the parties' culpability and allocate delay liability, and includes methods such as the global impact method, the dominant cause method, the apportionment method and the sharing loss method.

Traditional delay analysis methods are mainly used in circumstances where the parties have no reliable baseline schedule or updated schedule, and lack sufficient progress records and as-built information, where the claimants fail to provide proof of scheduling analysis, or the analysts lack knowledge of scheduling. The shortcoming of traditional analysis methods is that they ignore correlations between activities as well as the criticality of the delay to completion. The analysis is conducted based on subjective imprecise inferences and impressions and, therefore, cannot accurately assess the parties' culpability in delay or entitlement to EOT. Its advantage is it has low record-keeping and programme-management requirements and therefore has few constraints; it can be conducted easily and quickly and is easily understood, hence its popularity among many practitioners.

In practice, traditional delay analysis should not simply be precluded from application in construction projects. These methods can be used in small projects or simple EOT claims, or in amicable settlement negotiation or mediation. However, for complicated EOT claims in medium or large-size projects, or cases in litigation, traditional analysis is not recommended.

B. Scheduling analysis methods

Scheduling analysis uses CPM and relevant mathematical calculations and logic to study how actual events in a project interact in the context of a complex scheduling model, for the purpose of understanding the impact of these events on subsequent activities within the schedule. Compared with traditional delay analysis methods, it is characterised by the use of the CPM schedule through computation software, and can therefore reduce the inaccuracy arising from subjective inferences. However, this form of analysis sets high conditions regarding progress management and monitoring, contemporaneous record keeping and baseline/updated schedule management. It is normally used in complex projects and for complex EOT claims.

Various methods have been developed to conduct scheduling analysis and these are categorised into two types: prospective and retrospective analysis.

Prospective analysis

Prospective analysis is conducted when the delay event occurs or is likely to occur; the entitlement to EOT is thus assessed based on the likely delay effect on completion predicted at the time when the delay events occur or the likely delay is felt, but not based on a delay effect which has actually occurred. Its advantage is that it enables EOT claims to be settled in a timely manner and allows the parties to set a new

completion date to re-plan and arrange the remaining works. It can also avoid underestimating contractors' entitlement to EOT due to the acceleration, mitigation and re-sequencing of works. Furthermore, it follows the timeframe for EOT claim submission and determination stipulated by the current DMCC. Therefore, prospective analysis should be prioritised in construction projects.

Prospective analysis contains two methods – Impacted As-Planned analysis and time impact analysis. Please refer to Section 3.4.3 of this thesis for detailed methodologies, advantages and disadvantages, and the application environment of these methods.

Retrospective analysis

Retrospective analysis is normally conducted some time after the completion of the delay events and aims to identify the actual impact of delay events on the identified actual or as-built critical path.

The requirements for conducting retrospective analysis are demanding: it requires sound as-built information and an updated programme, and may also require the logic and critical path in the as-built progress to be re-identified. It is, therefore, quite costly and burdensome. Furthermore, it may underestimate contractors' entitlement to EOT as a result of the acceleration and re-sequencing of works. All these limit the application of retrospective analysis; practitioners should choose it based on the relevant circumstances.

Various methods can be used for retrospective analysis, including as-planned v as-built, windows/time slice, collapsed as-built. Please refer to Section 2.4.3 of this thesis for detailed methodologies, advantages and disadvantages, and the application environment of these methods.

Notwithstanding the above, some prospective methods, such as impact as-plan and the time impact method, can also be used for cases which are time-distant to the occurrence of the delaying events to determine contractors' entitlement to EOT in the cause-effect approach, which primarily adopts a modelling approach to theoretically infer the EOT which would have been awarded to contractors. In contrast, where time-related costs are determined, effect-cause analysis is more appropriate, which focuses on the facts of the project after taking delaying events and relevant common sense into consideration. It normally includes methods of windows analysis, retrospective as-planned vs as-built windows analysis, and longest path analysis.

3.2.5. External technique support for scheduling analysis

Training and professional qualification examination

It is recommended that training in planning and scheduling to judges and practitioners in construction projects be substantially reinforced and improved.

Relevant government authorities or associations should hold professional qualification examinations in planning and scheduling, and issue qualification certificates to qualified practitioners. Practitioners are also encouraged to participate in training and

qualification examinations held by international leading associations such as PMI and CIOB.

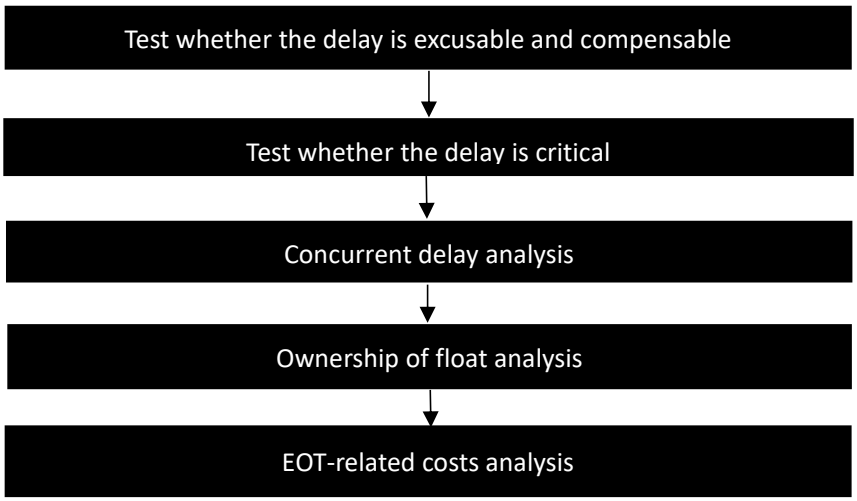
Service provided by authentication firms

It is recommended that authentication firms qualified in planning and scheduling should be established in China, and that only authentication reports of delay analysis issued by qualified authentication firms should be admissible in litigation or considered by the parties in claims settlement.

4. Core module – Steps to establish causation

When analysing EOT claims, the steps and factors shown in Diagram 5 below should have to be considered by analysts.

Diagram 5: Flow chart of causation establishment



4.1.1. Delay risk allocation

At the level of the law, in addition to detailed delay risk allocation, the legislation or judicial explanations issued by the SPC or high courts should clearly establish the general principle of delay risk allocation, to guide practitioners in allocating the risk of delay caused by all types of delay.

The DMCC should re-arrange its structure of delay risk allocation provisions to make all provisions consistent and not contradictory, and provide unequivocal legal wording to describe the eventualities triggering EOT entitlement, avoiding vague wording such as “caused by the employer’s reason”. Against employer risk events, the DMCC should establish unified standards or principles to provide remedies in terms of EOT and/or costs and/or profit. Furthermore, the DMCC should consider establishing different delay risk allocations for different types of contract, such as the EPC and PPP which are commonly used in China. When contracts are negotiated and drafted, the parties should endeavour to establish a balanced risk allocation, not shifting risks which should more conveniently or efficiently be settled by one party to the other.

In the process of analysing EOT claims, the starting point should be the analysis of delay risk allocation; analysts should test whether the delay to progress is caused by an employer risk event. To achieve this, analysts should refer to the relevant law and contract. If the test is failed, the EOT claim analysis should be stopped and no EOT should be awarded to the contractors.

4.1.2. Criticality of delay

After it is confirmed that the delay to progress is an employer-caused delay, a test of criticality should be conducted to detect whether the delay to progress has occurred on a critical path and therefore will cause a delay to completion. To this end, CPM scheduling analysis should be conducted. If the test cannot be passed, no EOT should be awarded to the contractors, and the process of EOT claims analysis should stop.

The contracting parties are advised to establish clear contract provisions, such as "no EOT will be awarded to the contractor unless the employer delay event has an impact which adversely and materially affects the Critical Path of the Work".

In litigation and project practice, judges and practitioners are recommended to firmly adhere to the principle that mere critical delay can bring about an EOT entitlement, and always conduct the test of criticality. It is not recommended to frequently use traditional delay analysis methods such as the global impact method which ignores the criticality of the delay.

4.1.3. Concurrent delay

After the EOT claim has passed the two tests above, the contractors' EOT entitlement may still be precluded or prejudiced by contractor risk events which contribute to the delay (known as concurrent delay); therefore, a test of concurrent delay should now be conducted.

There is as yet no unified principle to address concurrent delay in China. The courts should make consistent determinations in this regard to provide legal certainty to practitioners. The SPC or high courts may also directly promulgate judicial explanations to provide principles in relation to concurrent delay. Otherwise, the DMCC or the contracting parties should establish contract provisions to define the principle in this regard. In accordance with the principles of Chinese law and culture, it is recommended that the sharing loss principle should be applied in concurrent delay; that is, upon a concurrent delay, the full amount of EOT arising from the employer-caused delay should be awarded, but no prolongation compensation should be awarded to contractors unless they can prove that, without their own delay, the loss and expense arising from the prolongation would inevitably have been incurred. Although the apportionment approach is also commonly used in practice, it is not recommended that it be frequently applied unless the analysts can accurately identify the parties' culpability in a concurrent delay.

When analysing concurrent delay claims, the analysts should firstly verify whether a concurrent delay can be established. If in the same period two delay events occur, one

a contractor risk event and the other an employer risk event, concurrent delay only occurs where either of the events separately has an effective adverse impact on the critical path and completion date. The test to establish concurrent delay should also be conducted through CPM scheduling analysis; the employer delay and contractor delay should be separately input to the CPM programme to analyse whether, "but for" the other party's delay, the critical path would have been adversely impacted and would have caused a delay. In current litigation and project practice, many EOT claims have been incorrectly treated as "concurrent delay claims" because analysts have failed to conduct the test but have simply treated any delay where diverse employer risk events and contractor risk events have occurred within the same period, as a concurrent delay. Such analysis is not recommended as it ignores the underlying correlation between causative delay events and the completion date.

After establishing concurrent delay, in order to analyse the compensability of loss and expense flowing from the concurrent delay, a retrospective analysis of the employer delay "but for" the contractor delay in terms of loss and expense should be conducted separately, to detect "but for" the contractor's delay the loss and expense that would have been incurred and that, therefore, is compensable.

4.1.4. Ownership of float

After the EOT claim passes all the above tests, the parties' entitlement may still be impacted by employer-caused delay on non-critical paths, depending on the ownership of the float. If the float is controlled by the contractors, even though an employer risk event has no impact on the completion date, the contractors are entitled to EOT as they have lost their contingency time. They are also entitled to compensation for a delay to earlier completion if they had clearly informed the employer of their early completion plan in advance and if the earlier completion date was reasonable and achievable. If the float is controlled by the employers, the contractors must absorb the employers' non-critical delay without EOT.

To verify the ownership of float, analysts should refer to the contract. The DMCC or contracting parties are advised to establish provisions expressly defining ownership of float. In the absence of express provisions, analysts can infer the likely effect from the wording of the contract. If no such wording suggests exclusive ownership of the float, it is recommended that the float should not be exclusively occupied by any one party, and EOT will not be due until the total float is exhausted.

4.2. Prolongation compensation analysis

4.2.1. Test of compensability of delay

Prolongation refers to time beyond the original contract period which brings about additional loss and/or expense to the contractors. It primarily includes loss and/or expenses arising from using time-related resources, such as site and head-office overheads, as well as price inflation in construction resources.

It is a misconception that the entitlement to EOT automatically results in an entitlement to compensation of costs for prolongation. Upon an employer delay, to determine whether prolongation costs should be awarded, analysts should first test whether EOT entitlement is due, and then test whether the delay is compensable through referring to the delay risk allocations provided by the law and contract.

4.2.2. Principle of prolongation costs analysis and analysis methods

In accordance with the principles of loss as established by CCL, prolongation costs should be assessed based on the actual expense and/or loss incurred by contractors, but not likely loss inferred through theoretic calculations. Thus, when prolongation costs compensation is analysed, prospective analysis methods should be precluded and only retrospective analysis used.

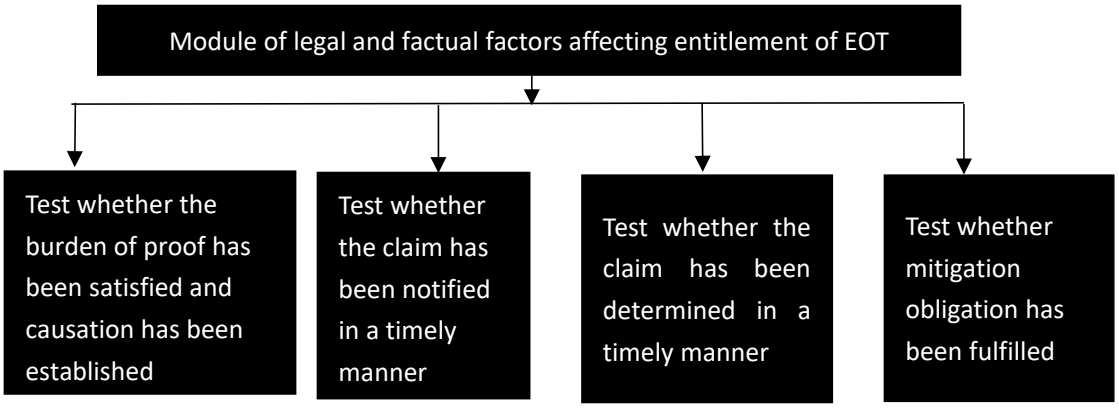
Where prolongation costs are claimed, the claimants bear a high burden of proof in providing factual evidence to support their claims. However, in some circumstances decision-makers should allow theoretic calculations based on relevant Cost Quotas issued by relevant authorities in relation to indirect costs and management costs, or the use of rates certified by a third party, such as audit or cost authentication entities.

To avoid disputes in this regard, the parties are advised to agree a contract rate for time-related costs in advance, or use the mechanism of Method Related Charges as introduced by CESMM at the tender stage.

5. Module of legal and factual factors affecting entitlement to EOT

During performance of the works, the parties should comply with legal requirements and contract provisions to fulfil their own obligations; failure to comply may impact the contractor's entitlement to EOT. Where EOT claims are analysed, these factors should be taken into account by analysts. The constitution diagram of this module is shown in Diagram 6 below.

Diagram 6: Module of legal and factual factors affecting entitlement to EOT



5.1. Burden of proof and establishing causation

When EOT claims are analysed and determined, the legal requirement for a claim to meet the burden of proof to prove the causation of claims cannot be underestimated. See Section 3 above for details.

In particular, the courts in China should expressly highlight this principle through judicial determinations or explanations. EOT claims that fail to provide sufficient proof, or those where the proof provided fails to prove causation of claims, should be rejected in order to encourage litigants to present, prove and defend their cases in a rational, logical and lawful way. In project practice, practitioners should present, analyse or determine EOT claims through endeavouring to prove or verify the causation of claims, provided that circumstances allow. Claims that lack proof or logic of causation, such as global claims, should not be allowed unless it is unrealistic or unnecessary to establish the causation of claims.

5.2. Time bar clause

The current legal position in China, as concluded by the SPC's Judicial Explanation, is that time bar clauses should not be enforced unless the contract has expressly established that compliance with the prescribed timeframe in notifying the intention to claim is a condition precedent to entitlement to EOT; furthermore, even though it is a condition precedent, the time bar clause is still unenforceable where contractors can justify their failure to comply.

In litigation, courts should apply this principle consistently. The DMCC or contracting parties should recognise the principle in the contract provisions or other agreement.

In project practice, contractors should always strictly follow the contractual procedure in notifying delay, submitting intention to claim and providing claims reports within the prescribed timeframe. To achieve this, contractors are advised to establish an *ad hoc* claims team to coordinate and maintain communication with the contract, technical and progress management departments as well as the site teams, and based on daily progress monitoring and analysis work, to promptly identify ongoing or likely delays and detect their cause and effect.

5.3. Timing of award

It is recommended that the DMCC provide sanctions against the employer's failure to comply with the timeframe for awarding EOT and related compensation. It may stipulate that the contractor's additional expenses and loss arising from the employer's failure to promptly and correctly award EOT should be borne by the employer. The litigation should confirm that principle.

In project practice, employers/supervisors should carefully assess each claim and provide their determination within the contractual timeframe. They should award EOT contemporaneously and not "wait and see". To avoid the possible overestimation of EOT caused by prospective analysis and awarding, they should prudently analyse

claims and award only EOT that is sufficiently supported by information provided by the contractors.

5.4. Mitigation of delay and acceleration

The DMCC should confirm the CCL position in relation to contractors' obligations to mitigate employer delay and embody it through contract provisions in relation to EOT analysis and determination. However, that obligation should be limited to the extent that no additional substantial loss and expense should be incurred by contractors unless an express instruction is ordered by employers/supervisors indicating that loss and expense will be additionally compensated.

In practice, against employer-caused delay, employers may request contractors to accelerate works to catch up the progress; such acceleration should not be conducted unless it has been expressly ordered by the employers/supervisors, and the costs of acceleration may be particularly agreed by the parties or measured and paid through the contract mechanism of variation.

Where no EOT is promptly and correctly awarded for employer-caused delay, to avoid liquidated damages contractors may perform constructive acceleration on their own initiative. The contract should provide remedies for this situation, and should stipulate that before initiating acceleration the contractor should expressly notify its intention to do so, provide a detailed plan and justify the reasons for the acceleration. When claims in relation to such constructive acceleration are analysed, the tests of notification and justification of constructive acceleration should first be conducted. The failure to pass these will eliminate the contractor's entitlement to compensation. In project practice, contractors should also expressly input the action of acceleration in the updated schedule, and keep records of the accelerated activity on a daily basis, to distinguish such activity and the costs of constructive acceleration from regular activities and costs.

6. External surroundings

6.1. Role of involved parties

The code of *Construction Law* of the PRC should be revised to limit the employer's power and promote a fair and equal business relationship between employers and contractors. Relevant legal sanctions should be established against common unfair employer actions such as imposing unrealistic construction periods, deliberately delaying the determination of claims, obstructing the dispute process, imposing improper pressure or influence on supervisors in processing visas or claims.

The *Construction Law* should also revise provisions regarding supervision in construction projects to establish an independent legal role in determining claims and Relevant Matters. The DMCC standard form of construction contract should embody that revision, to establish a mechanism akin to standard forms of contract in English law to ensure that claims and related matters should be determined by the supervisor according to their professional discretion or, at least, to provide that authority to some

extent. In the meantime, the *Construction Law* should establish supervisors' training and evaluation mechanisms to assess and publish supervisors' ability, fairness and professional ethics.

The *Construction Law* should also recognise the legal role of fast-track dispute resolution approaches such as adjudication and mediation, and stipulate relevant standards for dispute resolution and operation mechanisms and enforce the outcomes of each approach. The DMCC should promote the application of these alternative dispute resolution approaches.

Additionally, it is recommended that authentication firms in planning and scheduling should be established in China, to provide professional services in scheduling analysis for use in project practice and litigation. See Section 3.2.5 above for details.

6.2. Matters to be particularly acted upon by the relevant parties

Besides all the above, the parties at different levels are advised to make efforts in the areas below to construct an environment conducive to EOT claims analysis and allow the framework to be operated efficiently.

6.3. In law

6.3.1. At the level of legislation

Legislation in China should undergo significant reform in terms of running modes and dispute resolution in construction projects to constrain the undue influence of Chinese employers, which prevents EOT claims from being reasonably, fairly and promptly analysed and determined. To that effect, supervision and dispute resolution mechanisms should be reformed as recommended in Section 7.2.1 of the thesis.

6.3.2. At the level of litigation

Judges should substantially improve their expertise in analysing and determining EOT claims; in particular, the following measures are recommended:

a. A system of publishing judicial determinations in the field of construction disputes should be established.

b. Judges who are often involved in construction cases should have frequent training in construction management, planning and scheduling.

c. China should establish *ad hoc* courts or branch courts and *ad hoc* judges to deal with construction disputes.

6.3.3. At the level of the construction contract

The DMCC should follow the international tendency to use standard forms of construction contract. The particular reforms listed below are recommended:

a. To establish a relatively balanced relationship between the contracting parties, the employer's power should be constrained by supervision mechanisms and a fast-track dispute resolution mechanism;

b. To adopt a management-oriented mode and provide clearer procedures and approaches to enable parties to solve the practical problems which commonly occur in construction projects more efficiently.

c. To establish collaborative relationships and encourage the parties to jointly analyse and solve problems, claims and disputes.

6.3.4. For project practitioners

In construction projects, parties are particularly recommended to take the following actions:

a. Employers should not impose unrealistic contract periods on contractors; they should approve the initial and updated schedule on time, be active in progress management and monitoring, and award EOT and related compensation on time.

b. Supervisors should be pro-active in time management and identifying ongoing and likely delays, consulting all parties to solve problems, claims and disputes. They should act fairly and reasonably in confirming visas, and endeavour to provide reasonable and professional recommendations to employers.

c. Contractors should conduct effective risk management and planning, provide a reasonable baseline schedule, prepare a checklist of potential delays, establish and operate progress monitoring and delay risk identification systems, update the schedule from time to time, keep daily factual records and periodic reports, maintain the file storage system, and submit notifications of delays and claims on time.

Chapter 8

Conclusion

8.1 Review of the research

Through the chapters above, this research has conducted a thorough review, analysis and comparison of the factors (including principles, approaches and operation mechanisms) operating in EOT claims analysis in the UK and China. By following a basic routine of framework establishment, it firstly identifies the need for a framework and its constituent factors in Common Law countries through a literature review, then examines and compares how these factors operate at the levels of the law, contract, and project practice respectively in the UK and China, to identify the status quo and problems in China in this field. Finally, it concludes a framework to be used in construction projects in China.

8.2 Findings of the research

The following significant findings and conclusions have been reached by this research:

1. Under English law, EOT claims analysis is a systematic process; it has an inherent ambit, structure, compulsory procedures supplemented by optional assessment considerations, principles to address particular matters, a supporting proof system, constraint factors in the aspects of legal and contractual compliance, and an appropriate external impact environment. Together, these constitute a closed-loop systematic conceptual framework. Therefore, the hypothesis that a framework for EOT claims analysis can be established has been well proven.
2. At the level of the law, China and the UK have different legal systems and distinct legal cultures and environments. There is a substantial gap in the field of analysis of extension of time claims. The UK has developed a complete system of legal principles through case law to solve detailed questions of delay claims, provides relatively clear procedures to process EOT claim analysis, and has mature legal principles and a practice of causation analysis to allocate delay liabilities between parties in the construction chain. The UK has also developed a mature fast-track dispute resolution process. Together, these enable EOT claims to be assessed and determined reasonably and swiftly. Comparatively, China resolves EOT claims through the legal provisions of contract law and civil code, which are generic and not pertinent to detailed scenarios of claims. There is neither a clear procedure for claim analysis, nor clear approaches to allocate delay liabilities, nor fast-track dispute resolution. This, the courts' determinations are commonly questionable and inconsistent with each other, resulting in substantial legal uncertainty in this field.

3. At the level of contract provisions, significant differences are also found. In the UK, standard form contracts still show significant differences between each other, with different positions or arrangements for risk allocation, claim and resolution procedures, the role of contract administrators, the basis of and criteria for assessment. Nevertheless, all endeavour to enable extension of time claims to be solved swiftly and reasonably. In comparison, standard form contracts in China follow the general philosophy of the FIDIC contract, one of the English standard forms of contract, for EOT claims, which adopts a different position in almost all aspects of the conceptual framework, and lacks relevant claim-solving supporting mechanisms. One of biggest constraints is that many provisions are inconsistent with the legal provisions, legal culture and industry usage in China, which causes substantial problems in contract application.

4. At the level of project practice, significant differences exist between China and the UK. The UK has a relatively unified industry practice in relation to EOT claims, including analysis principles and methods, schedule establishment and update mechanisms and supporting records. It uses scheduling analysis as the basic approach to analysis, advocates analysing and awarding EOT in a timely manner, and also has relatively high consistency between the position of the law and the standard forms of contract. Although it still sways to some extent between logical analysis, based on a methodical approach, and impressionistic and simplistic analysis based on common sense, it enables EOT claims to be analysed in a consistent way and determined with greater legal certainty. Comparatively, China has no unified industry practice yet; EOT claims are commonly analysed and determined in a simplistic, impressionistic, superficial, compromised and time-distant manner, and practice commonly diverges substantially from positions of the law and contract. As a result, EOT claims are commonly not determined reasonably and carry a low degree of legal certainty.

5. To transfer the successful application of Common Law EOT claims analysis to the context of the Chinese Civil Law system, the law should be improved by providing clearer legal principles, positions and solutions in relation to particular legal questions, the role of construction parties, reforming claim determination and dispute resolution mechanisms, and establishing the necessary legal, professional support and platforms. The standard forms of contract should be improved by following the international tendency in construction contracts towards a balanced risk allocation, a management- oriented progress control, and a collaborative relationship between the parties. The construction industry should establish commonly accepted industry practice in the field of EOT claims analysis to guide and regulate the work of EOT claims preparation, analysis and determination, based on the law and the contract as well as Chinese legal culture, with reference to the Common Law EOT claim analysis framework.

6. The research concludes with the establishment of a self-contained conceptual framework for EOT claims analysis under Chinese Civil Law, developed

through the above comparative works and evaluated by relevant specialists in China. It comprises the relevant general principles and four modules of work or factors (causation establishment, proof, legal and contractual compliance, external environment) which should be used to process the analysis or may affect the analysis quality, and matters should be improved by relevant parties.

8.3 Other thoughts

Besides the findings above, the thoughts below have also been formed by the author during the process of this research:

1. EOT claims analysis depends on the one hand on the interpretation and application of the law and contract provisions and, on the other hand, on technical approaches. The application of technical approaches further depends on time management and records management. Therefore, EOT claims analysis should always be conducted and considered in conjunction with the relevant supporting works and impacting factors.

2. There are many different approaches to analyse EOT claims; the most reliable is to test the causation of claims, which is the preferred approach currently in the UK construction industry. The framework contains a core module of analysis work which should be conducted in any circumstances. To comply with specific legal or contractual requirements, this must be supplemented by relevant additional tests. Additionally, the analysis must be supported by proof and also is impacted by the external environment; all these constitute essential parts of an EOT claims analysis system and are, therefore, included in the framework.

3. In modern times, approaches to EOT claims analysis must evolve along with developments in construction; construction becomes more complex in terms of the technical processes involved, and the parties need more logical, systematic and scientific instruments and approaches to analyse delay and identify liability.

4. In the UK, EOT claim analysis has experienced a distinct development from relying on subjective impressions and common sense to assessment through objective, scientific scheduling analysis; from relying on superficial inferences to relying on in-depth logical causation analysis; from relying on a relatively subjective criterion of being “fair and reasonable” to being assessed based on a reasonable programme; from relying on the CA’s individual opinion to relying on information generated and exchanged collaboratively between the parties. Today, EOT claims analysis work in the UK is commonly conducted in a rational, standardised and routinised way; thus it is at an advanced level and worthy of being used for reference by practitioners in other countries, although it still has scope for improvement in many aspects.

5. In contrast, China is still at the initial stage of developing a routine. It is imperative to follow the inexorable development of EOT claims analysis as discussed above and to develop processes to a higher level. The UK’s current status in this field

provides a good example for China although the development trajectory in the UK should not simply be copied in China, and the level which has been achieved by the UK should not represent the ultimate level to be achieved by China.

6. Although the causation test approach is the overriding approach in the UK in analysing EOT claims, it is not the absolute test. Courts in the UK are also swaying between strictly establishing causation and demonstrating commercial sense. Where an EOT claim is determined some time after the delay event, the delay analysis used sways between cause-effect analysis through modelling type methods and effect-cause analysis through factual analysis methods. Therefore, besides the causation approach, other traditional approaches or methods should also be used as appropriate.
7. Furthermore, the UK now shows a tendency for courts to resolve EOT claims in a more flexible and open manner as distinct from their past rigid and literal position. In comparison, in Civil Law countries such as China, EOT is often dealt with based on general and vague legal principles, and determination is always made in an open way. In this respect, the gap between them is decreasing. Nevertheless, the gap will not absolutely vanish due to the fundamental difference between the legal systems under which laws, contracts and practitioners' behaviour operate differently. Therefore, China should refer to the framework of EOT claims analysis in the UK, but should not simply copy it.

8.4 Application of research

Through the research conducted, this thesis establishes a self-contained framework for EOT claims analysis for projects in China, through the introduction of diverse approaches such as publications, lectures or meeting presentations to make the framework known and increasingly understood by the construction industry. It is hoped that the framework can provide relatively clear unified guidance for project practitioners resolving delay and EOT claims and provide a reference for decision-makers (mediators, arbitrators or judges) in dispute resolution determining EOT claims, and therefore enable EOT claims in China to be addressed more consistently, reasonably and efficiently.

The thesis is also a pioneering work in the field of academic research and education in China. It can be used as a textbook for students of construction management or law, and also offers a new scenario and research starting point for scholars who intend to conduct relevant research in this field.

8.5 Future research

EOT claims analysis is a wide-ranging discipline, comprising complex knowledge, theories and practice in relation to diverse disciplines. Given the constraints of time and words in PhD research, this thesis merely provides a general framework for this field, and leaves substantial space for further development. In particular, areas such as

the legal grounds for EOT mechanisms, the applicability of time bar clauses, and the principles of prolongation costs, concurrent delay and global claims in China all merit further in-depth research.

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Appendix 1:

The initial draft of EOT claims analysis framework for Projects in China

The Initial draft of framework of EOT claims analysis in China

1. Introduction

Based on the structure of the framework of EOT claims analysis as concluded in Chapter 2, and through reading conjunction with statute quos and problems in this regard in China and taking reference of advanced arrangement and experience adopted by the EOT claims analysis framework in English law, a framework of EOT claims analysis is made as below:

2. General principles

The framework of EOT claims analysis should be made following principles as below:

a. The purpose of this framework is to provide a relative unitary procedure for parties to conduct EOT analysis, and provide relative unitary principle toward some debated factors determining or affecting EOT claims analysis and determination, so that to reduce disputes and increase efficiency to Chinese construction industry.

b. The framework on the one hand should follow or adopt the current international tendency in relation to progress and claim management as well as principle and approaches to deal with EOT claims, on the other hand should suit the unique Chinese legal and culture surrounding and take Chinese project practitioners' unique behavior mode into account.

c. This framework recommends that EOT claims should be processed in a circumstance that parties have good progress management and monitoring, good schedule establishment and update management, good record keeping management.

d. It is hold that the work of EOT claims analysis contains diverse decisive or impact factors and therefore is a systematic works, specifically, the analysis should be conducted based on good progress management and monitoring, good schedule establishment and update management, good record keeping management. When analysis is made, analyst should verify whether the claimant has proved its claims by establishing causation link and supported by relevant facture and analytic proof. In that process, factor of delay risk allocation, criticality of delay, ownership of float and concurrent delay should be taken into account of EOT entitlement, and factor of compensability of delay should be taken into consideration of prolongation compensation. Additionally, the parties' failure in compliance with contract such as failure in submitting claims or making awarding on time, or failure in mitigating the loss, may also impact parties' entitlement in EOT and compensation, therefore should also be additionally taken into consideration. All these steps constitute

a complete procedure of EOT claims analysis and therefore constitute this framework.

e. This framework hold that EOT claims should be submitted and determined in a contemporaneous way without delay, and analyzed in prospective way as practical as possible, the global claims or global settlement of multiple claims is not recommended.

f. This framework holds that EOT claims should be analyzed in a fair way, for that reason some independent professional firms, like independent Supervisor and schedule authentication firms, are recommended to be involved in.

g. This framework holds that EOT claims should be analyzed as accurate as possible, impressionistic analysis can be used in some circumstances but is not encouraged.

3. Role of involved parties

Given the employer's dominant position and commonly act aggressively in construction projects, the Construction Law is recommended to be revised to limit Employer's power to promote a fair and equal business relationship between employers and contractors in construction projects, relevant legal sanctions should be established against employers' common unfair actions which obstruct EOT claims can be reasonably and prompt analyzed and settlement such as imposing unrealistic construction period, deliberately default in delay providing determination of EOT or obstructing the process of dispute, inflicting improper pressure or influence to the Supervisors when the late confirm visa or recommending.

The Construction Law should revise the provisions regarding Supervisor in construction projects, to establish its legal independent role in determine claims and relevant matters. The standard form of construction contract DMCC should embody that revision, to establish an akin mechanism in standard forms contract in English law that claims and related matters should be determined by the Supervisors through their professional discretion, or at least provide that authority to some extent. In the meantime, the Construction Law should establish Supervisors' training system and evaluation system to assess and publish Supervisors' class of credit in ability, fairness, and professional ethics.

4. Causation and burden of proof

In litigation practice, courts should clearly depict the principle that claimants of EOT claims should clearly establish the link of cause and effect.

In contract drafting, drafter should expressly depict that the claimant should relate each event under claims and effect of delay or loss and/or expense, and what level of burden of proof should be borne by the claimant and expressly describe what items of evidence (e.g. updated schedule and other progress information) should be compulsorily submitted to support EOT claims.

In project practice, when EOT claims is prepared, contractors should carefully establish causation link between cause and effect of each delay to progress, and provide as much as possible factual and analytic evidence to support their claims, they should try to avoid to submit and substantiate claims in global approach. The analyst should carefully examine and verify the cause and effect of each delay, and verify the information and evidence provided by claimants, where it is necessary, they should also use of their own information and records as well as knowledge of the projects to supplement information gap left by the claimant.

4.1. Proof of EOT claims

4.1.1. Facture evidence

Facture evidence means evidence raw date records which does not need or need litter analysis, it should be captured and compiled on a regular basis, normally daily for anything which occur at site, it records how relevant parts of the works are being carried out. These records are at the heart of establishing progress achieved before, during, and after period of delay.

Regular factual evidence

The DMCC or parties of contract should set up contract provision about contemporaneous record capture and keeping, it should specify the item of records should be kept, the parties who responsible for keeping, the approach to file and access to, payment for record keeping, sanction for failure in comply with the provision of record keeping and etc.

In project where BIM is used, parties should additionally agree in contract about its intellect property, confidentiality, parties' responsibility to erroneous information, form of keeping and file, approach of information capture and access to, parties' coordination in information verification and etc.

In project practice, Normally, for the purpose of EOT claims analysis, records should be keep including site records (e.g. site daily dairy, quality control log, works test and acceptance log, HSE log, obstruction date, hand-over records, geological mapping records, progress photos and videos), Resources records (e.g. material and equipment enter/demobilization log, labor and equipment daily allocation records, materials order, procurement records, material consumption list, equipment operation log, salary lists of each team and etc., costs records (accountant records, records for application of payment, audited financial reports and etc.), correspondence and administration records (such as letter, emails, supervisors' site instruction records, notice of delay, variation proposal, bonds and insurance document and any other documents issued under or required by the contract),and technical documents and etc.

After project are started, parties should agree the form of each record and interval within which to submit, if some records need be confirmed or signed by the Supervisor/employer it should be particularly agreed in advance.

Visa

In relation to the unique mechanism of Visa, the DMCC should particularly set up provisions to specify its definition, legal effect, difference and connection with variation and claims, application circumstances, and operation procedure, and measures or remedies against the Supervisor/Employer refusing to sign it.

In project practice, upon events should be recorded by visa, contractors should produce the visa as detailed and objective as practice, and submitted to supervisors timeously, Supervisors should act fair to sign and confirm the visa or write their own otherwise comments or opinion to objectively reflect the fact, employers should respect the visa has been confirmed or otherwise commented or opined by Supervisors and provide additional payment and/or EOT accordingly.

If against employer delay employer/Supervisor improperly confirm or refuse to confirm visa presented by contractors, contractor should keep its own contemporaneous facture records such as photo, audio and video documents, test report, minutes of meeting, documents or notice published by government authorities, and etc. to support EOT claims.

4.1.2. Analytic evidence

Analytic evidence is evidence which is compiled based on factual records and is formed with relevant subjective explanation, opinion, and analysis. It is second-hand evidence but is much helpful to reader to easily understand the fact and its underlying reasons and correlation with other matters. As to EOT claims analysis, the analytic evidence mainly includes programme information, progress information, and delay analysis report.

4.1.2.1.The primary instrument of EOT claims analysis- Schedule

Schedule is a programme which use CPM and mathematic calculations and logic to plan when and where works is to be carried out in an efficient and time-effective sequence, it is a scientific instrument to achieve the target of macro-target of planning.

Practitioners in all level of practice should understand the significance of schedule in construction project to accept to use it as the primary instrument to conduct planning, progress management and monitoring, and EOT analysis and determination.

In litigation, courts should properly recognize the function of schedule and use it as the basic instrument to analyze and determine EOT claims, but not simply based on the rather vague and inaccurate impression or common sense. Determination of cases should be made based on the parties' accurate entitlement which is calculated through scientific instrument of scheduling analysis, but should not made based on inference from impression, and should also not to be "*zuo qing*" awarded so as to maintain a proximate balanced benefit to either party.

In contract negotiation and drafting, DMCC and parties should provide much more detailed contract provisions regarding the programme, it should expressly stipulate CPM should be used for programme preparation. Additionally, it should expressly depict which software and form should be used, the minimum of content and density,

the timeframe for contractors to submit baseline programme and for employers/Supervisors accept or order an otherwise accepted programme, intervals and procedure to update programme and etc. sanction and remedies for contractors failing in submit updated programme and employer unreasonable accepting or order updated programme.

In project practice, after projects are started, parties should forthwith agree the significant work method and planning, and agree the critical path and significant milestone of the baseline schedule. Contractors should prepare the baseline programme in a realistic way, the programme should be prepared relating to the construction resources which is planned for the works, activities should be linked by certain logic, constraints and works methodologies should be particularly explained. It should contain sufficient consideration of contingencies for time risk of different parties, it should be prepared in vary densities to consistent with the information available, however no duration of any event is allowed to exceed 3 months. Moreover, the baseline programme should not consideration any changes which are beyond the scenario as established by the contract. Upon the proposed baseline programme, Supervisors/employers should provide response within a timeframe, a failure to do so will amount to a "deemed acceptance". If Employer/Supervisor do not agree the proposed baseline programme, parties should negotiate it and try to agree it within a certain timeframe, if no agreement is achieved by a certain period, Supervisor/employers should order a programme which can be maximum in line with the baseline programme as proposed by contractors.

In the performance of works, progress analysis meeting should be held between parties in certain intervals such as each week or month and upon occurrence of significant delay events, delay analysis should be conducted by parties together so that to identify cause and effect of delay and work out planning or remaining works. Based on the discussion, contractor should prepare and submit the proposed updated programme, the procedure of submission and acceptance and remedies to parties' in compliance should follow these for the baseline programme as the paragraph above. For easy to track parties' intention at each stage, the updated programme should not be overwritten but should be separately made.

During performance of works, parties should endeavor follow the baseline or updated progaramme, if either party intend to take any action which will cause a significant deviation to the schedule he should inform the counterparty in advance, and the current used programme should be updated forthwith.

4.1.2.2.Progrmamme records

Programme records is straightforward proof to support EOT claims analysis, it contains a comprehensive system of progress information, other the one hand it contains as-built information in the past and therefore reflects the current status of the works, on the other hand it reveals parties' true intention at the time of programme is prepared for the remaining works. Particularly, it includes programme (e.g. tender programme, proposed/accepted/ordered baseline programme,

proposed/accepted/ordered updated programme, detailed short-term work programme and etc.), supplemental detailed programme for detailed activity or section of works, explanatory records (such as programme narrative, progress curves for costs, resources and physical construction, tabular report of milestone, as-built database for each activity, marked-up drawing and sketches showing the anticipated completion and as-built date for parties of the works) .

In contract negotiation and drafting, parties should carefully set up relevant contract provision regarding programme as discussion in the Section 6.3.5.2.1 above to ensure programme records can be produced and kept.

In litigation practice, when EOT claims are analyzed, courts are recommended to always investing time and effort to study programme records available and, and may order parties to present necessary programme records.

In project practice, after projects are started, parties should agree the details of programme records such as items, forms, and procedure of submission, review, and acceptance and etc. In the performance of the works, parties should carefully produce and verify these records and update it in accordance with changed circumstances from time to time.

4.1.2.3.Progress monitoring and Delay identification

DMCC should increase, or parties should negotiate and agree, contract provisions regarding progress management and monitoring so that to avoid and mitigate delay, identify delay as soon as practice, and keep relevant progress information and as-built records. Particularly, it is recommended that progress meeting should be held in a certain interval or when occurrence of events which significant breaks or disrupts the planned progress, parties should work together to identify the delay which has already occurred or is likely to occur, detect its cause and effect, work out mitigation measures, and make plan for remaining works, all these should be recorded in minutes of meeting and shared by parties. Additionally, contract provisions should be provide to depict that diverse progress reports, such as monthly or weekly progress report, should be submitted by contractor and verified by Supervisors/employers, the progress report should contain comprehensive information such as quantity of construction resources deployed, general narrative of the as-built progress, time of finished milestone, quantify of finished main works, occurrence of significant events obstructing or disturbing the progress, problems affecting the future progress and solution measures in that interval, planning for rest intervals, and a schedule analysis through comparison between the as-planned and as-built progress as well as narrative of cause and effect of delay.

In project practice, after projects are started, parties should further agree details above and may agree some more methods or mechanisms of progress monitoring as well as delay identification and mitigation. All parties should work in collaborative way to conduct the contract provisions and agreement above, Supervisor should act as the coordinator to actively coordinate parties and promote agreements are achieved.

All records including kinds forms of documents and minutes of meeting which are produced for progress management and monitoring as well as delay identification constitutes progress records. When EOT claims are analyzed, the analyst should take all relevance progress evidence into account.

4.1.2.4. Delay analysis method

In construction project projects, there is no perfect or fixed method can be used to analyze delay in every circumstance. Delay analysis can be made in diverse approaches, the approaches used depends on diverse factors including records available, the level of schedule prepared and update, the analyst's expertise in scheduling analysis and etc. Normally, based on the criterion whether CPM programme is used for the instrument of analysis, the methods can be categorized into traditional delay analysis and scheduling analysis.

Traditional delay analysis methods

Traditional delay analysis means methods which was used by practitioner to analyze progress and delay before CPM programme was introduced to construction industry, it mainly uses impression and common sense to infer parties' culpability and allocate delay liability, it includes some methods such as global impact method, dominant cause method, apportionment method, or parties sharing loss method.

Traditional delay analysis methods are mainly used in circumstances where parties have no reliable baseline schedule or update schedule, lack in sufficient progress records and as-built information, claimant failed to provide proof of scheduling analysis, or the analyst lack in knowledge of scheduling. The shortcoming of traditional analysis method is that it absolutely ignores correlation and logic of activities and the criticality of delay to completion, the analysis is conducted based on subjective imprecise inference from impression, therefore is inaccurate to assess parties' culpability of delay and entitlement of EOT. Its advantages are that it has rather low requirement of record keeping and programme management therefore has few constraints, there can be made easily and quickly and is rather straightforward to be understood, therefore these methods are still broadly used by practitioners and even courts in China.

In the practice, the traditional delay analysis should not be absolutely precluded from application in construction projects. It is recommended that these methods can be more used in small projects or simple EOT claims, or in amicable settlement negotiation or mediation. However, as to complicated EOT claims in middle or large projects, or cases in litigation, the traditional analysis should be not recommended to be used.

Scheduling analysis method

Scheduling analysis is a technique using CMP and relevant mathematic calculation and logic to study how actual events on a project interacted in the context of a complex scheduling model for the purpose of understanding the impact of these

events on the following activities within the schedule. Compared with traditional delay analysis methods, it is featured by use of CPM schedule through computation software and therefore can avoid the inaccuracy getting arising from subjective inference. However, such analysis requires rather high conditions regarding progress management and monitoring, contemporaneous record keeping, and baseline/updated schedule management. Normally it is used in complex projects and for complex EOT claims.

Diverse methods have been developed to conduct scheduling analysis, they are categorized in two types, i.e. prospective and retrospective method.

a. Prospective analysis

Prospective analysis is conducted at the time when the delay event occurs or is likely to occur, it is feature by that the entitlement of EOT is assessed based on the likely delay effect to the completion which is predicted at the time when the delay events occur or the likely delay is felt, but not based on the actual delay effect which has actually occurred. The advantage of prospective analysis is that it enables EOT claims settled in a timely manner and allow parties to have new completion date so that to re-plan and arrange the works. It can also avoid the underestimate contractors' EOT entitlement as a result of acceleration, mitigation, and re-sequence of works. Furthermore, it follows the timeframe of EOT claims submission and determination as stipulated by the current DMCC. Therefore, prospective analysis should be given priority to be used in construction project in China.

Prospective analysis contains two methods, i.e.

a) Impacted as-planned analysis

This method is to insert delay event sub-networks into the CPM baseline programme, through calculation made by the CPM software, to determine the prospective impact made by this event to completion and determine the magnitude of EOT. This is a static prospective method, it does not require careful prepared as-built records, therefore is the simplest scheduling analysis. While its application should be limited due to its accuracy is opt to be undermined by the reliability of baseline programme and changed circumstances.

b) Time impact analysis

This method follows the same process of Impacted as-planned analysis, the difference is to insert delay event sub-network into the updated CPM programme but not the CPM baseline programme. This method is a dynamic prospective method, can overcome the inaccuracy of impacted as-planned analysis, and is recommended to be used in all kind of EOT claims provided that there are sufficient contemporaneous records available and programme update management has been well conducted.

b. Retrospective analysis

Retrospective analysis is normally conducted time-distant to the completion of delay events, it is conducted to identify the actual impact of the delay events on the identified actual or as-built critical path.

Normally, the requirement to conduct retrospective analysis is rather high, it entails well as-built information and well updated programme, and may also need to re-identify the logic and critical path in the as-built progress, therefore is a quite costly and burdensome works. Furthermore, it also opts to underestimate contractors' entitlement of EOT resulted by acceleration and re-sequencing of works. All these limits the application of retrospective analysis in application, practitioners should choose it based on the actual circumstance.

Retrospective analysis normally contains three methods:

a) As-planed v As-built

This method is conducted through a comparison between the baseline programme and the final actual as-built progress so that to detect cause of and effect of delay. It is rather straightforward to be understood and accepted, however its application is constrained by diverse factors such as reliability of baseline programme, and the as-built works sequence should by at large follow the sequence established in baseline programme and etc. It therefore may more helpful to be used for relatively simple projects or for analysis in the initial stage of a complex project, or be used for projects, such as tunnel or pipeline works, where works are conducted in streamline sequence.

b) Windows/Time slice

This method requires the analyst to verify or develop a reliable series of contemporaneously updated baseline programme or revised contemporaneous programmes reflecting an accurate status of the works at various period of time (window) throughout of the works, and observe the change on critical path in each window, so that to detect delay has occurred in which window(s) and its delay effect. The advantages of this method are it attempts to analyze the cause of delay contemporaneously and with a firm base of as-built records and therefore can be very effective and reliable. However, it entails the baseline programme should be reliable and has been detailedly updated, and the analyst should ensure that in the revised programme the future sequences and duration of each window should be reasonable, realistic, and achievable. Therefore, it is a burdensome method also.

c) Collapsed as-built

This method is to simulate what the as-built programme should have looked like if delay events had not in fact occurred, so that to detect the cause of delay and the delay effect. It is fairly straightforward and easy to be accepted. However, its accuracy is constrained by many factors such as sufficient as-built information, reasonable logic in as-built programme, and it cannot properly reflect the impact

of concurrent delay, acceleration and re-sequencing and etc. and therefore is at the benefit of employers. Therefore, its application should be greatly limited.

External technique support for scheduling analysis

a. Training and professional qualification examination

It is recommended that training in planning and scheduling to judges and practitioners in construction projects should be greatly reinforced and improved, so that to improve involved parties' professional expertise in scheduling analysis and improve common practitioners' awareness and sense of scheduling.

Relevant government or association should be held qualification examination of planning and scheduling profession, and issue qualification certificate of planning and scheduling to qualified practitioners. Practitioners are also encouraged to participate training and qualification examination held by international leading associations such PMI (Project Management Institution) and CIOB (Chartered Institute of Building in UK).

b. Service provided by authentication firms

It is recommended authentication firms who have qualification of planning and scheduling should be established in China, only authentication report of delay analysis issued by qualified authentication firms can be considered by parties in claims settlement and admissible by courts in litigation.

5. Factors determine EOT

When EOT claims are analyzed, factors below should be compulsorily considered by analyst.

5.1. Delay risk allocation

In the level of law, additional to detailed specific delay risk allocation, legislation or judicial interpretation issued by SPC or high courts should clearly establish the general principle of risk allocation, so that to allocate the risk of delay caused by all types of employers' default or prevention to employers.

The DMCC should re-arrange its structure of delay risk allocation provisions so that to make all provisions consistent and not contractible with each other, and provide unequivocal legal wording to describe the eventualities triggering EOT entitlement and avoid wording like "caused by the employer's reason". Against employer risk event, the DMCC should establish and conduct a unitary standard or principle to provide remedies in term of EOT and/or costs and/or profit. Furthermore, DMCC should consider to set up difference delay risk allocation against different type of contract which procured by different modes such as EPC and PPP mode which are commonly used in China. When contract is negotiated and drafted, parties should endeavor to establish a balanced risk allocation, do not allocate risks which are more convenient or efficient to be settled by one party to the other party.

In the practice of EOT claims analysis, analysts should make the delay risk allocation as the starting point of EOT claims analysis, they should have test whether a delay to progress is caused by employer risk event(s). To achieve that, analysts should refer to relevant law and contract. If it is found the delay to progress has not caused by an employer risk event, the process of EOT claims analysis should be stopped and no EOT should be awarded to contractors.

5.2. Criticality of delay

After it is that a delay to progress has been caused by employer risk event (s), analyst should further conduct test of criticality of delay to detect whether the delay to progress occur on critical path and therefore effectively bring a delay to completion. To achieve that, CPM scheduling analysis should be conducted. If the test cannot be passed, no EOT should be awarded to contractors, and the process of EOT claims analysis should be stopped.

The DMCC or parties of contract should set up contract provision to clearly stipulate words like “no EOT will be awarded to the contractor unless the employer delay event has an impact which adversely and materially affects the Critical Path of the Work”.

In litigation and project practice, judges and practitioners are recommended to firmly adhere the principle that mere critical delay can bring about an EOT entitlement, and conduct test of criticality of delay, but not recommended to frequently use of traditional delay analysis such as global impact method which ignore whether the delay is critical to affect the final completion.

5.3. Concurrent delay

After the EOT claim pass these two tests above, contractors’ EOT entitlement may still be precluded or prejudiced by contractors’ risk event which attribute to delay called as concurrent delay), therefore test of concurrent delay should be further conducted.

By this moment there is no unitary principle to deal with concurrent delay in China yet. Courts in China should make consistent determination in this regard so that to provide an announcement effect to practitioners, SPC or high courts may also promulgate judicial interpretation to provide principle in relation to concurrent delay. Otherwise, DMCC or parties of contract should establish contractor provision(s) to particularly depict that principle. In accordance with principle of Chinese law and culture, it is recommended that sharing loss principle should be applied, i.e. upon concurrent delay a full amount EOT getting arising from the employer delay should be provided to contractors while no prolongation compensation is awarded to contractor unless he can prove that but for his own delay such the loss and expense getting arising from prolongation would have to incur. Despite apportionment approach is also commonly used in practice, it is not recommended due to it should be conducted based on the identification of parties’ culpability in concurrent delay, which, in fact, is very difficult, if not impossible, to be accurately achieved unless a complex calculation through some complicated mathematic model or computerization model.

When concurrent delay claims are analyzed, analyst should firstly verify whether the concurrent delay can be established. If in a same period two delay events occur, one is contractor risk event and the other is employer risk event, merely where either of events separately have effective adverse impact to critical path and bring a delay to completion can amount to a situation of concurrent delay. The test of establishment of concurrent delay should also be conducted through CPM scheduling analysis, specifically employer delay and contractor delay should be separately input to the CMP proramme to analyze "but for" the other party's delay whether the critical path would be adversely impacted and would bring about a delay. In the current litigation practice and project practice many EOT claims have been wrongly dealt with as "concurrent delay claims" due to analysts fails to conduct that test but simply treat a delay where diverse employer risk events and contractor risk events have occurred at same period as a concurrent delay, such analysis is not recommended due to it absolutely ignore the underlying correlation between events and the time of final completion.

After establishing concurrent delay, for the purpose to analyze the compensability of loss and expense flowing from concurrent delay, retrospective analysis of employer delay "but for" contractor delay in term of loss and expense should be conducted retrospectively and separately, so that to detect "but for" contractor's delay what loss and expense would have to incur and therefore is compensable.

5.4. Ownership of float

After an EOT claim passes all test above, parties' entitlement may still be impacted by delay occur in noncritical activities and noncritical paths, the answer depends on the ownership of float. If float is occupied by the contractor, he is entitled to EOT even through an employer risk even merely render a delay to progress but not to delay to completion due to it has got rid of contractor's contingency time, and he is also entitled to compensation for delay in earlier completion if he has clearly informed the plan of earlier completion in advance and the earlier completion date is reasonable and realistic to be achieved. If float is occupied by the employer, the contractor will suffer from the employer's noncritical delay without EOT.

To verify the ownership of float, analyst should refer to the contract. The DMCC or parties of contract are recommended to establish provisions expressly depicting the ownership of float. Absent of it, analysts can infer the likely effect from wording of contract. If the wording of EOT provision shows that an EOT will be due whenever the employer delay makes the contract planed completion date later than it would have been if it were not for that delay, then the float should be occupied by the contractor. If no such wording suggesting that meaning, and the contract keep silence, it is recommended that float should not exclusively occupied by any part, the EOT will not be due until the total float is used up.

6. Prolongation compensation analysis

6.1. Compensable/none-compensable delay

Prolongation means a period of time beyond the original contract period, it will have to bring about additional loss and/or expense to contractors, it primarily includes loss and/or expense getting arising from using time-related resources, i.e. site and head office overhead.

It is a misconception that the entitlement of EOT automatically result in an entitlement of costs compensation of prolongation. To determine against an employer delay whether prolongation costs should be awarded, analyst should firstly to test whether EOT entitlement is due, and then test whether the delay is compensable. To test compensability of delay analysts should refer to delay risk allocation provided law and contract.

Despite DMCC had thoroughly provided risk allocation to many eventualities and clearly provided remedies of EOT, costs, and/or profit to delay caused by these eventualities, parties of contract may need to additionally agree contract provision of remedies to delay caused by some special eventualities in accordance with the particular work extent, circumstances and contractor procurement mode.

6.2. Principle of prolongation costs analysis and delay analysis methods

In accordance with principle of loss as established in CCL, the prolongation costs analysis should be assessed based on the actual expense and/or loss incurred by contractors, but not the likely expense and/or loss as inferred by some theoretic calculation. Therefore, when prolongation costs compensation is analyzed, prospective delay analysis methods should be precluded, and appropriate retrospective analysis methods should be chosen.

When prolongation costs are analyzed, claimant should bear a high standard of burden of proof to endeavor to provide factual evidence to support their claims. However, in some circumstance decision-maker should allow theoretic calculation which is made based on relevant Cost Quota as issued by some authorities in relation to indirect costs and management costs.

7. Factors impacting EOT analysis

During performance of the works, parties should comply with contract provision to perform their own obligation, failure to do that may prejudice or even get rid of their entitlement in relation to EOT. Where EOT claims are analyzed, these factors should be particular taken into analysts' account.

7.1.Time bar clause

As to time bar clause, the current position in China has been concluded and established by SPC's Judicial Interpretation in 2019 that time bar clause should not be enforced unless the wording of contract expressly establishing the contractor's compliance with timeframe of notifying its intention of claim is a condition precedent to entitlement of EOT; furthermore, even thorough it is condition precedent, the time bar clause is still unenforceable where the contractor can justify its failure in compliance.

The DMCC or parties of contract should input that principle to contract provision in relation to EOT claims.

In litigation practice, courts should follow this principle and apply it to dispute of the enforceability of time bar clause in relation to EOT entitlement in a consistent way.

In project practice, contractors should always strictly follow the contract procedure to notify delay, submit intention of claims and claims reports within the prescribed timeframe. To achieve that, contractors are recommended to set up an *ad hoc* claim team to coordinate and keep communication with departments of contract, technical and progress management as well as site teams, through diverse progress monitoring techniques and daily progress analysis work, to timely identify the ongoing or likely delay and detect its cause and effect.

7.2. Time of awarding

It is recommended that DMCC should provide provision of sanction to the employer's failure to comply with timeframe to proper award EOT and related compensation to the contractor, for instance it may expressly stipulate that any contractor's expense and loss caused by employer's failure to timely and properly awarding EOT and compensation should be borne by the employer. The legislation and litigation should confirm that principle.

In project practice, upon EOT claims submitted by contractors, employers/supervisors should carefully assess each claim and provide awarding within the contractual timeframe, they should comply with the current DMCC to analyze EOT claims and make a proper awarding in a prospective way and should always not "wait to see". To avoid the might overestimate of EOT caused by prospective analysis and awarding, they should prudently analyze claims and award EOT which can be sufficiently supported by information which the contractor has provided.

7.3. Mitigation of Delay and acceleration

The DMCC should confirm CCL's position in relation to contractors' obligation in mitigation of employer delay and embody it to contract provisions in relation to EOT. However, that obligation should be limited in the extent that no additional substantial loss and expense should be spent by contractors unless an express instruction is ordered by employers/Supervisors and that loss and expense will be additional compensated.

In the practice, against employer delay, employers may request contractors to accelerate works to catch up the progress, the acceleration should be expressly ordered by employers/Supervisors, and costs of acceleration may be particularly agreed by parties or measured and paid through the contractual mechanism of variation.

Where upon employers delay no EOT is timely and properly awarded, for the sake to avoid the liquidated damages contractors may start constructive/substantial acceleration initiatively. The Contract should especially provide remedies to that

circumstance, the contract is recommended to establish that before starting any initial acceleration the contractor should expressly notify his intention of acceleration and detailed plan as well as to justify the reason of acceleration. Therefore, when claims in relation to such circumstance is analyzed, test of notification and justification of constructive acceleration should firstly be conducted by analyst, a failure to pass it will get rid of contractor's entitlement of compensation. In project practice, contractors should also to expressly input the action of acceleration into updated schedule, and keep record of acceleration in daily basis, so that to distinguish the activity and costs of constructive acceleration with these normal activities and costs.

8. Matters should be particular acted by involve parties

Besides all above, parties in different level are recommended to offer more effort in matters below so that to the Chinese EOT claims analysis framework more efficient.

8.1. In law

8.1.1. For legislation

The relative low-level fairness and reasonableness in EOT claims analysis and settlement in China is caused by diverse reasons, among which a significant problem is employers' unlimited position in construction projects. To solve that fundament problem, legislation in China should have a significant reform in construction project running mode and dispute resolution. Specifically, Supervisor' role of independent decision-maker of claims and other necessary matters has to be expressly established by law. As to dispute resolution, the current legal forms of dispute resolution in China are still limited in arbitration and litigation, they are commonly costly and inefficiently, therefore law about fast-track dispute resolution, e.g. DB and meditation, should be promulgated to allow EOT claims can be quick and professionally settled.

8.1.2. For litigation

Judges in China should greatly improve their capacity in analyzing and determining EOT claims, particularly the follow measures are recommended:

a. To establish judicial determinations publishment system and publish construction cases with details, it not only can provide announcement effect and legal certainty to common practitioners, but also enable judges to make analysis and determination more consistent.

b. Judges who are often involved in construction cases should have frequent training in construction management and planning and scheduling.

c. China should have ad hoc court or branch court under SPC and ad hoc judges to deal with construction cases.

8.2. In contract

To allow EOT claims can be dealt with in an efficient and fair way, the DMCC should follow international development tendency of standard form construction contract, and is recommended to made particular reform as below:

d. To establish a true balanced relation between parties of contract, the employer's power should be constrained by Supervisor mechanism and fast-track dispute resolution mechanism.

e. To adopt management-orientation mode, provide more clear procedures and approaches for parties to solve common practical problems which commonly occur in construction project more prompted and efficiently.

f. To meet Chinese culture and unique project performance behavior mode, adopt and establish collaboration relationship, encourage parties of project to jointly solve problems, claims, and disputes.

8.3. For project practitioners

In construction projects, parties are particularly recommended to:

a. Employer should do not impose unrealistic contract period, approve initial and update schedule on time, act active in in progress management and monitoring, and award EOT and related compensation on time

b. Supervisors should act active in managing the progress and identifying the ongoing and likely delay, act active in consultation between parties to solve problems, claims and dispute, act fairly and reasonably in confirming visa, and endeavor to provide reasonable and professional recommendation to employers.

c. Contractors should provide risk management and planning, make a reasonable baseline schedule, have checklist of potential delay, establish and run progress smoothly the monitoring and delay risk identification system, update schedule in certain intervals, keep daily fact records and period reports works and file system, and submit notification of delay and claims on time.