

AMERICAN UNIVERSITY OF BEIRUT

SCHEDULING AND GLOBAL CLAIMS RAMIFICATIONS
UNDER TIME-AT-LARGE CONDITIONS

by
CARINE NABIL EL MASRI

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submitted in partial fulfillment of the requirements
for the degree of Master of Engineering Management
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Approved by:



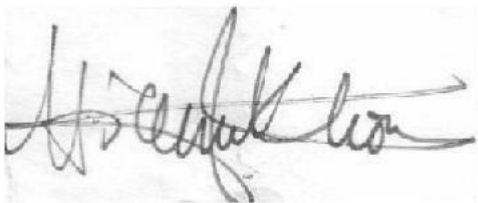
Dr. Mohamed-Asem Abdul-Malak, Professor
Department of Civil and Environmental Engineering

Advisor



Dr. Bacel Maddah, Professor
Department of Industrial Engineering and Management

Member of Committee



Dr. Hiam Khoury, Associate Professor
Department of Civil and Environmental Engineering

Member of Committee

Date of thesis defense: June 18, 2020

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AN ABSTRACT OF THE THESIS OF

Carine Nabil El Masri for Master of Engineering Management
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Construction delays have been the core of interest in construction claims. Some delay events may occur alone while others may occur in concurrency with one another. These delays may be subject to claims by the contractor claiming for time extension and/or extra compensation. For a normal construction claim to succeed, the contractor needs to establish a link between the cause of the loss and its effect. However, when numerous activities interact together, the contractor may be unable to link between the delay and its effect. In that case, the contractor will put forward a global claim in order to be compensated for one huge loss effect.

When delays occur concurrently, a rather complex situation emanates as a universal definition is still unknown. An important difficulty in analyzing concurrency may surface when the excuse of pacing delays comes into play. Dealing with concurrency claims can become more problematic when contractors call time to have become at large. Upon calling time to have become at large, the contractor is obliged to finish the works within a reasonable time. The reasonable time shall consider the circumstances under which the works is being done. The literature is short on guidelines for the interaction between concurrency, pacing, time-at-large conditions, and global claims.

The aim behind this research is testing the interaction of time at large conditions and concurrency. On the other hand, testing if time at large makes room for pacing to be exercised excusably or justifiably by the contractor. Moreover, performing a critical analysis of case laws to analyze if the contractor's computation of what is deemed to be a reasonable time is being built upon either a global claim or multiple individual incident-based claims.

These pillars helped in generating two theoretical models under the claim/dispute timeline of FIDIC 1999 and 2017 standard conditions of contract to pinpoint the major requirements that need to be done by the contractor, employer, and the dispute adjudication board. Finally, two real-life case studies are illustrated to validate the proposed theoretical models.

It was evident at the end of this research that the claim/dispute process under FIDIC 1999 or 2017 depends on the characteristics of each case. The characteristics set up the idea that the contractor might not succeed in packaging the loss incurred through

a global claim. The contractor, on the other hand, needs to contemporaneously update the schedules and revise them if possible. Such an exercise may need to be followed but might render impracticable in some severe cases.

The outcomes of this study contribute to the existing findings obtained in the literature concerning concurrency, pacing, time-at-large situations, and global claims. A set of guidelines are offered to benefit dispute resolution practitioners, contractors, and employers.

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CHAPTER 1

INTRODUCTION

1.1 Background

Construction delays have been the core of interest in construction claims as each project participant has a different view of the project delay events and their consequences. While some delay events may or may not affect the project completion date (Arditi and Pattanakitchamroon, 2008), these events giving rise to delays may be caused by the employer (owner), contractor, or an external factor, such as unusually severe weather conditions. There are three types of delays that can either occur individually or concurrently: non-excusable delays, excusable non-compensable delays, and excusable compensable delays. Non-excusable delays can be classified as the result of delay events occurring due to the contractor's own fault and for which there can be no granting of an extension of time (EoT) nor can there be an award of extra compensation. Excusable non-compensable delays, also known as "Acts of God," are out of the control of all project participants (Golanaraghi and Alkass, 2012), and for which the contractor is granted an EoT but no extra compensation. Excusable compensable delays, caused by the employer's own delinquent performance or faults, entitle the contractor for both an EoT and extra compensation.

For a normal construction claim to succeed, the claimant needs to prove three matters: (1) claim event(s), (2) quantum, and (3) causation. When a contractor puts

forward a claim to recover loss, it is often the case when the contractor needs to establish a link between the cause of the loss and its effect. When numerous activities interact together leading to one huge loss effect, the contractor in that case is unable to establish a link between the cause of the loss and its effect. The Delay and Disruption Protocol (DDP) by the Society of Construction Law (SCL) defines global claims as: “A global claim is one in which the Contractor seeks compensation for a group of Employer Risk Events but does not or cannot demonstrate a direct link between the loss incurred and the individual Employer Risk Events” (SCL, 2017). The protocol recommends that when it is impossible or impracticable to establish the causal link: “...then in this rare situation it is acceptable to proceed in two stages: (a) quantify individually those items of the claim for which the causal link can be established between the Employer Risk Event and the resultant costs and/or loss claimed; and (b) claim compensation for the remainder as a composite whole.” Those items for which a causal link can be established between the delay event(s) and the resultant loss can be analyzed by selecting a suitable analysis method. Delay analysis methodologies are used to guide project parties in analyzing the impact of delays on the project and coming up with a fair allocation of blame for each participant.

Identifying these types of delays may not be a very complicated exercise to perform, but when such delays occur concurrently, a rather complex situation emanates requiring more delicate approaches to be adopted. There are multiple definitions in the literature regarding delay concurrency. Kraiem and Diekmann (1987) described concurrency (based on Rubin et al., 1983) as the term “used to describe two or more delays that occur at the same time, either of which, had it occurred alone, would have

affected the ultimate completion date.” This probably has a rare occurrence as opposed to the definition offered by Baram (2000): “Concurrent delays are experienced on a construction project when two or more separate delay events occur during the same time period.” The SCL Delay and Disruption Protocol (2017) addresses concurrency as follows: “For concurrent delay to exist, each of the Employer Risk Event and the Contractor Risk Event must be an effective cause of Delay to Completion (not merely incidental to the Delay to Completion)”

Several issues arise when analyzing and detecting concurrent delays. In the US courts, the burden of proving the Relevant Events (REs) have indeed affected completion rests on the contractor. “...the contractor asserting a delay would have to establish that the owner was responsible for delay” (Livengood, 2015). The second issue is the degree of proof as Livengood (2017) explains: “to establish entitlement to a time extension, the contractor need only prove that concurrent delays resulted in a specific delay to project completion.”

The third most important issue related to concurrency is pacing delays. Livengood and Peters (2008) define pacing delays as a “proactive rather than reactive response to another party's parent delay.” The recommended practice by the American Association of Cost Engineers (AACE) defines pacing delays as: “Pacing occurs when one of the independent delays is the result of a conscious, voluntary and contemporaneous decision to pace progress against the other delay” (2011). Livengood (2017) added that: “Pacing delays are concurrent, but the reason they exist is because they are voluntary.” However, Joseph (2015) recognized the difference between delay pacing and delay concurrency, as follows: “The difference of ‘pacing delays’ with

‘concurrent delays’ is that the effect of concurrent delays is felt at the same time whereas pacing delays just consumes the float created by a parent concurrent delay event.” AACE (2011) recommends three criteria to guide contract parties in determining the legitimacy of pacing delays by the (1) existence of the parent delay, (2) showing of contemporaneous ability to resume to normal pace, and (3) evidence of contemporaneous intent.

Dealing with concurrency claims can become more problematic when the triggering of the prevention principle by the contractor in respect of an RE leads to time being called to have become at large. SCL (2002) recommends that when concurrency occurs a time extension should be granted to the contractor as the protocol is influenced by the prevention principle. SCL (2002) further clarifies the idea of concurrency and prevention principle as follows: “Where there has been Employer Delay, this may prevent the Employer charging the Contractor with LDs for failure to achieve a contract completion date. Time for completion of the works may become ‘at large’ until a new contract completion date is set by the granting of an EOT.” Three conditions are reported to justify calling time to have become at large: (1) an act by the employer preventing the contractor from completing the works by the agreed time for completion, (2) failure of the time extension mechanism, and (3) waiver by the employer to contractually set a new completion date (Abdul-Malak and Jaber, 2018).

Abdul-Malak and Jaber (2018) defined the prevention principle from a common law perspective as calling “for the completion date to be suspended when an owner impedes a contractor from meeting the completion date because no person can take advantage of the nonfulfillment of a condition the performance of which has been

hindered by the person.” Abdul-Malak and Jaber (2018) added that the contractor, under such a situation, is still obliged “to complete the remaining works within a reasonable time, and the owner should be disallowed from benefitting from its own wrong.”

Judging the time taken to finish the works to be reasonable or not shall account for the circumstances under which the work execution has been done (Abdul-Malak and Jaber, 2017). To be noted is that such circumstances might not affect all the activities progressing within a certain time window. However, delays caused by the prevailing circumstances may appear to be concurrent with other contractor-caused delays. This version of concurrency can be representing the case where the contractor paces his own-controlled works under the assumption that the prevailing circumstances already governs (or dominates) the delayed completion time.

This interaction among delay concurrency, pacing, and the triggering of the prevention principle can present a unique challenge when deciding on the respective liabilities of the concerned parties. It is even more crucial if contractors approach the computation of reasonable time on the basis of a global claim rather than on contemporaneously evaluating the impacts of individual incidents on the expected new target date for completion.

1.2 Problem Statement

1. A universal definition for concurrency is still unknown, which is the reason behind being the most problematic issue in construction claims.

2. Difficulties arise when disputes involve the alleged triggering of the prevention principle in respect of a RE that is caused by the employer being concurrent with the contractor's delay event.

3. Courts have been ruling on delay concurrency using multiple approaches but the literature generally addresses this topic giving vague guidelines to start with.

4. Courts have been ruling on delay concurrency under a time-at-large situation but that might not change the approach to be relied on for ruling on a case on hand.

5. Concurrency might affect the decision behind the justifiability of calling time at large and the enforceability of time risk structure.

6. In time at large situations, the computation of what is deemed to be a reasonable time may be affected by the contractor's schedule updates administration which might pave the way for contractors to package the reasonable time under the umbrella of a global claim.

1.3 Research Objective

As such, this work aims at attempting to answer three research questions. Firstly, will concurrency continue to play a role in the justifiability of time-at-large callings? Secondly, will concurrency continue to play a role in the enforceability of time risk structure? Lastly, will the conceptualization, from the contractor's perspective, of what is deemed to be a reasonable time be likely built upon following a global rather than a traditional incident-based claim approach?

1.4 Methodology

The methodology to be followed in this research includes the following steps:

1. Conducting a review of the literature related to the objectives of this research;
2. Performing a case law review concerning the treatment of delay concurrency, with emphasis on situations involving time-at-large callings and identifying the characteristics of each adopted concurrency approach;
3. Simulating the claim administration phase in a time at large situation using the FIDIC 1999 and 2017 standard conditions of contract to depict the different timings of dispute referral to adjudication board;
4. Simulating the dispute administration phase in a time at large situation using the FIDIC 1999 and 2017 standard conditions of contract to describe the different scenarios the contractor may opt to package the reasonable time through a global claim;
5. Constructing two models for depicting the potential interplay among concurrency, global claims, and time-at-large callings;
6. Validating the developed framework using the details of two real-life project cases involving time-at-large callings;
7. Withdrawing conclusions based on the findings of the analyses.

CHAPTER 2

LITERATURE REVIEW

2.1 Types of Delays

Time is the most critical aspect when it comes to construction projects. It is one of the main factors to be taken care of especially when it comes to completion dates, delays, claims, and even disputes. A claim often arises when delays, changes, or unforeseen events occur during the project timeline. Various reasons occur for a party allegedly claiming for their rights to additional compensation and/or time extension. Several factors may cause the project completion date to be delayed which range from project complexity, project parties, equipment, materials, to level of expertise.

Some of the major delay causes which occur almost in all projects are lack of design details, incomplete design documentation, execution of works, material, rework, equipment and tools, Acts of God (Force Majeure), legal issues, and project financing (Srđić and Šelih, 2015). Dealing with delays is a critical issue, it is important to identify and quantify the delays and their impacts on the project as a whole. Delay situations can be very complex and can often be viewed differently by each project participant. Arditi and Pattanakitchamroon (2008) discussed that some delayed activities may not affect the project completion time, others will impact the project completion time, or even delayed activities may be as a result of an external factor such as unusually severe weather conditions.

There are three types of delays that can either occur individually or concurrently: non-excusable delays, excusable non-compensable delays, and excusable

compensable delays. Non-excusable delays can be classified as the result of delay events occurring due to the contractor's own fault and for which there can be no granting of an extension of time (EoT) nor can there be an award of extra compensation. The contractor, in that case, may face having to (1) pay liquidated damages for exceeding the project completion time (Vasilyeva-Lyulina et al., 2015), or (2) accelerate the construction activities at his expense (Zack 2000). Excusable non-compensable delays, also known as "Acts of God," are out of the control of all project participants (Golanaraghi and Alkass, 2012), and for which the contractor is granted an EoT but no extra compensation. Excusable compensable delays, caused by the employer's own delinquent performance or faults, entitle the contractor for both an EoT and extra compensation. Vasilyeva-Lyulina, et al. (2015) stated that a clear contract document should specify each party's own liability from common risk events, which are expected to occur during construction projects.

Numerous delay events are escalated to become disputes and can itself become a litigation case. So, by taking care of the contract documents and clearly stating the common risks for all project participants, one can minimize the number of claims, avoid high costs of resolving claims or even disputes, and decrease the deviation of attention from the project priorities. Shahsavand et al. (2018) conducted a survey in the Iranian construction industry and came up with 78 well-recognized construction delay factors. Furthermore, they grouped these factors into seven categories as Client-related, Contractor-related, Consultant-related, design-related, material-related, labor and equipment, and material-related causes. Based on the 78 common delay factors, change orders by the owner during construction ranked as the first cause of delay in the Iranian

construction industry that is quite common in other construction industries.

2.1.1 Classification of Delays

There are three delay classifications, mainly: Independently, Sequentially, or Concurrently (Perera and Sutrisna, 2013). Independent delays occur in isolation and are one single delayed activity. These delays do not depend on any other delayed activity and it is easy to obtain the impact on the whole of the project (Joseph, 2015). Sequential delays occur consecutively, meaning that delays do not overlap in time. The third delay classification is concurrent delays. Concurrent delay definition remains the most complex issue in determining the liability of each project participant (Perera and Sutrisna, 2013).

2.1.2 Extension of Time Mechanism (EOT)

As it was explained, excusable delays grants the contractor EoT to complete the works without having the liability to pay liquidated damages to the employer, but the famous question arise, does the contractor always gets extra time to complete the works? El-Adaway et al. (2016) proposes: “In order for the contractor to manage claims, it is of great importance to note the clauses which raise the contractor’s entitlement to extensions of time.” For a construction claim to succeed the claimant needs to prove three matters as it shows in Figure 1. The claimant, which happens to be the contractor, needs to prove the existence of a claim event(s), RE, the resultant quantum of that event, and the causation. When a contractor puts forward a claim to

recover loss, it is often the case when the contractor needs to establish a link between the cause of the loss and its effect as shown in Figure 2.

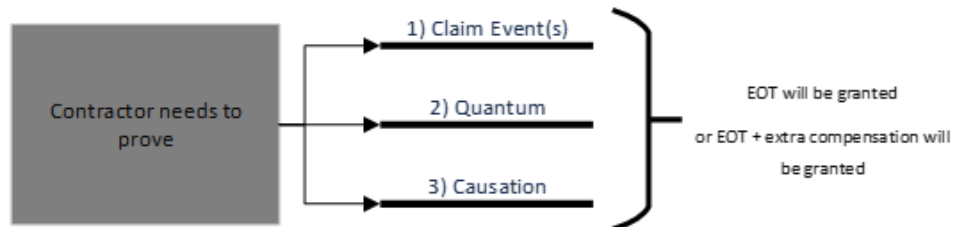


Figure 1 Success of a Construction Claim

In that case, the contractor is granted time extension to complete the works without having the liability to pay liquidated damages to the employer. Some cases are not that explicit as Mehdi (2018) stated that EoT clause in the contract should specify the events which allows the contractor an EoT, which are also known as the REs.

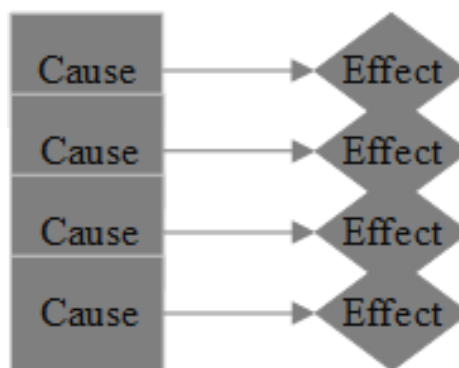


Figure 2 Causal Link

2.1.2.1 EOT under FIDIC 4th

In 1987 FIDIC, the Extension of Time for Completion clause states the common delays which grants the contractor time extension are listed under Sub-Clause 44.1 such as:

- The amount or nature of extra or additional work;
- Any cause of delay referred to in these conditions;
- Exceptionally adverse climatic conditions;
- Any delay, impediment, or prevention by the Employer; or
- Other special circumstances which may occur, other than through default of or

breach of contract by the Contractor or for which he is responsible.

The last condition under clause 44.1 gives some ambiguous interpretations which might lead the contractor of allegedly thinking he is eligible for extra time to be granted (Mehdi, 2018). Under FIDIC 1987, there are other clauses which might grant the contractor extra time extension such as clause 6.4 (Delays and Cost of Delay of Drawing), clause 12.2 (Not Foreseeable Physical Obstructions or Conditions), clause 27.1 (Fossils), clause 36.5 (Engineer's Determination where Tests Not Provided for), clause 40.2 (Engineer's Determination following Suspension), clause 42.2 (Failure to Give Possession), and clause 69.4 (Contractor's Entitlement to Suspend Work).

2.1.2.2 EOT under FIDIC 1999

The delay causes are listed in FIDIC (1999) under sub-clause 8.4, which grants the contractor an EoT whenever these causes are present such as:

- A Variation (unless an adjustment to the Time for Completion has been agreed under Sub-Clause 13.3 [Variation Procedure] or other substantial change in the quantity of an item of work included in the Contract,

- A cause of cause of delay giving an entitlement to extension of time under a Sub-Clause of these Conditions,

- exceptionally adverse climatic conditions,

- unforeseeable shortages in the availability of personnel or Goods caused by epidemic or governmental actions or

- any delay, impediment or prevention caused by or attributable to the Employer, the Employer's Personnel, or the Employer's other contractors on the Site.

Under FIDIC 1999, there are other clauses which might grant the contractor extra time extension:

- sub-clause 1.9 (Delayed Drawings or Instructions),
- sub-clause 2.1 (Right of Access to the Site),
- sub-clause 4.7 (Setting Out),
- sub-clause 4.12 (Unforeseeable Physical Conditions),
- sub-clause 4.24 (Fossils),

- sub-clause 7.4 (Testing),
- sub-clause 8.5 (Delays Caused by Authorities),
- sub-clause 8.9 (Consequences of Suspension),
- sub-clause 10.3 (Interference with Tests on Completion),
- sub-clause 13 (Variations),
- sub-clause 13.7 (Adjustments for Changes in Legislation),
- sub-clause 16.1 (Contractor's Entitlement to Suspend Work),
- sub-clause 17.4 (Consequences of Employer's Risk), and
- sub-clause 19.4 (Consequences of Force Majeure).

In real life projects, this process hardly ever goes as planned. Contractors often request time extension by following the contractual requirements. But, the contract engineer might disagree and might believe that the contractor is not eligible for any extra EoT which escalates any claim into dispute.

2.1.3 Global Claims

The construction claim procedure gets complicated when numerous activities interact together leading to one huge loss effect as shown in Figure 3. In that case, contractors are not be able to link between the causes of the loss and their effects.

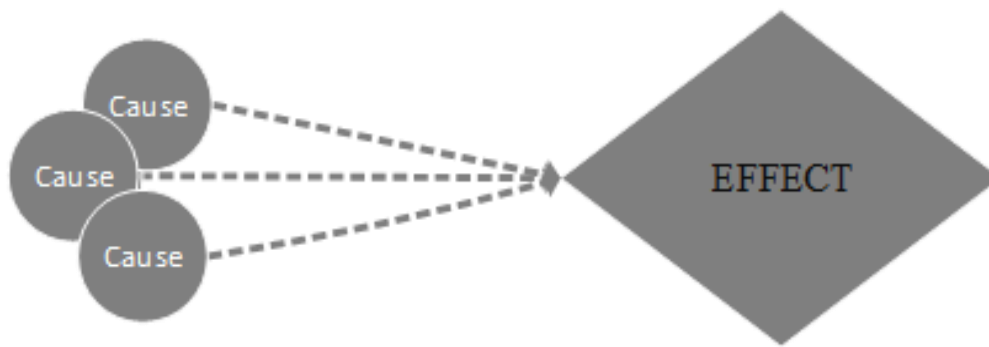


Figure 3 Interaction of Activities

2.1.3.1 Definition of Global Claims

Davenport (2011) define global claims as: “the claimant claims that the overrun is due to the cumulative effect of a number of events each of which is an event that under the contract entitles the claimant to extra costs or time.” Haidar (2011) define global claim as follows: “a global or composite sum put forward or claimed as damages due to two or more separate heads of claim or events, where it is alleged that it is impracticable or impossible to provide a distinct sum claimed for each of the cause and effect.”

The Delay and Disruption Protocol (DDP) by the Society of Construction Law (SCL) (2017) define global claims as: “A global claim is one in which the Contractor seeks compensation for a group of Employer Risk Events but does not or cannot demonstrate a direct link between the loss incurred and the individual Employer Risk Events.” On a global claim basis, the contractor will not offer to present or even prove a causal link between events and their loss.

The first edition of the SCL Protocol (2002) states that: “In what should only be rare cases where the financial consequences of the various causes of compensation are

impossible to distinguish, so that an accurate apportionment of the compensation claimed cannot be made between the several causative events, then in this rare situation it is acceptable to quantify individually those items of the claim which can be dealt with in isolation and claim compensation for the remainder as a composite whole.” The Protocol takes a strict position towards global claims as it mentions that: “The not uncommon practice of contractors making composite or global claims without substantiating cause and effect is discouraged by the Protocol and rarely accepted by the Courts.” Demashkieh et al. (2020) further added that: “It recommends, in fact, that if accurate and adequate records are kept, the contractor shall be capable to establish the causal link between the employer’s risk event and the subsequent loss and/or expense incurred without the need to file for a global claim, and that the failure to keep such records does not defend the contractor in submitting a global claim.”

In producing the second edition of the SCL protocol (2017), changes were made to the definition and procedure of filing a global claim in light of recent case laws. The Protocol made key changes as follows: “.... (e) There is recognition of an apparent trend for the construction legal industry and the courts to take a more lenient approach towards global claims, albeit the risks of proceeding on this basis remain.” Demashkieh et al. (2020) stated (based on SCL 2017): “The protocol also states that the contractor shall be conscious that there is a risk that a global claim will not succeed at trial if any substantial contribution to the causality of the global damage can be proven to have been made by an event for which the employer has no accountability and it is not practicable for the contract administrator, adjudicator, judge or arbitrator to weigh the value of that “non-recoverable portion” on the existing evidence.”

SCL (2002) as well as SCL (2017) discourage the idea of contractors putting forward a global claim as the protocol states: “The not uncommon practice of contractors making composite or global claims without attempting to substantiate cause and effect is discouraged by the Protocol, despite an apparent trend for the courts to take a more lenient approach when considering global claims.” On the other hand, SCL (2017) suggests to maintain accurate records and complete information of the project in order to establish a causal link between the RE and the loss it incurred. SCL (2017) recommends that when it is impossible or impracticable to establish the causal link: “...then in this rare situation it is acceptable to proceed in two stages: (a) quantify individually those items of the claim for which the causal link can be established between the Employer Risk Event and the resultant costs and/or loss claimed; and (b) claim compensation for the remainder as a composite whole.”

2.1.3.2 Treatment of Global Claims

When contractors put forward a global claim, two treatments are offered in the literature of whether this claim can succeed or fail. The two treatments are (1) all or nothing or (2) apportionment argument.

2.1.3.2.1 All or Nothing

The contractor needs to maintain accurate records of the project in order to establish a causal link between the cause of the event and its effect. SCL (2017) states: “The Contractor must be aware that there is a risk that a global claim will fail entirely if any material part of the global loss can be shown to have been caused by a factor or

factors for which the Employer bears no responsibility and it is not possible for the CA, adjudicator, judge, or arbitrator to assess the value of that non-recoverable portion on the available evidence.”

Davenport (2011) states that when the respondent is faced with a global claim then it may fail when part of the claim is the responsibility of the claimant, which happens to be the contractor. The contractor needs to show that these claim events are of the sole responsibility of the employer.

2.1.3.2.2 Apportionment

Davenport (2011) suggests that the all or nothing argument is quite risky to undertake. Parties should consider apportioning responsibilities by providing sufficient data records. By providing such records, the adjudicator analyzes if both parties were partly responsible for the additional cost and time. The adjudicator may apportion responsibility and quantum.

In *John Doyle Construction, Ltd. v. Laing Management (2004)* case, the court said that the apportionment is possible as: “It seems to us that in such cases the contractor should be able to recover for part of his loss and expense, and we are not persuaded that the practical difficulties of carrying out the exercise should prevent him from doing so.” The court then added: “An apportionment procedure of this nature has been used with apparent success in the United States in cases before the Court of Claims.”

2.1.4 Analysis of Delays

Those items for which a causal link can be established can be analyzed by selecting a suitable analysis method. Delay analysis methodologies are used to guide project parties in analyzing the impact of these delays on the project and coming up with fair allocation of each liable participant. Unfortunately, multiple delay analysis methods are available, which will result in different outcomes. In practice, a diligent expert can analyze delays through different methods depending on the data available in order to build a case with multiple analysis that shows granting time and/or compensation is valid.

Employers often use total float as a way to make changes thinking it will not have an impact the project completion date. On the other hand, contractors might use the float available in order to relax activities or to postpone works that will not affect the project completion. In order to minimize the delay period caused by either party during the project timeline, clear contract documents should specify the right for crediting and debiting float ownership in case delays occur (Mohan and Al-Gahtani, 2006).

2.2 Float Ownership

Float is the amount of time an activity can be delayed without delaying the project. Specifically, the total float is the amount of time the activity can be delayed without delaying the project completion time. Hence, the total float can only be consumed on non-critical paths of a project network.

Various opinions were discussed concerning this topic as float can be viewed differently from the contractor's and the employer's point of view. De La Garza et al.

(1991) highlighted that contractors use total float to manage unexpected or unforeseen conditions as not to delay the project completion time. “Owners have a tendency to use such total-float windows to accommodate changes in the original project concept. Such change reduces the amount of total float consumed so contractors used techniques such as leads/lags, unprecedentedly long activity durations and other methods to reduce the amount the owner uses the float” (De La Garza et al., 1991).

2.2.1 Who Owns Float?

When contractors draft their construction project timeline, a balance between uncertain and certain events need to be established as they might need to cover up losses from overtime costs, acceleration costs, and/or unproductive use of resources. So, when the employer uses up the float to make changes (uncertain event) the contractor’s probability of finishing on schedule will decrease and will increase the probability of going through liquidated damages. For the past three decades, several issues aroused on the basis of who owns the float and who has the right to consume it i.e. the contractor and/or the owner being the two most active parties in the project execution.

2.2.1.1 Float Belongs to the Project

As Kraiem and Diekmann (1987) and Peters (2003) explained that float belongs to the project, also known as the project approach, which means that whoever needs it first will own the float as long as the project party will not delay the project. For a project party to use the float, it should be less than the total float of the activity. When the float belongs to the project it will decrease the probability of having adversarial relationship between the project parties and understand that the float exists for the

benefit of the project only. This type of float ownership can be clearly expressed as the “First-come-first-served basis”. “The UK Delay and Disruption Protocol's position on float ownership is that if the clause stating the entitlement of float is not specified in the contract, float should belong to a project” (Arditi and Pattanakitchamroon, 2006).

SCL Delay and Disruption Protocol (2002) and (2017) highlights and links float ownership to an EoT clause. Both guides specify that if the wording of the EoT clause in the contract states that time will only be granted if the REs delay completion beyond the contract completion date which means that the total float should be used all up in order for an EoT to be granted.

The American Association of Cost Engineers (AACE) (2011) states that whenever the contract is silent regarding who owns the float then in such a case the float is shared between both parties and for the interest of the project and not for one self-benefit.

2.2.1.2 Trade in Value

De La Garza et al. (1991) introduced a commodity approach which gives flexibility to trade float between the parties. This approach was introduced from the motto “time is money”. De La Garza et al. (1991) assumed that float time can be traded as a commodity whenever the employer needs it, he must pay to use it as the contractor has full control over it. The trade-in value for the float will help contractors compensate for the losses they may encounter when quantifying acceleration costs, resource conflict costs, lost morale costs, and/or even lost learning effect costs (De La Garza et al., 1991). This is a flexible approach as it will help employers purchase float whenever they need it.

2.2.1.3 Apportionment Method

De la Garza et al. (2007) introduced an equal float allocation or 50/50 concept approach as can be beneficial for both parties. This approach tries to establish a common ground that can be accepted by both the employer and the contractor. “The preallocation must be clearly and expressly stated in specific scheduling clauses or in subsequent addendums” (De la Garza et al., 2007). If a party exceeded their allowable total float and hence affected the project completion date, then the responsible party in question is held responsible for the other party for any damages and/or delays. “Many researchers proposed apportionment methods of float, to be adopted by the parties to a project” (Birgonul et al. 2015).

Although this approach might be viewed as being fair and reasonable at first, it also has its drawbacks. “This concept alone is impractical if applied to delay analysis because it cannot capture the changing nature of activity paths during the course of work such as changes in critical paths and in logical sequences” (Ibbs and Nguyen, 2008).

2.2.1.4 Total Float Management Technique

Al-Gahtani and Mohan (2007) derived a step-by-step algorithm called the total float management technique which can help employers and contractors better understand the float ownership in order to reduce conflicts at a later stage. Initially, this approach assigns total float for employer and contractor, and a day-by-day analysis is

performed to keep the total float entitlement schedule updated after delays and changes occur. These float durations for both parties will be adjusted according to the new inserted changes and/or delays to have new total float entitlement for both employer and contractor. This approach helps the project parties to keep track of float consumption, solves scheduling issues related to accelerations and delays, and helps solve the issue of concurrent and pacing delays impact on the project (Al-Gahtani, 2009). Ibbs and Nguyen (2008) gave a strong opinion about the disadvantages that are held using total float management technique. When concurrent delays occur, this technique only focuses on the number of delays it has caused rather than the importance of different paths or activities these delays occur on.

2.2.1.5 Employer Owns Float

Al-Gahtani (2009) explained that the employers are the sole financiers to the project, therefore they have the right to own the float. However, this definition cannot be justified since the employers, in this case, are increasing the overall risks and cost. This approach can only be used when the risk associated with the contract is to the employer, in cases of cost-plus-fixed-fee and cost-plus-percentage-fee contracts.

2.2.1.6 Contractor Owns Float

“...the contractor has the right to manage the workforce, equipment, and cash flow to achieve the project on time and within the planned budget. In order to achieve this goal in a lump-sum contract, the contractor can use the project float to control project risk in terms of time and cost” (Al-Gahtani, 2009). The contractor’s goal is to

complete the project within time and budget to the employer, so granting flexibility of using the float may not be an issue as long as the project is completed within time, budget, and cost.

2.2.1.7 Contract Approach

The last float ownership approach to be discussed is the contract approach. Al-Gahtani (2009) explained the contract approach, as it has a link between contract risk and float ownership. Whenever one-party controls and have full responsibility on the project risk then he will own the float. For example, in a lump sum contracts, contractors have full responsibility on project risks so they fully own the float. Same for the re-measured contracts where the employers have the responsibility on project risks so they will own the float. If both parties share the risks of the project, then they should both agree on a ratio to share that float. The ownership of float should be proportional to the level of risk they have with respect to the project.

2.2.2 Float as it Relates to the Contract

“The recommendation made by most commentators is that whatever policy is adopted, it should be clearly stated in the contract. Perhaps a stronger exhortation to ensure that float ownership is defined in the contract would be beneficial” (Scott et al., 2004). As Wang et al. (2015) commented on stating the method of float ownership in the contract, if both parties did not reach an agreement at the early stage of the project then a neutral party may be helpful to settle their opposite opinions through. Such exercise may reduce the possibility of disputes and increase the efficiency of the project.

Float is still an unsolved debate as to how it can be owned, used, or determined. Float allocation will vary according to the delay analysis methods used and whether concurrent and/or pacing delays have occurred in the project.

2.3 Delay Analysis Methods – DAMs

Delays are the most common problematic issue practitioners face when dealing with construction projects. Delayed activities might increase project cost, duration, and might escalate a claim to a dispute between the parties. Delay analysis method (DAM) is used to identify and calculate the delays in construction projects. There are several DAMs and each method is reliable based on limitation factors practitioners face while conducting the analysis. For a complete delay analysis process, one should take the following four steps into consideration to achieve optimal results.

2.3.1 Major steps to start the analysis of delays

Kamandang et al. (2017) defined a four-step delay analysis process that consists of the preparation phase, diagnosis phase, analysis phase, and summation phase. This process guides the analyst by collecting relevant project information, updating the schedule through weekly progress and adding types and causes of delays, analyzing the schedule using one of the DAMS, and selecting an optimal DAM based on limited information available.

SCL (2017), on the other hand, specified the relevant factors that help in choosing an adequate DAM by checking:

- The relevant conditions of contract;
- The nature of the causative events;

- The nature of the project;
- To ensure a proportionate approach, the value of the project or dispute;
- The time available;
- The nature, extent and quality of the records available;
- The nature, extent and quality of the programme information available; and
- The forum in which the assessment is being made.

2.3.2 Types of delay analysis methods

The most efficient analysis technique is to detect all delays that occurred during the span of the project and successfully identify the type and cause of each delay. There are five existing DAMs as well as other recent methods that were developed in order to enhance the quality of the analysis.

2.3.2.1 As-Planned Vs. As-Built

The first easiest, simplest, and inexpensive retrospective DAM is the as-planned vs. as-built schedule. “SCL suggests that the as-planned vs. as-built method is useful as a starting point in relation to other complex methods of analysis” (Arditi and Pattanakitchamroon, 2006). Braimah (2013) described this method as the difference between two completion dates which are the actual finish date and the expected finish date. An accurate as-built schedule is developed by adding the delaying events to the as-planned schedule from project records such as time sheets, daily logs, weekly progress (Lifschitz et al., 2009).

2.3.2.2 Impacted As-Planned

Mohan and Al-Gahtani (2006) explained this method as inserting all the delay events on a timeline based on their type (i.e. employer caused delays, contractor caused delays, third party caused delays), then the contractor's as-planned critical paths are added to that timeline. The difference between the two paths will determine the owner caused delays and this will determine the total compensation given to the contractor, while the contractor caused delays will determine the amount of liquidated damages given to the owner. "Many courts have not accepted this method since the 1990s" (Arditi and Pattanakitchamroon, 2006).

2.3.2.3 Collapsed As-Built

The collapsed as-built methodology, also known as the but-for analysis, takes the as-built schedule as its baseline. This advantage overcomes the disadvantage of the previous method, impacted as-planned. Kim et al. (2005) described this method as easy and simple use for analysis. Ndekugri et al. (2008) explained this method as first building the as-built schedule that includes all delay events occurring. Then the delays are removed to create a "collapsed" as-built schedule that shows how the project could have been completed but for those delays that occurred.

2.3.2.4 Time Impact Analysis

Arditi and Pattanakitchamroon (2006) classified time impact analysis as being the most credible method. The approach analyzes the delay events individually using

fragnets (subnetworks that are added to the existing schedule) to provide the project parties with the causes and effects of the delay events. This technique includes delays from both parties unlike the procedure of impacted as-planned and collapsed as-built techniques. This procedure is performed throughout the project timeline through a series of analysis.

2.3.2.5 Window Analysis Method

Window analysis method, also known as the contemporaneous period analysis, first starts with the as-planned schedule, then the schedule is updated on a specific period of time using accurate project documentation (Zack, 2000) which is typically carried out on a monthly basis and keeping the remaining as-planned network beyond the analyzed window (Ndekugri et al., 2008). Retrospectively, each period is analyzed separately to determine the impact, cause, and liability for each delay event. The difference between the two schedules results in the number of delays from that review window. Same procedure repeats for other windows as project progresses. Courts generally are accepting this methodology because it identifies and distinguishes project delays as excusable noncompensable, excusable compensable, nonexcusable delays, and concurrent delays, therefore the liabilities are accurately calculated (Kim et al., 2005).

2.3.2.6 Other Developed Methods

Continuous Delay Measurement (CDM) is a new technique proposed by Seals (2004) which helps the claim analyst to analyze the schedule in a sequential manner and

through a costly detailed procedure. This technique helps analysts detect critical path(s), near critical path(s), and concurrent delays on a daily basis.

The Isolated Delay Type (IDT) technique examines windows or timeframes when conducting the analysis. Mohan and Al-Gahtani (2006) state that this approach adjusts the as-planned schedule during the window being analyzed, then it isolates the three types of delays, i.e. Excusable Non-Compensable, Excusable Compensable, and Non-excusable.

Al-Gahtani and Mohan (2007) proposed a new technique called the Total Float Management Technique which analyzes the delay events on a daily basis. Its main goal is detecting the changes in the total float whenever a delay event existed.

Float, Logic, and Resource Allocation – FLORA was developed by Nguyen and Ibbs (2008). This technique captures the changes of float, logic, and resource allocation during the delay analysis performance. FLORA is the only procedure that takes into account that float ownership has various concept, thus the float ownership is based on a prior agreement between the two parties. FLORA can be applied both prospectively as in real-time analysis and retrospectively as in after-the-fact analysis.

Golanaraghi and Alkass (2012) proposed a new technique called the Modified isolated technique. Similar to the IDT, the analysis is considered twice, once from the owner's perspective and the other is from the contractor's perspective.

The Critical Path Effect Based Delay Analysis Method (EDAM) procedure was proposed by Yang and Kao (2012) as it is similar to the window analysis method in which it analyzes the delays using time frames, i.e. windows. It uses these time frames to define the delay impacts on the critical path (Yang and Kao, 2012). Kamandanga et

al. (2017) then added: “The project duration in this method is also divided into several time frames or scenarios. The analyst has to calculate using some equations represent baseline duration, duration caused by owner’s delay and contractor’s delay, and duty of owner and contractor for each window and each activity. The critical path changes in each window have to be analyzed comprehensively.”

Birgonul et al. (2015) proposed a new approach called an Integrated Approach based on seventeen shortcomings arising out of the contract documents, scheduler, delay analyst, delay analysis technique, and lack of record keeping and communication. In addition to that, a set of rules were identified to guide project parties from the contract agreement stage up until the construction stage where delay analysis occurs.

2.3.2.7 Advantages and Disadvantages of DAMs

The probability of each method used is contingent on weighing the advantages and disadvantages of each method. Data and records availability, conditions of the contract, time availability, and the nature of the causative events will help in selecting a suitable delay analysis method. A summary of the potential advantages and disadvantages of each delay analysis method is shown on Table 1.

Table 1 Types of DAMs & the Pros and Cons

DAMS	Pros	Cons
As-Planned Vs. As-Built	Easy method No generation of new schedule Compares before and after networks Requires general administrative information Detects concurrent delays	Does not scrutinize the delay events Does not specify the impact of concurrent delay events Does not consider the changes in the critical path
Impacted As-Planned	Easily determines the types of delays	Ignores as-built critical path Overestimates the project duration Failure to detect concurrency Does not identify project progress and the changes in the critical path
Collapsed As-Built	Accurate in analyzing the real as-built schedule	Does not consider the changes in the critical path Needs a lot of effort and time to create the as-built schedule Failure to detect concurrent delays
Time Impact Analysis	Preferred technique Keeps the schedule updated Documenting important project information Follows day-by-day information Detects float consumption, concurrent delays, recovery time, acceleration, and/or rescheduling of activities	Needs huge amount of information Needs a lot of effort and time availability Lack of available resources to perform the analysis
Window Analysis	Identifies and distinguish project delays Liabilities are accurately calculated	Needs a lot of time and effort Difficulty in choosing the right time increments Insufficient consideration in acceleration activities
Critical Path Effect Based Delay Analysis (EDAM)	Identifies critical path changes Identifies project acceleration Develops a clear liability distribution approach Detects and apportion concurrent delays	Does not consider float ownership Delay classifications should be identified in the contract before using this method Results are inaccurate for complex delay situations

Float, Logic, & Resource Allocation (FLORA)	Detecting the changes in float, logic, and resource allocation Helps in solving concurrent delays, pacing delays, float ownership, and acceleration	More complicated than window-based analysis methods Requires more information than any other methods Requires data records regarding changes in logic and resource allocation Needs a lot of time and effort Delays for each project party must be calculated separately
Isolated Delay Type	Detects delays before the analysis of the schedule	Failure to consider changes in the critical path(s) Does not detect concurrent delays
Modified Isolated Delay Type	Detailed technique which uses windows in its analysis Detects critical path(s) changes Detects concurrent delays	Analysis period is subjective Different period length may change the results Needs a lot of available information
Continuous Delay Measurement	Easy, accurate, and credible analysis Helps create the as-built schedule Detects the changes in the critical path(s) Detects concurrent delays Uses actual project data to analyze results Helps in the tracking of each delayed activity	Requires a complete and full baseline schedule May have inaccurate results if used for large schedules.
Total Float Management	Accurate Detects concurrent delays and pacing delays Detects changes in total float Helps project parties know more about their total float and total float of the whole project	Needs availability of day-by-day information Needs a lot of updates whenever new project information is present
Integrated Approach	Considers and analyzes all project stages Accurate and useful Detects consumption of float Detects concurrent and pacing delays Detects changes in the critical path Detects resource over allocation Detects accelerated activities	Needs a lot of available information available to achieve accurate and credible results

2.3.3 Selecting a DAM

Proper analysis is critical when multiple factors play a role during the delay period being analyzed. Some of the aforementioned techniques ignore important qualities which makes the results inadequate and sometimes unfair.

2.3.3.1 Inspect the Use of DAMs

Ndekugri et al. (2008) as well as Braimah and Ndekugri (2009) are the major survey sources found for the use of the delay analysis methods. Their surveys were based on United Kingdom's contracting organizations and construction consulting organizations respectively.

From the contracting organizations perspective, the as-planned vs. as-built and the impacted as-planned techniques are the most successful techniques. The most important staff who contributes in preparing delay claims are quantity surveyors, commercial managers, schedulers, site managers, external claim consultants, and estimators (Ndekugri et al., 2008). Commercial managers and quantity surveyors both ranked 1 and 2 respectively for the level of involvement in the preparation and settlement of claims (Ndekugri et al., 2008). As for the main difficulties to the use of these methods, the survey concluded with respondents having a poor level of required knowledge, insufficient project information, and lack of scheduling practice (Ndekugri et al., 2008).

From the consulting organizations perspective, the collapsed as-built, as-planned vs. as-built, and the impacted as-planned techniques are the most used and

known techniques in these organizations. The most important staff who assesses contractors' delay claims are quantity surveyors being the first involved party of the owners' consultants as for the project A/E ranked second even though it is common in the contracts that the project A/E is the main responsible party for evaluating claims (Ndekugri and Braimah, 2009). As for the main difficulties to the use of these methods, the survey concluded with respondents having insufficient project information and record keeping, lack of scheduling practice, lack of programmes with CPM network form (Ndekugri and Braimah, 2009).

The results of the surveys indicate that there are sufficient number of difficulties to select the optimal delay analysis method that needs to be reliable and credible to increase the level of agreement between both project parties. One cannot just place the thought of one method is more reliable than the other is as the information limitation plays a role in selecting the optimal method. A diligent expert may need to analyze the delays using multiple methods in order to ensure the validity of the claim in hand.

2.3.3.2 Factors that Affect the Selection of DAM

Braimah and Ndekugri (2008) came up with another survey to report the factors that influence claim analysts in their selection of these methods. Eighteen factors were noted from their literature review and their study, and then they were ranked based on their importance and data collection in the United Kingdom construction organizations. Braimah and Ndekugri (2008) grouped the eighteen factors into six group

factors which are: project characteristics, contractual requirements, characteristics of baseline programme, cost proportionality, timing of the analysis, and record availability.

Record availability was ranked first followed by baseline programme availability, which was ranked second. It is not uncommon to have record availability as the first factor that influences the selection of a delay analysis method since each method varies the number of records available.

The timing of analysis may change the results of the methods. “Foresight analysis is conducted to present the effects of potential delays caused by proposed events such as future change orders” (Arditi and Pattanakitchamroon, 2006). As for the hindsight analysis, which is more common than foresight analysis, parties are eager to act as soon as the delay occurs (Arditi and Pattanakitchamroon, 2006). These delays might be occurring individually or concurrently. The most common drawbacks of the above-discussed DAMs are detecting concurrent delays and pacing delays.

2.4 Concurrent Delays

There have been various definitions concerning concurrent delays. From 1987 up until today, a universal definition of concurrent delays is still unknown. Kraiem and Diekmann (1987) described concurrency (based on Robin et al., 1983) as the term “used to describe two or more delays that occur at the same time, either of which, had it occurred alone, may have affected the ultimate completion date.” This probably has a rare occurrence as opposed to the definition offered by Baram (2000): “Concurrent delays are experienced on a construction project when two or more separate delay events occur during the same time period.” Other practitioners argue that concurrent

delays should occur on the same day or else the first delayed event will cause float to the latter one which will not be the true definition of concurrency (Rider and Finnegan, 2005). Ibbs and Nguyen (2008) stated that when an owner caused delay event concurrently with a contractor caused delay event, the delay is treated as an excusable non-compensable delay thus the contractor will only be granted time extension with no extra compensation as both parties should bear their own damages at their own costs. Peters (2003) showed the results when concurrency existed from various scenarios.

When concurrent delays occur as excusable with non-excusable delay almost an equal portion of studies believe that a time extension should be rewarded for the contractor as opposed to not granting time extension for the contractor. For excusable delays occur concurrently with compensable delays, the majority believe granting time extension is the most optimal solution. Finally, for compensable delays being concurrent with non-excusable delays various opinions were held of granting the contractor time extension, not granting the contractor time extension, and others did not have a say to it.

“Consideration should certainly be given to include statements in the contract documents addressing quite ... how concurrent delays are to be defined and their impact assessed” (Scott and Harris, 2004). Ostrowski and Midgette (2006) suggested that since there is no clear definition of concurrent delays, a scheduling expert should present an accurate analysis of the impacts in question and eventually will solve the confusion surrounding this issue.

2.4.1 Institutional Expert Guides That Addresses Concurrent Delays

Three institutional expert guides address concurrent delays: ASCE Standard Guidelines for Schedule Delay Analysis (ASCE, 2016), Association for the Advancement of Cost Engineering International (AACE) Recommended Practice on Schedule Delay – RP 29R-03 (AACE RP, 2011), and the Society of Construction Law’s Delay and Disruption Protocol (SCL, 2002) and (SCL, 2017). These guides help practitioners with their forensic schedule analysis when concurrent delays are present.

2.4.1.1 ASCE Standard Guidelines for Schedule Delay Analysis

ASCE Standard Guide to Schedule Delay Analysis (2016) defines concurrency as “...a situation where two or more critical delays are occurring at the same time during all or a portion of the delay time frame in which that delays are occurring.” This definition has some limitations as follows: (1) does not specify anything related to different parties causing the delay and (2) two concurrent delays can be caused by the same party.

2.4.1.2 AACE International Recommended Practice on Schedule Delay – RP 29R-03

“There are two different theories regarding the exact timing of the two or more delays that are candidates for concurrency. Under the Literal Theory, the delays have to be literally concurrent in time, as in “happening at the same time.” In contrast, under the Functional Theory, the delays need to be occurring within the same analysis period.” (AACE, 2011). Some commentators believe that it is impossible to recognize literal

concurrency, but the use of an analytical approach where a day is measured as a unit of time is helpful regardless what time the delay occurred as long as the delayed events occurred at that exact day (Livengood and Peters, 2008). AACE (2011) stated four pre-requisites in order for two delays to be concurrent. These delays must be:

- Two or more delays that are unrelated, independent, and would have delayed the project even if the other delay did not exist;
- Two or more delays that are the contractual responsibility of different parties, but one may be a force majeure event.;
- The delay must be involuntary; and,
- The delayed work must be substantial and not easily curable.

To evaluate concurrency, the AACE (2011) recommends to first check the liability of each delay event and to separately analyze those events by assigning the responsibility behind the cause of each delay. The second step is to evaluate whether each delay event is concurrent with the other types of delays. Table 2 identifies the net effect of each delay event concurrently with another for multiple different scenarios.

Table 2 Net Effect Matrix - Concurrent Delay – Retrieved from AACE

Delay Event	Concurrent with	Net Effect
Owner Delay	Another Owner Delay or Nothing	Compensable to Contractor, Non-Excusable to Owner
Owner Delay	Contractor Delay	Excusable but Not Compensable to both Parties
Owner Delay	Force Majeure Delay	Excusable but Not Compensable to both Parties
Contractor Delay	Another Contractor Delay or Nothing	Non-Excusable to Contractor, Compensable to Owner
Contractor Delay	Force Majeure Delay	Excusable but Not Compensable to both Parties
Force Majeure Delay	Another Force Majeure Delay or Nothing	Excusable but Not Compensable to Contractor

2.4.1.2.1 Definitions Under AACE Protocol

AACE (2011) gives five definitions which reflect some of the differing opinions and applications associated with concurrent delay. This shows the contradictions between each definition and proves that it is one of the most argumentative areas in analyzing delays. These definitions are as follows:

“(1) Two or more delays that take place or overlap during the same period, either of which occurring alone would have affected the ultimate completion date. In practice, it can be difficult to apportion damages when the concurrent delays are due to the owner and contractor respectively.

(2) Concurrent delays occur when there are two or more independent causes of delay during the same time period. The “same” time period from which concurrency is measured, however, is not always literally within the exact period of time. For delays to be considered concurrent, most courts do not require that the period of concurrent delay precisely match. The period of “concurrency” of the delays can be related by

circumstances, even though the circumstances may not have occurred during exactly the same time period.

(3) True concurrent delay is the occurrence of two or more delay events at the same time, one an employer risk event, the other a contractor risk event and the effects of which are felt at the same time. The term “concurrent delay” is often used to describe the situation where two or more delay events arise at different times, but the effects of them are felt (in whole or in part) at the same time. To avoid confusion, this is more correctly termed the “concurrent effect” of sequential delay events.

(4) Concurrent delay occurs when both the owner and contractor delay the project or when either party delays the project during an excusable but non-compensable delay (e.g., abnormal weather). The delays need not occur simultaneously but can be on two parallel critical path chains.

(5) The condition where another delay-activity independent of the subject delay is affecting the ultimate completion of the chain of activities. The existence of a contractual definition is a major factor on the determination of concurrency. As stated in the previous subsections, contracting parties are free to mutually agree on any method or procedure as long as those agreements are legally enforceable. Therefore, the general rules, exceptions, and considerations in this RP are applicable to the extent that they do not directly contradict contractual definitions and specifications” (AACE, 2011).

2.4.1.3 Society of Construction Law's Delay and Disruption Protocol

The last guide to be discussed in this section is the Delay and Disruption Protocol by the Society of Construction Law. The first edition was published in 2002 and it defines concurrency as: “True concurrent delay is the occurrence of two or more delay events at the same time, one an Employer Risk Event, the other a Contractor Risk Event, and the effects of which are felt at the same time. True concurrent delay will be a rare occurrence.” (SCL, 2002).

The second edition of Delay and Disruption Protocol by the Society of Construction Law addresses concurrency as follows: “For concurrent delay to exist, each of the Employer Risk Event and the Contractor Risk Event must be an effective cause of Delay to Completion (not merely incidental to the Delay to Completion)” (SCL 2017). The protocol's second edition clarified both the practical and legal perspective of concurrency. “From the practical perspective, the analysis of the effects of the delay events is simpler if it considers only those events that will result in Delay to Completion (rather than a consideration of all events in the programme) so that the grant of an EOT follows the outcome of the critical path analysis” (SCL, 2017). From the legal perspective, SCL (2017) gave an example as to whether the RE is an effective cause of Delay to Completion. The example given by the protocol is as follows: contractor is in delay and it delayed project completion. The employer's delay occurred after the contractor delay and it continued parallel with the contractor delay but ended before the contractor delay ended.

The English appeal courts support the view that the two causes of delay where effectively the causes of Delay to Completion because they would have both caused a

delay regardless if the other was present. The lower level English courts support the view that the RE will not result in the works being completed beyond the completion date because the first cause (contractor's delay) created float to the latter and it was already in delay. The RE did not affect the project completion date where in fact it was just consuming the extra float created. The protocol recommended the latter point of view as for concurrency to exist, both delay events should occur at the same time. Both editions of the protocol aid contracting parties with the entitlement to EOT at the time of delay rather than waiting for the effect to actually be felt and analyzing the delay afterward (Chong et al., 2015).

2.4.2 Technical Aspects of Concurrent Delays

The dictionary defines concurrency as two events happening at the same time, coexisting together. From the technical definition of concurrency, there are five aspects to be considered when defining concurrency.

2.4.2.1 Should the Two Delays Occur on Separate Paths?

Livengood (2017) mentioned that for delays to be concurrent, they must be present on parallel critical paths. The delays must be from separate parties and their responsibilities are separate. For example, two delays can occur one of which is the owner caused delay which is late approval of shop drawings and the other delay is the contractor caused delay which is reworking due to errors during construction. Clearly, the two delay events are from different project parties having different responsibilities are considered concurrent delays since both of them occurred on parallel critical paths

and both of them affected the project completion date. On the other hand, when two delayed events occurred having a joint responsibility, i.e. leading to the same activity, then both parties are liable. These delays are not defined as concurrent delays. From this discussion, we assume that concurrent delays occur from two different parties and from two separate critical paths having different responsibilities (Livengood, 2017).

2.4.2.2 Do Concurrent Delays Have to Occur Exactly at the Same Time?

As it was mentioned earlier that AACE (2011) discussed literal concurrency as well as SCL (2002) define true concurrency which means delays shall occur literally on the same time, exactly on that same day. But that case occurs in rare situations. If two parallel critical paths have concurrently two parallel delays, the first delay cannot occur before the other since it will grant float for the second delay and hence the latter will change from being critical delay to a noncritical delay. As for SCL (2017) states that for delays to be concurrent as least their effects should be felt at the same time. This is understood as two delays not necessarily starting at the same time affects the project completion time are considered concurrent.

2.4.2.3 Can Concurrency Be Defined as One of the Delays Is Not On the Critical Path?

Livengood (2017) explains the difference between delays on the critical and near critical paths. Concurrent delays should be on the critical paths otherwise it will not affect the project completion time.

There are two viewpoints, as mentioned in the AACE (2011), to look at when defining concurrent: the cause perspective or the effect perspective. From the cause perspective, both events should occur together independently at the same time and should affect the project completion time. This concept will eliminate the thought of having concurrent delays on near critical paths. From the effect perspective, both events should result in the same effect which is delaying the project completion time and can occur at different times. The later perspective is equivalent to the concurrency effect mentioned in SCL (2017).

2.4.3 Rules for Eligibility and Quantum of Concurrent Delays

To identify concurrency, Perera and Sutrisna (2013) explained that AACE (2011) identifies two theories when identifying the critical path and float value. These theories are the longest path theory and total float value theory. On the other hand, Arif and Morad (2014) discussed several law cases and had the opportunity to come up with how courts rule on cases pertaining to concurrency. Two rules were adopted which are the easy rule and the fair rule.

2.4.3.1 Longest Path Theory vs. Total Float Value Theory

Perera and Sutrisna (2013) and Peters (2003) discussed the longest path theory as having the longest delay being the effective cause compared to the other shorter delay being ineffective. AACE (2011) define the longest path as follows: "...the longest path

was the path with the lowest float.”. The delay which occurred parallel to the longest path will not be treated as if it caused any delay to the project completion date.

AACE (2011) define the total float value theory as: “The total float value adherents tend to align with the zero-float thinking...” The total float value theory is based upon checking the total float value of each activity and the ones with total float having zero or negative float compared to the existing contract completion date, then these activities are considered critical (Peters, 2003).

2.4.3.2 Easy Rule vs. Fair Rule

The easy rule allows only time extension with no extra compensation to be granted. Arif and Morad (2014) pointed out that this rule is mostly used when the court is unwillingly able to apportion the delay damages for both parties.

On the other hand, the fair rule is adopted in court’s ruling when apportioning percentage for each party’s responsibility is eligible based on facts and evidence from project data (Arif and Morad, 2014). This rule is more credible than the easy rule but it requires a sufficient amount of data records and project information.

2.4.4 Issues Related to Concurrent Delays

Several issues arise when analyzing and detecting concurrent delays. In the US courts, the burden of proving the REs have affected completion rests on the contractor.

“...the contractor asserting a delay would have to establish that the owner was responsible for delay” (Livengood, 2015).

The second issue concurrency faces is the degree of proof. Livengood (2017) explains: “to establish entitlement to a time extension, the contractor need only prove that concurrent delays resulted in a specific delay to project completion.”

The third most important issue related to concurrency is pacing delays. If you paced an activity with an already existing delay, it will appear as if those two activities are occurring at the same time within the same time frame. Pacing delays can be used by both participants in order to stretch their activities because the project has been delayed anyway by the preexisting initial delay. This type of delay needs a lot of time, effort, and major data records from both parties to prove that they were just pacing the activity with respect to the already existing parallel activity.

2.5 Pacing Delays

Pacing delays can be confusing with respect to concurrent delays. Livengood and Peters (2008) define pacing delays as a “proactive rather than reactive response to another party's parent delay.” Livengood (2017) added that: “Pacing delays are concurrent, but the reason they exist is because they are voluntary.” However, Joseph (2015) recognized the difference between delay pacing and delay concurrency, as follows: “The difference of ‘pacing delays’ with ‘concurrent delays’ is that the effect of concurrent delays is felt at the same time whereas pacing delays just consumes the float created by a parent concurrent delay event.”

2.5.1 AACE Protocol

AACE (2011) define pacing delays as: “Pacing occurs when one of the independent delays is the result of a conscious, voluntary and contemporaneous decision to pace progress against the other delay.” AACE (2011) drew out the advantage of pacing delay as follows: “By pacing the work, the performing party is exercising its option to reallocate its resources in a more cost effective manner in response to the changes in the schedule caused by the other parent (nonpacing) delay and thereby mitigating or avoiding the cost associated with the resource demands.”

A parent delay needs to be present before pacing any activity; it is a delay that creates relative total float for other activities and it also delays the project completion date (Hoshino, 2006; Livengood and Peters, 2008). AACE (2011) recommends three criteria to guide contract parties in determining the legitimacy of pacing delays by the (1) existence of the parent delay, (2) showing of contemporaneous ability to resume to normal pace, and (3) evidence of contemporaneous intent.

AACE (2011) further distinguished between two circumstances in which pacing delays may be applied which are referred to as (1) direct pacing and (2) indirect pacing. AACE (2011) define direct pacing: “...occurs where the duration of a schedule activity is extended due to a delay in a predecessor activity on which the progress of the subject activity is directly dependent.” AACE (2011) define indirect pacing as: “...where the paced activity has no direct dependency on the parent delay activity, sometimes called indirect pacing. The fact that it shares the same time frame is a function of schedule timing as opposed to construction logic.” Both delays only share

the same time frame and the parent delay creates relative total float for the paced delay to consume (Hoshino, 2006).

2.5.2 Practical Effect of Pacing Delays

Zack (2000) explained the practical effects of pacing an activity as it is related to concurrent delays, float ownership, and schedule delay analysis. Pacing an activity can be a bit confusing if one party did not defend it in a rightful way. Since concurrent delay does not have a fixed definition, it may be confusing when one needs to pace their activity. If one activity is paced along with an already existing delayed activity, it will seem as if a paced activity has caused concurrency.

Float ownership is another practical effect of pacing delay. For example, if an owner caused a delay on the critical path and hence stretching out the project completion date, the contractor, on the other hand, will pace some non-critical path activities by consuming the relative total float that the owner caused in the first place. Zack (2000) mentioned an example of an owner caused a delay on the critical path and the contractor have paced his non-critical activities by dismissing some laborers or releasing some equipment from the project. But what if the critical path that was caused by the owner gets alleviated and the contractor was not able to remobilize his resources quickly and the critical path is shifted to the contractor's delay? The practical effect of pacing delay with respect to consumption of float should be wisely used in reference to the relative total float in order not to delay the project and have the responsible party pay for damages and/or losses later.

Schedule delay analysis is the third practical effect of pacing delay. It is not always beneficial for one party to pace their activity with respect to a parent delay. For example, having an owner caused delay increased the project time completion and the contractor have paced his/her activity to take advantage of the relative total float. When analyzing delays using a windows technique or the but-for technique, pacing a delay will show that the contractor is clearly delaying other activities. The schedule delay analysis will check the time difference between the actual project end date and when the project would have ended but-for the owner-caused delay (Zack, 2000). This will clearly show a less time difference leading to a less compensable time since the overlapping time between the two delays will result as time extension only.

2.5.3 Steps Required to Prove Pacing Delays

Pacing delays can become a source of uncertainty as it may bring concurrency issues. To avoid going into that confusion, several steps need to be taken to prove the existence of pacing delays.

In order to prove pacing delays, there should be an existence of the parent delay in the first place in order to pace an activity without delaying the project completion date. Rider and Finnegan (2005) explained the major steps to guide the contractors when proving pacing delays. Contractors should basically be very familiar with their contract; they should have a thorough knowledge about their contractual responsibilities and requirements when it comes to recovering damages or overhead costs. Some contractors usually ignore any ambiguities and try to compensate for it later

on during the project execution, but that should not be the case as they need to seek clarification for any vagueness in clauses especially when it comes to pacing delay clauses.

Seeking clarification is an optimal solution for any ambiguities resulting from the contract language. Contractors, on the other hand, can seek clarification when it comes to pacing delays and even concurrent delays to come up with a mutual agreement with the owner regarding this matter and to accurately specify a full meaningful definition, recovery costs, and liability calculation for both parties in case of no recovery costs.

A dialogue between the Contractor and the Owner will avoid or minimize disputes later on as it is optimal to keep the agreement between both parties rather than having a third neutral party come up with a decision. The ideal way to that is to communicate before the execution of the project and set up rules of when and why should the contractor pace the work if there was a possibility of doing so (Rider & Finnegan, 2005).

Pacing delays is a source of difficulty when dealing with concurrency claims. Concurrency can become more problematic when the triggering of the prevention principle by the contractor in respect of a RE leads to time being called to have become at large.

2.6 Time-at-Large Callings

SCL (2002) recommends that when concurrency occurs a time extension should be granted to the contractor as the protocol is influenced by the prevention principle. SCL (2002) further clarifies the idea of concurrency and prevention principle as follows: “Where there has been Employer Delay, this may prevent the Employer charging the Contractor with LDs for failure to achieve a contract completion date. Time for completion of the works may become ‘at large’ until a new contract completion date is set by the granting of an EOT.” The contractor may preserve the idea of time being called to have become at large if the employer did not grant the contractor the deserved EoT as a result of a prevention made by the employer.

2.6.1 The Prevention Principle

Abdul-Malak and Jaber (2018) defined the prevention principle from a common law perspective as calling “for the completion date to be suspended when an owner impedes a contractor from meeting the completion date because no person can take advantage of the nonfulfillment of a condition the performance of which has been hindered by the person.” Abdul-Malak and Jaber (2018) added that the contractor, under such a situation, is still obliged “to complete the remaining works within a reasonable time, and the owner should be disallowed from benefitting from its own wrong.” When time is being called at large, the contractor is responsible to finish the works within a reasonable time being computed according to the circumstances available.

2.6.2 Justifying Time-at-Large Callings

Abdul-Malak and Jaber (2018) came up with a model to help justify time being called at large by the contractor. The framework accounted for three justifiability bases as per Figure 4, which include: The contractor preserves that idea under three conditions: (1) the employer prevented the contractor from completing the works at the Time for Completion, (2) failure of the time extension mechanism, and (3) waiver by the employer to contractually set a new completion date (Abdul-Malak and Jaber, 2018). If one condition is met, the contractor will be obliged to complete the works within what is deemed to be a reasonable time.

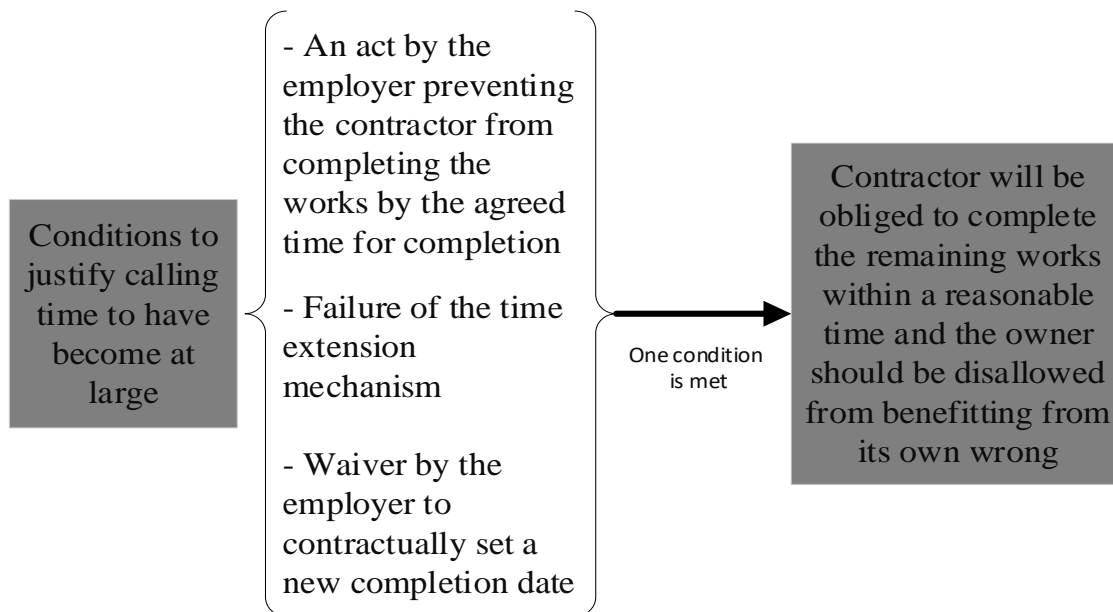


Figure 4 Time-at-Large Conditions

The prevention principle stands in the way against the notice for time extension being a condition precedent notice. While serving a notice, the contractor will increase the probability of having the eligibility and quantum regarding the claim in hand. On the other hand, if the contractor failed to issue a notice this does not directly correlate to the fact that the time being called at large due to a prevention by the owner is not operable. The employer might be aware of the delay such as financing delaying events and hence time is being called to have become at large is valid.

2.6.3 Governing Circumstances and the Reasonable Time

Abdul-Malak and Jaber (2017) described the overall reasonable time through the following periods:

- The original Time for Completion;
- Any awarded extension of time as requested by the Contractor under the extension of time (EoT) provision.

- A self-awarded period which is a virtual but fair one that is computed based on factors such as:

- Financial status of the contractor;
- Re-establishing the Workforce;
- Seasonal constraints;
- Resuming procurement

The self-awarded period is the time that the contractor entitles himself an extension of time after suffering from certain factors which are out of their control and due to the denial of the EoT request he put forward.

- An adjustment period based on extensions pertaining to events mentioned in the EoT clause (variation orders, differing site conditions, etc.).

- The additional period beyond the adjustment period will be considered a period of culpable delay under which the employer can claim for general damages.

Judging the time taken to finish the works to be reasonable or not shall account for the circumstances under which the work execution has been done (Abdul-Malak and Jaber 2017). The reasonable time is computed as the time needed to finish the project taking into consideration all the EoT the contractor has the right to take if he had otherwise done things right. But these circumstances do not just happen as it is; the inability to finance, or the inability to reassign or reengage contractors and/or suppliers is not a one-day event that could happen. Mehdi (2018) focused on the effect of the initial set of circumstances with those of new emerging ones by stating that: “New Employer’s risk events like variation orders and differing site conditions, come each in different timings, and thus a new set of circumstances will be generated in the specific contemplated window of time.”

To be noted that any such circumstances might not affect all the activities progressing within a certain time window. However, delays caused by the prevailing circumstances may appear to be concurrent with other contractor-caused delays. This version of concurrency can be representing the case where the contractor paces his own-controlled works under the assumption that the prevailing circumstances already governs the delayed completion time. The interaction among delay concurrency, pacing, and the triggering of the prevention principle can present a unique challenge when deciding on the respective liabilities of the concerned parties. It is even more crucial if

the contractors bring out the concept of global claims when calculating their reasonable time upon calling time to have become at large.

CHAPTER 3

DELAY CONCURRENCY UNDER TIME-AT-LARGE SITUATIONS

3.1 Overview

In this chapter, a critical analysis of the literature is performed to identify different case laws that were ruled as relevant to concurrency under various approaches, on one side, and concurrency coupled with reliance on time at large being used as part of the claim basis by the claimant, contractor. A further analysis is performed to identify the difference in the characteristics of each adopted approach, and examine how the triggering of time at large was interpreted by way of achieving the given rulings.

It has been established that ruling on delay concurrency can be dealt with using multiple approaches. In addition, pacing delays and calling time to have rendered at large by the contractor may represent relevant concepts to address as well. To this end, the effect of the interplay among concurrency, pacing, and time-at-large situations is yet to be clarified.

3.2 Legal Approach to Concurrency

Courts have been adopting a number of approaches to determine the causation and liability in concurrent delay cases. The most widely used methods follow the Malmaison, dominant, and the apportionment approaches.

3.2.1 Malmaison Approach

The Malmaison approach is based on the case of *Henry Boot Construction, Ltd. v. Malmaison Hotel, Ltd.* (1999), which grants the contractor an EoT for the period of delay caused by the relevant events (RE) provided that the two concurrent delays, one of which is caused by an employer-caused event while the other by a contractor-caused event, independently delay the project completion date. Livengood (2015) summarizes the Malmaison approach as follows: “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 effect of the other event.” Livengood (2015) then added that when the claimant, contractor, can succeed if the employer’s delay happened to be the dominant cause of delay which is confusing the malmaison approach with the dominant approach as follows: “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. Which cause is dominant is a question of fact, which is not solved by the mere point of order in time, but is to be decided by applying common sense standards.”

3.2.2 Dominant Approach

Arif and Morad (2014) express dominancy as follows: “If there is a particular event that can be termed as a dominant cause of delay, effect will be given to that delay

and other nonmaterial causes shall not be considered.” Livengood (2015) added that the dominant cause is performed in English courts and not in US courts. “The term "dominant cause," as used in English cases, has no named counterpart in US law. Nevertheless, the functional analysis that English courts perform in determining the "dominant cause" is similar to the factual examination and CPM schedule analysis presented in US courts.” (Livengood, 2015).

3.2.3 Apportionment Approach

Baram (2000) describes the approach as: “The apportionment approach takes into account different factors, among them the contractual agreement, the criticality of the delay under scrutiny, the delay period, the importance of the activity, the level of effort involved in performing the activity, and other weighting factors.” Joseph (2015) clarifies it such that: “...if two delay events are concurrent and the loss/expense of the parties in concurrency period can be separated, then the parties should be allowed to recover their loss/expense appropriately.” Livengood (2017) adds that: “The term apportionment is sometimes used in cases to allocate the delays based on the significance of each of the concurrent events on the project as a whole.”

3.3 Defining Concurrent Delays

Concurrency can be looked at from two different viewpoints when it forms part of the basis of an arisen EoT claim. The first widely acknowledged viewpoint is that by

Marrin (2013) which has been widely accepted by courts: "... the expression "concurrent delay" is used to denote a period of project overrun which is caused by two or more effective causes of delay which are of approximately equal causative potency." This definition seems to be suitable for two different effective causes of delays of equal significance to the project as a whole, as proven by detailed factual events, and for which both participants are to blame for the single common consequence, delay.

Livengood (2015) explained causative potency as it: "seems to be a lower-level test, a simple hurdle to prove that the delay is not of minimal importance." Livengood (2015) then added: "Hence: where there are two competing causes of delay, they often differ in terms of their causative potency. Even where both competing causes are effective causes of delay, in the sense that each taken on its own may be regarded as the cause of the whole delay, the two may be of unequal causative potency. It is a commonplace to find that during the course of the factual enquiry, it becomes obvious as a matter of common sense that the two supposed causes of delay are of markedly different causative potency. One is then regarded [by the tribunal] as the effective cause and the other as ineffective. In other words, the minor cause is treated as if it were not causative at all." Livengood (2015) suggests that when using the But-for analysis the two causes on its own may affect the project completion date. Nevertheless, when the two causes are concurrently occurring, then one causes the project to be delayed while the second one is not causative at all. This hints to the second viewpoint of concurrency.

In *Royal Brompton Hospital NHS Trust v. Frederick A Hammond & Ors* (2000), his Honour Judge Richard Seymour Q.C. said:

“However, it is, I think, necessary to be clear what one means by events operating concurrently. It does not mean, in my judgment, a situation in which, work already being delayed, let it be supposed, because the contractor has had difficulty in obtaining sufficient labour, an event occurs which is a Relevant Event and which, had the contractor not been delayed, would have caused him to be delayed, but which in fact, by reason of the *existing delay*, made no difference. In such a situation although there is a Relevant Event, "the completion of the Works is [not] likely to be delayed thereby beyond the Completion Date." The Relevant Event simply has no effect upon the completion date. This situation obviously needs to be distinguished from a situation in which, as it were, the works are proceeding in a regular fashion and on programme, *when two things happen, either of which, had it happened on its own, would have caused delay, and one is a Relevant Event, while the other is not. In such circumstances there is a real concurrency of causes of the delay.*" [Emphasis Added].

This second viewpoint on concurrency is expressed to be to the effect that when delay events occur sequentially, one delay taking place after the other has gained dominancy in delaying completion. This results in two different delays but of different causative potency, one of which affecting completion while the other, given the delay already in place, has no further impact on completion.

3.4 Analysis of Concurrent Case Laws

A critical analysis was conducted on seven different concurrent delay cases that were ruled under the Malmaison, dominant, and/or apportionment approaches. Table 3 shows the relevant outcomes from each of the considered cases.

Table 3 Relevant Outcomes of Concurrent Cases

No.	Case Name	Relevant Outcomes
C1	McAlpine Humberoak, Ltd. v. McDermott International Inc	“if we were to uphold the judge's finding of frustration, this would be the first contract to have been frustrated by reason of matters well-known to the parties which had not only occurred before the contract was signed, but had also been expressly provided for in the contract itself”
C2	Henry Boot Construction, Ltd. v. Malmaison Hotel, Ltd.	“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 effect of the other event.”
C3	Royal Brompton Hospital NHS Trust v. Frederick A Hammond & Ors	“work already being delayed..., an event occurs which is a Relevant Event and which, had the contractor not been delayed, would have caused him to be delayed”; “although there is a Relevant Event, “the completion of the Works is [not] likely to be delayed thereby beyond the Completion Date””
C4	John Doyle Construction, Ltd. v. Laing Management	“... even if it cannot be said that events for which the employer is responsible are the dominant cause of the loss, it may be possible to apportion the loss between the causes for which the employer is responsible and other causes.” “Such a procedure may be appropriate in a case where the causes of the loss are truly concurrent, in the sense that both operated together at the same time to produce a single consequence.” “In such a case responsibility for the loss can be apportioned between the two causes, according to their relative significance.” “responsibility during that period should probably be divided on an equal basis, at

		least where the concurrent cause is not the contractor's responsibility”
C5	City Inn, Ltd. v. Shepherd Construction, Ltd.	“none of the causes of delay can be regarded as a "dominant" cause...”; “Where there is true concurrency between a relevant event and a contractor default, it may be appropriate to apportion responsibility for the delay”
C6	De Beers UK, Ltd. v. Atos Origin It Services UK, Ltd.	“where there is concurrent delay to completion caused by matters for which both employer and contractor are responsible, the contractor is entitled to an extension of time but he cannot recover in respect of the loss caused by the delay.”
C7	Walter Lilly & Company, Ltd. v. Mackay & Anor	“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..., the Contractor is entitled to a full extension of time.”; “many of the Relevant Events would otherwise amount to acts of prevention”; “Provided that the Relevant Events can be shown to have delayed the Works, the Contractor is entitled to an extension of time for the whole period of delay caused by the Relevant..”

3.4.1 Adoption of Malmaison Approach

The Malmaison approach was adopted by way of ruling on cases C2, C6, and C7. The three cases had the common ground that: (1) both delays, one of the contractor’s and the other is an RE, affect completion date; (2) absent the other, each will still affect completion date; and (3) the contractor can prove that the RE affects completion date. The construction of a schematic timeline for the three cases is shown in Figure 5, illustrating the different scenarios of relying on the Malmaison approach for granting an EoT. The concurrency in case C2 occurred during the original contract duration while the concurrency in the other two scenarios, case C6 and C7, was pushing the completion date even further as those delays initially occurred before the time for

completion (TfC) and continued beyond it. The length of delay caused by the employer's RE will be the basis for granting EoT. Specifically speaking, in case C7, the concurrent causes of delay arose where the RE was the only major cause of delay, whereby the contractor's delay event had no contribution to the overall delay. This scenario may be interpreted in a way that the contractor might have paced his delayed works with the delay caused by the RE.

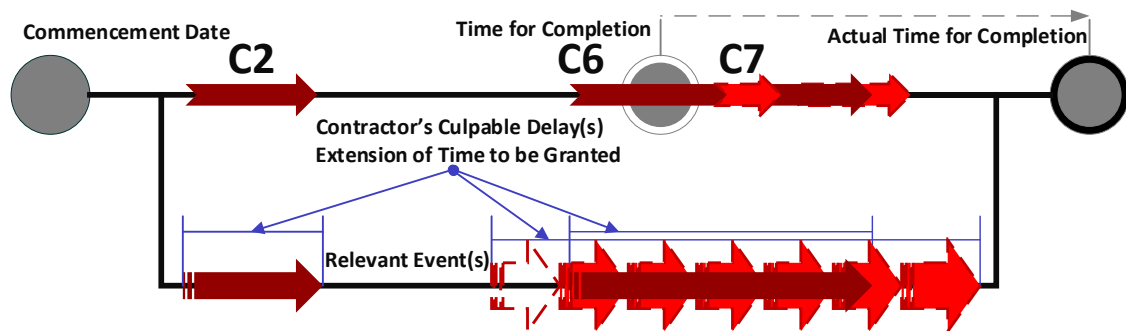


Figure 5 Ruling Using the Malmaison Approach

3.4.2 Adoption of Dominant Approach

The dominant approach was found to have been adopted in cases C1 and C3. The mutual reasons for adopting the dominance method were: (1) the contractor was already in a culpable delay, (2) the events occurred sequentially, (3) the RE did not affect completion date, and (4) the contractor could not show that the RE caused a delay to completion. The timeline for the two cases is shown in Figure 2, reflecting two different scenarios for the rejection of the EoT claim made by the contractor. In Figure 6, case C3 shows the concurrent delays occurring before the TfC as opposed to the C1

case where the contractor was pushing the TfC even further, coupled with an instruction by the employer having been made after the passing of TfC. The scenarios show that the employer might have paced his activities given the fact of having been aware that the contractor would not in any way have finished the works within the TfC.

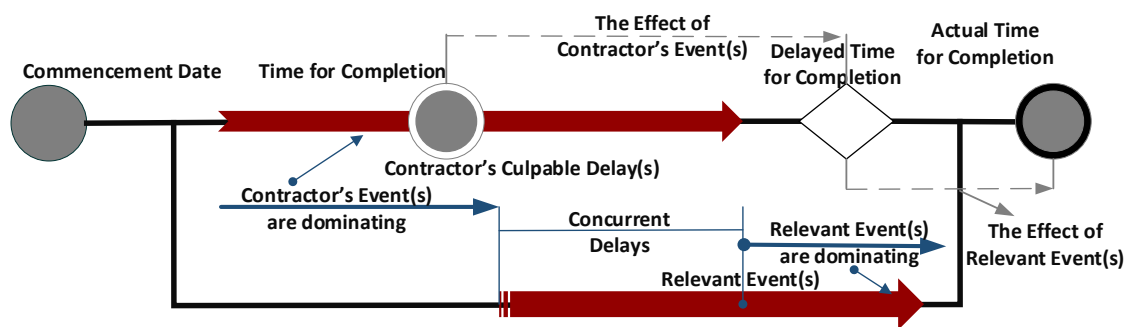


Figure 6 Ruling Using the Dominant Approach

3.4.3 Adoption of Apportionment Approach

The apportionment approach was adopted in cases C4 and C5. The related reasons were: (1) dominancy could not be proven and (2) existing delays are simultaneous, true concurrency. Apportioning the delay can be based on two elements as explained in *City Inn, Ltd. v. Shepherd Construction, Ltd.* (2007): "...the degree of culpability involved in each of the causes of the delay and the significance of each of the factors in causing the delay." The former considers the length of each event while the latter is the significance of each of the causative events on the works as a whole.

The timeline for these two cases is shown in Figure 7, which demonstrates two different scenarios for adopting the apportionment approach. In case C4, the contractor's delay events occurred, before reaching the TfC, concurrently with snowfall that made it impossible to work during that period. The judge in this case apportioned responsibility between the causes of delay on equal basis given the fact that the concurrent cause was not that of the contractor's responsibility. In case C5, the delays took place beyond the TfC, and the REs were more than those delay events by the contractor. Both participants shared the responsibility of the delay based on their relative significance on the works as a whole. As depicted in Figure 3, the dominance of delays alternated: starting with those initially caused by REs, followed by those contractor's culpable ones, with the last set of REs causing no further impact on completion.

Figure 8 shows a hypothetical scenario where the contractor's culpable delays are the initially occurring ones, as opposed to the scenario in Figure 3. The REs occur concurrently with the existing contractor's delays. In this scenario, though, the contractor can prove that the REs do affect the project completion, by delaying the TfC beyond the time at which the contractor may otherwise have finished the works. This scenario confirms the applicability of the apportionment approach, as no sole cause is shown to be dominating the full period of experienced delays.

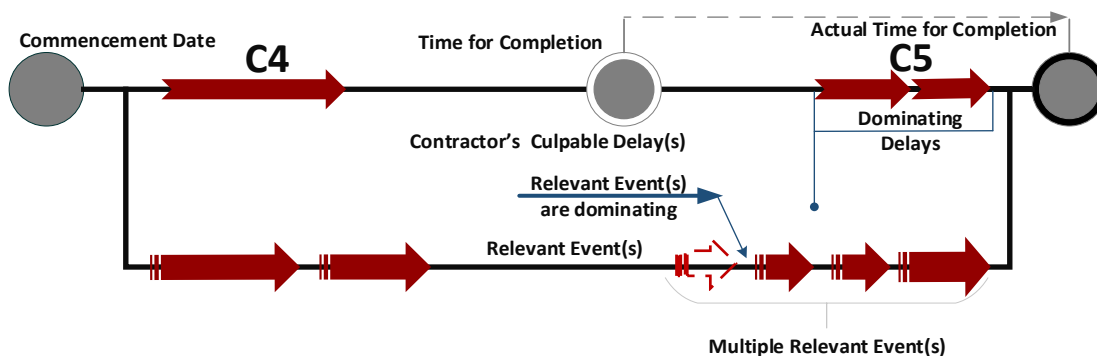


Figure 7 Ruling Using the Apportionment Approach

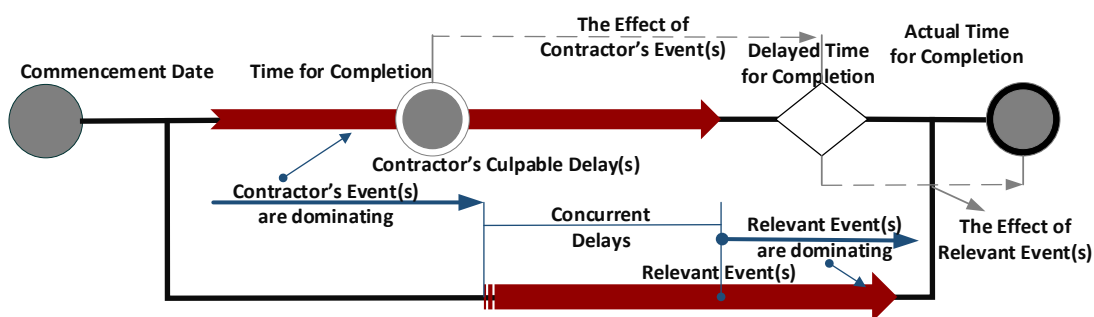


Figure 8 Apportionment Approach with Alternating Delay Dominancy

3.4.4 Conclusion

The discussed cases showed several scenarios for the sequencing and timing of delay events, which resulted in adopting different approaches. Marrin (2013) supports the Malmaison approach the most by stating: "... the Malmaison approach involves little risk of falling foul of the prevention principle." This method grants the contractor a realistic time to complete the works taking into consideration the occurring of the RE(s) during the project life cycle. Marrin (2013) then added that dominancy could also

trigger the prevention principle if one seems to address concurrency as if the contractor's delay was the dominant one. Marrin (2013) further pointed out the risk of using apportionment when dealing with concurrency, as the prevention principle will be a convenient excuse for the contractor to pave his way for considering time to have become at large in the lack of being granted the full assessed EoT. Therefore, it is crucial to understand how the applicability of these adopted approaches possibly varies when the triggering of the prevention principle comes into play, particularly that such time-at-large callings may not necessarily be found as justifiable.

3.5 Summary of Case Rulings

The analysis of concurrent case laws shows that for each adopted approach there were different characteristics in which the court has ruled under the various approaches. Figure 9 shows a theoretical guideline framework of how the courts ruled under the three adopted approaches which is of a benefit for dispute resolution practitioners as well as contractors and employers. The framework consists of different characteristics taken from the court's ruling on each analyzed case.

From Figure 9 it can be seen that the sequence of delays plays a major role in determining which approach is to be adopted. When delays occur simultaneously, both delays occurring at the same time, and both project participants can prove that the other delay had caused delay to completion, then it can be seen that true concurrency has occurred. When true concurrency occurs, if the delays are of equal causative potency, both are of equal significant to the project, then the case can be ruled under the

Malmaison approach in which the contractor is granted time extension for the length of period covered by the RE. If the delays are not of equal causative potency, then the case can be best described as if it is adopting the apportionment approach. The participants will apportion the delays according to their significance to the project as a whole.

If the delays occurred sequentially, one delay after the other, then the initially occurred delay plays a critical role when determining the liability of each project participant. When the RE initially occurs and the contractor could actually prove that the RE did in fact affect the project completion date, then this case can be described as following the Malmaison approach in which the contractor is granted time extension for the length of delay covered by the RE irrespective of the second concurrent delay. This scenario can be described as if the contractor consciously paced his works with the already existing concurrent RE. If the RE initially occurred but the contractor could not prove that the RE affected the project completion time, then the case can be ruled under the apportionment approach. In this case, the contractor might or might not have paced his works with the already existing concurrent RE. It may be seen as if unforeseen events had occurred and that the contractor had consumed all the extra float the RE had created. The contractor's delay pushed the delayed completion date even further, which led the contractor's portion of delay, beyond that of the employer's delay, become the dominating delay. In this case, the contractor could not prove that the RE did in fact affect the project completion date beyond the delayed completion date. This scenario can prove that apportionment approach is used when the dominance is alternating between different delay events.

When the delays occur sequentially with the contractor's delay initially starts and he could actually prove that the RE did in fact affect the project completion date, then the scenario can be best described as being ruled under the apportionment approach as well. In this scenario, the employer might or might not have paced his works with the already existing concurrent contractor's delay, but it may be seen as if unforeseen events had occurred and that the employer had consumed all the extra float the contractor's delay had created. The employer's delay pushed the delayed completion date even further which led the employer's portion of delay, beyond that of the contractor's delay, become the dominating delay. In this case, the contractor could actually prove that the RE did in fact affect the project completion date beyond the delayed completion date. This scenario can also prove that apportionment approach is used when the dominancy is alternating between different delay events.

If the contractor's delay initially occurs and he could not prove that the RE affects the project completion date, then this scenario can follow the dominant approach. The contractor will be held liable for the extended project completion date since the delay caused by the contractor affected the completion date whereas that of the employer's delay had no impact at all. The employer's delay was consuming the extra float the contractor's delay had created. This scenario can be seen as if the employer had consciously paced his work with the already existing contractor's concurrent delay as it may be seen that the contractor could not in any way finish the project within the contract completion date.

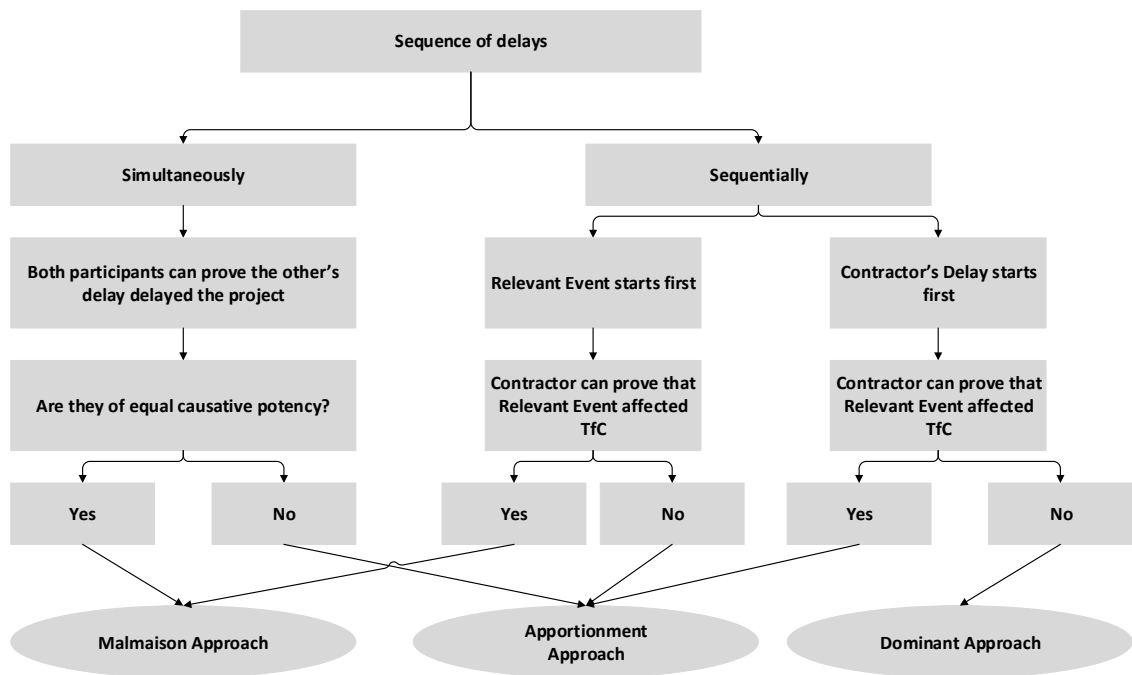


Figure 9 Summary of Case Rulings

3.6 Analysis of Concurrent Case Laws in Time-at-large Situations

After the analysis of concurrent case laws and the interpretation of how courts dealt with concurrency by adopting one of the three mentioned approaches, a further analysis of concurrency coupled with allegedly claiming that time has become at large by the contractor was made. In order to identify how the interpretation of the prevention principle was dealt with by way of ruling on the cases on hand, six different cases were analyzed in order to come up with arguments of how courts view the alleged triggering of the prevention principle by the contractor and if the triggering of the prevention principle will in any way change the resultant outcome. Table 4 shows the six analyzed case laws along with their relevant outcome.

Table 4 Relevant Outcomes of Concurrent Cases with Emphasis on Time-at-large Conditions

No.	Case Name	Case Ruling
C1	SMK Cabinets v. Hili Modern Electrics Pty, Ltd.	“The ordering of variations after the due date which must substantially delay completion will, unless the contract provides otherwise, and in the absence of an applicable extension of time clause, disable the proprietor from recovering or retaining liquidated damages which might otherwise have accrued after the giving of the order, the employer’s right in respect of amounts that have already accrued by way of liquidated damages not being affected”
C2	Balfour Beatty Building, Ltd. v. Chestermount Properties, Ltd.	“The completion date as adjusted retrospectively is thus not the date by which the contractor ought to have achieved or ought in future to achieve practical completion but the date which marks the end of the total number of working days starting from the date of possession within which the contractor ought fairly and reasonably to have completed the works.” “Before leaving this issue it is right to add that the application of the "net" method to relevant events occurring within the period of a culpable delay may give rise to particular problems of causation.” “Fundamental to this exercise is an assessment of whether the relevant event occurring during a period of culpable delay has caused delay to the completion of the Works and, if so, how much delay.”
C3	Dhabi v. Sd Marine Services	“I hold that in relation to both its extension of time claim and its claim in reliance on the prevention principle it has to establish causation in fact, which means showing that the variations were likely to or (as the case may be) did cause actual delay to the progress of the works.” “the contract provides for an extension of time” “any claim for such Permissible Delay fails due to the lack of an Article VIII, clause 2 notice. Even if no such notice is required, any extension of time under Article II, clause 3.3 depends on proof of actual delay.” “one must look at what actually happened.” “Article II, clause 3.3 requires consideration of the period of delay “caused by the Buyer's default or any Permissible Delay”” “If there is such delay then there shall be an extension of the period of time to sea trials "to the same extent.”” “This requires a retrospective analysis, identifying the delay actually caused by the default or Permissible Delay and adding that period of delay to the original sea trials date. As I have already found, it is clear that there was no actual delay.”
C4	Jerram Falkus Construction, Ltd. v. Fenice Investments, Inc.	“for the prevention principle to apply, the contractor must be able to demonstrate that the employer’s acts or omissions have prevented the contractor from achieving an earlier completion date and that, if that earlier completion date would not have been achieved anyway, because of concurrent delays caused by the

		contractor’s own default, the prevention principle will not apply.” “for what it is worth, that if, contrary to my findings, there had been delay to the works as a result of British Gas and/or EDF, and if, also contrary to my findings, Fenice had been responsible for those delays as a matter of contract, I would still have concluded that the prevention principle had not been triggered.” “such delays would have been concurrent with the delays caused by either the initial matters for which JFC were responsible, or the later problem with the levels” “the completion date would not have been any earlier than it actually was” “the delays by British Gas and/or EDF (if that is what they were) did not prevent JFC from completing the works any earlier.”
C5	Saga Cruises BDF, Ltd. & Anor v. Fincantieri SPA	“The Court is not concerned with concurrent delay in the Malmaison sense. If completion of the project was already delayed for reasons for which the Yard was responsible, then delays to completion of particular activities by the Owners are not examples of concurrent delay and do not give rise to any entitlement to an extension of time by the Yard. That is because they do not in fact cause any delay to completion.” “A careful consideration of the authorities indicates that unless there is a concurrency actually affecting the completion date as then scheduled the contractor cannot claim the benefit of it. Causation in fact must be proved based on the situation at the time as regards delay. The Yard’s approach is over broad. The submissions of Owners are to be preferred.”
C6	North Midland Building, Ltd. v. Cyden Homes, Ltd.	"The parties agreed that, in the scenario I have outlined above, if the contractor were responsible for a delaying event which caused delay at the same time as, or during, that caused by a Relevant Event, then the delay caused by the Relevant Event "shall not be taken into account" when assessing the extension of time. I fail to see how that raises any issues of construction whatsoever."

3.6.1 Time Extension was Granted

Two out of six reviewed cases ruled to grant the contractor an EoT in respect of an occurred RE: *SMK Cabinets v Hili Modern Electrics Pty, Ltd. (1984)* and *Balfour Beatty Building, Ltd. v. Chestermount Properties, Ltd. (1993)*. The specifics of the first case, C1, were: (1) the contractor had already been in culpable delay; (2) the employer

had ordered variations after the contract completion date; (3) the contract did not have an EoT clause; and (4) the contractor had triggered the prevention principle. The case ruling was to the effect that the employer was not entitled to recover liquidated damages by stating that:

“The ordering of variations after the due date which must substantially delay completion will, unless the contract provides otherwise, and in the absence of an applicable extension of time clause, disable the proprietor from recovering or retaining liquidated damages”

The case proves that the prevention principle prevails when an RE occurs and is shown to have an effect on the completion date. The triggering of the prevention principle in that case was justifiable as an EoT clause was not present in the contract which shows to be one of the conditions justifying time becoming at large. The case can be analyzed as being ruled under the apportionment approach as the contractor was entitled to time extension for the period when the RE was dominating and not for the whole delay period.

Figure 10 shows a schematic timeline of C1 case ruling. The contractor’s delay was first dominating the completion date. After that, a variation occurred after time for completion for which the contractor did not achieve because of his own culpable delays. The contractor could not claim for time extension as the contract lacked a proper time extension clause, so the contractor had triggered the prevention principle stating that time has become at large. The contractor was granted time extension for the period of covered by the RE which had two different portions. The first portion of delay was concurrent with that of the contractor’s own culpable delay which granted the contractor

time extension only. The second portion of delay was the sole responsibility of the employer which granted the contractor time extension as well as extra compensation. The analysis of granting time extension will only occur in a retrospective manner with factual details and evidence.

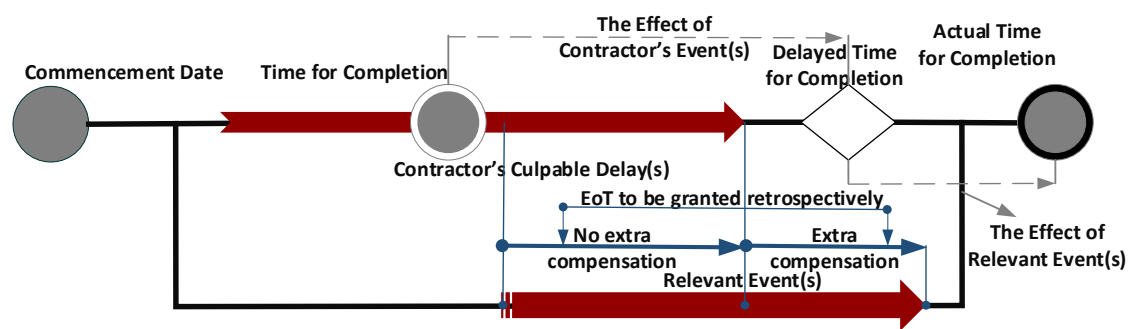


Figure 10 Schematic Timeline - SMK Cabinets v Hili Modern Electrics Pty, Ltd.

The second case, C2, dealt with: (1) a variation ordered after the due completion date, which had already passed due to contractor's culpable delays; (2) the engineer granted an extension of time to the effect of being applied from the original due date only; and (3) the contractor relied on the prevention principle, as the EoT allegedly needed to have been issued by taking account of the timing at which the variation was ordered. The ruling did indeed confirm granting the EoT on a net basis, that is, by benchmarking with the original completion date and adding the time extension needed to complete the variation to that specific date. O'leary (2014) described this ruling as if the EoT was applicable in a retrospective manner. This ruling

can best be described to have also relied on the apportionment approach, albeit the EoT having been of retrospective effect. As a result, the reliance on the prevention principle by the contractor can be said to have been deemed unjustifiable as the engineer granted a time extension for the period covered by the RE and which was affecting the project completion date.

Figure 11 shows a schematic timeline of the delays occurring in the case where the Engineer granted retrospectively time extension for the effect of the variation order. Figure 11 shows that the granting of a time extension retrospectively cannot trigger the prevention principle since the Engineer had granted time extension on a net basis. Regardless of when the variation order occurred, benchmarking the completion date and granting time extension will result in unjustifiably calling time to have become at large. This case can also be ruled under the apportionment approach where an EoT is granted only for the period needed to complete the VO irrespective of the other concurrent delay provided however that the contractor could prove that the RE did in fact affect the completion date beyond the delayed completion date.

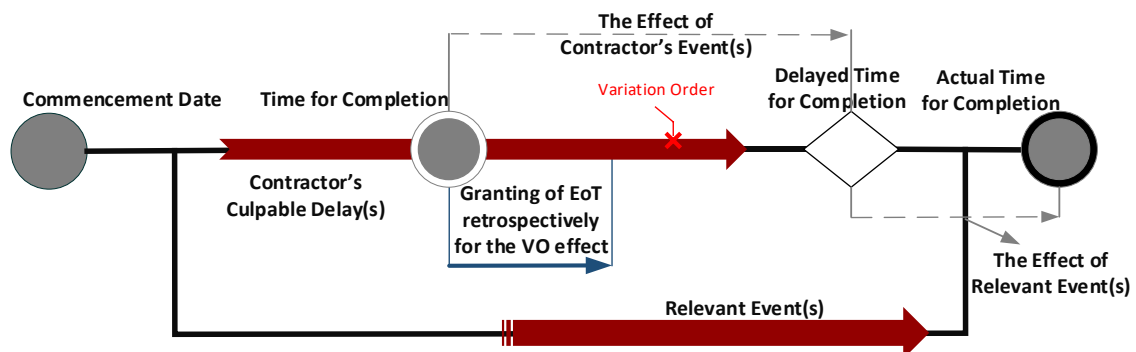


Figure 11 Schematic Timeline - Balfour Beatty Building, Ltd. v. Chestermount Properties, Ltd.

3.6.2 No Time Extension was Granted

Three out of the six cases were ruled on to the effect that the contractor was not entitled to any EoT: *Dhabi v. Sd Marine Services (2011)*, *Jerram Falkus Construction, Ltd. v. Fenice Investments, Inc. (2011)*, and *Saga Cruises BDF, Ltd. & Anor v. Fincantieri SPA (2016)*.

The basics of *Dhabi v. Sd Marine Services (2011)*, C3, were that: (1) the contractor was already in a culpable delay; (2) the RE did not affect completion date; (3) the contractor could not in any way prove retrospectively the effect of the RE on the completion date; (4) the contractor triggered the prevention principle; and (5) counterclaim was that the contractor did not satisfy notices. The case ruled that the contractor unjustifiably calling time to have become at large by triggering the prevention principle will not change the case ruling under the dominant approach. The contractor should prove causation in fact that the RE did affect completion date. That should only occur in a retrospective manner with the benefit of hindsight. The contractor should also satisfy notices if the notice is a condition precedent in order to allegedly claim for extra time extension.

The second case, *Jerram Falkus Construction, Ltd. v. Fenice Investments, Inc. (2011)*, C4, had the characteristics that: (1) the contractor was already in a culpable delay; (2) the time extension clause was deleted; (3) the contractor claim that the employer's and/or their servants prevented completion; (4) the contractor claimed that levying of liquidated damages is inoperable as the prevention principle applies; (5) contractor could not prove that the employer's and/or their servants prevented completion. The case ruled that the contractor is not entitled for time extension mainly

because: (1) the contractor could not prove that the employer's act prevented the completion and (2) the delays alleged to be the responsibility of the employer's servants did not cause any impact on the delayed completion date. This case was ruled under the dominant approach as the employer might have paced his works with the already existing dominant contractor's delay.

The third case, *Saga Cruises BDF, Ltd. & Anor v. Fincantieri SPA (2016)*, C4, had the basics of: (1) the contractor was responsible for delays between 2 and 16 March 2012; (2) the Owner was responsible for delays from 3 to 14 March 2012; (3) the contractor claimed that the contract did not have a general time extension clause and that the prevention principle applies. The case was ruled that the malmaison approach does not apply in this case because the completion date was delayed for reasons for which the contractor was responsible and that the employer's delays did not affect the project completion date. The case proves that even if the delays overlapped by some time, this does not indicate that concurrency is taking place. Concurrency should actually affect the completion date caused by the two overlapping events. The case was ruled under the dominant approach with no time extension granted to the contractor.

Even though the contractor had triggered the prevention principle and claimed that time had become at large in the three analyzed cases, the claim failed on the bases that: (1) the contractor was already in a culpable delay; (2) the RE did not affect completion date; and (3) the contractor could not in any way prove retrospectively the effect of the RE on the completion date. The justifiability of claiming that time had become at large failed in these three cases as the dominant approach stood in the way of allegedly triggering and relying the prevention principle.

The most recent case, *North Midland Building, Ltd. v. Cyden Homes, Ltd.* (2018), C6, had an amended EoT clause that excluded any entitlement for additional time when a RE occurs concurrently with a contractor's delay event. The contractor triggered the prevention principle by claiming that: (1) the employer had prevented him from completion; (2) no extended time was granted, thereby rendering time to have allegedly become at large; and (3) the EoT clause rendered inoperable. The claim failed on the grounds that: (1) the EoT clause was "crystal clear"; (2) no ambiguous wordings were present; and (3) the contractor had agreed on that clause when signing the contract. Had the clause not been amended, the contractor would have been granted an EoT for the period covered by the RE, provided, however, that the event did indeed prevent the contractor from finishing the works within the TfC. The case shows that clear contract language stood in the way of possibly relying on the Malmaison approach.

3.7 Conclusion

The analysis performed of selected legal cases shows that the sequencing and timing of the delay events play a major role in adopting one of the three approaches over the other. As such, it can be argued that employers might pace their delayed works proactively under the existence of a contractor's dominant delay cause, and vice versa. It can also be observed that in order for an EoT claim to be successful, the contractor carries the burden of proving that the RE causes delay to completion, using the factual events when conducting detailed delay analyses. The interpretation of the allegedly triggered prevention principle under a prevailing delay concurrency seems not to change

the approach to be relied on for ruling on a case on hand, unless the contract says otherwise. As such, clear contract language, addressing delay concurrency, can play a critical role in hindering the otherwise justifiable reliance on the prevention principle. The findings of the work presented can be of benefit to both dispute resolution practitioners as well as owners and contractors, alike. More specifically, contractors are made warier of needing to avoid unjustifiably triggering the prevention principle, as the odds seem to indicate that it has a limited capacity to serve the contractor's interests under delay concurrency situations.

CHAPTER 4

INTERACTION AMONG TIME-AT-LARGE, DELAY CONCURRENCY, AND GLOBAL CLAIM

4.1 Concurrency under Time-at-large conditions – Recapping

Chapter III dwelled upon identifying the characteristics of each adopted approach that were performed under concurrency on one hand and the triggering of the prevention principle by the contractor on the other hand.

- Malmaison Approach:

- Two delays occurring at the same time, one of which is a RE and the other is the contractor's delay event.

- Both delays affect the completion date; absent the other will still affect completion date.

- The contractor can prove that the RE affects completion date.

- Dominant Approach:

- The contractor was already in a culpable delay.

- The delay events occurred sequentially.

- The RE did not affect completion date.

- Contractor could not show that the RE caused a delay to the completion date.

- Apportionment Approach:

- Dominancy could not be proven.

- Existing delays occurred simultaneous, true concurrency exist.

- Contractor could prove that the RE affected part of the overall delay to the time for completion

The triggering of the prevention principle by the contractor under a prevailing concurrency seems not to have change the approach to be relied on for ruling on a case on hand. This shows that even if the contractor had triggered the prevention principle, delay concurrency will prevail under the different characteristics of each adopted approach unless the contract says otherwise.

4.2 Burden of Proving Reasonable Time

When contractors call time to have become at large using one of the three conditions that justify calling time at large: (1) prevention by the employer; (2) failure of the extension time mechanism; and (3) waiver by the employer to contractually set a new completion date. Even if concurrency exist upon calling time to have become at large, the contractor is obliged to finish the works within what is deemed to be a reasonable time under the circumstances under which the work execution has been done.

Mehdi (2018) focused on two schools of thought when computing the reasonable time: (1) when the time risk structure remains enforceable after time being called at large and (2) when the risk structure lapses. The two schools of thought offered in the literature can be a benefit to determine which participant is liable for proving if the time taken by the contractor was reasonable or not.

4.1.1 Time Risk Structure Remains Enforceable

Pickavance (2005) explains when the contractor computes the reasonable time: “In these circumstances the contractor may be entitled to the contract period together with any additional time caused by the employer’s time risk events stipulated under the contract (which, depending upon the contract may include everything that is beyond the contractor’s control).” The burden of proving the needed overall reasonable time rests on the contractor by showing the needed time which covers all the employer’s risk events and any force majeure events that are beyond the control of the contractor (Mehdi, 2018).

Mehdi (2018) pointed out two ways in which the contractor can prove that the time needed to finish the works is reasonable:

1. By conducting a prospective analysis: The contractor prospectively updates the project schedule and with each update a new completion date is produced. The final completion date will be determined when the last update is being produced. One cannot create a schedule which shows all the flow of activities from the moment the contractor declares that time has become at large in one shot. The schedule updates are critical to the circumstances under which the contractor is obliged to be in and the interrelationship with new emerging ones. The contractor cannot predict these circumstances from the start.
2. By conducting a retrospective analysis: In this case the contractor may resort to any of the delay analysis methods or to the AACE (the Association for the Advancement of Cost Engineering) protocol forensic delay analysis methods. However, multiple factor may affect the results of such analyses or even to

choose one of the analysis methods, as mentioned earlier. The presence of contemporaneous schedule updates and record availability will certainly increase the accuracy of the method being used.

4.1.2 Time Risk Structure Lapsing

Pickavance (2005) explains that when the time risk structure lapses: “as it is the employer’s breach that has set time at large, the employer should not be entitled to maintain its right under the contract for the contractor to prove its entitlement to any more time that it needs. In those circumstances, so the argument runs, the burden of proof should shift to the employer to show that the time actually taken is unreasonable in all the circumstances that then exist.” Mehdi (2018) added: “That being said, the overall reasonable time would be the actual time taken to complete minus the time caused by events that fall under the control of the Contractor. The Employer will have to conduct a retrospective exercise (probably an As-Built But-For Analysis) either by directly using the schedule updates produced by the Contractor, or by recreating them in case they were not available. Such exercise consists of collapsing as-built schedules by removing the delaying events which are considered to be under the control of the Contractor.”

4.1.3 Conclusion

Mehdi (2018) concluded that when the contractor is in culpable delay the time risk structure will remain enforceable for that delay period. The employer, in that case, has the right to levy liquidated damages for this period. The contractor is responsible to show the new target date to complete the works either by presenting a prospective or a retrospective time analysis and to prove that the time taken to finish the works was reasonable giving the circumstances in which he is obliged to finish the works in.

On the other hand, when the employer is the one liable for preventing the contractor from finishing the works by a deterrent act he committed, then the risk structure would lapse. The employer, in that case, cannot levy liquidated damages, and the burden of prove shifts to him. The employer is responsible to prove that the time taken to finish the works is unreasonable through a retrospective time analysis. Mehdi (2018) mentioned that when the time risk structure lapses: “some contractual provisions would no longer be applicable after the Employer prevented the Contractor from meeting the Time for Completion agreed upon.”

4.3 Computation of the Reasonable Time

Regardless of the time risk structure is assumed to have been enforceable or lapsed, the contractor needs to compute the reasonable time to be taken by him. Abdul-Malak and Mehdi (2019) proposed a framework in assessing the reasonable time for the contractor to complete the works under a time-at-large situation. The framework consists of:

- Initially warranted EoT: an estimate of the initial or virtual EoT that may have been granted to the contractor

- Effect of the initial set of circumstances: the contractor, in a time-at-large situation, may probably suffer from incurred prolongation-related expenses. This may affect the progress rate of the works leading to delays that will stretch the reasonable time even further

- Interaction with new relevant events: new emerging employer's risk events may normally come around, such as variations by the employer and delayed payments. A new set of circumstances will be generated leading to a new target date

- Dynamic impact of the circumstances: the target date is assumed to be a moving target date with every schedule revision due to the additional circumstances interacting with the already existing ones. Abdul-Malak and Mehdi (2019) added: "... the contractor to maintain consecutive assessments of the impacts of these governing circumstances the way they are read at each desired point in time." The target date may end up either pushing forward or pulling back, depending on how continuously the circumstances are affecting the project.

Abdul-Malak and Mehdi (2019) proposed that the contractor needs to follow the submissions of updated and revised schedules. These schedules should reflect:

- Fully updated information on the completed activities
- Updated information concerning the start dates of the ongoing activities
- The contractor's prospective estimates of the completion dates for the ongoing activities, and

- The contractor's prospective estimates of the start date and duration for each activity that is yet to be launched at the time any such hybrid schedule is being generated.

Abdul-Malak and Mehdi's (2019) proposed model aims at guiding the contractor to produce schedule updates and revisions continuously throughout the reasonable time. Since the circumstances are bound to evolve with time, the work progress will likely be affected. Abdul-Malak and Mehdi (2019) added: "... the best and most accurate approach for doing that would be for the contractor to periodically conduct prospective scheduling analyses, starting at the time when the T@L calling is made."

4.4 Global Claims

Upon calling time to have become at large, the contractor may assume that he is no longer obliged to submit updated schedules. Instead, he might have the option to sell his loss through a global claim once the actual time for completion has been served.

When contractors put forward a global claim, it is often the case when they could not or would not determine a causal link between each cause of delay and its effect, as explained in Chapter II. However, contractors tend to claim the whole loss as a global claim as they may not want to adduce the causal link but rather the total amount of loss has been incurred due to the collection of the event causes all together.

4.4.1 Success and Failure Factors of a Global Claim

Contractors often face delays and disruptions that lead to increased costs and late completion of projects which is the reason behind claiming for time extension

and/or extra compensation. When filing for a claim, contractors are expected to establish the causal link between each loss with its corresponding causing event. Difficulties arise when providing such detailed, time consuming, and costly analysis, they resort to putting forward a global claim instead. Contractors may believe that this simple approach is the easy way out; however, global claims can be extremely complicated to construct and claim for. Demashkieh et al. (2020) added: “That is, contractors shall be prepared to deal with the multifaceted reasoning underlying the presentation of a global claim in order to ensure its admissibility and improve its chances of success.”

Demachkieh et al. (2020) analyzed numerous industry-reported case law review involving global claims. The analysis of case laws determined the success and failure factors in which it can be related with establishing the contractual basis for a global claim.

4.4.1.1 Success Factors of a Global Claim

Demachkieh et al. (2020) analyzed 13 cases contributing to the success of a global claim. Six success factors were filtered out and presented in a decreasing order of occurrence frequency:

- Success Factor 1: Impracticable or impossible to particularize (i.e., establish the causal nexus between each event and the attributed loss)
- Success Factor 2: Sufficient or adequate particularity (i.e., a balance between excessive particularity and basic information)

- Success Factor 3: Reasonableness of the contractor's actual incurred costs
- Success Factor 4: Contractor not unreasonably delaying the claim and/or himself creating the difficulty
- Success Factor 5: Reasonableness of the contractor's bid price
- Success Factor 6: Lack of the contractor's responsibility for the added costs

4.4.1.2 Failure Factors of a Global Claim

Demachkieh et al. (2020) analyzed 11 cases contributing to the failure of a global claim. Three failure factors were filtered out and presented in a decreasing order of occurrence frequency:

- Failure Factor 1: Failure to plead the case with sufficient or adequate particularity and facts (i.e. inability to quantify the effect of disruption, etc.)
- Failure Factor 2: Failure to eliminate from the causes of his loss and expenses all matters that are not responsibility of defendant of Failure to prove the costs incurred were due to faults by defendant
- Failure Factor 3: Failure to eliminate from the causes of his loss and expenses all matters that are not responsibility of defendant or Failure to prove the costs incurred were due to faults by defendant

4.4.1.3 Re-emergence of Global Claims

Demashkieh et al. (2020) tackled two new case laws that show a major shift in legal analysis of global claims. The two cases were *John Doyle Construction Limited v. Laing Management (Scotland) Limited (2004)* and *Walter Lilly & Company, Ltd. v. Mackay & Anor (2012)*.

Demashkieh et al. (2020) shows that the success of the first case was that: “The court confirmed that there is no problem with submitting a global claim if it exists a large number of interrelating events and the loss linked to each of these events cannot be proven. As long as John Doyle can determine or prove those events, the accountability of Laing for each of them, their contribution in producing the global loss, and the method for computing the loss incurred, the claim can be successful.”

The decision in this case made a huge shift from the previous analyzed cases. Three main changes were reported by Demashkieh et al. (2020) which are as follows:

- ...even where the loss has been caused both by events for which the employer is responsible and by others for which he is not accountable, the global claim can still be successful if those for which the employer is liable are the main cause of loss: “... if an event or events for which the employer is responsible can be described as the dominant cause of an item of loss, that will be sufficient to establish liability, notwithstanding the existence of other causes that are to some degree at least concurrent...”
- In cases where it is unfeasible to recognize the dominant cause of the loss, and the causes of damages are actually concurrent, a global claim may partly succeed. Accordingly, it may be possible for the court to apportion liability for the loss amid those events for which the defendant is liable and other events.

- The merits of a global claim and its chances of success are not likely to be specified at an “interlocutory stage”. The matter of whether causation can be demonstrated should usually be postponed until the trial when all the particularity and evidence is submitted, and, therefore, it may not be determined at some “interlocutory stage” upon the submission of a request to strike out.

The second case analyzed by Demashkieh et al. (2020) shows three significant changes on global claims that are as follows:

- It is no longer a necessity for a contractor to prove that it is impossible or impractical to separate the consequence of each head of claim (i.e., establish the causal nexus between an employer’s risk event and the resultant loss and/or expense suffered). The impossibility of establishing the causal nexus should not be due to the contractor’s fault.

- Global claims are not expected to fail if they include events for which the employer is not liable.

- The contractor will need to adduce evidence that it would not have suffered the loss in any event.

Demashkieh et al. (2020) stated that: “in the view of Judge Akenhead in Walter Lilly case, the unreasonable delay by the contractor in making his global claim does not impede the success of the claim at trial.” According to the two recent cases, it is also not a prerequisite for the contractor to show that it is impracticable or impossible to particularize, which is the first success factor as well as the third failure factor.

Demashkieh et al. (2020) added that: “However, John Doyle and Walter Lilly cases show that even if the global claim contains an event that is not the fault of the employer,

it does not imply that the contractor will not recover a part of the claimed damages, and the award thus depends heavily on the significance of this event.” The change seen by the above discussed two case laws shows that the court is taking a more lenient approach when it comes to global claims.

The shift in the legal analysis of global claims concluded that the contractors has to satisfy two principles in order to enhance the probability of a global claim to succeed. Demashkieh et al. (2020) tackled the two principles namely: “(1) not having unreasonably delayed making the claim, and (2) proving the reasonableness of both his tender price and the actual incurred costs.”

The success/failure factors as well as the apportionment approach taken by the court in the above discussed two case laws shows that courts are taking a more lenient approach towards global claims as the second edition of the SCL Protocol stated. This proves that the contractor may resort to the approach of filing a global claim with respect to the extra costs incurred within what deemed to be a reasonable time even though delayed events not attributed to the employer may exist and may be concurrent with the employer’s events as well.

CHAPTER 5

SURFACING OF GLOBAL CLAIM UNDER TIME-AT-LARGE

5.1 Theoretical Model – Foundation

This Chapter is based on the findings of both chapters III and IV in order to formulate a theoretical model on the multiple scenarios a contractor can pursue in order to validate the success of a global claim. Based on either FIDIC 1999 or FIDIC 2017 standard conditions of contract, the contractor may have the advantage to package his claim through a global claim rather than an incident-based claim.

Chapter III concludes that calling time to have become at large by the contractor may not change the adopted approach, in ruling on a case in hand, under a prevailing concurrency case. Chapter IV shows different scenarios of each participant having the burden of proving that the reasonable time, taken by the contractor, was reasonable or not. The chapter ended by stating if the contractor opted to sell the reasonable time through a global claim, factors needs to be maintained to a success of a global claim. These factors are of a benefit to the contractor to determine the success probability of a global claim.

The next part of this chapter dwells upon a schematic framework that shows the various variables that changes upon claiming the loss incurred by the contractor as a global claim. The next part of this chapter expands on the potential interplay between concurrency, time-at-large, and the reasonable time being packaged as a global claim. The theoretical models consist of two possible tracks that the contractor chooses from.

It further focuses on the different timings the contractor packages his claim as a global claim from a cost perspective on one hand and from time and cost on the other.

5.2 FIDIC 1999 and 2017 Claim/Dispute Timeline

For the contractor to package his claim as either an incident-based claim or a global claim, he needs to initiate his claim based on what the construction contract adopts.

Under the FIDIC 1999 standard conditions, the claim/dispute timeline illustrated in Figure 12 is stipulated under “Clause 20 Claims, Disputes, and Arbitration”. Delay event(s) or circumstance should occur for the contractor to initiate the claim. The contractor should submit a notice of claim within 28 days from when the contractor became or should have become aware of the delay event(s) or circumstances giving rise to the claim. Once the notice is submitted, the contractor can proceed to submit a fully detailed claim within 42 days after the contractor became aware (or should have become aware) of the delay event(s) or circumstance giving rise to the claim. After the contractor submits the fully detailed claim, the engineer shall, within 42 days, proceed to give determination. Once the engineer’s determination or the lack of determination is rendered, the contractor can refer the dispute to the adjudication board.

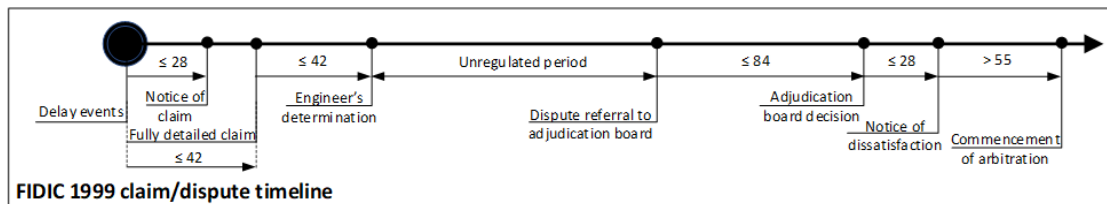


Figure 12 FIDIC 1999 Claim/Dispute Timeline

The contractor may refer the dispute to the adjudication board at any point thereafter. Within 84 days after receiving the dispute, the adjudication board shall give its decision which shall be binding to both parties. If either party is dissatisfied with the decision, then the party may issue a notice of dissatisfaction within 28 days. When the notice of dissatisfaction is issued then both parties shall attempt to settle the dispute amicably before the commencement of arbitration.

Under the FIDIC 2017 standard conditions, the claim/dispute timeline illustrated in Figure 13 is stipulated under “Clause 20 Employer’s and Contractor’s Claims” and “Clause 21 Disputes and Arbitration”. Delay event(s) or circumstance shall occur for the contractor to initiate the claim. The contractor is required to submit a notice of claim within 28 days from when the contractor became or should have become aware of the delay event(s) or circumstances giving rise to the claim. Once the notice is submitted, the engineer can issue an initial response within 14 days to indicate if the notice of claim submitted by the contractor is relevant. The contractor further submits a fully detailed claim within 84 days after the contractor became aware (or should have become aware) of the delay event(s) or circumstance giving rise to the claim. After the contractor submits the fully detailed claim, the engineer should, within 42 days, consult

with both parties to reach an agreement. If an agreement was not reached, then the engineer shall proceed to give determination within 42 days. Once the engineer's determination is rendered, the contractor can issue a notice of dissatisfaction within 28 days of the engineer's determination and then refer the dispute to the adjudication board within 42 days.

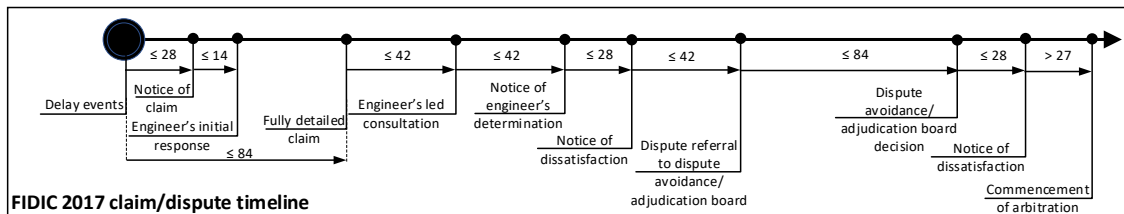


Figure 13 FIDIC 2017 Claim/Dispute Timeline

Within 84 days after receiving the dispute, the adjudication board shall give its decision which shall be binding to both parties. If either party is dissatisfied with the decision, then the party may issue a notice of dissatisfaction within 28 days. When the notice of dissatisfaction is issued, then both parties shall attempt to settle the dispute amicably before the commencement of arbitration.

Both claim/dispute timelines have similar time-bars and mechanisms. The referral to the adjudication board plays a major role that differentiates between the two claim/dispute timelines. The unregulated period in FIDIC 1999 became regulated with a fixed time-bar in FIDIC 2017.

5.3 Schematic Framework

In order for the contractor to claim his loss, he needs to fulfill the contract requirements pertaining to submitting a claim for extra time and/or compensation. In Figure 14, a schematic framework shows a typical claim/dispute process in light of the construction duration timeline along with either FIDIC 1999 or FIDIC 2017 standard conditions of contract. The claim/dispute process is divided into four stages: (1) claim administration, (2) dispute initiation, (3) adjudication decision I, and (4) adjudication decision II.

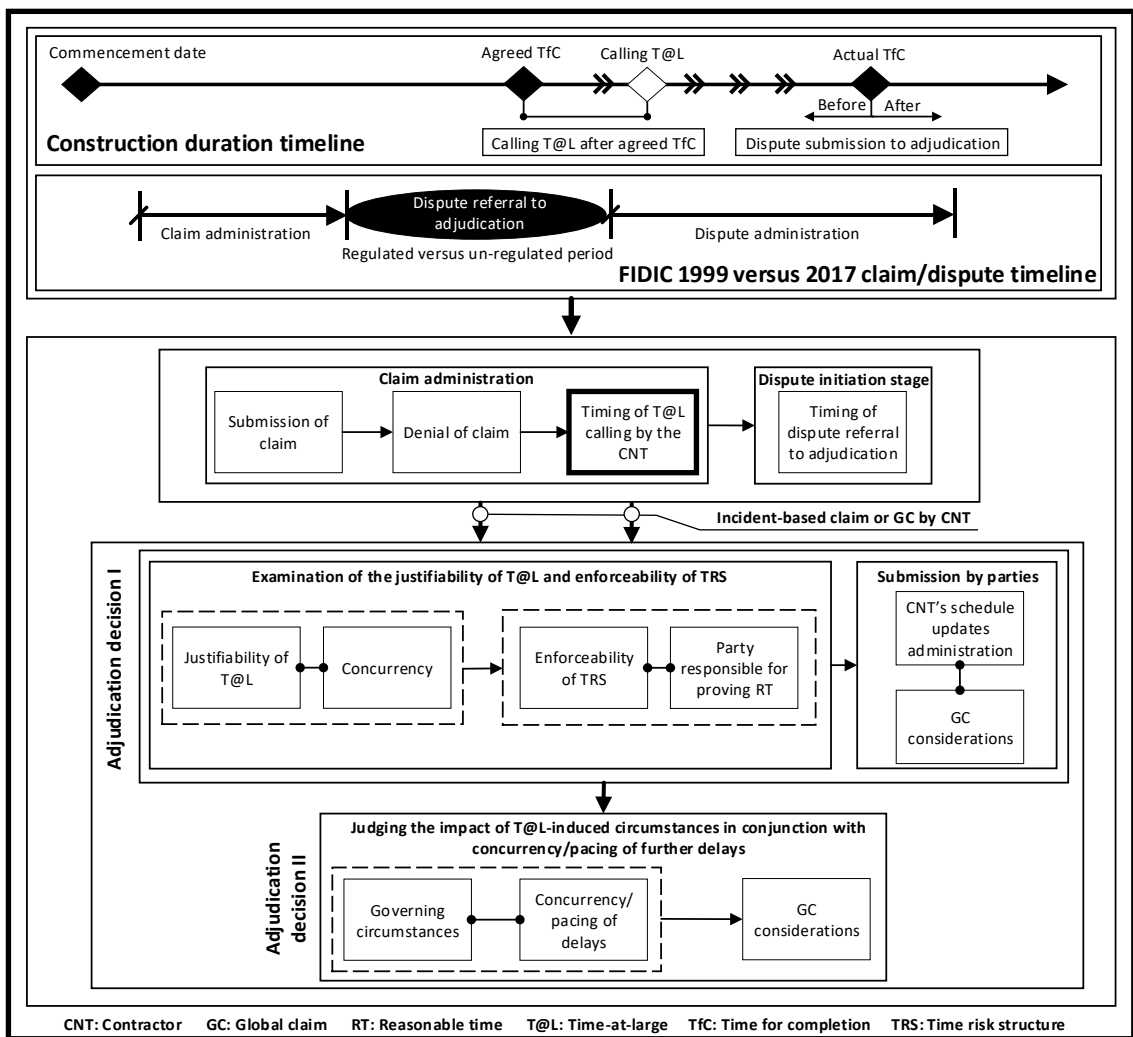


Figure 14 Schematic Framework

The claim administration stage initiates from the delay events occurring, being the responsibility of the employer, up to having the contractor call time to have become at large. This stage consists of the contractor submitting his claim under either FIDIC 1999 or FIDIC 2017. The contract engineer may deny the contractor's claim by responding that: (1) the EoT mechanism does not operate in that condition, (2) the contractor did not satisfy notice, or (3) the engineer waives his right to give

determination. The action or the lack of action by the contract engineer may lead the contractor to call time to have become at large. The assumption given in that framework is that the timing of calling time to have become at large is always after the planned or agreed time for completion has passed.

Dispute initiation stage occurs after the contractor had called time to have become at large. This stage has multiple variables as for the flexibility of referring the dispute to adjudication board. For FIDIC 1999, the contractor may refer the dispute in hand to the adjudication board either before or after the actual time for completion has passed. This can occur because of the unregulated period between the claim administration and the dispute administration stage. On the other hand, for FIDIC 2017, the contractor is unable to ignore the claim until after the time for completion has passed because of the regulated period after the determination given by the contract engineer. The contractor can either refer the dispute to adjudication board before the actual time for completion or if chances occurred, to refer the dispute to the adjudication board, exactly when the actual time for completion had occurred. In this stage, the contractor may proceed to two models for FIDIC 1999 as well as for FIDIC 2017. The first model shows the contractor claiming his loss based on a global claim and the second model shows the contractor claiming his loss through an incident-based claim.

After the referral of dispute to the adjudication board, a two-step decision approach occurs. To examine the justifiability of calling time-at-large by the contractor and the enforceability of time risk structure, the adjudication board initially decides if the justifiability of time-at-large was served in conjunction with the occurrence of delay concurrency. Then the enforceability of time risk structure is decided upon either having

the time risk structure to have lapsed or being enforceable. This is linked to the responsible party having to prove that the reasonable time taken by the contractor to being reasonable or not. Once the adjudication decision is served, the parties makes further submissions based on the contractor's schedule updates administration in correlation with the contractor having to consider to package the loss as a global claim.

Once the parties had made their submissions regarding the adjudication decision I, the adjudication board needs to examine the reasonable time taken by the contractor given the governing circumstances. To do so, the adjudication board may need to judge the impact of the time-at-large induced circumstances in conjunction with any concurrency and/or pacing of further delays. The time-at-large induced circumstances being concurrent or paced with further delays are the foundation of the adjudication decision II concerning the success or failure of a global claim consideration.

The claim administration process in Figure 14 does not differ if the contract follows FIDIC 1999 or FIDIC 2017. The dispute initiation stage varies in both standard conditions of contract by referring the dispute either before or after the actual time for completion has occurred and either claiming the loss as an incident-based claim or packaging the loss as a global claim. This variation is correlated with the parties making further submissions. On the other hand, the adjudication decision I and II do not vary for both standard conditions of contracts. Both decisions are not affected by the timing of the dispute initiation nor by submitting the claim through an incident-based claim or a global claim.

5.4 Adjudication Decision Stage

As discussed above, the adjudication decision stage does not vary if the contract follows the FIDIC 1999 or FIDIC 2017 standard conditions of contract. The two-step decision by the adjudication board shows the process in which the contractor may need to follow in order to put forward a claim for the loss incurred due to an occurring RE. The two-step decision examines the justifiability of time-at-large and the enforceability of time risk structure followed by the judgement of the impact of time-at-large induced circumstances in conjunction with concurrency and/or pacing of further delays.

5.4.1 Adjudication Decision I

The first decision done by the adjudication board starts with examining if the delays, that pushed the project beyond the agreed time for completion, were concurrent or not. If delay concurrency prevails, then an applicable concurrency treatment approach is adopted based on how the delays occurred. If the dominant approach was adopted, then the justifiability of time-at-large is not served and the contractor may submit a notice of dissatisfaction followed by proceeding the dispute to arbitration. If either the Malmaison or apportionment approach was adopted then the justifiability of time-at-large is served.

If the delays that pushed the project beyond its agreed time for completion were not concurrent and if the justifiability of time-at-large was served, then the burden of proving that the reasonable time taken by the contractor was reasonable or not is yet to be examined. These delays could be through either the contractor's culpable delays or a

Relevant Event(s) occurrence. If the contractor's culpable delay is the reason for delaying the project, then the time risk structure is enforceable. The burden of proving that the reasonable time taken by contractor was reasonable rests on the contractor. When the time risk structure is decided upon being enforceable and the delays were concurrent, this may occur in one case. Figure 15 shows case 1 that is based on the apportionment approach as having the contractor's culpable delay first dominating the project and is the delay that pushed the project beyond its agreed time for completion. The Relevant Event(s) being concurrent or paced with the dominating contractor's culpable delay do not affect the project at first until the dominancy shifts to the Relevant Event after the agreed time for completion has passed.

If the Relevant Event delayed the project then the time risk structure has lapsed. The burden of proving the reasonable time taken by contractor was unreasonable rests on the employer. Whenever the time risk structure has lapsed and delays were concurrent, this may occur in two cases. Figure 15 shows case 2 is based on the Malmaison approach as having the Relevant Event dominating the delay of the project concurrent or paced with the contractor's culpable delay. The contractor's delay is not affecting the delayed project time. Case 3 is based on the apportionment approach as having the Relevant Event first dominating the project and is the delay that pushed the project beyond its agreed time for completion. The contractor's delay being concurrent or paced with the dominating Relevant Event do not affect the project at first until the dominancy shifts to the contractor after the agreed time for completion has passed.

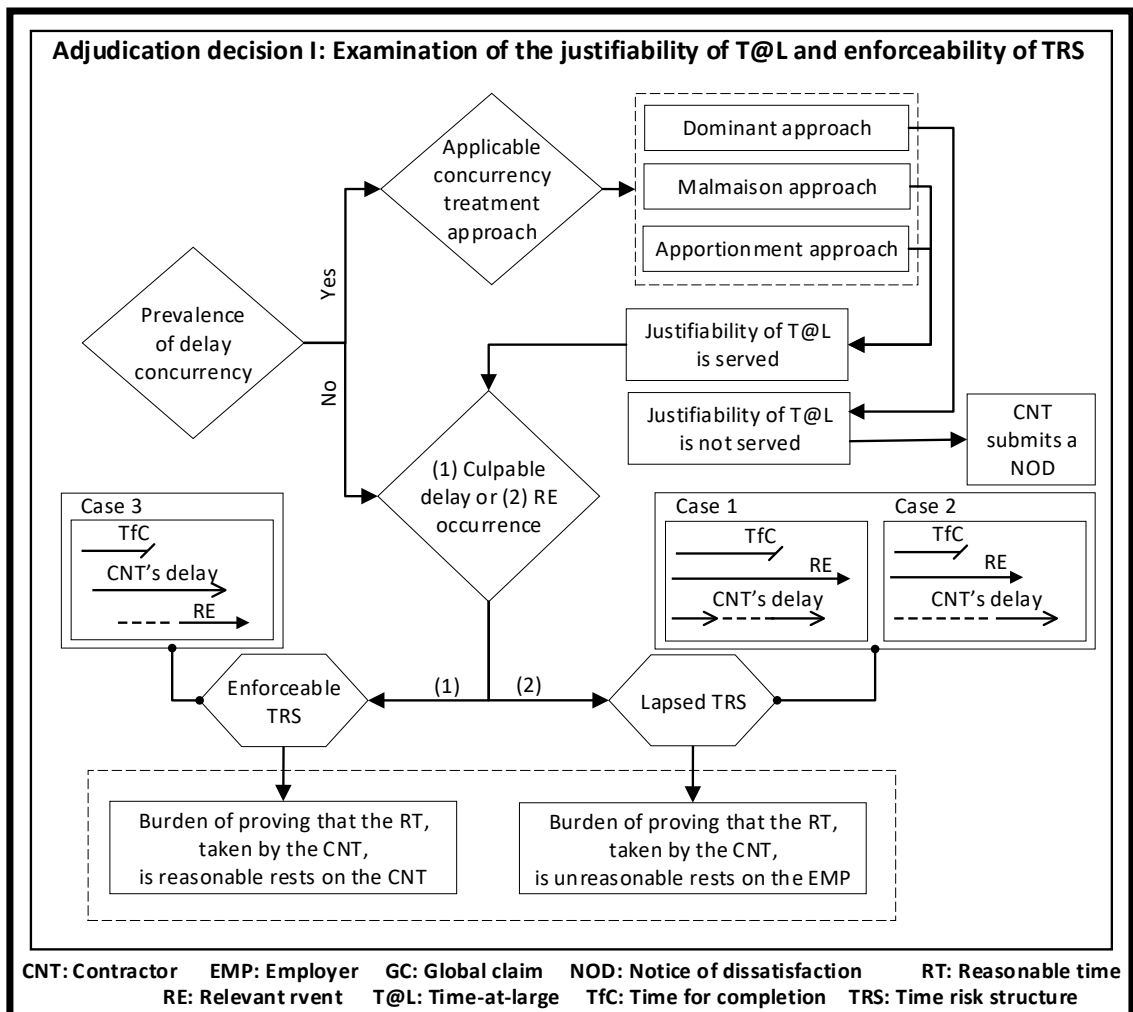


Figure 15 Adjudication Decision I

5.4.2 Adjudication Decision II

After the adjudication board had made the first decision, a second decision is made after the parties make their further submissions. Adjudication decision II, shown on Figure 16, is based on judging the impact of the time-at-large induced circumstances in conjunction with any concurrent and/or pacing of further delays that led the contractor to complete the project within what is deemed to be reasonable. It is to be

noted that this decision is a case-by-case decision and one cannot theorize what the decision of the adjudication board might be.

The standard process starts with observing the interaction between the time-at-large induced circumstances, the event that led the contractor to call time at large, with the interaction of new emerging events from either the employer or the contractor. The interaction between the existing circumstances with the new emerging ones threaten the contractor's ability to complete the project in lesser time than that of what is deemed to be a reasonable time. The grey shades in Figure 16 intends to imply that the disturbance of the contractor's capability to complete the project is hindered and is gradually aggravated with time. These time-at-large induced circumstances might have a concurrent effect with the new employer's or contractor's emerging events. The adjudication board needs to examine if the concurrency or pacing of events are an adoption of either dominant, Malmaison, or apportionment approach.

Once the concurrent or pacing approach is adopted and if the contractor had packaged his loss through a global claim, the adjudication board proceeds to judge the justifiability of the contractor's global claim. The judgment is based on the six factors that guides the adjudication board in the success of a global claim. If the contractor had claimed his loss through an incident-based claim then the last step may not be operable.

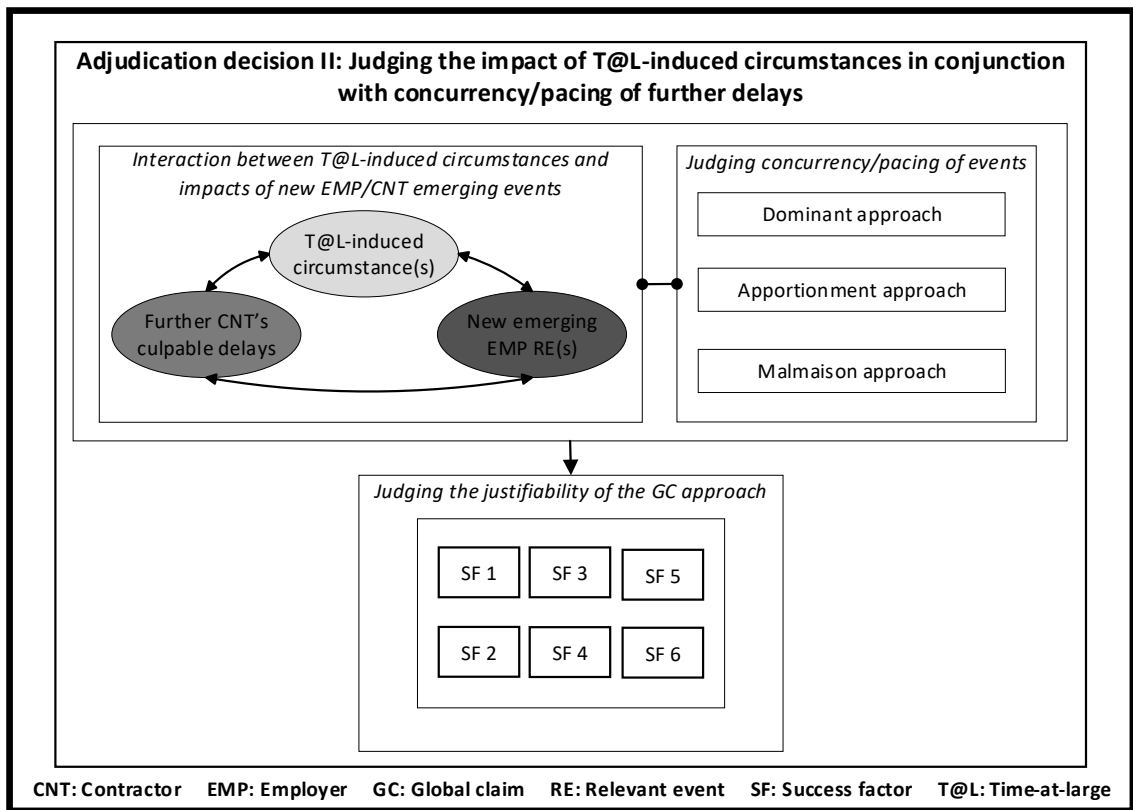


Figure 16 Adjudication Decision II

5.5 Theoretical Model 1

The first theoretical model illustrates the claim/dispute process in the event of referring the dispute to the adjudication board after the actual time for completion has passed. The first model shows the contractor claiming his loss based on a global claim.

In the dispute initiation stage, the contractor refers the dispute to the adjudication board by submitting a statement of case claiming that:

1. Time-at-large is justifiable,
2. The time risk structure has lapsed, i.e. the burden of proving that the reasonable time taken by the contractor was unreasonable rests on the employer, and

3. The extra-incurred direct and indirect cost is packaged through a global claim.

The contractor's scenario A shows global claim proposition 1. The model provides the contractor with guidelines with respect to the success factors if he aims to package his claim through a global claim and after the actual time for completion has passed.

- Success factor 1 shows that it prevails as the contractor is acting opportunistically by delaying the submittal of dispute until after the actual time for completion. This factor is no longer a prerequisite for the success of a global claim only if the impossibility of establishing a causal nexus is not due to the fault of the contractor. The court might have doubts about the success of a global claim if the causal nexus is possible to be established but was not used. The contractor's assumption that the time risk structure has lapsed made him believe that the burden of proving that the reasonable time to complete the project does not rest on him.

- Success factor 2 is likely to prevail from a cost perspective, as the contractor have sufficient and adequate particularity to the extra direct and indirect cost that was added during the reasonable time taken by the contractor.

- Success factor 3 is dependent on facts and is based on a case-by-case basis for the reasonableness of the contractor's actual incurred costs.

- Success factor 4 is likely to prevail as long as the claim is permissible on the facts and subject to proof. Even if the contractor delayed in making the claim or himself created the difficulty or the impossibility of proving the disentanglement, this factor is

still acceptable, based on the facts of the case. This factor is no longer a prerequisite according to the Walter lily's case.

- Success factor 5 is facts dependent and is based on a case-by-case basis for the reasonableness of the contractor's bid price.

- Success factor 6 is likely to prevail as the contractor is acting opportunistically for not showing his responsibility of the added costs as he is assuming that the extra costs were of effect of the Relevant Event that occurred before the agreed time for completion.

When the contractor submits his statement of case, the employer responds by showing that the alleged calling of time at large is not justifiable. The employer is not going to prove that the reasonable time taken was unreasonable because he may not want to show that the burden of proving the reasonable time rests on him.

Then, the adjudication board proceeds with their decision based on the contract parties' initial submission of their statement of case. The contractor's schedule updates administration can be assumed to have been either lax or progressive. This is dependent on the employer's insistence on enforcing the contract requirements pertaining to the schedule updates. If the adjudication board had decided that the time risk structure has lapsed, the burden of proving that the reasonable time taken by the contractor to have been unreasonable rests on the employer. The employer, in that case, is the claimant, and the contractor is the respondent. The employer makes further submissions using a retrospective delay analysis method to prove that the time taken by the contractor was unreasonable and the extra cost incurred was partially or wholly due to the contractor's own fault. This is dependent on the contractor's schedule updates administration and the

evidence the employer has in hand. The respondent, contractor, resorts to the scenario B that shows global claim proposition 2. The contractor keeps claiming the loss incurred through a global claim for time and cost as the contractor may show that the time taken by him to complete the works was indeed reasonable.

If the adjudication board had decided that the time risk structure was enforceable, the burden of proving that the reasonable time taken by the contractor to have been reasonable rests on the contractor. The contractor, in that case, is the claimant, and the employer is the respondent. The contractor resorts to scenario C that shows global claim proposition 3. The contractor insists on claiming the loss incurred through a global claim for time and cost as the contractor may show that the time taken by him to complete the works was reasonable in addition to the incurred cost that was due to the employer's Relevant Event. The respondent, employer, makes further submissions using a retrospective delay analysis method to prove that the time taken by the contractor was unreasonable and the extra cost incurred was partially or wholly due to the contractor's own fault. This is also dependent on the contractor's schedule updates administration and the evidence the employer has in hand.

Proposition 2 and 3 guides the contractor in the possibility of the success or failure of packaging the claim as a global claim:

- Success factor 1 shows that it prevails with a higher probability when the contractor's schedule updates administration is assumed to have been progressive. The contractor shows that with every updated schedule, he is unable to establish a cause-effect link between each cause of delay and its own effect.

- Success factor 2 is likely to prevail from a cost and time perspective as the contractor have sufficient or adequate particularity for the extra direct and indirect cost that was added during the reasonable time. The contractor also have sufficient information and evidence that the time taken to finish the works by him was reasonable.

- Success factor 3 is facts dependent and is based on a case-by-case basis for the reasonableness of the contractor's actual incurred costs.

- Success factor 4 is likely to prevail as long as the claim is permissible on the facts and subject to proof. Even if the contractor delayed in making the claim or himself created the difficulty or the impossibility of proving the disentanglement, this factor is still acceptable, based on the facts of the case. This factor is no longer a prerequisite according to the Walter lily's case.

- Success factor 5 is facts dependent and is based on a case-by-case basis for the reasonableness of the contractor's bid price.

- Success factor 6 is likely to prevail even when the apportionment approach is applicable for ruling on delay concurrency. This factor is no longer a prerequisite for the success of a global claim as per Walter Lily's and John Doyle's case. Even if part of the claim was due to the contractor's fault, the claim is not going to fail in its entirety.

After the parties had made further submissions according to the adjudication decision I, the adjudication board proceeds to give their second decision. Adjudication decision II cannot be theorized, as it is varied based on the conditions of the case.

Proposition 1, 2, and 3 in Figure 17 demonstrates grey shades that intends to show the correlation of the success of a global claim with the employer's submissions. The lighter shade shows that the success of a global claim is higher than the darker

ones. Proposition 1 shows that the success of a global claim is higher since there is not any responses by the employer. Proposition 2 shows that the success of a global claim is low since there are two responses by the employer which might limit the success of a global claim to a partial global claim. Proposition 3 shows that the success of a global claim is moderate since there is one response by the employer that might or might not limit the success of a global claim.

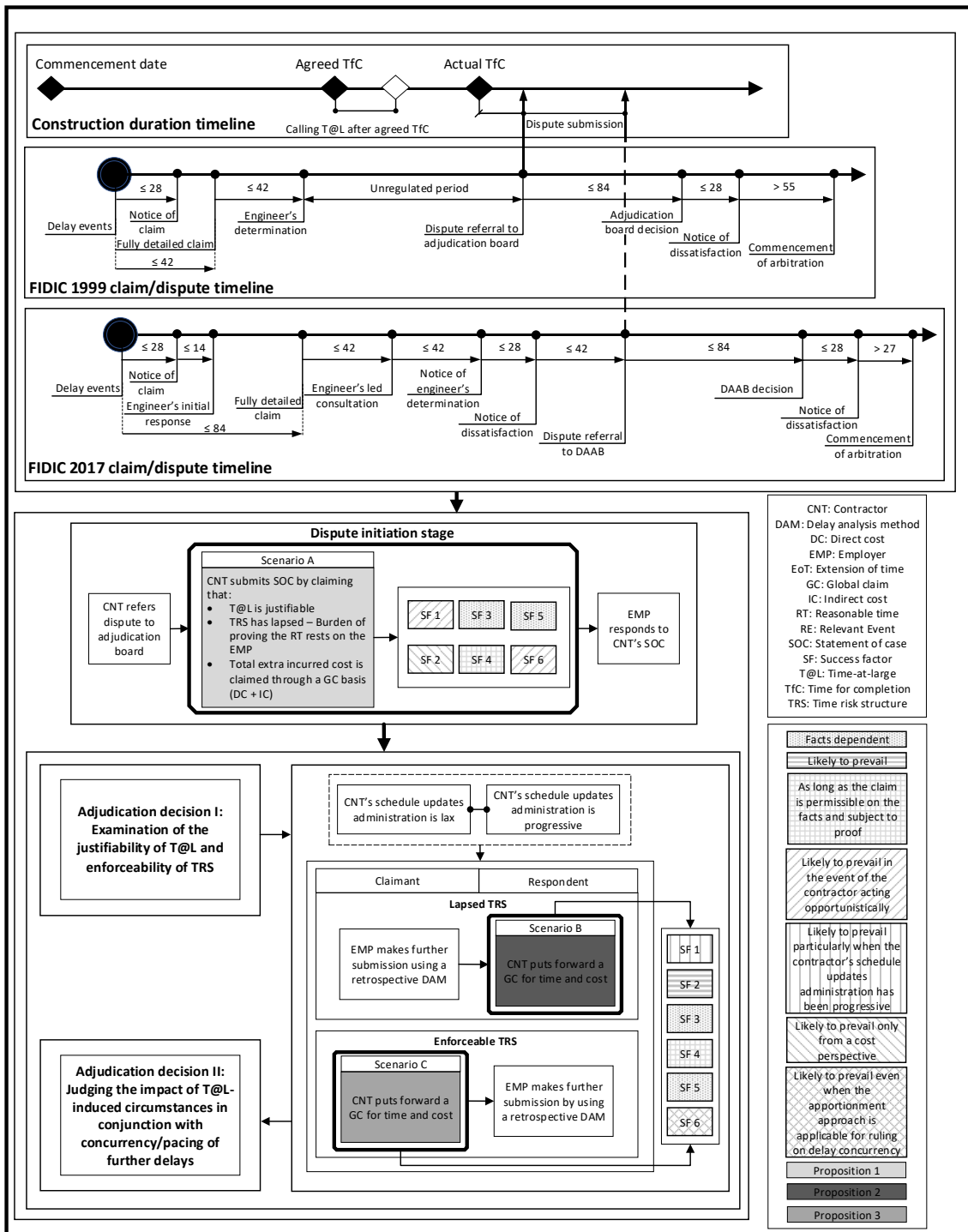


Figure 17 Theoretical Model 1

5.6 Theoretical Model 2

The second theoretical model illustrates the claim/dispute process in the event of referring the dispute to the adjudication board before the actual time for completion has passed. The second model shows the contractor claiming his loss through either an incident-based claim or a global claim.

In the dispute initiation stage, the contractor refers the dispute to the adjudication board, resorting to scenario D, by submitting a statement of case for the adjudication to decide upon:

1. The justifiability of time-at-large
2. The party responsible for proving the reasonable time taken by the contractor to complete the works

The contractor refers the dispute to the adjudication board before the actual time for completion for preventive measures and in order for the employer not to levy liquidated damages. After the contractor's submission of the statement of case, the employer responds by showing that the calling time to have become at large by the contractor is unjustified. The employer is not going to take the time to analyze if the reasonable time, to be taken by the contractor, is unreasonable. The reasonable time at this stage is not identified yet.

Then, the adjudication board proceeds with their decision based on the contract parties' initial submission of their statement of case.

If the adjudication board had decided that the time risk structure has lapsed, the burden of proving that the reasonable time taken by the contractor to have been unreasonable rests on the employer. The employer, in that case, is the claimant, and the

contractor is the respondent and can respond in two different scenarios. The employer makes further submissions using a retrospective delay analysis method to prove that the time taken by the contractor was unreasonable. This is dependent on the information and evidence the employer has in hand. The contractor, by resorting to scenario E, makes further submissions using also a retrospective delay analysis method and addresses the weaknesses of the employer's submission by showing that the effect of the Relevant Event(s) is pushing the time for completion even further. Scenario E occurs when the contractor's schedule updates administration can be assumed to have been progressive. This can be seen that the contractor is updating and revising the schedule on a window basis. The contractor, by resorting to scenario B, makes further submissions by packaging his claim through a global claim for time and cost. Scenario B, shows global claim proposition 2, occurs when the contractor's schedule updates administration can be assumed to have been either progressive or lax or a combination of the two. The contractor, in that case, can only submit updated schedules without any revision to that schedule. This is due to the fact that the contractor's ability to foresee the impact of the circumstances on the activities is lost. When the contractor's schedule updates administration is assumed to have been progressive, this supports the global claim by showing the impossibility of establishing the causal nexus between the delay cause and its attributed loss.

If the adjudication board had decided that the time risk structure was enforceable, the burden of proving that the reasonable time taken by the contractor to have been reasonable rests on the contractor. The contractor, in that case, is the claimant and can proceed in two different scenarios, and the employer is the respondent. In

Scenario F, the contractor makes further submissions using a prospective delay analysis method because of the schedule updates administration is assumed to have been progressive. Scenario C, shows global claim proposition 3, may be when the contractor packages his claim through a global claim for time and cost. Scenario C occurs when the contractor's schedule updates administration can be assumed to have been either progressive or lax or a combination of the two. Scenario F occurs before the actual time for completion as opposed to Scenario C where it occurs after the actual time for completion has passed. The respondent, employer, makes further submissions using either a prospective or a retrospective delay analysis method, depending on the contractor's submission, to prove that the time taken by the contractor was unreasonable and the extra cost incurred was partially or wholly due to the contractor's own fault. This is also dependent on the contractor's schedule updates administration and the evidence the employer has in hand.

Proposition 2 and 3 guides the contractor in the possibility of the success or failure of packaging the claim as a global claim. The grey shades in Figure 18 intends to show the correlation of the success of a global claim with the employer's submissions.

- Success factor 1 shows that it prevails with a higher probability when the contractor's schedule updates administration is assumed to have been progressive. The contractor shows that with every updated schedule, he is unable to establish a cause-effect link between each cause of delay and its own effect.

- Success factor 2 likely to prevail from a cost and time perspective as the contractor have sufficient or adequate particularity for the extra direct and indirect cost

that was added during the reasonable time. The contractor also have sufficient information and evidence that the time taken to finish the works by him was reasonable.

- Success factor 3 is facts dependent and is based on a case-by-case basis for the reasonableness of the contractor's actual incurred costs.

- Success factor 4 likely to prevail as long as the claim is permissible on the facts and subject to proof. Even if the contractor delayed in making the claim or himself created the difficulty or the impossibility of proving the disentanglement, this factor is still acceptable, based on the facts of the case. This factor is no longer a prerequisite according to the Walter lily's case.

- Success factor 5 is facts dependent and is based on a case-by-case basis for the reasonableness of the contractor's bid price.

- Success factor 6 is likely to prevail even when the apportionment approach is applicable for ruling on delay concurrency. This factor is no longer a prerequisite for the success of a global claim as per Walter Lily's and John Doyle's case. Even if part of the claim was due to the contractor's fault, the claim is not going to fail in its entirety.

Proposition 2 and 3 in Figure 18 demonstrates grey shades that intends to show the correlation of the success of a global claim with the employer's submissions. The lighter shade shows that the success of a global claim is higher than the darker ones. Proposition 2 shows that the success of a global claim is low since there are two responses by the employer which might limit the success of a global claim to a partial global claim. Proposition 3 shows that the success of a global claim is moderate since there is one response by the employer that might or might not limit the success of a global claim.

After the parties had made further submissions according to the adjudication decision I, the adjudication board proceeds to give their second decision. Adjudication decision II cannot be theorized, as it is varied based on the conditions of the case.

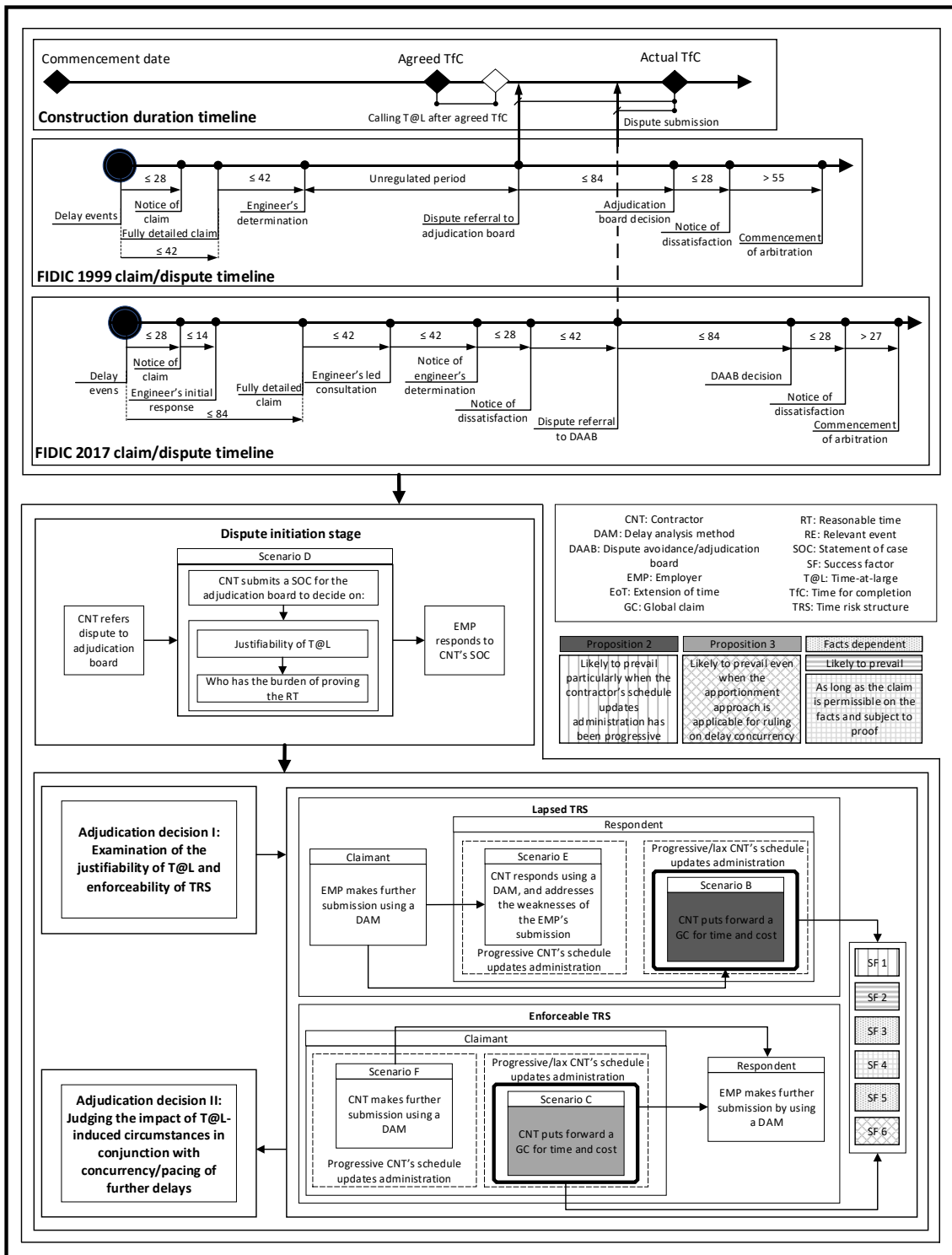


Figure 18 Theoretical Model 2

5.7 Characteristics of the Scenarios

As shown from Theoretical Model 1 and 2, the contractor has six different scenarios when submitting his claim under FIDIC 1999 and 2017 standard conditions of contract. The characteristics of each scenario differs based on the timing of the submissions, the decision made by the adjudication board, and the contractor's schedule updates administration.

The characteristics of scenario A:

- The contractor adopts the justifiability of time-at-large
- The contractor assumes that the time risk structure has lapsed
- The contractor does not need to prove the reasonable time because the burden of prove does not rest on him
- The contractor has intentionally delayed the referral of dispute to adjudication board until after the actual time for completion has passed
- The contractor claims the whole incurred cost as a global claim
- The contractor has the facts and evidence as to the reason of packaging the claim through a global claim rather than an incident-based claim
- Scenario A represents proposition 1 through which the contractor packages his claim as a global claim based on an opportunistic behavior.

The characteristics of scenario B:

- If the contractor's schedule updates administration is assumed to have been progressive then the contractor could prove that the reasonable time taken by him was justified and the incurred costs were due to the Relevant Event(s). This could prove that

with each updated schedule, the contractor is unable to link each cause of delay to its own effect. This action is done through a prospective delay analysis method.

- If the contractor's schedule updates administration is assumed to have been lax then the contractor could prove that it is impossible to foresee the start of the activities and could not estimate the time needed to complete the works because of the interaction between the governing circumstances and the new emerging events. The contractor resorts to a retrospective delay analysis method.

- Irrespective of the contractor's schedule updates administration, the contractor responds to the employer's further submissions that the delay is due to the time-at-large induced circumstance that is being of effect that caused the delay in completing the works on one hand and the start and finish of activities on the other hand.

- Scenario B represents proposition 2 through which the contractor packages his response to the analysis submitted by the employer on the basis of global claim taking into consideration two cycles of submissions by the employer.

The characteristics of scenario C:

- If the contractor's schedule updates administration is assumed to have been progressive then the contractor could prove that the reasonable time taken by him was reasonable and the incurred costs were due to the Relevant Event(s). This could prove that with each updated schedule, the contractor is unable to link each cause of delay to its own effect. This action is done through a prospective delay analysis method.

- If the contractor's schedule updates administration is assumed to have been lax then the contractor could prove that it is impossible to foresee the start of the

activities and could not estimate the time needed to complete the works because of the interaction between the governing circumstances and the new emerging events. The contractor resorts to a retrospective delay analysis method.

- Scenario C represents proposition 3 through which the contractor packages his response to the analysis submitted by the employer on the basis of global claim taking into consideration one cycle of submission by the employer.

The characteristics of scenario D:

- The contractor submits a statement of case for preventive measures
- The contractor shows that the calling of time to have become at large is justifiable by showing the action or lack of action by the engineer.

- The contractor refers the dispute to the adjudication board, as a neutral third party, to decide who has the burden of proving the reasonable time.

The characteristics of scenario E:

- The contractor can prove and link each cause and its own effect by progressively updating and/or revising the schedule. The contractor can resort to a prospective or a retrospective delay analysis method

- The contractor checks the weaknesses of the employer's further submissions and responding by proving the reasonable time taken by him is reasonable. The reasonable time taken is due to the interaction of the time-at-large induced circumstance with the new emerging ones.

The characteristics of scenario F:

- The contractor can prove and link each cause and its own effect by progressively updating and/or revising the schedule. The contractor can resort to a prospective or a retrospective delay analysis method
- The contractor proves that the reasonable time taken is due to the interaction of the time-at-large induced circumstance with the new emerging ones.
- The contractor shows the culpable delay that pushed the project beyond its agreed time for completion is not the dominant delay as it shifted to a new Relevant Event by the employer.

5.8 Characteristics of the Propositions

As shown from Models 1 and 2, the contractor has three different global claim propositions when submitting his claim either under FIDIC 1999 or 2017 standard conditions of contract. The characteristics of each proposition differs based on the timing of the submissions, the decision made by the adjudication board, and the contractor's schedule updates administration.

The characteristics of Proposition 1:

- The contractor has the facts and he is packaging the claim through a global claim
- The contractor has an opportunistic behavior and sees that it suits him best to package it globally after time for completion

The characteristics of Proposition 2:

- The contractor might get affected or influenced by the employer's analysis

- It can be a partial global claim because of what the employer had responded in two cycles of analysis. The first cycle which is the dispute initiation stage where the employer had responded to the contractor initial statement of case. The second cycle is when the adjudication board had decided upon having the time risk structure to have been lapsed

- The employer took the chance to exploit the delay analysis process that proves the reasonable time taken by the contractor was unreasonable

The characteristics of Proposition 3:

- The contractor might get affected by the employer's analysis but on a lesser burdensome

- It can be a partial global claim based on only one response by the employer

- The employer did not take the chance to exploit the delay analysis process that proves the reasonable time taken by the contractor was unreasonable

5.9 Global Claim Success Factors

According to Theoretical Models 1 and 2, scenarios A, B, and C represent the propositions 1, 2, and 3 for the contractor submitting a global claim respectively. Table 5 shows the success factors of a global claim for each applicable scenario.

Success factors 3, 4, and 5 do not vary if the contractor submits a global claim before or after the actual time for completion. For success factor 3, the contractor needs to prove if the actual incurred costs were reasonable. The contractor may charge extra costs that are unreasonable and the adjudication board judges if this success factor

prevails based on the facts of each case. Success factor 4 shows that the claim is likely to prevail as long as it is permissible on the facts and subject to proof. Even if the contractor had reasonably delayed in making the claim, this does not impede the success of the claim at trial, based on the facts of the case. Success factor 5 is based on the facts of deciding whether the bid price is reasonable or not. The contractor's bid price might have been lower than the fair market price, or he might have speculated on claims.

In Scenario A, the variable success factors are 1, 2 and 6. Success factors 1 and 6 are related to the opportunistic behavior of the contractor, whereas success factor 2 is related to the cost information and evidence that the contractor can provide in order to support the global claim from cost perspective only.

In Scenario B and C, the adjudication decision I decides if the time risk structure has lapsed or is enforceable. Regardless of who has the burden of proving the reasonable time, success factor 2 is likely to prevail by submitting information and evidence for cost and time. The contractor, as a claimant or a respondent, have to defend himself by submitting adequate information for the reasonable time taken by him.

The results of Scenarios B and C are not affected by the timing of the dispute referral to adjudication, in Models 1 or 2. Scenarios B and C are only related to the variables of the contractor's schedule updates administration and the adjudication decision I. Such variables are shown in success factor 1 and 6 respectively.

For success factor 1, it is likely to prevail when the contractor's schedule updates administration is assumed to have been lax or progressive. The contractor cannot prove the causal nexus between each delay cause and its attributed loss

whenever the contractor. Particularly, when the contractor's schedule updates administration is assumed to have been progressive, the probability of this success factor prevailing is higher as the contractor shows with every schedule update, that he cannot disentangle each delay cause and its effect.

For success factor 2, the contractor provides information and adequate particularity for both time and cost. The contractor proves that he was unable to complete the works less than what was deemed reasonable. In Scenarios B and C, the contractor wants to achieve cash neutrality by showing the difference between the incurred cost and his contract price.

Success factor 6, for Scenarios B and C, the contractor can still claim through a global claim even if part of the delay is due to his responsibility. When ruling on delay concurrency using the Malmaison approach, the contractor might have paced his activities with the already existing delay. In that case, the contractor is not responsible for the added costs because his delay is not affecting the project time for completion. This factor has been lessened even if the contractor is partially liable for the added cost, in the case where the apportionment approach is adopted for ruling on delay concurrency.

In conclusion, the success factors that are likely to be varied are 1, 2, and 6. The success factors 3 and 5 are based on facts that are related to the case. Scenario 4 is based on if the claim is permissible and it is subject to proof based on the facts of the case.

Table 5 Success Factors of a Global Claim

Global Claim Success Factors	Model/Scenario/Global Claim Proposition					
	1			2		
	A	B	C	D	E/B	F/C
	1	2	3	—	—/2	—/3
SF1: Impracticable or impossible to particularize (i.e., establish the causal nexus between each event and the attributed loss)	LP ^a	LP ^b	LP ^b	—	—/LP ^b	—/LP ^b
SF 2: Sufficient or adequate particularity (i.e., a balance between excessive particularity and basic information)	LP ^c	LP	LP	—	—/LP	—/LP
SF 3: Reasonableness of the contractor's actual incurred costs	FD	FD	FD	—	—/ FD	—/ FD
SF 4: Contractor not unreasonably delaying the claim and/or himself creating the difficulty	LP ^d	LP ^d	LP ^d	—	—/LP ^d	—/LP ^d
SF 5: Reasonableness of the contractor's bid price	FD	FD	FD	—	—/ FD	—/ FD
SF 6: Lack of the contractor's responsibility for the added costs	LP ^a	LP ^e	LP ^e	—	—/LP ^e	—/LP ^e

FD: Facts dependent

LP: Likely to prevail

^a Save in the event of the contractor acting opportunistically

^b Particularly when the contractor's schedule updates administration has been progressive

^c Only from a cost perspective

^d As long as the claim is permissible on the facts and subject to proof

^e Even when the apportionment (as opposed to Malmaison) approach is applicable for ruling on delay concurrency as per Walter Lily's and John Doyle's case

5.10 Remarks on Theoretical Model 1 and 2

The assumption in both theoretical models is that the calling of time-at-large by the contractor is opted for after the agreed time for completion. In Model 1, the contractor has two chances to package his claim through a global claim. In Model 2, the contractor has only one chance to package his claim through a global claim.

In Model 1, the assumption was that the contractor had referred the dispute to the adjudication board after the time for completion has passed. The contractor, given the facts and under FIDIC 1999 standard conditions of contract, is not under the obligation to refer the dispute to the adjudication board within a time bar. Whereas in FIDIC 2017 standard conditions of contract, given the summation of the time bars, the referral of dispute to the adjudication board happened to occur after the actual time for completion has passed. The contractor in both cases is not going to expedite the process and submits the dispute after the time for completion.

In Model 1, one cannot assume that the contractor has consumed the contract price or went beyond the contract price after the agreed time for completion. If the project got beyond the agreed time for completion is not necessarily correlated to the contractor going beyond the consumption of the contract price. This assumption cannot be made because it is analyzed on a case-by-case basis. This needs the profitability percentage taken by the contractor and/or the timing of the consumption of the contract price during the construction project timeline.

In Model 1, the dispute process was after the actual time for completion has been served. Whereas in Model 2, the dispute process may not necessarily occur after

the actual time for completion as the contractor refers the dispute to the adjudication board before the time for completion.

In Model 2, when the time risk structure has lapsed then the burden of proof rests on the employer to prove that the time taken by the contractor was unreasonable. This means that the employer has the overall reasonable time and needs to prove that it was unreasonable. The employer is not progressively updating the schedule to check if the time to be taken is reasonable or not. Even if the employer went through a retrospective delay analysis method to prove the reasonable time taken by the contractor was unreasonable, the contractor may either be going through a regular incident-based claim or package the claim through a global claim regardless of whether the schedule updates administration is assumed to have been progressive or lax. The contractor may update the schedule, as it is feasible by showing the start and end of activities and its percent completion. However, the schedule revision might not be possible. With every update, based on the evolving circumstances, the contractor can ideally foresee the start, end, and duration of activities that will be delayed. The revision is ideally based on the reading of the new circumstances. The revision by the contractor is through a progressive analysis. If the contractor was not able to foresee the start, end, and duration of each activities, then he is not able to produce revision schedules. The contractor resorts to a retrospective analysis with the benefit of hindsight.

To be noted that in Model 2 particularly when the time risk structure has lapsed, the employer needs to prove the reasonable time taken by the contractor to be unreasonable after the time for completion has served. This is not correlated to the fact that the contractor may be going through schedule update or possible revisions. The

dispute initiation stage occurs before the time for completion has passed. Further submissions occur after the time for completion has passed. This occurs when the time risk structure has lapsed and when the time risk structure is enforceable and the contractor opts to package the loss through a global claim. Further submissions occurs before the time for completion only when the time risk structure is enforceable and the contractor opts to go through an incident-based claim.

When the time risk structure is enforceable then the burden of proof rests on the contractor to prove that the time taken by him is reasonable. It may be a possibility that when the contractor exceeds the contract price, the contractor may have the option for the global claim, a rolling claim.

When the contractor packages his loss through a global approach using Scenarios A, B, and C, claimed for the extra-incurred cost, and proved the total time taken by the contractor was reasonable, then the contractor needs to achieve cash neutrality by subtracting the contract price from the total incurred cost. In that case, the contractor foregoes his profitability unlike Scenarios E and F.

In Scenarios E and F, when the contractor goes through an incident-based claim then he can claim for the extra cost and maintains, in addition, his profitability. Unlike in Scenarios A, B, and C where he compromises his profitability and maintain cash neutrality.

When the contractor goes through an incident-based claim, he can attribute and show the origin of these delays. In addition, he claims for the total period along with the total cost attributed to that delay which may not cause the contractor to lose the profit

beyond his contract price. Whereas, if the global claim is righteous, the contractor is compromising by losing the profitability on the job in order to obtain cash neutrality.

Whenever the contractor has achieved his contract price, he is able to claim the extra cost incurred by continuously updating the numbers. This may not be the case in Scenarios A, B, or C because the contractor was able to disentangle the factors that lead to that delay. The definition of a global claim stands in the way of disentanglement. Whereas in Scenarios A, B, and C, the contractor looks at the reasonable time holistically and prove that he cannot disentangle the factors. This can also be proven through having the effect of the circumstances being so interrelated that the contractor is not able to create the causal nexus between each event and its attributed loss.

When the time risk structure is enforceable, the contractor can update his claim gradually. This can only occur before the actual time for completion. The disentanglement stands in the way of proving the reasonable time taken by the contractor is reasonable only before the actual time for completion. Scenario F can be applicable for a continuous claim. The contractor could update the loss on a rolling basis.

In conclusion, in Model 1, and regardless of whether the time risk structure has lapsed or is enforceable, the submissions by the parties occurs after the actual time for completion has been served. In Model 2, when the time risk structure has lapsed, the employer proves that the reasonable time taken by the contractor was unreasonable only after the actual time for completion has been served. When the time risk structure is enforceable, the contractor may prove that the time to be taken is reasonable, before the actual time for completion has achieved, in Scenario F. Scenario C, where the

contractor has packaged his loss through a global claim, occurs after the actual time for completion has served.

CHAPTER 6

VALIDATION OF GLOBAL CLAIM SURFACING MODELS

6.1 Case Background

This chapter dwells upon the validation of the discussed models in chapter V. Two real-life cases were studied to test the practicability of the developed theoretical models. Each case has its own chronology of events and circumstances, which are summarized in Table 6. In Case study I, the delayed payment defaults by the employer took the project beyond the agreed time for completion followed by the calling of time at large by the contractor. The circumstances governing the progress of the contractor along with the stretching of the reasonable time taken to complete the works were emanating from the delayed payments by the employer. This cause has led to an effect of not being able to generate progressive schedule updates. The contractor was only able to produce retrospective analysis with the benefit of hindsight.

In Case study II, the successive variations by the employer were the initial set of delays that took the project beyond its agreed time for completion followed by the calling of time at large by the contractor. The circumstances governing the progress of the contractor along with the stretching of the reasonable time taken to complete the works were initially due to the employer's variations. At a later point, subcontractor's wood issues were concurrent with other employer's delays (first civil defense

modifications, operator’s modifications, temporary current, testing and commissioning, and late civil defense modifications).

Table 6 Characteristics of Case Study I and II

Characteristics	Case	
	I	II
Cause of delay	Delayed payment defaults by the employer	Successive variations by the employer
Justifiability of calling time at large	Yes	Yes
Enforceability of time risk structure	Lapsed	Lapsed
Generation of progressive schedule updates	Not possible	Possible
Concurrent delays between the timing of calling time at large and the actual time for completion	No	Yes

6.2 Case Study I

6.2.1 Overview

The first case study is a high-end residential complex in the MENA region. The contractor in that case declared time to have become at large because of the employer’s successive payment defaults. The EoT clause in the contract conditions excluded delays

that result from such payment defaults. The contractor in this type of delay is not qualified for an extension of time; instead, the only remedy was to terminate the contract. The termination of contract may be without giving the contractor a chance to first reduce the rate of work progress, or even suspend the works before terminating the contract.

6.2.2 Remarks on Timeline

The timeline of this case is shown on Figure 19

- The original time for completion was 24 months, end of January 2010
- The amended time for completion adds non-compensable period of 13 months, having the agreed time for completion to be end of February 2011. The extended time was agreed upon due to concurrent delays pertaining to work disruptions caused by the joint venture contracting teams on one hand and delayed payments by the employer on the other hand.

- On February 06, 2011, the contractor submitted a revised schedule showing October 31, 2011 as the new completion date conditional to releasing part of the then-retained money, having partial payment for certain materials delivered (90% of invoice value), and reducing the payment cycle for these installed materials from 44 days to 10 days.

- The Engineer gave remarks on the submitted revised schedule on February, 16,2011

- The attempt to reach agreement on a new completion date had failed which caused the contract to expire without having a new date set or agreed to
- On March 06, 2011, the contractor called time to have become at large after the agreed time for completion has passed
- On March 23, 2011, the contractor shows that the works would be completed 20 days after October 31, 2011
- On May 14, 2011, the employer unilaterally extended the agreed time for completion by 199 days
- The contractor was not able to generate revised schedule and lost the ability to produce prospective schedule updates

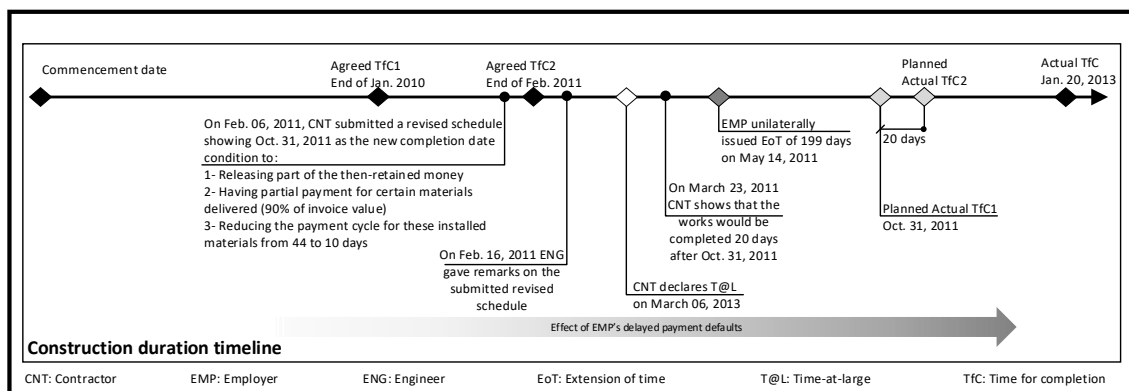


Figure 19 Case Study I – Timeline

The calling of time at large by the contractor is justified through the fact that the delayed payments by the employer, an excusable delay, is not reflected in the EoT clause. This could be considered as a prevention by the employer or the EoT mechanism has failed. The delayed payment defaults, by the employer, was the only delaying event

that pushed the project beyond the agreed time for completion. Therefore, the time risk structure has lapsed. The concrete proof of the enforceability of time risk structure is that the employer had unilaterally issued an EoT and did not open to levy liquidated damages after the contractor did not complete the works at the agreed time for completion. This could be seen as the employer being convinced that he was liable for taking the project beyond the agreed time for completion. Accordingly, the burden of proving that the reasonable time, taken by the contractor, was unreasonable rests on the employer. The employer resorts to a retrospective delay analysis with the benefit of hindsight.

6.2.3 Reflecting on Model 1

When the contract conditions do not force the contractor to refer the dispute to the adjudication board through a specified time frame, the contractor might have consumed the unregulated period to his own advantage and referred the dispute to the adjudication board after the actual time for completion. That may be the case of FIDIC 1999 standard conditions of contract. On the other hand, it might be the case when the summation of all the time bars may result in referring the dispute to the adjudication board after the actual time for completion has passed. The timeline of the case along with the path of Model 1 is shown in Figure 20.

If the contract is under FIDIC 1999 standard conditions of contract, the contractor may consume the whole unregulated period and refer the dispute to the adjudication board after the time for completion has passed.

If the contract is under FIDIC 2017 standard conditions of contract, the contractor is required to refer the dispute to the adjudication board after the time for completion has passed because the summation of the time bars add up to being after January 20, 2013.

The contractor in Model 1 is required to submit his statement of case through a global claim rather than an incident-based claim. The contractor had waited until after the time for completion has passed to submit his claim through a global claim. This assumption is being used since the contractor could not produce any progressive schedule updates and has lost the ability to generate revised schedules.

After the contractor has submitted his statement of case, the employer may not prove that the reasonable time taken was unreasonable because he does not want to show that the burden of proof rests on him. He did not take the time to analyze if the reasonable time was reasonable. In fact, he may probably respond to the contractor's statement of case without proving the reasonableness of time. This step proves that the adjudication board needs more information and goes through a two-step process to take their decision.

In adjudication decision I, it may be decided that the calling of time-at-large is justifiable and the time risk structure has lapsed. The payment delays, by the employer, were the only delays that took the project beyond its agreed time for completion. In that case, the burden of proving that the reasonable time, taken by the contractor, was unreasonable rests on the employer. In addition to the employer's response during the dispute initiation stage, the employer needs to prove the reasonableness of time using a retrospective delay analysis method.

In this case, the employer resorts to a But-for delay analysis method to prove that the reasonable time, taken by the contractor, was unreasonable. This exercise is done through a But-for delay analysis method that starts with filtering out the delays that were under the control of the contractor. However, there were no delays attributed to the contractor. The contractor was suffering from the circumstances resulting from the financial difficulty that was getting worse with time. In this case, it may be unrealistic to filter out the dominant effect of the payment delays after the completion of the project.

The worst-case scenario may be if the contractor had any delays concurrent with the payment delays by the employer. The employer, when resorting to the But-for delay analysis method, needs to filter out the delays attributed to the contractor. However, the reasonable time could not be any less as the contractor might have paced his activities with the already existing payment delays that are attributed to the employer.

The contractor, as a respondent, keeps proving the reasonable time taken by him and the extra incurred cost through a global claim. In this case, the contractor's schedule updates administration is assumed to have been lax, as he was not generating any updates. More importantly, the contractor did not generate progressive updates so this can be a proof that the schedule updates administration is not assumed to have been progressive. The contractor is restricted to two submissions by the employer that may limit the success of the global claim.

This case study shows that the employer cannot in any way prove the unreasonableness of the reasonable time as the payment delays were controlling the duration of the project.

Model 1 shows that Scenario A and B are the effective scenarios that are applicable to the characteristics of the case. Scenario A and B reflect propositions 1 and 2 respectively. The contractor did not act opportunistically in proposition 1 as he could not act any differently than claiming through a global claim because the financial difficulty was dominating every activity on the project.

On the other hand, the contractor was not affected, in proposition 2, by the employer's analysis in the two submissions made. The global claim could not become a partial global claim because there were no delays attributed to the contractor. Even if the employer had exploited the delay analysis process because the reasonable time taken by the contractor could not be any less than what the contractor had taken to complete the works.

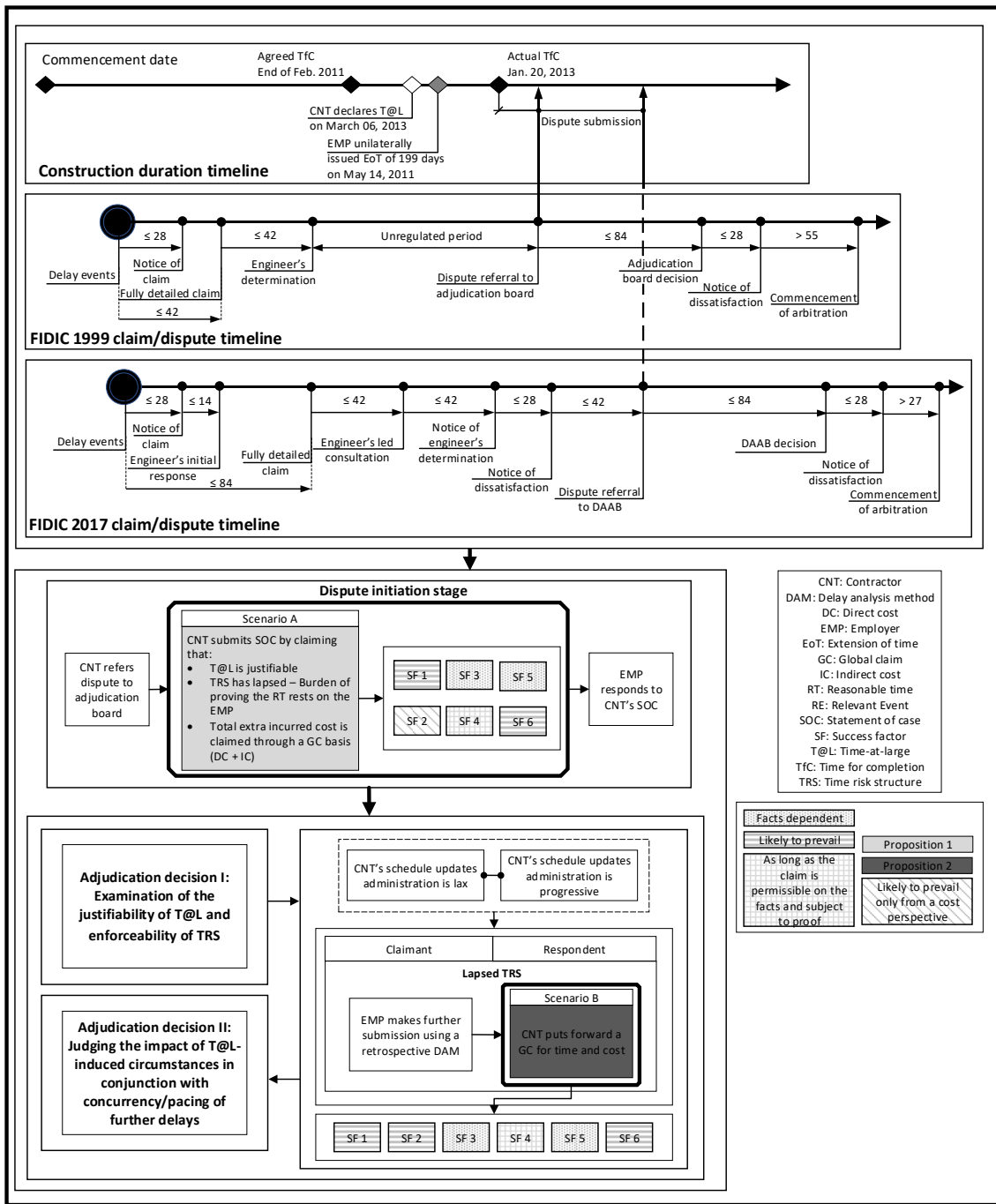


Figure 20 Case Study I – Validating Model 1

6.2.4 Reflecting on Model 2

The contractor, in Model 2, can refer the dispute to adjudication before the actual time for completion has passed, in the case of FIDIC 1999 standard conditions of contract. On the other hand, it might be the case when the summation of all the time bars may result in referring the dispute to the adjudication board before the actual time for completion has passed. The timeline of the case along with the path of Model 2 is shown in Figure 21.

If the contract is under FIDIC 1999 standard conditions of contract, the contractor may consume the unregulated period and refer the dispute to the adjudication board either before or after the employer had unilaterally issued an EoT of 199 days. This gives the contractor two alternatives to determine the referral to adjudication board.

If the contract is under FIDIC 2017 standard conditions of contract, the contractor is required to refer the dispute to the adjudication before the employer unilaterally issued an EoT because the summation of the time bars up until the referral to the adjudication board do not add up to being after May 14, 2011.

The contractor in Model 2 is required to submit his statement of case for preventive measures, and claim whether the calling of time at large was justifiable and who has the burden of proving the reasonable time taken by the contractor.

After the contractor has submitted his statement of case, the employer needs to respond before the adjudication board makes a decision on the justifiability of time-at-large and the enforceability of time risk structure. The employer is not going to take the time to go through a complete analysis to check whether the reasonable time that the

contractor is taking is reasonable or not. It should be noted that the employer's response during the dispute initiation stage is before the actual time for completion and hence the complete reasonable time is not readily available for the employer to base his response on. In fact, he may probably respond to the contractor's statement of case showing that the calling of time-at-large is not justified and that the burden of proving the reasonable time rests on the contractor. The employer might also respond by claiming that an extension of time was given to the contractor, in case the contract followed FIDIC 1999 standard conditions of contract (Alternative 1). This step proves that the adjudication board needs more information and goes through a two-step process to take their decision.

In adjudication decision I, it may be decided upon that the calling of time-at-large is justifiable and the time risk structure has lapsed. The payment delays, by the employer, were the only delays that took the project beyond its agreed time for completion. In that case, the burden of proving that the reasonable time, taken by the contractor, was unreasonable rests on the employer. In addition to the employer's response during the dispute initiation stage, the employer needs to prove the reasonableness of time using a retrospective delay analysis method. It should be noted that when the employer makes further submissions, it requires the completion of the project in order for the reasonable time to be obtainable to base his submissions on. In that case, it shows that the contractor was not able to produce neither progressive updates nor any revised schedules; hence, the employer needs to resort to retrospective delay analysis method with the benefit of hindsight.

The contractor, as a respondent, cannot further submit that the reasonable time taken can be proven through an incident-based claim. Scenario E is not applicable in that case. The contractor was already suffering from financial difficulties and could not produce any progressive schedule updates. The only cause that occurred was the delayed payments by the employer which resulted in several circumstances leading the contractor to self-finance the project. The contractor resorts to Scenario B by making further submissions through a global claim. The contractor needs to prove that the reasonable time taken by him was reasonable in addition to the extra-incurred cost retrospectively with the benefit of hindsight. The contractor could not produce progressive updates nor revised schedules as the financial difficulties were overshadowing his ability to produce such schedules. In this case, the contractor's schedule updates administration is assumed to have been lax. More importantly, the contractor did not generate progressive updates so this can be seen as a proof that the schedule updates administration is not assumed to have been progressive. The contractor is restricted to two submissions by the employer that may limit the success of the global claim. Nevertheless, the employer could not have limited the success of the global claim made by the contractor as the payment delays have had the dominating effect on the reasonable time.

In this case study, the employer resorts to a but-for delay analysis method to prove that the reasonable time, taken by the contractor, was unreasonable. This exercise is done through a But-for delay analysis method that starts with filtering out the delays that were under the control of the contractor. However, there were no delays attributed to the contractor other than the circumstances resulting from the financial difficulty

suffered by the contractor that was getting worse with time. In this case, it is unrealistic to filter out the dominant effect of the payment delays after the completion of the project.

The worst-case scenario may be if the contractor had any delays concurrent with the payment delays by the employer. The employer, when resorting to the But-for delay analysis method, needs to filter out the delays attributed to the contractor. However, the reasonable time could not be any less as the contractor might have paced his activities with the already existing payment delays that are attributed to the employer.

This case study shows that the employer cannot in any way prove the unreasonableness of the reasonable time as the payment delays were controlling the duration of the project.

Model 2 shows that Scenario D and B are the effective scenarios that are applicable to the characteristics of the case. Scenario D does not reflect any global claim proposition as opposed to Scenario B that reflects 2 respectively.

The contractor was not affected, in proposition 2, by the employer's analysis in the two submissions made. The global claim could not become a partial global claim because there were no delays attributed to the contractor. Even if the employer had exploited the delay analysis process because the reasonable time taken by the contractor could not be any less than what the contractor had taken to complete the works.

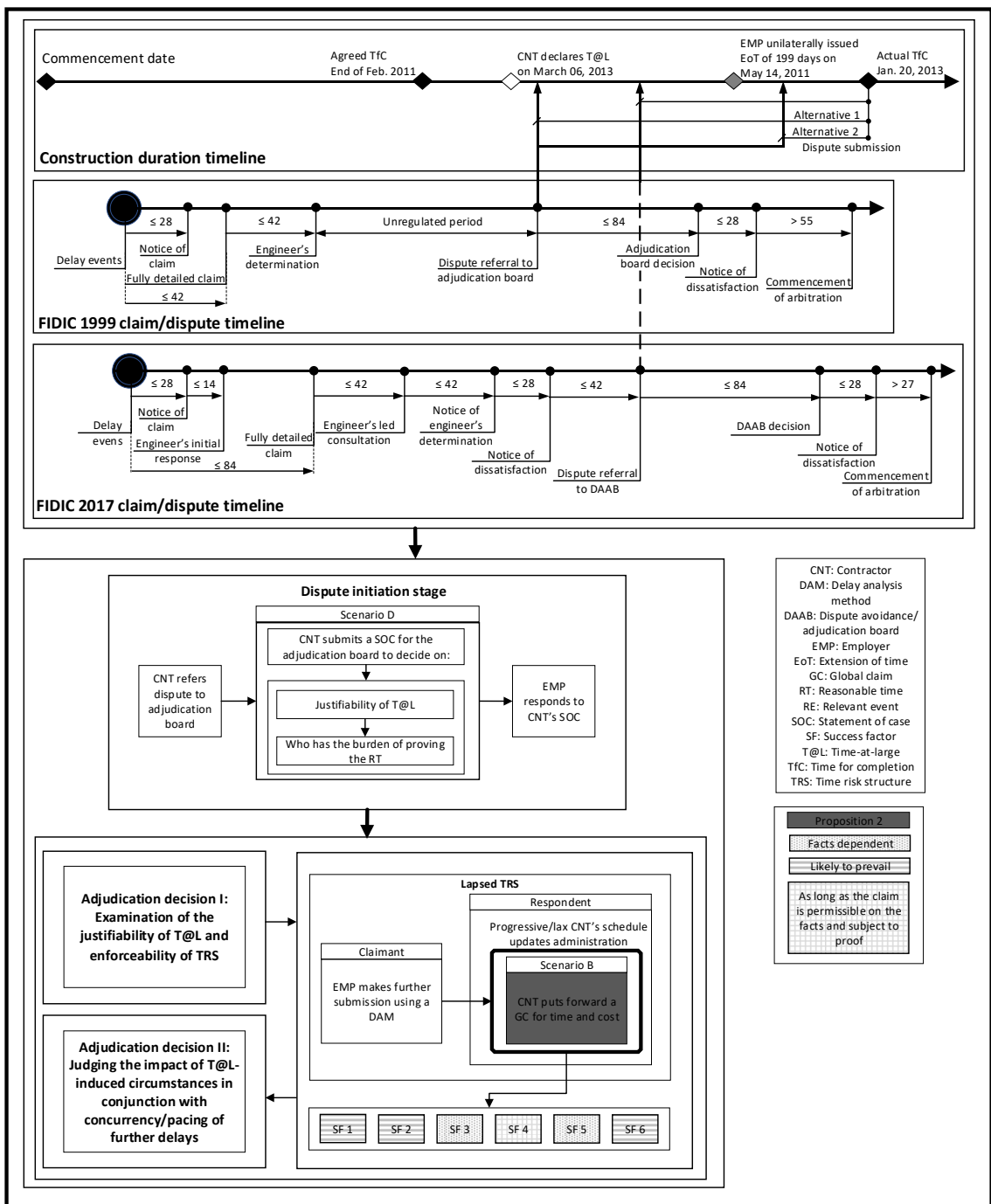


Figure 21 Case Study I – Validating Model 2

6.2.5 Remarks on Case Study I

Case Study I shows that even if the contractor referred the dispute to the adjudication before or after the actual time for completion, he is only able to submit his claim through a global claim. The fact that the contractor was suffering from financial difficulties led to overshadowing and dominating the governing circumstances. These circumstances were evolving with time and the contractor could not foresee their effects until they had occurred.

The employer in both Models resorts to a retrospective delay analysis method but is not able to filter out any delays attributed to the contractor since there were none. On the other hand, the effects of the payment delays cannot be filtered out, rendering the employer's response unworkable and even impossible.

The employer's first response in Model 1 is a comprehensive response. He is only responding to the contractor's statement of case. It is on the complete analysis because the actual reasonable time is known. The second response is based on the first response with further submissions.

The employer's first response in Model 2 includes that either the extension of time is denied or that he had unilaterally issued an extension of time. This occurs in FIDIC 1999 (Alternative 1)/FIDIC 2017 or FIDIC 1999 (Alternative 2) respectively. The second response by the employer is based on the complete analysis. The employer makes further submissions after the actual time for completion has passed to benefit from hindsight for the reasonable time.

6.3 Case Study II

6.3.1 Overview

The second case study is for a 400-room luxurious hotel in the MENA region. The contract follows FIDIC 1987 standard conditions of contract. The employer ordered suspensions of several key parts of the works and issued many successive directed changes in relation to suspended work. The contractor declared time to have become at large after the denial of the extension of time claim. The contract engineer had denied the contractor's claim on the basis of the notices not being fulfilled.

6.3.2 Remarks on Timeline

The timeline of this case is shown on Figure 22

- The original time for completion was 24 months, March 2014
- The amended time for completion adds 90 days to the original agreed time for completion, June 07, 2014
- The contractor submits an extension of time claim of 280 days showing the planned time for completion to be March 12, 2015
- The Engineer denied the contractor's EoT claim on the basis of the notices not being fulfilled on June 01, 2014
- The contractor declares that time has become at large on January 05, 2015
- On March 05, 2015, the contractor submits a delay analysis to show an additional delay of 193 days and the planned time for completion of September 21, 2015
- The employer offered 108 days as a final settlement on September 16, 2015

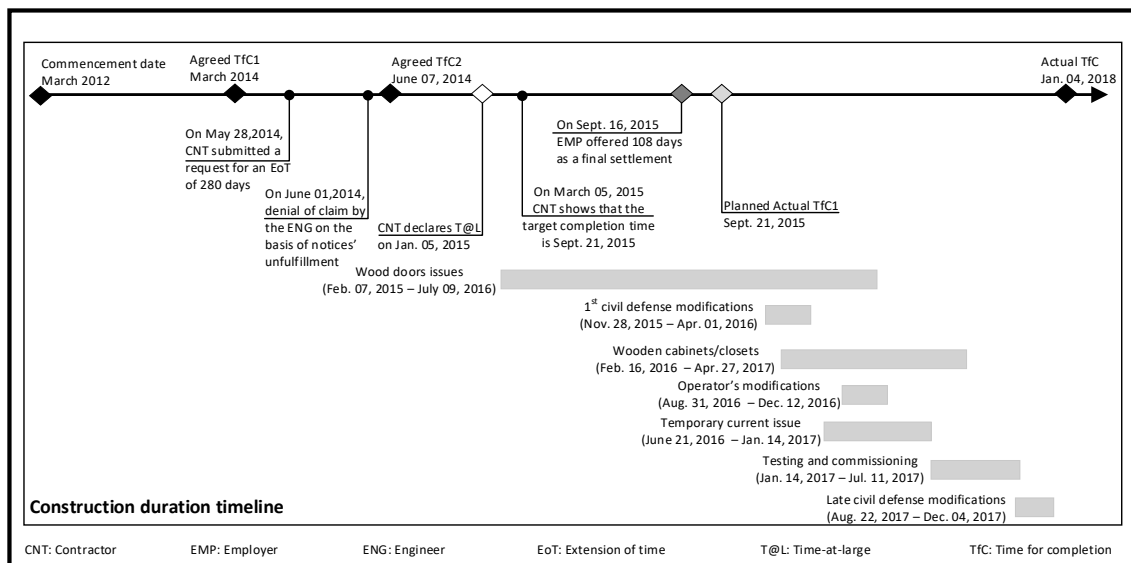


Figure 22 Case Study II – Timeline

The employer had instructed partial suspension and associated successive variations that led to slow progress rate, delays and stoppages, and incurred prolongation costs. These circumstances highlight the contractor’s extension of time for 280 days. This EoT claim was based on a prospective time-impact analysis. The denial of claim by the contract engineer led the contractor to call time to have become at large. The calling of time at large by the contractor is justified through the model presented by Abdul-Malak and Jaber (2018).

For the enforceability of time risk structure, it can be said to have lapsed. This is due to the fact that the partial suspension by the employer took the project beyond the agreed time for completion. The concrete proof of the enforceability of time risk structure is that the employer had issued an EoT after the contract has expired. This could also be seen as the employer being convinced that he was liable for taking the project beyond the agreed time for completion. Accordingly, the burden of proving that

the reasonable time, taken by the contractor, was unreasonable rests on the employer. The employer resorts to a retrospective delay analysis with the benefit of hindsight.

6.3.3 Reflecting on Model 1

When the contract conditions do not force the contractor to refer the dispute to adjudication board through a specified time frame, the contractor might have consumed the unregulated period to his own advantage and referred the dispute to adjudication board after the actual time for completion. That may be the case of FIDIC 1999 standard conditions of contract. On the other hand, it might be the case when the summation of all the time bars may result in referring the dispute to the adjudication board after the actual time for completion has passed. The timeline of the case along with the path of Model 1 is shown in Figure 23.

If the contract is under FIDIC 1999 standard conditions of contract, the contractor may consume the whole unregulated period and refer the dispute to the adjudication board after the time for completion has passed.

If the contract is under FIDIC 2017 standard conditions of contract, the contractor is required to refer the dispute to the adjudication board after the time for completion has passed because the summation of the time bars add up to being after January 04, 2018.

The contractor in Model 1 is required to submit his statement of case through a global claim rather than an incident-based claim. In Model 1, the contractor has postponed the referral of dispute until after the actual time for completion has passed. The contractor's packaging of the reasonable time taken along with the extra-incurred

cost as a global claim might not succeed. The failure of the global claim is based on the fact that the contractor was able to check the effect of each delay on the project.

After the contractor's submission, the employer is not going to prove that the reasonable time taken was unreasonable because he does not want to show that the burden of proof rests on him. He did not take the time to analyze if the reasonable time was reasonable. In fact, he probably responds to the contractor's statement of case without proving the reasonableness of time. This step proves that the adjudication board needs more information and goes through a two-step process to take their decision.

In adjudication decision I, it may be decided upon that the calling of time-at-large is justifiable and the time risk structure has lapsed. The partial suspension along with the successive variations directed by the employer were the cause of taking the project beyond its agreed time for completion. In that case, the burden of proving that the reasonable time, taken by the contractor, was unreasonable rests on the employer. In addition to the employer's response during the dispute initiation stage, the employer needs to prove the reasonableness of time using a retrospective delay analysis method.

The employer resorts to a But-for delay analysis method to prove that the reasonable time, taken by the contractor, was unreasonable. This exercise is done through a But-for delay analysis method that starts with filtering out the delays that were under the control of the contractor. The only delay attributed to the contractor, wood issues, are concurrent with several delays attributed to the employer.

The contractor, as a respondent, keeps his position by proving the reasonable time taken by him and the extra incurred cost through a global claim. In this case, the contractor's schedule updates administration is assumed to have been lax or progressive

or a combination of the two. Unlike Case I, he was able to progressively update the schedule or submit revised schedules. He was suffering from financial difficulties due to the employer's delay, but he was still able to foresee the start of the activities. The financial difficulties did not overshadow his ability to produce revised schedules. Even if schedule updates were not followed, the possibility of generating updates and revisions led to the failure of the global claim. Being restricted by two submissions from the employer also led to the failure of the global claim.

Model 1 shows that Scenario A and B are the effective scenarios that are applicable to the characteristics of the case. Scenarios A and B reflect propositions 1 and 2 respectively. The contractor did act opportunistically in proposition 1, unlike case study I, as he could have acted differently by claiming his loss through an incident-based claim. Therefore, the global claim in this model did fail.

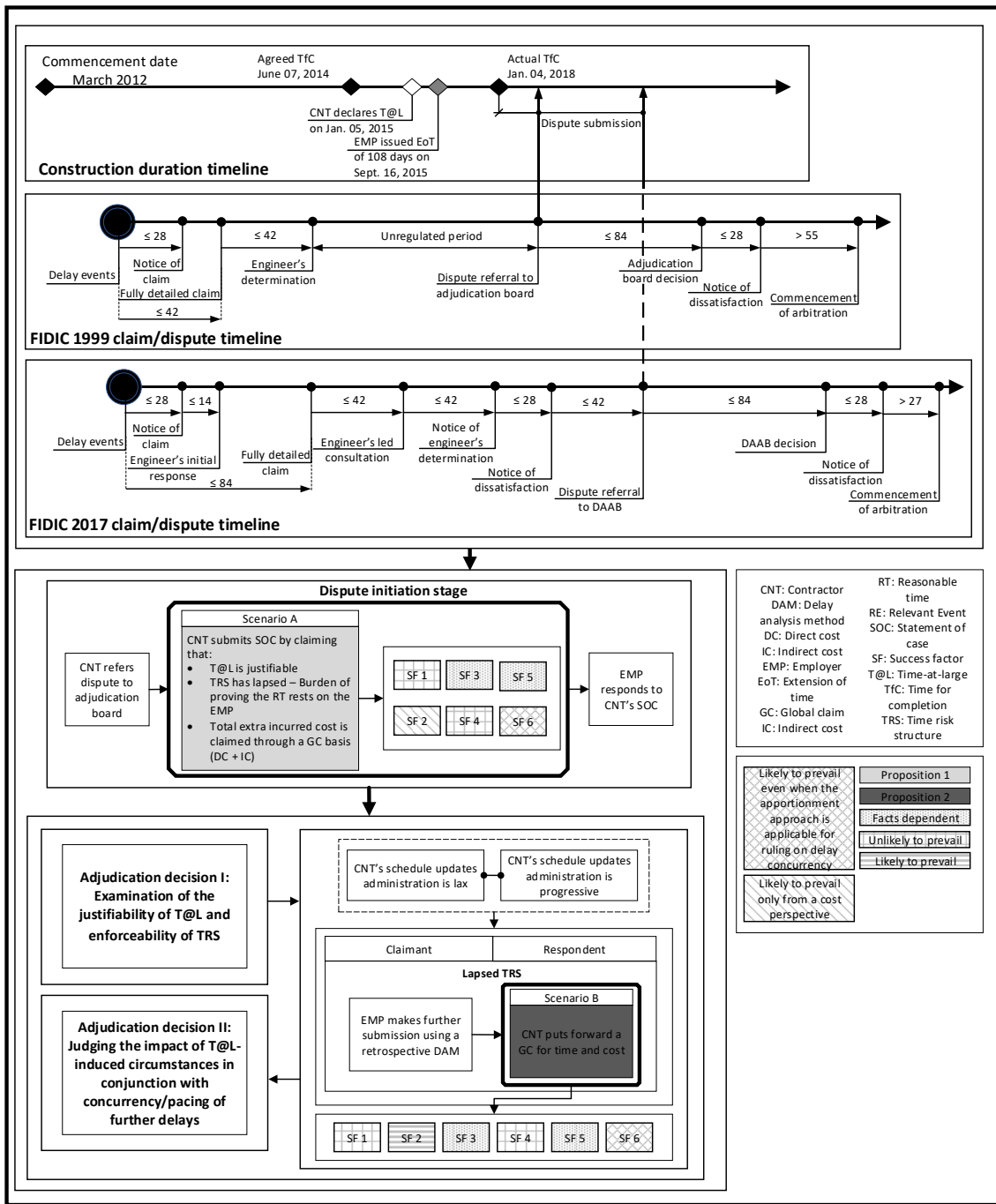


Figure 23 Case Study II – Validating Model 1

6.3.4 Reflecting on Model 2

The contractor, in Model 2, can refer the dispute to the adjudication board before the actual time for completion has passed, in the case of FIDIC 1999 standard conditions of contract. On the other hand, it might be the case when the summation of all the time bars may result in referring the dispute to the adjudication board before the actual time for completion has passed. The timeline of the case along with the path of Model 2 is shown in Figure 24.

If the contract is under FIDIC 1999 standard conditions of contract, the contractor may consume the unregulated period and refer the dispute to the adjudication board either before or after the employer had unilaterally issued an EoT of 108 days. This gives the contractor two alternatives to determine the referral to adjudication board.

If the contract is under FIDIC 2017 standard conditions of contract, the contractor is required to refer the dispute to the adjudication board before the employer had issued an EoT because the summation of the time bars up until the referral to the adjudication board do not add up to being after September 16, 2015.

The contractor in Model 2 is required to submit his statement of case for preventive measures, and claim whether the calling of time at large was justifiable and who has the burden of proving the reasonable time taken by the contractor.

After the contractor has submitted his statement of case, the employer needs to respond before the adjudication board decides on the justifiability of time-at-large and the enforceability of time risk structure. The employer is not going to take the time to go through a complete analysis to check whether the reasonable time that the contractor is

taking is reasonable or not. It is to be noted that the employer's response during the dispute initiation stage is before the actual time for completion and hence the complete reasonable time is not readily available for the employer to base his response on. In fact, he may probably respond to the contractor's statement of case showing that the calling of time-at-large is not justified and that the burden of proving the reasonable time rests on the contractor. The employer might also respond by stating that an extension of time was given to the contractor, in case the contract followed FIDIC 1999 standard conditions of contract (Alternative 1). This step proves that the adjudication board needs more information and goes through a two-step process to take their decision, similar to the analysis in Case Study I.

In adjudication decision I, it may be decided upon that the calling of time-at-large is justifiable and the time risk structure has lapsed. The partial suspension along with the successive variations directed by the employer were the cause of taking the project beyond its agreed time for completion. In that case, the burden of proving that the reasonable time, taken by the contractor, was unreasonable rests on the employer. In addition to the employer's response during the dispute initiation stage, the employer needs to prove the reasonableness of time using a retrospective delay analysis method. It is important to note that when the employer makes further submissions, this requires the completion of the project in order for the reasonable time to be obtainable to base his submissions on.

The employer resorts to a But-for delay analysis method to prove that the reasonable time, taken by the contractor, was unreasonable. This exercise is done through a But-for delay analysis method that starts with filtering out the delays that

were under the control of the contractor. The only delay attributed to the contractor, wood door issue, was concurrent with several delays attributed to the employer.

The contractor, as a respondent, makes further submissions using an incident-based claim, Scenario E. The contractor knows each variable and its effect; he can also show the impact of each delay cause on the project. If the contractor opted to go through a global claim, using Scenario B, the global claim is not going to succeed. The contractor was suffering from financial difficulties but that did not overshadow his ability to produce progressive schedule updates. The contractor, in both scenarios, needs to prove that the reasonable time taken by him was reasonable in addition to the extra-incurred cost retrospectively with the benefit of hindsight. The contractor is restricted to two submissions by the employer that may limit the success of the global claim as opposed to submitting an incident-based claim in Scenario E.

Model 2 shows that Scenario D, E, and B are the effective scenarios that are applicable to the characteristics of the case. Scenario D does not reflect any global claim proposition as opposed to Scenario B that reflects proposition 2.

The contractor is affected, in proposition 2, by the employer's analysis in the two submissions made. The global claim is not going to succeed because the employer's two submissions restricts the contractor's ability to package the claim through a global claim.

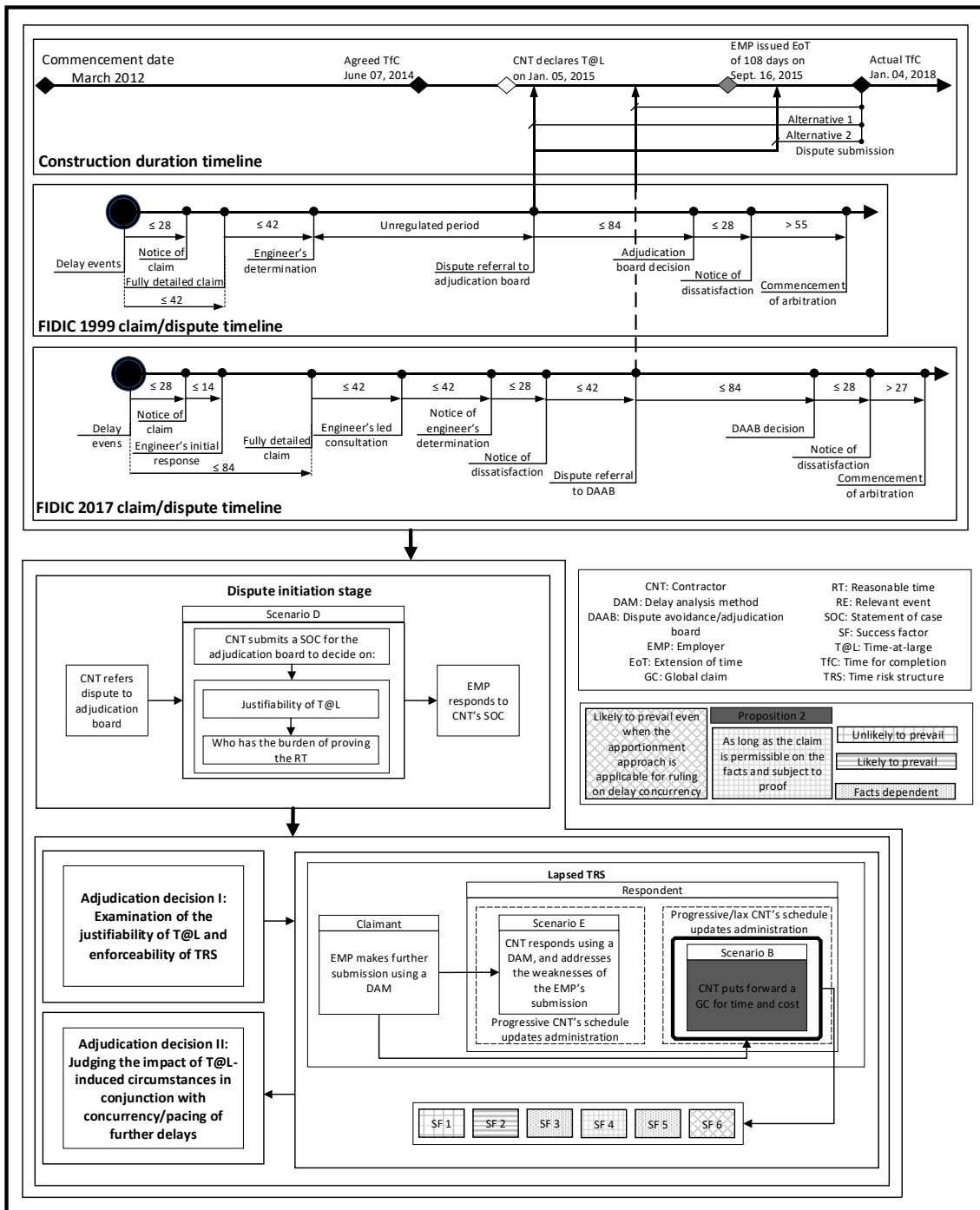


Figure 24 Case Study II – Validating Model 2

6.3.5 Remarks on Case Study II

Case Study II shows that even if the contractor referred the dispute to adjudication before or after the actual time for completion, the contractor can submit his claim through an incident-based claim or a global claim with a higher and a lower probability of success respectively. The fact that the contractor was suffering from financial difficulties did not affect his ability to produce revised schedule and progressive schedule updates. The governing circumstances were evolving with time concurrently with one contractor's caused delay.

The employer in both Models resorts to a retrospective delay analysis method and can filter out any delays attributed to the contractor since there was only one delay, wood door issue.

The employer's first response in Model 1 is a comprehensive response. He is only responding to the contractor's statement of case. It is on the complete analysis because the actual reasonable time is known. The second response is based on the first response with further submissions.

The employer's first response in Model 2 includes that either the extension of time is denied or that he had issued an extension of time. This may occur in FIDIC 1999 (Alternative 1)/FIDIC 2017 or FIDIC 1999 (Alternative 2) respectively. The second response by the employer is based on the complete analysis. The employer makes further submissions after the actual time for completion has passed to benefit from hindsight for the reasonable time.

6.4 Remarks on Case Study I and II

Based on the above validation of both case studies, the contractor may proceed to package his loss through a global claim in case study I as opposed to case study II. In the first case study, the contractor's packaging of the reasonable time, through a global claim, succeeds. In the second case study, the contractor's global claim fails. A summary of global claim success factors for both cases are shown in Table 7.

In Model 1, Case study I, the contractor's submissions of a global claim succeed because the lack of establishing a causal nexus and not being able to generate updates. The contractor is no longer acting opportunistically. Success factor 1 is likely to prevail in scenarios A and B that show global claim proposition 1 and 2 respectively. As opposed to Case study II, the contractor had the chance to produce updates, regardless if it was followed, but it was possible. Even if it was not followed, the contractor is able to produce retrospective analysis showing every cause and its effect with the benefit of hindsight. The global claim, in case study II, is not going to succeed due to the fact that he was able to establish a causal nexus between the cause and its attributed loss. Even though success factor 1 is no longer a prerequisite for the success of a global claim, the contractor was creating the difficulty in establishing the causal nexus which proves that success factor 1 is unlikely to prevail.

In Model 1, Case Study I the contractor was not creating the difficulty in submitting the claim. Therefore, success factor 4 is likely to prevail, as long as the claim is permissible under the facts and subject to proof. As opposed to Case study II, the contractor was creating the difficulty by intentionally submitting the claim after the time for completion has passed. Although he was able to generate progressive updates along

with revisions to prove gradually how the reasonable time taken is changing, the contractor opted to go through a global claim instead. Hence, success factor 4, is unlikely to prevail.

Success factor 6 is likely to prevail, in Case study I, as there were not any concurrent delays with the delayed payment by the employer. In Case study II, it is also likely to prevail although there were concurrent delays but this factor is no longer a prerequisite for the success of a global claim.

Table 7 Global Claim Success Factors

Global Claim Success Factors	Case/Model/Scenario/Global Claim Proposition							
	I				II			
	1		2		1		2	
	A	B	D	B	A	B	D	E/B
	1	2	—	2	1	2	—	—/2
SF1: Impracticable or impossible to particularize (i.e., establish the causal nexus between each event and the attributed loss)	LP	LP	—	LP	UP	UP	—	—/UP
SF 4: Contractor not unreasonably delaying the claim and/or himself creating the difficulty	LP ^a	LP ^a	—	LP ^a	UP	UP	—	—/LP ^a
SF 6: Lack of the contractor's responsibility for the added costs	LP	LP	—	LP	LP ^b	LP ^b	—	—/LP ^b

LP: Likely to prevail

UP: Unlikely to prevail

^a As long as the claim is permissible on the facts and subject to proof as per Walter Lily's case

^b Even when the apportionment (as opposed to Malmaison) approach is applicable for ruling on delay concurrency as per Walter Lily's and John Doyle's case

In Model 2, Case study I, the contractor's submission of a global claim succeeds due to the lack of establishing a causal nexus and not being able to generate updates. The contractor is no longer acting opportunistically. Success factor 1, is likely to prevail in scenario B that shows global claim proposition 2. As opposed to Case study II, the contractor had the chance to produce updates, regardless if it was followed, but it was possible. Even if it was not followed, the contractor is able to produce

retrospective analysis showing every cause and its effect with the benefit of hindsight. The global claim, in case study II, is not going to succeed due to the fact that he was able to establish a causal nexus between the cause and its attributed loss. Even though success factor 1 is no longer a prerequisite for the success of a global claim, the contractor was creating the difficulty in establishing the causal nexus which proves that success factor 1 is unlikely to prevail.

Success factor 4 is likely to prevail in Case study I and II, as long as the claim is permissible under the facts and subject to proof, in Case study I. The contractor was not creating the difficulty in submitting the claim. In both cases, the contractor did not create the difficulty in submitting the claim as it was submitted before the actual time for completion had passed.

Success factor 6 is likely to prevail in Case study I as there were not any concurrent delays with the delayed payment by the employer. In Case study II, it is also likely to prevail although there were concurrent delays but this factor is no longer a prerequisite for the success of a global claim.

In conclusion, Case study I succeeds as a global claim in both model 1 and 2. Case study II is not going to succeed in both model 1 and 2, but is going to succeed in model 2 only if the contractor opted to go through an incident-based claim.

CHAPTER 7

SUMMARY AND CONCLUSIONS

7.1 Summary

In light of this research, delays are bound to occur in construction projects. The contractor and the employer may face various disagreements when delay concurrency exists. Since the definition of concurrency is still universally unknown, the contractor takes advantage of the ambiguity of such a case and claim for an extension of time. The contractor assumes that the employer's delay was the one affecting the time for completion of the project. In most cases, the employer denies the contractor's claim. The contractor chooses to call time to have become at large assuming that the time for completion may no longer be applicable. Thus, the contractor needs to complete the works within what is deemed to be a reasonable time. Eventually, the contractor may resort to packaging the loss incurred, during the reasonable time, through a global claim.

Had there been guidelines that explain how the contractor may react to such cases, the on-going dispute between the parties to the contract may decrease. Exploring the available literature resulted in basic guidelines to begin with. This helped in zooming into the picture of the interaction among concurrency, pacing, time-at-large conditions and global claims.

Four fundamental sources were relied on for this matter. The analysis shows how the court rules on concurrency under three adopted approaches: (1) dominant approach, (2) Malmaison approach, and (3) apportionment approach. The analysis of concurrent case laws on one hand, and the concurrent cases in time-at-large situations on the other hand, summarized how courts view the calling of time becoming at large in relation to concurrency. The triggering of the prevention principle by the contractor under a prevailing concurrency seems not to have any change on the approach to be relied on for ruling on a case on hand. This shows that even if the contractor had triggered the prevention principle, delay concurrency prevails under the different characteristics of each adopted approach unless the contract says otherwise.

The second fundamental source is the enforceability of the time risk structure. When the time risk structure remains enforceable, the burden of proving that the reasonable time, taken by the contractor, was reasonable rests on the contractor. The contractor can update his schedules prospectively according to actual progress of the works. The contractor can also show that the time taken to finish the works was reasonable by following a retrospective analysis with the benefit of hindsight. When the time risk structure has lapsed, the burden of proving that the reasonable time, taken by the contractor, was unreasonable rests on the employer. The employer can conduct a retrospective analysis to prove that the time taken was unreasonable.

The third fundamental source was the computation of the reasonable time, where the contractor may need to update and revise the schedule prospectively, in order to keep track of the target date. This exercise is done through an estimate of how the circumstances are evolving and interacting with other emerging events. The contractor

may need to foresee the start, end, and duration of each on-going and the yet to begin activities.

Lastly, defining a global claim and the success and failure factors of such a claim. These factors can be related with establishing the contractual basis for a global claim. Six success factors were outlined along with three failure factors. Three of the success factors are not a prerequisite as per Walter Lily's and John Doyle's case.

Based on the four discussions, the research then tackles the main goal of this study. The effect of the interplay among concurrency, pacing, time-at-large conditions, and global claims led to proposing theoretical models that guide dispute resolution practitioners along with contractors and employers to better understand the scenarios of when the contractor may opt to package his claim through a global claim given concurrency and time-at-large conditions. The models take into consideration the FIDIC 1999 and 2017 standard conditions of contract which promotes the idea that the contractor shall maintain his contractual obligations by producing progressive schedule updates if possible. Finally, two recent case studies were tested under the proposed theoretical models and are presented with their chronological characteristics and facts. The case studies helped in supporting the offered conclusions and guidelines that helped in supporting the proposed theoretical models.

7.2 Conclusions

On the issue of delay concurrency under time-at-large situations, several conclusions were evident:

- Delay concurrency still plays a major role in disputes between the contractual parties
- The sequencing and timing of the concurrent delay events play a major role in adopting one of the three approaches over the other
- Employers might pace their delayed works proactively under the existence of a contractor's dominant delay cause, and vice versa
- In order for an EoT claim to be successful, the contractor carries the burden of proving that the RE causes delay to completion, using the factual events when conducting detailed delay analyses
- The triggering of the prevention principle by the contractor under a prevailing concurrency case does not change the approach to be relied on for a case ruling
- Clear contract language, addressing delay concurrency, can play a critical role in hindering the otherwise justifiable reliance on the prevention principle
- Contractors are made warier of needing to avoid unjustifiably triggering the prevention principle, as the odds seem to indicate that it has a limited capacity to serve the contractor's interests under delay concurrency situations.

On the issue of the contractor's perspective on packaging the reasonable time through a global claim under time-at-large, several conclusions were evident:

- The contractor needs to maintain prospective schedule updates and revisions in order to compute the reasonable time taken by him to complete the works
- The timing of referring the dispute to the adjudication board seems to play a role in packaging the reasonable time taken by the contractor through a global claim

- When the referral of dispute occurs after the actual time for completion, and regardless of whether the time risk structure has lapsed or is enforceable, the submissions by the parties occurs after the actual time for completion has been served

- When the referral of dispute occurs before the actual time for completion and the time risk structure has lapsed, the employer proves that the reasonable time taken by the contractor was unreasonable only after the actual time for completion has been served

- When the referral of dispute occurs before the actual time for completion and the time risk structure is enforceable, the contractor may prove that the time to be taken is reasonable, before the actual time for completion only when he is submitting an incident-based claim

- When the referral of dispute occurs before the actual time for completion and the time risk structure is enforceable, the contractor may prove that the time taken is reasonable, after the actual time for completion only when he is packaging the loss through a global claim

- Some of the global claim success factors are no longer a prerequisite. This promotes the idea of packaging the contractor's loss through a global claim

- The adjudication board's decision aims to restrict the contractor's relinquishing of contractual requirements pertaining to schedule updates in a time-at-large situations

- The decision made by the adjudication board closes the door on the idea of selling the loss incurred through a global claim.

7.3 Recommendations

At the end of this study, I would like to recommend the following:

1. The universal definition of concurrent delays should be defined in order for the contractual parties to fully understand how to react to such delays
2. The contractor would need to be more careful in calling time at large as it might not be justifiable even when concurrency exists.
3. The contractor would need to be careful when packaging his claim through a global claim. Even if courts are taking a more lenient approach when dealing with such claims, the failure of these claims will occur in such cases as case II.
4. The extension of time clause should be drafted carefully to protect the employer from committing acts of prevention that will justify the calling of time to have become at large.
5. The contractor should keep his schedule updated, especially when it is highly likely for the burden of proving that the reasonable time taken is reasonable rests on him in a time-at-large situation.
6. The employer should be more cautious in time-at-large cases by insisting on enforcing contract requirements pertaining to schedule updates and revisions.

7.4 Future Work

Future research may focus on the practicability of the proposed theoretical models by attempting to apply it to recent time-at-large situations. The two cases discussed show that the financial condition of the contractor can hinder his ability to produce prospective revised schedules. More effort can be put into qualifying the applicability of the theoretical models with various standard conditions of contract. In addition to this, various factors such as the conditions of an extension of time clause, notice requirements, and other factors can be added to the theoretical models to show the practicability of the models. Moreover, legal investigation could attempt to generalize the adjudication decision pertaining to global claims in time at large situations.

7.5 Significance of the Research

The contract parties, in time at large situations, are highly likely to disagree whether the time taken to finish the works is reasonable or not along with the packaging of the loss through a global claim. The findings of this research can be of benefit to both, dispute resolution practitioners as well as contractors and employers alike. The importance of this work lies in providing a structured platform of guidelines, which can be relied on, when dealing with concurrency in time-at-large situations on one hand, and global claims in time-at-large situations on the other hand. More particularly, this research attempts to help contractors in the process of the justifiability of calling time to have become at large and the possibility of succeeding as a global claim.

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