

QUANTIFICATION OF DELAY AND DISRUPTION IN CONSTRUCTION AND ENGINEERING PROJECTS

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This book of seven chapters and 838 pages is written by a quantity surveyor who has had over 25 years of experience in the construction and engineering industry internationally. He has had a hands-on role as advisor and quantity surveyor acting for employers and contractors, as well as in the prevention and resolution of disputes concerning the quantification of loss caused by delay and disruption to the progress of construction work.

The book was written to provide practical guidance to quantifying loss caused by delay and disruption. It includes detailed practical scenarios based on decided case law.

The book's 838 pages on the quantification of delay and disruption loss initially looks very daunting, until it is realised that two thirds of the pages are devoted to substantial extracts from relevant case law. The author's text itself is a manageable and accessible 266 pages.

The forward to the book is by the Hon Justice Peter Vickery, judge in charge of the Technology, Engineering and Construction List of the Victorian Supreme Court. His Honour notes that the subject matter is not only written for application in Australia, but also internationally, and is a unique complement to the fifth edition of the well-known *Delay and Disruption in Construction Contracts*.

Chapter 1 describes the purpose of the book as intended to be a practical guide to quantification of loss caused by delay and disruption, covering: (1) planning and programming of a construction project; (2) the methods of delay analysis; and (3) the methods used to quantify financial loss caused by delay and disruption.

The first and second editions of the Society of Construction Law Protocol are discussed, and the changes to the 2017 second edition highlighted. The differences between delay and disruption are discussed by reference to a United States case and the SCL Protocol.

Chapter 2 covers the technical issues of planning and programming, commencing with a short history. The overview of project planning is described from the perspective of the structure required to use current project management software. The techniques used and the various methods of presentation of results from the software are covered in more detail under the sections of CPM Program, Gantt Chart, Network Program, and Line of Balance.

These are illustrated with appropriate diagrams that make the concepts clear. Commonly used terminology of program levels, baseline programs and method statements are described. There is a very useful and practical section on checking, review and updating a CPM program that should be compulsory reading for every contractor that expects to be able to use its updated programs to support extension of time claims. This is supported by a scenario based on a case in which the contractor's programme was manipulated to disguise periods of delay, which the court ultimately found was misleading and ineffective. The chapter concludes with a section on planning and programming using Oracle Primavera P6, perhaps the most widely used planning software used internationally in the construction industry.

Chapter 3 is on extensions of time (EOT). The benefits of an extension of time for the contractor and employer are briefly discussed.

The topic of notice of delay is covered in some detail, illustrated with several case law scenarios. The importance of a notice of delay as a condition precedent to a contractor's entitlement to an EOT is emphasised by the scenario based on the recent Australian case of *CMA v John Holland*.

Time at large and the prevention principle are given a detailed treatment, illustrated with a number of case law scenarios that support the author's text. There is a section on float in relation to time that addresses the use and ownership of float, and the contractor's right to complete early, and a section that discusses the distinction between a contractor's contingency for early completion of the works and float. In this reviewer's view, the author has not clearly distinguished between float and contractor's contingency; the use of the term 'end float' for contractor's contingency tends to obscure the significant difference between float (the time a task may be delayed for it to impact the early finish date of a project) and contractor's contingency (the activity between the end of the contractor's critical path and the contractual date for completion). The discussion on ownership of float would have been assisted by reference to the way in which specific standard form contracts deal with this issue. The chapter also discusses non-excusable and excusable delay, and the various approaches to concurrent delay, illustrated with case law scenarios. Whilst the different approaches to concurrent delay are discussed in some detail, the author provides little commentary on these from his own experience.

Chapter 4 is a short chapter on delay analysis. It covers the identification of delays and discusses the difference between an as-planned/baseline program and an as-built program.

Six different methods of delay analysis are described: as-planned versus as-built, impacted as-planned, time impact, windows, longest path and collapsed as-built. The chapter concludes with a brief commentary on which method to use. The contents of this chapter provide a useful and clear summary of the methods of delay analysis currently used, with helpful suggestions as to the available sources of data. There are no case law scenarios presented; this is a topic that could perhaps usefully have been illustrated by (anonymous) examples from the author's own experience.

Chapter 5 is on the quantification of loss caused by delay, covering both contractors' entitlements as well as employers' entitlements. The section on calculation of contractors' delay costs covers the issues of direct additional construction costs, preliminaries (site overheads/indirect job costs), subcontractors, off-site/head office overhead, loss of profit, increased cost of resources/inflation and finance charges and interest. The section on off-site/head office overheads is very useful addition to the literature, covering additional office costs, loss of opportunity and a review of three formula methods of calculation. The details, supplemented by a case law scenario, reinforce the difficulties that contractors face in trying to recover head office overheads.

The section on liquidated damages is almost entirely devoted to the employer's entitlements; the possibility of providing for (liquidated) delay damages for the contractor is acknowledged, but it is suggested that this is hardly ever used. In this reviewer's experience, the benefits to both parties of pre-agreeing the contractor's delay damages are not uncommon in Australia.

This book is a valuable contribution to the literature on two issues that are at the heart of many construction law disputes: time delays and the quantification of costs occasioned by them. It will be a welcome addition to the library of construction practitioners for its coverage of legal issues and cases, as well as construction lawyers for its explanation of the technical aspects of programming and cost quantification and the relevant text of significant cases.

The discussion on liquidated damages highlights the important differences in the approach to penalties between recent Australian and United Kingdom case law, and discusses various defences to a claim for liquidated damages.

Chapter 6 is on the quantification of loss caused by disruption. Disruption is explained and illustrated by loss of productivity graphs derived from research by others. The difficulties of proving disruption are discussed and various methods of calculating loss of productivity listed and briefly described. The detailed steps required to use the measured mile and baseline productivity methods are described, and illustrated with appropriate calculations and graphs derived from three case studies.

The author highlights some of the limitations of the measured mile method, and details his improvements to this method incorporated in the baseline productivity method. The section on acceleration covers instruction to accelerate, contractor's acceleration and the approaches to constructive acceleration in the United States, United Kingdom and Australia. The author discusses how acceleration costs may be incurred, and proving acceleration by reference to a case law scenario.

Chapter 7 is on global claims for delay and disruption, an important topic for contractors. Global claims are described and distinguished from total cost/time claims. A number of sections are devoted to the issue that makes or breaks a global/total cost claim: proof of causation, usually based on inference. Various United Kingdom and Australian cases are referred to illustrate what is required for a successful claim. Apportionment of liability for a claim between the contractor and employer is

discussed, and concludes that notwithstanding its application in Scotland, it is unlikely to be available elsewhere unless the contract provides otherwise. The issues of assessment of a global claim, the requirement for a claimant to establish breach, causation, loss, and apportionment are discussed in the three case law scenarios.

The book has a comprehensive index, a bibliography and a list of the cases referred to. Although it has a list of scenarios, figures and tables, there is no list of the cases included in the book. As two thirds of the book is devoted to the text of important cases, it would be very useful to have a separate list of these cases, with their full citation.

Given the use of specific terminology used in relation to programming and delay and disruption, it would have been very helpful if the author had provided a clear definition when a term is first used, and a Glossary of terms for subsequent reference. Terms are sometimes used before their meaning has been explained. For example, the formal definition of critical path is on page 334 in chapter 4, long after the term has been used in other contexts.

The book does not always clearly distinguish between the common law, and contract provisions. For example, in the section on acceleration, the author refers to an employer's instruction to accelerate, without making clear that such an instruction would only be available if it was specifically provided for in the contract; there is no entitlement under the common law for an employer to instruct a contractor to accelerate work to overcome the effect of an employer caused delay. Virtually all standard form and sophisticated bespoke contracts have detailed provisions in relation to time, and discussion of some

examples of these would have been of value.

This book provides a useful overview of quantification of delay and disruption for practitioners in the construction industry and lawyers practising in construction law. It assumes a more than passing knowledge of contract law and legal principles; inexperienced practitioners will also need to refer to a text on construction law contracts to understand some of the terminology and concepts referred to by the author. For example, in the discussion on liquidated damages, bringing a contract to an end by rescission is discussed, without defining what rescission means.

Readers of this work should not be put off by its length. It is really two books in one: a guide to the practical issues involved in quantifying delay and disruption costs in construction projects, and a casebook on judicially decided cases relevant to delay and disruption in different common law jurisdictions.

Many readers of this text may not need to refer to the cases in detail, but for those that do, they will be grateful to the author for providing the judgments in the text, some of which would not be readily available to the average user.

This book is a valuable contribution to the literature on two issues that are at the heart of many construction law disputes: time delays and the quantification of costs occasioned by them. It will be a welcome addition to the library of construction practitioners for its coverage of legal issues and cases, as well as construction lawyers for its explanation of the technical aspects of programming and cost quantification and the relevant text of significant cases.