

# CONTENTS

<i>Preface to the fifth edition</i>	xx
<i>Acknowledgments to the fifth edition</i>	xxiii
<i>Editorial team biographies for the fifth edition</i>	xxv
<i>Table of acronyms</i>	xxvii
<i>Table of case report references</i>	xxxii
<i>Table of cases</i>	xxxv
<i>Table of legislation</i>	lxvii
<i>Table of contract clauses</i>	lxxi
<i>Online Resources</i>	xcix
<i>List of figures</i>	ci
CHAPTER 1 INTRODUCTION AND TERMINOLOGY	1
Introduction	1
Terminology	6
The contractor	6
The developer	6
The contract administrator	7
The works	8
Programme and schedule	8
Critical path	9
Delay	10
Disruption	12
CHAPTER 2 THE RISK OF DEVELOPMENT	13
Introduction	13
Standard form provisions	18
Allocation of risk	23
Project planning and programming risk	26
Legal risk	29
Dispute risk	36
Design risk	39
Buildability risk	43
Biddability risk	43
Construction risk	46
Financial risk	50

Where there is no contract	285
Where there is no completion date under the contract	287
Where there is a stipulated contract period	289
<b>CHAPTER 7 PLANNING AND PROGRAMMING</b>	<b>290</b>
Introduction	290
Planning	295
Familiarisation	297
Outline plan	297
Strategic plan	297
Detailed plan	298
Programming	298
Varieties of programme	299
Introduction	299
Baseline and target programmes	300
The development programme	304
The tender programme	304
The working programme	305
The occupational programme	307
The as-built programme	308
Subcontractors' programmes	309
Programme preparation	311
The critical path method	311
The contract period	316
Early completion	317
Milestones, key dates and sectional completion	320
Work content	323
Logical relationships	325
Activity durations	330
Calculating durations	333
Project planning method statements	338
Standard form requirements for programmes	343
The programme as a contract document	354
Specifying the programme requirements	356
Pricing the programme requirements	360
<b>CHAPTER 8 PRESENTATION AND APPROVAL OF PROGRAMMES</b>	<b>363</b>
Introduction	363
Bar chart	366
Flow chart	368
Line-of-balance chart	368
Time chainage diagram	370
Milestone programme and chart	370
Network diagrams	371

Arrow diagram	372
Precedence diagram	373
Cascade diagram	374
Standard form provisions	374
The initial programme	374
Programme approval, acceptance and rejection	375
<b>CHAPTER 9 REVISING, UPDATING, MONITORING AND REPORTING</b>	<b>385</b>
Introduction	385
Standard form provisions	393
Programme revision	400
Programme updating	405
Progress monitoring	410
Target CPM programme monitoring	411
Resource monitoring	412
Cash flow monitoring	414
Cost monitoring	415
Earned value monitoring	417
Milestone monitoring	417
Bar chart monitoring	418
Count the squares chart monitoring	419
Jagged line monitoring	420
Work content monitoring	422
Progress reporting	424
Visual aids	426
<b>CHAPTER 10 PROJECT CONTROL</b>	<b>429</b>
Introduction	429
Forecasting delay	431
The SCL Protocol	432
The change management supplements	442
The management information structure	443
Definitions	443
The programme	444
Electronic submittals	445
Progress records	446
Key dates	446
Roles and relationships	447
Managing the effect of change	449
First step – programme update	451
Second step – programme review for better information	452
Third step – recovery	452
Potential fourth step – event impacting	453
Potential fifth step – acceleration	453

Calculating time-related compensation	454
Identifying the cost of project controls	454
Redress for a failure to comply	455
<b>CHAPTER 11 MITIGATION, RECOVERY AND ACCELERATION</b>	<b>457</b>
Introduction	457
Standard form provisions	463
Constructive acceleration	480
Constructive acceleration as a legal doctrine	481
Initiation of grounds for construction acceleration	483
Conduct requiring acceleration	484
The mechanics of constructive acceleration	489
Methods of recovery and acceleration	493
Omissions	495
Changing the sequence of activities	496
Other logic changes	498
Using a different method of working	499
Increasing motivation	499
Increasing resources	499
Increasing the working time	500
Failure to recover or to accelerate	503
<b>CHAPTER 12 VARIATION AND CHANGE</b>	<b>509</b>
Introduction	509
Standard form provisions	516
The bill of quantities	528
Ambiguities, discrepancies and divergences	536
Omissions	543
Value engineering	546
Constructive change	547
Constructive change of quality	552
Constructive change of quantity	555
Consequential changes	556
<b>CHAPTER 13 CONSTRUCTION RECORDS</b>	<b>557</b>
Introduction	558
Record keeping	558
Progress records	562
Change control	564
Record retrieval	568
Electronic data exchange	569
Building Information Modelling	573
The acronym	574
Definition	574
What's involved and how does it differ from "conventional" practice?	575

Levels of BIM maturity	576
What is arguably not BIM?	576
Perceived benefits of working in a BIM environment	577
Perceived barriers against BIM adoption	577
Collaboration	578
Legal, contractual and insurance issues	578
Use and management of information	579
Investment	579
Overcoming the barriers	580
Key documents	580
Case studies	580
Standard forms of contract	581
What does BIM mean for claims and disputes?	583
Retrieval of information	583
Communication of information	584
Case law	584
Conclusion	584
Independent information management	585
Standard form provisions	588
Presentation of evidence	595
Oral evidence	595
Documentary evidence	596
Database records	598
Computer generated evidence	600
Factors influencing the evidentiary strength of records	602
Getting at the facts of delay	603
Retrospective assembly of evidence	603
Manual sorting of evidence	605
Multi-volume collections	605
Single-volume tagged collections	606
Sorting evidence on databases	607
Discovery, disclosure and inspection	611
Disclosure of electronic documents	616
Disclosure of experts' documents	618
Disclosure of privileged communications	619
<b>CHAPTER 14 CAUSE AND EFFECT</b>	<b>623</b>
Introduction	624
The three-part chain of causation	630
Primary causation – occurrence of a causal event	631
Voluntary or implied variations and other instructed changes	632
Expenditure of prime cost and provisional sums	633
Developer's acts or omissions	636
Acts or omissions of third parties	639

Other occurrences	641
Secondary causation – a delay to progress of the works	641
Instructed variations	645
Suspension of the works	646
Failure to perform	647
Tertiary causation – delay to completion of the works	649
Proof of causation	654
Introduction	654
The terms of the contract	655
Completion is likely to be delayed	656
Completion is likely to be, or has been, delayed	657
Completion has been delayed	658
Whatever is fair and reasonable	659
The subject-matter of the proof	660
The factual materials available	662
Proportionality	663
Illustrating inference	668
Introduction	668
Cause and effect matrix	671
Scott Schedules	672
Graphs and histograms	674
Bar charts	675
As-planned versus as-built	677
Collapsing technique	681
Visualisations	682
Smoke and mirrors	682
 CHAPTER 15 FORENSIC PROGRAMME ANALYSIS	 687
Introduction	687
Preparing the materials	693
The planned programme	693
Correcting the planned programme	694
Updating the planned programme with progress	698
The as-built schedule	700
Analytical methods	703
As-planned versus as-built	703
As-planned updated versus as-planned updated	706
As-planned impacted	708
Collapsed as-built	716
Time impact analysis	723
Windows and watersheds	727
 CHAPTER 16 FLOAT AND TIME CONTINGENCIES	 730
Introduction	730
Float	732
Free float	733
Independent float	734

Interfering float	734
Total float	735
Negative float	739
Time contingencies	739
Standard form provisions	743
Who owns the float?	745
Potential ambiguities between free float and contingency	746
Ad hoc creation of total float	749
Interpretation of total float as contingency	751
Example 1 – absence of completion constraint on planned work	752
Example 2 – applied completion	752
Example 3 – non-driving link between applied constraints	752
Example 4 – applied fixed lag between unconstrained milestones	753
Example 5 – time contingency activity	753
Example 6 – contract duration bar	754
Total float belongs to D	754
Total float belongs to C	755
Total float belongs to the first to get to it	757
 CHAPTER 17 DISRUPTION TO PROGRESS AND LOST PRODUCTIVITY	 762
Introduction	763
Productivity	765
Resource-based planning	768
The importance of records	770
Conditions causing lost productivity	771
Staffing	772
Variations	773
Recovery and acceleration	775
Errors and omissions	777
Partial possession	777
Adverse weather	778
Loss of morale	780
Extended working hours	780
Reassignment of manpower	781
Dilution of supervision	783
Learning curve	783
Logistics and site restrictions	784
Ripple	785
Trade stacking	786
The analysis of lost productivity	786
A worked example	787
Planned versus actual	789
Industry productivity norms versus actual	790
Historic versus actual	792
Benchmark data versus actual	793

Actual impacted versus actual unimpacted	794
The basic approach	795
Modified measured mile approach	796
Accounting for the effects of separate events	797
Judicial consideration of the measured mile approach	799
Expert opinion	802
<b>CHAPTER 18 CONCURRENCY, PARALLELISM AND PACING</b>	<b>803</b>
Concurrency	804
Introduction	804
The parties	806
Entitlement	807
Distinguishing a delay to progress from a delay to completion	807
Distinguishing primary, secondary and tertiary causation	807
Distinguishing concurrent and parallel delays	808
Distinguishing concurrent and sequential delays	809
Distinguishing concurrent and pacing delays to progress	809
Distinguishing the timing of primary cases	810
Legal concepts of relief and compensation	810
Distinguishing delay and financial loss	812
Concurrency and delay to progress	812
Concurrent delays to progress	812
Sequential delays to progress	814
Parallel delays to progress	817
Concurrency and extensions of time	818
Concurrent delays to completion	818
Sequential causes of delay to completion	821
C must pay liquidated damages for all the delay to completion, if it cannot show for which part, if any, C is not responsible	821
D is not entitled to any liquidated damages at all, because it is, at least in part, responsible	821
C must pay all the liquidated damages, unless it can show for which part of the delay to completion D was responsible	822
D is not entitled to any liquidated damages at all unless it can show for which part of the delay to completion C is responsible	823
Parallel cause of delay to completion	824
Concurrency and prolongation	825
Concurrent causes of prolongation	825
Sequential causes of prolongation	827
Parallel cause of prolongation	827
Concurrency and pacing	828
<b>CHAPTER 19 TOTAL TIME, TOTAL LOSS AND GLOBAL CLAIMS</b>	<b>833</b>
Introduction	833
Total time claim	837
Defence to a total time claim	838

Total loss claim	838
Defence to a total loss claim	841
Global claims	844
Defence to a global claim	850
<b>CHAPTER 20 APPORTIONMENT</b>	<b>855</b>
Introduction	855
Apportioning delay to completion	859
Apportioning loss and/or expense	864
Methods of apportionment of loss or expense	865
The tortious solution	866
The burden of proof approach	866
The Devlin approach	867
The dominant cause approach	867
Jury verdict approach	869
The modified "global claim" approach	869
The "A/B estimates" approach	870
The "delta estimates" approach	870
The modified "total cost" approach	870
The "City Inn" approach	871
The net effect approach	873
<b>CHAPTER 21 DAMAGES</b>	<b>874</b>
Introduction	875
Entitlement to compensation	878
Potential heads of claim	884
Direct labour costs	885
Non-productive overtime	887
Staff costs	890
Management costs	892
Goods and materials	894
Plant and equipment	895
Loss of productivity	897
Temporary works	898
Preliminaries	898
Head office costs	901
Insurances	903
Financing costs	903
Profit on costs	908
Loss of future profits	908
Unabsorbed overheads	910
Formula adjustments	914
1. The contractor has actually suffered loss, or expense	918
2. The loss or expense has not been recovered elsewhere	919
3. The loss or expense incurred during the period of delay has remained unabsorbed	919

## CONTENTS

4. It is impossible, or unreasonably burdensome, to calculate the loss or expense without resorting to a "formula" approach	919
The <i>Eichleay</i> formula	921
The <i>Hudson</i> formula	923
The <i>Emden</i> formula	923
Other formulae	923
<i>Quantum meruit</i>	924
Developer's damages	931
Liquidated damages	936
Standard form provisions	938
An exclusive remedy	939
Penalties	940
Failure to quantify	944
Quantifying predictive loss	946
Exclusion clauses	953
CHAPTER 22 SETTLEMENTS AND DISPUTE RESOLUTION	961
Introduction	961
Costs	963
Claim preparation	965
In-house	966
Claims consultants	967
Experts	968
Settlement	979
Duress	982
Misrepresentation and fraud	985
Dispute resolution	988
Non-binding	989
Mediation	990
Conciliation	991
Non-binding or final and binding	992
Expert determination	992
Adjudication	997
Final and binding	1002
Arbitration	1002
Litigation	1004
Statements of case	1011
Claim	1013
Defence	1015
Counterclaim	1015
Reply and defence to counterclaim	1017
Amendment of statements of case	1017
Request for further information	1019
Striking out statements of case	1019

## CONTENTS

CHAPTER 23 ADJUDICATION IN THE UNITED KINGDOM	1023
Introduction	1023
Update on adjudication in the United Kingdom	1024
Limitation periods	1024
Complex decisions and human rights aspects	1024
Costs and interest	1024
Definition of a construction contract	1025
Sequential adjudications and single disputes	1025
Complex decisions and human rights aspects	1025
Costs and interest	1029
Definition of a construction contract	1031
Residential occupiers	1034
Sequential adjudications and single disputes	1035
Recovering adjudication costs	1039
CHAPTER 24 DISPUTE BOARDS	1043
Introduction	1043
Dispute boards in context	1044
The advantages of dispute boards	1046
Standing or ad hoc dispute boards	1048
DRBs, DABs and CDBs	1051
Dispute board rules	1052
Independence of the dispute board members	1053
Dispute board operations	1054
Enforcement of dispute board decisions	1056
Referral to a dispute board prior to arbitration	1058
Costs of dispute boards	1059
National and international developments	1060
CHAPTER 25 MANDATORY LAWS IN INTERNATIONAL CONSTRUCTION CONTRACTS	1062
Introduction	1062
Private international law	1064
Time-bar clauses	1066
Liquidated damages	1067
Taking-over (practical completion)	1068
Decennial liability	1070
APPENDIX 1 GLOSSARY OF TERMS AND DEFINITIONS	1073
APPENDIX 2 TYPES OF DOCUMENT	1097
APPENDIX 3 THE SOCIETY OF CONSTRUCTION LAW DELAY AND DISRUPTION PROTOCOL: A RETROSPECTIVE ANALYSIS	1103

CONTENTS

APPENDIX 4	SELECTING THE APPROPRIATE DELAY ANALYSIS METHODOLOGY: A DECISION-MAKING MODEL FOR FACILITATING THE PROCESS	1127
<i>Index</i>		1137

**Per Alexander Matteo, Thomas Jacopo e Alice**

<http://www.pbookshop.com>