Contents

Author's Notes  
Acknowledgements  
Biographies  
Preface  
Why Have I Written this Book?  
Objectives  
My Journey from the Australian Bush to International Construction  
Who Should Read this Book and Why?  
Conclusion  

1 Introduction  
Ian Williams  
1.1 Opening Remarks  
1.2 Section A – The State of the Industry (Chapters 2–6)  
1.3 Section B – People and Teamwork (Chapters 7–11)  
1.4 Section C – The Right Framework – Forms of Contract, Business Models, and Public Private Partnerships (Chapters 12–15)  
1.5 Section D – Management of Risk (Chapters 16–23)  
1.6 Section E – Robust Processes – Corporate and Project Management (Chapters 24–27)  
1.7 Section F – Emerging Conclusions (Chapter 28)  
1.8 Final Note  

Section A – The State of the Industry  

2 Global Overview of the Construction Industry  
2.1 Introduction – Globalisation Impacts on Construction  
2.2 Construction Industry Cycles  
2.3 Industry Trends – Business Models, Contract Types, Financing, Technology  
2.4 Regional Trends – Middle East, Asia Pacific, Africa, the Americas, UK and Europe
2.5 Bad News and Its Consequences  11
2.6 The Good News – Significant Improvements in the Right Direction  13
2.7 Summary and Conclusions  15

3 Construction Consultants in the Global Market Place  19
   Judy Adams
3.1 Introduction  19
3.2 Political Risk  19
3.3 Regional/Cultural Differences  20
3.4 Payment or Fee Recovery  21
3.5 Localisation  21
3.6 Failure to Attract or Retain Skilled People  21
3.7 Contractual Terms and Conditions  22
3.8 Ability to Deliver Across Major Projects/Programmes  22
3.9 Cyber Security  22
3.10 Contractor Failure  23
3.11 Design Liability  23

4 Common Causes of Project Failure  25
   Judy Adams
4.1 Introduction  25
4.2 High Profile ‘Problem Projects’ Since 2000  26
   4.2.1 Berlin’s New Brandenburg Airport  27
   4.2.2 The Central Artery/Tunnel Project (the Big Dig), Boston  27
   4.2.3 Brisbane Airport Link  28
   4.2.4 The Scottish Parliament Building  28
   4.2.5 Stuttgart 21 Rail Development  28
   4.2.6 National Physics Laboratory, UK  29
   4.2.8 The Sydney Opera House and the Hamburg Symphony Concert Hall
       (Elbphilharmonie)  30
4.3 The 35 Common Causes  30
   4.3.1 Structuring, Bidding and Pre-Contract Phase  32
   4.3.2 Design, Construction, Commissioning, and Transition to Operations  39
4.4 Project Leadership – How Bad Can It Get?  41
4.5 Lessons Learnt from Incompetent Site Management  43
4.6 Conclusion  44

5 The Use and Abuse of Construction Supply Chains  45
   Rudi Klein
5.1 Introduction  45
5.2 Construction: An Outsourced Industry  46
5.3 Adverse Economic Forces Bearing Down on the Supply Chain  47
5.4 Supply Chain Dysfunctionality  47
5.5 Addressing the Issues and Solutions  48
   5.5.1 Latham  48
   5.5.2 Egan  49
5.5.3 Farmer 50
5.5.4 The Plunder Goes On 50
5.5.5 Conditions Precedent 51
5.5.6 Cross-Contract Set-Off 51
5.5.7 Avoidance of Statutory Obligations 52
5.5.8 Not the Whole Story 52
5.5.9 Charters and Codes 53
5.5.10 Supply Chain Finance Initiative 54
5.5.11 Public Contracts Regulations 2015 54
5.5.12 Project Bank Accounts 54
5.5.13 What is a PBA? 55
5.5.14 Retentions 56
5.5.15 The Cost of the Retention System 57
5.6 The Future 58

6 A Discussion on Preventing Corporate Failure: Learning from the UK Construction Crisis 59
Stephen Woodward and Nigel Brindley
6.1 A Call to Action’ 59
6.1.1 Corporate Risk Manager 59
6.1.2 Investment Banker 60
6.2 Lifting the General Level of Corporate Management 61
6.2.1 Operational 63
6.2.2 Commercial 63
6.2.3 Financial 63
6.3 Improving Risk Management 64
6.4 Joint Recommendations by the Corporate Risk Manager and the Investment Banker 65
6.4.1 Programme and/or Project Risk Register Actions 66
6.4.2 Gateway Reviews (GRs) 66
6.4.3 Early Warning Systems (EWS) 67
6.5 Conclusions 67

Section B – People and Teamwork 69

7 Obstacles to Senior Management and Board Success 71
7.1 Introduction 71
7.2 Groupthink and Team Selection 72
7.3 Training 73
7.4 Choosing the Wrong Strategy and/or Projects 74
7.5 Need for ‘Macro-Level’ Focus, with Effective Corporate Oversight (‘the Wider Picture’) 75
7.6 Effective Communication and Delegation 76
7.7 Summary 77
8  **Structuring Successful Projects**  79
8.1  Introduction  79
8.2  So What Happens on Successful Projects? What Are the Key Factors that Create Success?  79
8.3  The Different Activities and Responsibilities, from Concept to Completion of Construction  80
8.3.1  Building Effective Teams  80
8.3.2  Understanding the Bigger Picture  81
8.3.3  Know and Manage the Contract Diligently  81
8.3.4  Performance Bonds, Payment Terms, Retentions, and Pricing of Variations and Back Charges  83
8.4  Checklist for Structuring Successful Projects  85
8.4.1  Structuring the Project (Client)  85
8.4.2  Tendering and Bidding Activities (Client, Contractor, User/Operator, FM)  85
8.4.3  Establishing the Risk Management Process (Each Party is Responsible for their own Risk Management)  86
8.4.4  Finalising the Financing and the Contract  86
8.4.5  Establishing the Project Leadership and Team Spirit  86
8.4.6  Agree the Key Processes with All Stakeholders at the Outset  86
8.4.7  Construction Phase (Contractor, FM)  87
8.4.8  Commissioning, Completion and Transition to Operations (Client, Contractor, User/Operator, FM)  87
8.4.9  Defects Liability Period (Client, Contractor, FM)  87
8.4.10  Claims and Disputes (All Parties)  88
8.4.11  Crisis Management Planning (All Parties)  88
8.5  Summary  90

9  **Understanding and Managing Difficult Client/Contractor Relationships**  91
   *David Somerset*
9.1  Introduction  91
9.2  Problems Posed by Difficult Clients  91
9.3  How to Manage Difficult Clients  92
9.3.1  The Client Brief  92
9.3.2  The Programme  93
9.3.3  Cost of the Works  93
9.3.4  Quality Procedures  94
9.3.5  Relationships with Consultants  94
9.3.6  Claims  94
9.3.7  Payments  94
9.4  Problems Posed by Difficult Contractors  95
9.5  Steps to Manage Difficult Contractors  96
9.5.1  Developing a Procurement Strategy  96
9.5.2  Tender Reconciliation  96
9.5.3  Acceptance of the Tender  96
## 9.5.4 Contract and Other Documents 97
## 9.5.5 Performance on Site 97
## 9.6 Conclusion 97

### 10 Social Intelligence – The Critical Ingredient to Project Success 99

**Tony Llewellyn**

10.1 Introduction 99
10.2 Project Intelligence 100
10.3 Social Intelligence 100
10.4 Learning and Development 102
10.5 Building Cohesive Teams 103
10.6 Introducing a Specialist into Your Team 103
10.7 Coaching the Team 104
10.8 Managing Behavioural Risk 104

### 11 Practical Human Resources Considerations 107

11.1 The Changing Job Requirements in the Construction Industry – Government and Corporate 107
11.2 The Argument for Broader Based Training of Tomorrow's Industry Leaders 108
11.4 Personnel Recruitment and Positioning – A Different Perspective 109
11.5 Leadership Considerations 110
11.5.1 Real Team Leaders versus Egos, Arrogance, and Poor Basic Management Skills 110
11.5.2 Cronyism 111
11.5.3 Bosses with Poor People Skills Who Avoid Staff Management Problems 111
11.6 The Inherent Risks of Decision Making for Survival 112
11.7 The Human Fallout from a Failed Project 113
11.8 Summary 114

### Section C – The Right Framework – Forms of Contract, Business Models, and Public Private Partnerships 115

### 12 The Contract as the Primary Risk Management Tool 117

**Rob Horne**

12.1 Common understanding (or lack thereof) 118
12.2 Clarity 118
12.3 Knowledge transfer 119
12.4 Adaptability 119
12.5 Acceptance 119
12.6 Application 119
13 The New Engineering Contract (NEC) Interface with Early Warning Systems and Collaboration 129
Richard Bayfield

14 Development Contracting – An Efficient Way to Implement Major Projects 133
Jon Lyle
14.1 Introduction 133
14.2 Major Projects Are Unique 133
14.3 Commitment and Costs 134
14.4 The Tools for Successful Development Contracting 135
14.4.1 Vision and Value 135
14.4.2 Identify All the Stakeholders 137
14.4.3 Plan, Programme, and Process 139
14.4.4 Sustainability 143
14.5 Conclusion 145

15 A Critical Review of PPPs and Recommendations for Improvement 147
15.1 Introduction 147
15.2 Proponents and Opponents 150
15.2.1 Supporters 150
15.2.2 Opponents 151
15.2.3 Addressing the General Pros and Cons of PPPs 151
15.3 Project Viability and Necessary Due Diligence 153
15.3.1 PPP Project Due Diligence 154
15.4 Some Current Perspectives on the PPP Process 155
15.4.1 North America 155
15.4.2 United Kingdom 156
15.4.3 General Points 156
15.4.4 Europe 157
15.4.5 Australia 157
15.5 Efficient Structuring and Managing of PPPs 160
15.5.1 Structuring, Bidding and Finalising the Contracts and the Financing 161
15.5.2 Establishing the Project Leadership and Team Spirit 161
15.5.3 Agree the Key Processes with all Stakeholders at the Outset 161
15.5.4 Construction Phase 161
15.5.5 Commissioning, Completion and Transition to Operations 162
15.5.6 Defects Liability Period 163
15.6 PPP Claims and Disputes 164
15.6.1 PPP Disputes – Typical Categories 164
15.6.2 PPP Disputes 164
15.6.3 Transfer of PFI Risk 165
15.7 Summary of Key Factors for Success and Minimising Risk 165
Section D – Management of Risk  167

16  A Tale of Oil Rigs, Space Shots, and Dispute Boards: Human Factors in Risk Management  169
   Dr Robert Gaitskell QC
16.1 Human Factors in Risk Management  169
16.2 The Challenger Disaster  169
16.3 Dispute Boards  171
16.3.1 DB Background  171
16.3.2 FIDIC DB Clauses  172
16.3.3 Operation of a DB  172
16.4 Nuclear Fusion  173
16.5 The ITER Project  174
16.5.1 Plasma  174
16.5.2 Magnetic Fields  175
16.5.3 The Tokamak Complex  175
16.6 Conclusion  175

17  Effective Risk Management Processes  177
17.1 Introduction  177
17.2 Effects of Human Behaviour in Risk Management  177
17.3 Typical Project Risks  178
17.3.1 Client, Contractor, and Other Stakeholders  178
17.3.2 Project Bidding  178
17.3.3 Award of the Contract, Design, and Construction  179
17.4 Keeping Risk Management Simple  180
17.5 Procedures to Eliminate, Mitigate, and Control Risks  183
17.5.1 Project Executive Summaries for ‘By Exception’ Reporting  184
17.5.2 Audit the Process Regularly  185
17.5.3 Collaboration, Communications, and Relationship Management  186
17.5.3.1 Company Level  187
17.5.3.2 Project Level  187
17.6 Conclusions  187

18  Risk Management and its Relation to Success in the North American Context  189
   John McArthur
18.1 Introduction  189
18.2 Relationship of Success to Risk Management  191
18.3 Planning for Success and Managing Risks  194
18.4 Go/No-Go Stage  194
18.5 Summary  196
18.6 Recent Projects: A Success and a Failure  197
18.6.1 Project A – A Highly Successful Outcome for all Stakeholders – Southwest Calgary Ring Road, Calgary, Alberta, Canada 197
18.6.2 Project B – An Unsuccessful Project for Certain Parties Relative to Initial Expectations – Santa Clara County (California), Valley Medical Center 198

19 Early Warning Systems (EWSs), the Missing Link 199
Edward Moore and Tony Llewellyn
19.1 Introduction 199
19.2 Look Outside of the Technical Bubble 199
19.3 Cultural Barriers 200
19.4 Learning to Value ‘Gut Feel’ 201
19.5 Case Study 202
19.6 Summary 204

20 Construction Risk Management – Technology to Manage Risk (ConTech) 205
Rob Horne
20.1 Introduction to Technology in Construction 205
20.2 What Do We Mean by ConTech? 206
20.2.1 The Currently Used ConTech 206
20.2.2 Less Used ConTech 207
20.2.3 Not Yet Substantially Used ConTech 208
20.3 ConTech as a Tool Not a Toy 209
20.4 Major Projects – Temporary Smart Cities 211
20.5 Smart City Principles 212
20.5.1 Interconnectivity 212
20.5.2 Records and Data 212
20.5.3 Energy Use and Optimisation 213
20.6 ‘Smart’ Commercial Management 213
20.7 Dehumanising Risk Management 214
20.7.1 Data Generation and Capture 215
20.7.2 Data Analysis and Presentation 216
20.7.3 Process Automation 217
20.7.4 Option Generation and Implementation 218
20.8 Joining the Dots for Exponential Growth 218
20.9 Project Control and Risk Management – The Future 223
20.10 Conclusion 225

21 Intelligent Document Processes to Capture Data and Manage Risk and Compliance 227
Graham Thomson
21.1 Introduction 227
21.2 The Dimensions of IDF 229
22 Organisational Information Requirements for Successful BIM Implementation 233

Dr Noha Saleeb

22.1 Introduction 233
22.2 Leveraging Organisational Information Requirements for Business Success 234
22.2.1 Business Success 234
22.2.2 Organisational Information Requirements (OIRs) 235
22.3 Developing OIRs Using BIM 236
22.3.1 Aspired Business Goals and Operational Financial Gains 240
22.3.2 Spares, Maintenance, and Purchasing 240
22.3.3 Automated System Enhancement 241
22.3.4 Asset Management Optimisation 241
22.3.5 Space Management Optimisation 241
22.3.6 Estate Management 242
22.3.7 Human Resource Management 242
22.3.8 OIR Template 242
22.4 Conclusion 243

References 243

23 Examples of Successful Projects and how they Managed Risk 245

23.1 Introduction 245
23.2 People, People, People – London 2012 Olympic and Paralympic Games 245
Ian Williams
23.2.1 Governance 247
Ian Williams
23.3.1 Introduction – 1994 Onwards, the Years that Influenced how Terminal 5 would be Delivered 249
23.3.2 Terminal 5 (T5) Tunnel Projects – Managing Project Delivery Risks 251
23.3.3 The T5 Agreement (the Contract) 251
23.3.4 Project Delivery Team – Management Approach 253
23.3.5 Workforce Safety – Incident and Injury Free Programme 253
23.3.6 Risk Management 253
23.3.7 The Outcome? 254
23.3.8 What Are the Key Lessons Learnt from the Above Projects? 255

Acknowledgements 255
Bibliography 256

23.4 Cyber Design Development – Alder Hey Institute in the Park, UK 256
Stephen Warburton

23.5 The Importance of Clear Ownership and Leadership by the Senior Management of the Client and the Contractor 258
Charles O’Neil
Section E – Robust Processes – Corporate and Project Management 261

24 Planning and Programming Major Projects 263
Charles O’Neil and Rob Horne
24.1 The Foundations of Success 263
24.2 Monitoring ‘Progress versus Programme’ and ‘Cost-to-Complete versus Budget’ 265
24.2.1 S-Curves and Their Significance 265
24.2.2 S-Curves with Earned Value Analysis 266
24.2.3 The Importance of S-Curves to Property Developers and Their Lenders 267
24.3 Extensions of Time, Concurrency and Associated Costs 267
24.3.1 Guiding Principles for Delay, EOTs and Cost Reimbursement 267
24.4 Ownership of Float 270

25 Managing and Resolving Conflict 275
David Richbell
25.1 Conflict Can Be Good 275
25.1.1 Different Truths 275
25.1.2 Difficult Conversations 275
25.2 Co-operation Versus Confrontation 276
25.2.1 Making the Effort to Co-Operate Is Only the Start 276
25.3 We Are All Different 276
25.3.1 Cultural Differences 277
25.3.2 Changing Assumptions into Fact 277
25.3.3 Time, Seniority, Decision Making 277
25.4 Fairness or Justice (or Both) 278
25.4.1 Trust Is Everything 278
25.5 Relationships 278
25.6 The Move Towards Collaborative Working 279
25.7 Best Deals 279
25.8 Staged Resolution 279
25.8.1 Dispute Resolution Spectrum 279
25.8.2 An Outbreak of Common Sense 280
25.9 Conclusion 282

26 Dispute Resolution – The Benefits and Risks of Alternative Methods 283
26.1 Introduction 283
26.2 Avoiding Formal Disputes Through Early Communications and Negotiations 283
26.3 Main Considerations of the Parties When They End Up in a Formal Dispute 285
26.5 Working with Lawyers 286
26.6 Techniques for Negotiating Settlements 287
27 Peer Reviews and Independent Auditing of Construction Projects 291

Section F – Emerging Conclusions 295

28 Conclusions and Recommendations 297
28.1 Overview 297
28.2 Where Is the Global Industry Headed? 298
28.3 Key Observations and Recommended Actions 299
28.3.1 Legislative Change 300
28.3.2 Client Contractor Relationships 300
28.4 Final Thoughts 303

Appendix A 305

Index 307