Contents

Introduction *xvii*

Chapter 1 Why Is Technology So Important to Construction Management? 1

The Promise of BIM 2
Processes 4
Technologies 5
Behaviors 7

The Value of BIM in Construction 8
Where Does BIM Play a Role in Construction Management? 15
Team Engagement 16
Project Pursuit and Business Development 16
Planning for BIM Success 19
Using Contracts in Planning 19
Scheduling 20
Logistics 22
Estimating Cost 23
Constructability 25
Analyzing Data in BIM 27
Designing for Prefabrication 29
Coordinating Construction 31
Using Mobile Devices 32
Controlling Schedules 33
Controlling Cost 34
Managing Change 35
Material Management 37
Tracking Equipment 37
Closeout 38
Managing Facilities 39
Knowledge Platform Population 40

Where the Industry Is Headed 42
Leadership Buy-In 42
The Evolving Role of the BIM Manager 43
What Have Been the Results? 43

Summary 44

Chapter 2 Project Planning 45

Delivery Methods 46
Design-Bid-Build 47
Construction Manager at Risk 52
Design-Build 56
Integrated Project Delivery 62

BIM Addenda (Contracts) 63
AIA: Document E202 65
AGC: ConsensusDocs 301 65

DBIA: Document E-BIMWD 65
AIA: Document E203 66
Contracts Summary 66

The Fundamental Uses of BIM 67
Level of Development 68
Model-Based Coordination 69
Model-Based Scheduling 72
Model-Based Estimating 72
Model-Based Facilities Management 73
Model-Based Analysis 74

BIM Execution Plan 75
History of the BIM Execution Plan 75
Communication 77
Expectation 83
Organization 85

Summary 89

Chapter 3 How to Market BIM and Win the Project 91

BIM Marketing Background 92

Building Your Team 94

Marketing Your Brand of BIM 97
Does What You Are Proposing Show Clear and Demonstrable Value? 98
Is This a Proven Tool or Process, a Developing One, or an Innovative One? 99
Can You Show Real Results from the Impact of Implementation? 102
Is This What the Owner Wants? 104
Is This Something You Can Deliver? 105

Using BIM to Enhance the Proposal 108
Addressing BIM in the RFP 108
Project Pursuit Images 110
Project Simulations 112
Project Pursuit Virtual/Augmented Reality Simulations 113
Other Marketing Tools 116
Tailor-Fit Your Offerings 116

Client Alignment 117
Pushing the Envelope 118

Seeking Value and Focusing on Results 118

Summary 121

Chapter 4 BIM and Preconstruction 123

Leaning on the Past 124
The Empire State Building 125
Adopting New Technology 132
The Journey to BIM 134

The Kickoff 136
Getting the Right People in the Room 136
Creating the Vision 138
Opening the Lines of Communication 139
Accounting for the Expectation Bias 139

Scheduling Design 139
Design Structure Matrix 145
Scheduling the LOD 148

Constructability Review 149
Leverage the Plans 150
Leverage the Details 153
Leverage the People 158

Estimating 163
Revit Schedules for Estimating 164
Cost Trending with Assemble 171

Analysis 175
The 2030 Challenge 176
Overview of Sustainability and BIM 177
Sustainability Analysis with Sefaira 182

Logistics and Planning 188

Summary 190

Chapter 5 BIM and Construction 191

Overview of BIM in Construction 192

Model Coordination 194
BIM and Site Coordination 194
Clash Detection 196
Navisworks Conflict Exercise 196
Fabrication 208

BIM Scheduling 213
Scheduling Software 217

Completing the Feedback Loop 226
Systems Installation 228
Installation Management 228
Installation Verification 232
Construction Activity Tracking 234
Field Issue Management 235

BIM and Safety 236

Producing Better Field Information 238
Beginning with the End in Mind 239
What Information Do You Need to Build? 242
Model Redlining Exercise 242
Video Embedding Exercise 250

The Virtual Job Trailer 252

The Conference Room 252
The Plans and Specifications Hub 254
The Jobsite Office as a Server 254
The Jobsite Office as a Communication Hub 255
Setting Up the Job Trailer 255

Summary 256

Chapter 6 BIM and Construction Administration 257

The Battle for BIM. 258

Training Field Personnel. 261
Training Goals for Basic Skills 263
Advanced Training Goals for Model Creation 263
Training Courses for Additional Uses 265

Document Control. 270
Creating a Digital Plan Room with Bluebeam Revu eXtreme 272

The Real Value of 4D. 281

Developing BIM Intuition 284
Starting with a Door 284
Assemble Systems: Beyond the Basics 286
Importing Search Sets into Navisworks 288
Mapping Equipment to BIM 360 Field 291
Information Loading and QR Coding 295
Using 360 Field to Status Material 299
Visualizing Equipment Status in the Model 301
Endless Possibilities 304

Small Wins to Big Change 305

Summary 305

Chapter 7 BIM and Close Out 307

True Costs of Facility Operations. 308
Artifact Deliverables 310
Constant Deliverables 315
Taking a Hybrid Approach 317

Owners and BIM 317
Owner Options 318
Integration of a Record BIM 320

BIM and Information Handover 325

Maintaining the Model 329
Ongoing Investment and Logistics for Facility Management BIM 330
Training 332
Model Maintenance 333

One BIM = One Source of Information 334

Summary 337

Chapter 8 The Future of BIM **339**

What Will BIM Be? 340
Industry Trends 340
BIM and Prefabrication 342
New Processes and Roles 343
Interoperability 345

BIM and Education 349

BIM and the New Construction Manager 351

BIM and the New Team 354

BIM and the New Process 356
Future Opportunities 357
Future Relationships 359
Virtual Builder Certification 360

Summary 362

Index *363*