Contents

1	Intro	duction	1
	1.1	Road Map	1
	1.2	Origin of the Book and Acknowledgments	3
Part I		Contracting	
2	Mult	iple-Project Management	7
	2.1	The Multiple-Project Environment	7
	2.2	Project Portfolio Management	8
	2.3	Program Management	8
		2.3.1 Notion of Program Management	8
		2.3.2 Grouping Projects	9
			10
		2.3.4 Developing Programs	12
	Refe		13
3	Cont	ract Organization	15
	3.1		15
	3.2	Notion of Contracting	16
	3.3		17
			18
			20
			22
			23
			24
			24
	3.4		25
		3.4.1 Time and Material	27
		3.4.2 Unit Prices	28
			29
			31
			31
			32



vi Contents

			34
			34
		3.4.9 Firm Fixed Price	36
		3.4.10 Summary of Payment Schemes	37
	3.5	Award Methods	38
	3.6	Selecting the Appropriate Contract Organization	39
	Refer	ences and Additional Resources About Contract	
		Organization	42
4	Cont		43
	4.1	Introduction to Contract Administration	43
	4.2		43
	4.3	The Contract Documents	45
	4.4	Contract Bonds	47
	4.5	Changes and Extra Work	48
	4.6		50
	4.7	Claims and Disputes	50
	4.8		52
	Refer	ences and Additional Resources About Contract	
		Administration	53
Par	t II	Human Resources	
5	Proje	ect Management Organization	57
	5.1	The Organizational Challenge	57
	5.2	Organizing the Firm for Project Management	58
	5.3	Organizing the Project Team	62
	5.4		64
	Refer	ences and Additional Resources About Project	
		Management Organization	66
6	Proje	ct Information and Communications Management	67
	6.1	Role of Information and Communications	67
	6.2	Technologies and Systems for Project Management	67
		6.2.1 Filing System	68
		6.2.2 Individual Productivity Tools	68
			68
			69
	6.3		69
	Refer	ences and Additional Resources About Information	
			71
_	4 777	W	
	t III	Money	
7	Proje		75
	7.1		75
		7.1.1 Owner Financing	75

Contents

		7.1.2 Project Financing
		7.1.3 Contractor Financing
	7.2	Financial Evaluation of Projects
		7.2.1 Net Present Value
		7.2.2 Choice of Discount Rate 8
		7.2.3 IRR Versus NPV
	Refer	rences and Additional Resources About Feasibility 8
8	Plani	ning and Scheduling
	8.1	Project Planning: Breakdown Structuring
		8.1.1 Work Breakdown Structure – "What" 89
		8.1.2 Organizational Breakdown Structure – "Who" 92
		8.1.3 Cost Breakdown Structure – "How Much" 93
	8.2	Deterministic Scheduling Principles
	8.3	Scheduling Systems
		8.3.1 Matrix Scheduling
		8.3.2 Gantt Chart Scheduling
		8.3.3 Network Diagramming 9
		8.3.4 Line-of-Balance Scheduling 103
	8.4	Critical Path Method
		8.4.1 Float Ownership
	8.5	Precedence Diagramming Method 10
	8.6	Resource-Based Scheduling
		8.6.1 Time-Cost Schedule Optimization with CPM 11
		8.6.2 Resource Leveling
		8.6.3 Heuristic Scheduling Approaches
	Refer	ences and Additional Resources About Planning
		and Scheduling
9	Proie	ect Monitoring and Control
	9.1	The Monitoring Process
	9.2	Measurement of Actual Progress
	9.3	Performance Measurement: Earned Value Analysis 124
	9.4	Forecasting Performance
	9.5	Project Reporting
	9.6	Areas of Project Control
		rences and Additional Resources About Project
	110101	Monitoring & Control
Do-	t IV	Material Resources
10		urement Management
	10.1	Introduction to Procurement Management
	10.2	Procurement Methods and Strategies for Managing
		the Construction Supply

viii Contents

	10.3 Refere	The Procurement Process	143 145
11	11.1 11.2 11.3	Management	147 147 148 149 150
Part	\mathbf{V}	Uncertainty	
12	12.1 12.2	ion Making Introduction Decision Analysis 12.2.1 Decision Trees 12.2.2 Expected Value 12.2.3 Utility Function 12.2.4 Notion of Risk Premium	153 153 153 154 155 156 157
	12.3 12.4 Refere	Multiple-Attribute Decision Making	159 161 161
13	13.1 13.2 13.3	Abilistic Scheduling Scheduling with Uncertainty Pert Simulations 13.3.1 Monte Carlo Simulations 13.3.2 GERT ences and Additional Resources About Probabilistic Scheduling	163 163 170 170 173
14	14.1 14.2 14.3 14.4	Management Risk Identification Risk Breakdown Structure Risk Quantification Risk Control ences and Additional Resources About Risk Management	175 175 177 177 181 182
Abb	reviati	ions and Acronyms	185
Inde	x		187