
Contents

Preface..... x

Acknowledgments.....xi

Chapter 1 Introduction 1

Chapter 2 Basic Concepts 3

2.1 Cost × Price 3

2.2 Labor..... 3

2.3 Material 10

2.4 Equipment..... 13

2.5 Direct and Indirect Cost 18

2.6 Overhead..... 21

2.7 Fixed, Semi and Variable Costs 22

2.8 Scope and Work Breakdown Structure 24

2.9 Cost Breakdown Structure 26

2.10 CAPEX and OPEX..... 30

Notes..... 30

Bibliography 30

Exercise Answers 31

Chapter 3 Cost Estimate – Quick Methods..... 32

3.1 Physical Dimensions..... 32

3.2 End-product Units..... 36

3.3 Capacity Factor..... 37

3.4 Factor Method..... 40

3.5 Parametric Equation 41

Bibliography 51

Exercise Answers 51

Chapter 4 Cost Estimate – Detailed Method 52

4.1 Basis of Estimate (BOE) 52

4.2 Detailed Method – Process 54

4.3 Scope Definition and Take-off 55

4.4 Planning..... 56

4.5 Direct and Indirect Cost Estimates 59

4.6 Pricing, Overhead, Profit, and Tax Estimates 62

4.7 Baseline 64

4.8	Accuracy Range.....	65
4.9	Cost Estimate Review.....	66
4.10	Cost Estimate Validation.....	67
4.11	Cost Estimate – Detailed Method – Example 3	70
	Notes.....	81
	Bibliography	82
Chapter 5	Probabilistic Cost Estimate	83
5.1	Probabilistic Cost Estimate Due to Uncertainties	83
5.2	Risk Assessment – Probabilistic Cost Estimate Due to Risks and Uncertainties.....	87
5.3	Contingency.....	90
5.4	Management Reserve	97
	Bibliography	105
Chapter 6	Economic Costs.....	106
6.1	Payback Period	106
6.2	Return on Investment (ROI).....	108
6.3	Return on Capital Employed (ROCE).....	111
6.4	Break-even Analysis	112
6.5	Net Present Value (NPV)	116
6.6	Profitability Index (PI)	120
	Notes.....	122
	Bibliography	123
	Exercise Answers	123
Chapter 7	Economic Feasibility Study	124
7.1	Assumptions and Data Acquisition	124
7.2	Cost Estimation	125
7.3	Cash Flow	126
7.4	Economic Analysis.....	126
7.5	Decision Gate	127
7.6	Economic Feasibility Study – Example 1	127
7.7	Economic Feasibility Study (Escalation Included) – Example 2.....	130
7.8	Economic Feasibility Study – Exercise 1	135
	Bibliography.....	137
	Exercise Answer	137

Chapter 8	Cost Control	138
8.1	Planned × Performed.....	138
8.2	Earned Value Management	149
8.3	S Curve	168
8.4	Rundown Curve.....	172
8.5	Indicators	173
	Notes.....	176
	Bibliography	176
Chapter 9	Additional Topics	178
9.1	Benchmarking	178
9.2	Depreciation Methods	181
9.3	Inflation and Escalation	190
9.4	Sensitivity Analysis	191
9.5	Value Engineering (VE).....	193
9.6	Contract Cost Updates – Readjustment	194
	Notes.....	198
	Bibliography	198
	Exercise Answer	199
Chapter 10	Sustainability and Cost.....	201
10.1	Embodied Carbon Calculation	201
10.2	Decommissioning.....	204
	Bibliography	205
	Exercise Answer	206
Annex		207
Index		216