## **Contents**

## Preface xi

1	Austria 1
1.1	Introduction 1
1.2	Concept 2
1.3	Financing 2
1.4	Cost Calculation 3
1.4.1	Basic Principles of Cost Calculation 3
1.4.2	Cost Assessment System 4
1.4.2.1	Basic Costs 5
1.4.2.2	Cost Coefficients for Value Adjustment and Inflation 7
1.4.2.3	Cost Coefficients for Risks 7
1.4.2.4	Cost Coefficients for Preliminary Monetary Adjustment 7
1.5	Cost Coefficients for Risks Corresponding to the Value of the ÖGG-Guideline
	2005 7
1.5.1	Structure of the Cost Coefficients for Risks According to Project Phases 8
1.5.2	Structure of the Cost Coefficients for Risks According to Risk Spheres 8
1.5.3	Levels Used to Estimate the Cost Coefficients for Risks 9
1.5.4	Reference Values for Cost Coefficients for Risks – Planning Phase 10
1.5.4.1	Cost Coefficient $U_{\rm E}$ 10
1.5.4.2	Cost Coefficient $U_{\rm B}$ 11
1.5.5	Reference Values for Cost Coefficients for Risks – Execution Phase 12
1.6	Control 12
1.6.1	Project Cost Control 12
1.6.2	Project Cost Control in the Annual Control Loop 13
1.6.3	Project Phases 14
1.6.4	Levels of Cost Planning 14
1.6.5	Project Structuring 16
1.7	Change Management 16
1.8	Cost Coefficients for Risks Corresponding to the Value of the ÖGG-Guideline
	2016 16
	Abbreviations 18
	References 18



Contents
----------

vi

2	Germany 19
2.1	Introduction 19
2.2	Plan for Maintaining and Expanding Rail Infrastructure 20
2.3	The 2030 Federal Transport Infrastructure Plan 20
2.3.1	Principles 20
2.3.2	The Key Changes Under the Requirements Plan Implementation
	Agreement 21
2.4	Financing 23
2.4.1	New Construction and Upgrades 23
2.4.2	Investment in Replacement Infrastructure on the Existing Network 25
2.4.3	Cost Breakdown on New Constructions and Upgrades and Replacement 26
2.5	Costs 27
2.5.1	Principles for Calculating Costs Based on the Final Report of the Reform
	Commission 27
2.5.2	Work Breakdown Structure for a Project 27
2.5.3	Determining the Basic Costs 29
2.5.3.1	Estimation of Construction Costs in the Preliminary Design Phase ('Lph 1+2',
	Section 55, HOAI) 29
2.5.3.2	Calculation of Construction Costs in the Final Design Phase ('Lph 3+4',
	Section 55, HOAI) 29
2.5.3.3	Design Cost Estimate in the Preliminary Design Phase ('Lph 1+2', Section 55,
	HOAI) 30
2.5.3.4	Calculation of design costs in the final design phase ('Lph 3+4', Section 55,
	HOAI) 30
2.5.4	Financial Contingency Reserve for Risks and Unpredicted Events 30
2.5.5	Inflation 31
2.5.6	Determining Total Costs in the Course of a Project 32
2.6	Risk Management 34
2.6.1	Corporate Risk Management 34
2.6.2	Project Risk Management 36
2.6.2.1	Openly Addressing Rather Than Suppressing Risks 37
2.6.2.2	A Realistic Perception Versus Forced Optimism 39
2.6.2.3	Acting Early to Manage Crises Rather Than Firefighting 39
2.6.2.4	Creating Opportunities 39
2.6.2.5	Timely Use of Communication Channels 39
	Abbreviations 40
	Further Reading 40
3	Norway 43
3.1	Concept, Background, and a Description of the Follo Line Project 43
3.1.1	Objective 43
3.1.2	The National Transportation Plan (NTP) 43
3.1.3	Follo Line Project 45
3.1.4	Responsibilities 47
3.1.5	Project Strategy 47

3.2	Finance 48
3.2.1	Structure of the Cost Estimate 49
3.3	Cost 51
3.4	Project Schedule 52
3.5	Risk Management 53
3.5.1	Identify Risk 53
3.5.2	Quantify Risk 54
3.5.3	Risk Treatment 54
3.5.4	Follow-Up and Report 54
3.6	Controlling 56
3.6.1	Progress, Schedule, and Cost Control 56
3.6.2	Work Breakdown Structure (WBS) 56
3.6.3	Project Phases 56
3.6.4	Progress, Schedule, and Cost Control 56
3.6.5	Planning Basis 56
3.6.6	Commitment Control 56
3.6.7	Estimated Cost at Completion 58
3.7	Trend and Change Control for the Project 58
3.7.1	Change Control 58
	Abbreviations 60
	Further Reading 60
4	Slovenia 61
4.1	Introduction 61
4.2	Responsibilities 62
4.2.1	Railway Infrastructure Investments 62
4.2.2	Infrastructure Management 63
4.3	Planning Background 63
4.4	Development Goals 64
4.5	Financing Sources 65
4.5.1	State Budget 65
4.5.2	EU Grants 66
4.6	Cost Estimates 66
4.7	Risk Management 68
4.8	
	Controlling and Reporting 70
4.8.1	Controlling and Reporting 70
4.8.1 4.8.2	Controlling and Reporting 70
	Controlling and Reporting 70 Investment Documentation 72
4.8.2	Controlling and Reporting 70 Investment Documentation 72 EU Funds 72 Project Second Track Divača–Koper 73
4.8.2 4.9	Controlling and Reporting 70 Investment Documentation 72 EU Funds 72 Project Second Track Divača–Koper 73
4.8.2 4.9 4.9.1	Controlling and Reporting 70 Investment Documentation 72 EU Funds 72 Project Second Track Divača–Koper 73 Concept, Background, and Description of the Project 73
4.8.2 4.9 4.9.1 4.9.1.1	Controlling and Reporting 70 Investment Documentation 72 EU Funds 72 Project Second Track Divača–Koper 73 Concept, Background, and Description of the Project 73 Objective 73
4.8.2 4.9 4.9.1 4.9.1.1 4.9.1.2	Controlling and Reporting 70 Investment Documentation 72 EU Funds 72 Project Second Track Divača–Koper 73 Concept, Background, and Description of the Project 73 Objective 73 Transportation Strategy and National Programme 73
4.8.2 4.9 4.9.1 4.9.1.1 4.9.1.2 4.9.1.3	Controlling and Reporting 70 Investment Documentation 72 EU Funds 72 Project Second Track Divača–Koper 73 Concept, Background, and Description of the Project 73 Objective 73 Transportation Strategy and National Programme 73 Project Description 73

viii   Contents	
-----------------	--

4.9.3	Project Phases 79
4.9.4	Project Cost Estimate 80
4.9.4.1	Elaborating Basic Costs 80
4.9.4.2	Cost Estimations for Tunnels T1 and T2 – Occurrence of Karst Phenomena 82
4.9.5	Project Contingencies 87
4.9.6	Cost Estimate Overview 90
4.9.7	Sensitivity Analysis and Risk Assessment 91
4.9.7.1	Sensitivity Analysis 91
4.9.7.2	Probabilistic Risk Analysis 91
4.9.7.3	Qualitative Risk Analyses 93
4.9.8	Controlling 94
	Abbreviations 99
5	Switzerland 101
5.1	Introduction 101
5.2	Responsibilities 101
5.2.1	The Principal 102
5.2.2	The Constructors 102
5.2.3	The Operating Companies 103
5.3	Financing by the FinöV Fund (1998–2015) 103
5.3.1	Revenues from Duties and Taxes 104
5.3.2	The Advance 104
5.3.3	Inflation 104
5.3.4	Financing Terms 105
5.4	Financing by BIF (from 2016) 106
5.4.1	Functioning of the Fund and Main Features of Railway Infrastructure
	Financing 106
5.4.2	Revenues from Duties and Taxes 107
5.4.3	The Advance 108
5.4.4	Inflation 108
5.4.5	Cost Calculation According to FOT Guidelines 108
5.5	Risks 109
5.5.1	Principle 109
5.5.2	Intention 109
5.5.3	Risks and Tasks 109
5.5.4	Procedure 110
5.5.4.1	Risk Identification 110
5.5.4.2	Risk Evaluation 110
5.5.4.3	Risk Assessment 111
5.5.4.4	Risk Strategy 111
5.5.4.5	Documentation of Risk Management 111
5.6	Costs 112
5.6.1	Presumed End Cost 112
5.6.2	Presumed End Costs and Risk Potentials of the Gotthard Axis (Gotthard and
	Ceneri Base Tunnels) 112

5.6.3	Controlling the Performance, Deadlines, and Costs 113
5.6.4	Project Structure Plan 113
5.6.5	Phase Structure 113
5.6.6	Cost Types 113
5.6.7	Performance Control 113
5.6.8	Performance Reference Basis 114
5.6.9	Performance Situation and Prognosis 115
5.6.10	Order Control 115
5.6.11	Cost Control 115
5.6.12	Billing 115
5.6.13	Change Management – Process Flow of the Change Procedure 115 Abbreviations 116
	DETEC: Federal Department of the Environment, Transport, Energy, and
	Communications Terms and Definitions 117
	Further Reading 121
6	Brenner Base Tunnel: Transnational Project between Austria
	and Italy 123
6.1	Brenner Base Tunnel Project 123
6.1.1	Project Content: Studies, Planning, Approvals 123
6.2	Approval Phase and Financing 126
6.2.1	Approvals and Financing in Italy 126
6.2.2	Approvals and Financing in Austria 126
6.2.3	European Approval and Financing 127
6.2.3.1	EU Budget and TEN-T Programme 127
6.2.3.2	EU Institutions Involved in Funding 128
6.2.3.3	Structure of the European Funding 128
6.2.3.4	TEN-T Programme 2007–2013 and Former Programmes 129
6.2.3.5	CEF Programme 2014–2020 129
6.3	Cost Models 129
6.3.1	Cost Calculation and Risk Provision in Italy 129
6.3.2	Calculation of Total Costs, Including Risk Provision, Adjustment for Inflation, and Preliminary Cost Adjustment in Austria 130
6.4	Cost Calculation and Risk Provision for the BBT 130
6.4.1	Calculation of Risk Provision for Identifiable and Quantifiable Risks 131
6.4.2	Calculation of Risk Provision According to the ÖGG Directive 135  Abbreviations 136
	References 136
7	Lyon-Turin: Transnational Project between Italy and France 139
7.1	Concept 139
7.1.1	Objective 139
7.1.2	The TEN-T Trans-European Transport Network 139
7.1.2	The Project 139
7.1.4	Responsibilities 141

×	Contents		
	7.1.5	Finance 142	
	7.2	Costs 143	
	7.3	Risk Provision 143	
	7.4	Control 144	
	7.5	Variation Procedures 145 Abbreviations 145	
		Further Reading 145	
	8	Conclusion: Essential Elements of Cost and Risk Management	147

Past and Present Participants 151