1. Record Nr. UNINA9910485590303321

Autore	Hofstadler Christian
Titolo	Chances and risks in construction management and economics : a systemic approach to dealing with models and uncertainties / / Christian Hofstadler, Markus Kummer
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-64014-0
Descrizione fisica	1 online resource (xxxii, 696 pages) : illustrations (some color)
Collana	Springer tracts in civil engineering
Disciplina	658.404
Soggetti	Construction industry - Management Construction industry - Risk management Project management
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Note generali	Includes index.
Nota di contenuto	Intro -- Preface -- Table of Contents -- Abbreviations, Acronyms and Notations -- Authors -- 1 Introduction -- 1.1 Production System and Processes -- 1.1.1 Applying the Trapezoidal Model in Construction Management -- 1.1.2 Efficiency and Effectiveness -- 1.1.3 Accuracy, Distortion, and Spread -- 1.1.4 Complexity of Systems -- 1.1.5 Uncertainties in Systems -- 1.2 Objective -- 1.3 Structure -- 1.4 Target Audiences -- 1.5 Summary -- 1.6 References -- 2 Basics -- 2.1 Chance and Risk -- 2.1.1 Etymology -- 2.1.2 General Language -- 2.1.3 Usage in Business and Economics -- 2.1.4 Usage in Construction Economics -- 2.1.5 Usage of the Concepts of Chance and Risk in this Book -- 2.1.6 Selection of the Reference Base -- 2.2 Assumptions Regarding the Future -- 2.3 Terminology in Statistics and Probability Theory -- 2.3.1 Stochastics -- 2.3.2 Random Variable -- 2.3.3 Distribution -- 2.3.4 Histogram -- 2.3.5 Location Parameters -- 2.3.6 Variance -- 2.3.7 Standard Deviation -- 2.3.8 Quantile Values and Ranges -- 2.3.9 Central Limit Theorem -- 2.3.10 Correlation and Correlation Coefficients -- 2.3.11 Historical Data -- 2.4 Summary -- 2.5 References -- 3 Data, Information, Knowledge, and BIM -- 3.1 Types of Knowledge -- 3.1.1 Implicit and Explicit Knowledge -- 3.1.2 Subjective and Objective Knowledge -- 3.1.3 Individual, Collective, and

Organizational Knowledge -- 3.1.4 Contextualized and Decontextualized Knowledge -- 3.2 General Considerations on Documentation and Knowledge Expansion -- 3.3 Flow of Information -- 3.4 Information and Data Quality -- 3.4.1 Methods of Acquiring Information -- 3.4.2 Information Asymmetry -- 3.5 Systematic Knowledge Management -- 3.6 Data and Information for BIM -- 3.6.1 Principles of BIM Models -- 3.6.2 Targets of BIM Models in the Project, Use, and Operation Processes -- 3.7 Summary -- 3.8 References.
4 Management of Chances and Risks -- 4.1 Management of Chances and Risks in Accordance with ISO 31000 -- 4.2 Situational Analysis with Respect to Chance and Risk Behavior -- 4.2.1 Chance and Risk Behavior in Construction Companies -- 4.2.2 Chance and Risk Behavior and Competitive Intensity -- 4.3 Chance and Risk Policy -- 4.4 Macro- and Micro-Analysis -- 4.4.1 Macro-Analysis - Organizational Level -- 4.4.2 Micro-Analysis - Project Level -- 4.5 Chance and Risk Management Process -- 4.5.1 Analysis and Synthesis of Chances and Risks -- 4.5.2 Optimization of Chances and Risks -- 4.5.3 Monitoring of Chances and Risks -- 4.5.4 Documentation of Chances and Risks -- 4.5.5 Reflection on Chances and Risks -- 4.6 Summary -- 4.7 References -- 5 Applying the Management of Chances and Risks to Project Phases -- 5.1 Phases of a Construction Project -- 5.2 Using Tools and Methods of Chance and Risk Management in Project Phases -- 5.3 Costs of Buildings/Structures - Cost Funnel - Contingencies -- 5.4 Summary -- 5.5 References -- 6 The Fundamentals of Monte Carlo Simulations -- 6.1 Origins and Evolution of the Method -- 6.2 Distinction between Method and Simulation -- 6.2.1 Monte Carlo Method -- 6.2.2 Simulation -- 6.2.3 Monte Carlo Simulation -- 6.2.4 Scenario vs. Iteration -- 6.2.5 Areas of Application -- 6.3 Generation of Random Numbers -- 6.3.1 Sampling Methods -- 6.3.2 Number of Iterations -- 6.4 Distribution Functions -- 6.4.1 Influence of the Shape of Distribution Functions -- 6.4.2 Influence of the Skewness of Distribution Functions -- 6.5 Correlations -- 6.5.1 Correlations in the Literature on Construction Management and Economics -- 6.5.2 Influence of Correlations -- 6.6 Comparison - Deterministic and Probabilistic Calculations -- 6.6.1 Critical Review of Deterministic Calculations -- 6.6.2 SWOT Analysis for Monte Carlo Simulations -- 6.7 Summary.
6.8 References -- 7 Application of Monte Carlo Simulations -- 7.1 Selection of Distribution Functions -- 7.1.1 Theoretical Considerations Based on Known or Assumed Characteristics -- 7.1.2 Gathering Empirical Data -- 7.1.3 Combination of Data Collection Methods -- 7.2 Data Fitting -- 7.2.1 Labor Consumption Rates -- 7.2.2 Quantity Deviations -- 7.3 Identifying Correlations -- 7.3.1 Total Labor Consumption Rate of Reinforced Concrete Operations -- 7.3.2 Expert Survey Results -- 7.3.3 Effects of Correlations on the Total Labor Consumption Rate of Reinforced Concrete Operations -- 7.4 Interpretation of Simulation Results -- 7.4.1 Histograms -- 7.4.2 Tornado Diagrams -- 7.4.3 Scatter Plots -- 7.4.4 Spider Diagrams -- 7.5 Summary -- 7.6 References -- 8 Influence of Project Lead Time and Construction Time on Project Targets -- 8.1 System of Targets for Construction Projects -- 8.2 Project Lead Time and Project Targets -- 8.3 Productivity and Production System -- 8.3.1 Production System -- 8.3.2 Labor Consumption Rates -- 8.4 Influence of Construction Time on Planning Processes -- 8.5 Significance of Construction Time -- 8.5.1 Significance for Construction Management -- 8.5.2 Significance for Construction Economics -- 8.5.3 Significance for Quality -- 8.5.4 Significance for Construction Process Disruptions -- 8.5.5 Legal Significance -- 8.6 Specification of Construction Time -- 8.6.1

Significance of Construction Time for the Construction Contract -- 8.6.2 Definitions of Construction Time -- 8.6.3 Consequences for the Client -- 8.7 Credible Construction Time -- 8.8 Influence of Construction Time on Productivity -- 8.8.1 Construction Time and Losses of Productivity -- 8.8.2 Comparison with Pertinent Literature -- 8.9 Summary -- 8.10 References -- 9 Worked Examples - Client -- 9.1 Project Phase 1 (PPH 1) -- 9.1.1 Developer Costing.
9.1.2 Life-Cycle Cost Considerations -- 9.2 Project Phase 2 (PPH 2) -- 9.2.1 Life-Cycle Cost Calculations -- 9.2.2 Soil Survey -- 9.2.3 Cost Estimate/Calculation -- 9.3 Project Phase 3 (PPH 3) -- 9.3.1 Cost Quotation -- 9.3.2 Determination of Construction Time -- 9.3.3 Bid Analysis - In-Depth Bid Assessment -- 9.3.4 Contract Award Decision -- 9.4 Project Phase 4 (PPH 4) -- 9.4.1 Trend Analysis -- 9.5 Project Phase 5 (PPH 5) -- 9.6 Portfolio Management -- 9.6.1 Basics -- 9.6.2 Task -- 9.6.3 Modeling -- 9.6.4 Calculation and Interpretation of Results -- 9.6.5 Benefit for the Client -- 9.7 Summary -- 9.8 References -- 10 Worked Examples - Contractor -- 10.1 Project Phase 1 (PPH 1) -- 10.2 Project Phase 2 (PPH 2) -- 10.3 Project Phase 3 (PPH 3) -- 10.3.1 Quantity Uncertainties/Combined Pricing -- 10.3.2 Macro-Analysis of Number of Workers -- 10.3.3 Calculation of Number of Required Pieces of Construction Equipment -- 10.3.4 Register of Chances and Risks -- 10.3.5 Determination of Construction Time -- 10.3.6 Rough Process Comparison -- 10.3.7 Rough Estimation of Stocking Quantities^29) -- 10.3.8 Costing (Zero-Base Approach) -- 10.3.9 Assessment of Costing Risk -- 10.3.10 Bid Pricing -- 10.4 Project Phase 4 (PPH 4) -- 10.4.1 Logistics/Number of Transport Cycles -- 10.4.2 Coordination of Equipment Chains -- 10.4.3 Compaction Performance in Earthworks -- 10.4.4 Method Selection -- 10.4.5 Construction Process Planning -- 10.4.6 Stocking of Construction Materials -- 10.4.7 Aggregation of Losses of Productivity -- 10.4.8 Determination of Stocking Quantities -- 10.4.9 Procurement Optimization -- 10.4.10 Trend Analyses -- 10.4.11 Weather Impact -- 10.4.12 Determination of Additional Costs -- 10.5 Project Phase 5 (PPH 5) -- 10.6 Project Portfolio Management across all Phases -- 10.6.1 Basics -- 10.6.2 Task -- 10.6.3 Modeling.
10.6.4 Calculation and Interpretation of Results -- 10.6.5 Benefit for the Contractor -- 10.7 Summary -- 10.8 References -- Figures -- Tables -- Index.