

1. Record Nr.	UNINA9910483411803321
Titolo	Non-destructive in situ strength assessment of concrete : practical application of the RILEM TC 249-ISC recommendations / / Denys Breysse, Jean Paul Balayssac, editors
Pubbl/distr/stampa	Cham, Switzerland : , : Springer, , [2021] ©2021
ISBN	3-030-64900-8
Descrizione fisica	1 online resource (397 pages)
Collana	RILEM State-Of-the-Art Reports ; ; Volume 32
Disciplina	620.136
Soggetti	Concrete - Testing Nondestructive testing
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Intro -- RILEM Members -- Preface -- RILEM Publications -- RILEM Proceedings (PRO) -- RILEM Reports (REP) -- Contents -- Contributors -- Part I Theory -- 1 In-Situ Strength Assessment of Concrete: Detailed Guidelines -- 1.1 Scope -- 1.2 Preliminary Considerations -- 1.2.1 Context and Objective of the Investigation -- 1.2.2 Details of the Structure to Investigate -- 1.2.3 Constraints of the Investigation -- 1.2.4 Investigation as Part of a Wider Evaluation Program -- 1.3 Planning of the Investigation -- 1.3.1 Methods -- 1.3.2 Preliminary Recommendations Before Performing the Tests -- 1.3.3 Methodology for Determining the Locations and Number of NDT Locations -- 1.4 Cores -- 1.4.1 Location of Cores -- 1.4.2 Number of Cores -- 1.4.3 Dimensions -- 1.4.4 Extraction, Conservation and Preparation of Cores -- 1.4.5 Core Testing (Mechanical Testing, NDT) -- 1.5 Identification of the Conversion Model -- 1.5.1 Main Steps and Principles -- 1.5.2 NDT Test Result Precision -- 1.5.3 Data Processing: The Case of Outliers -- 1.5.4 Types of Conversion Models -- 1.5.5 Model Identification Approach -- 1.5.6 Using the Conversion Model and Quantifying Its Error -- 1.6 Overall Assessment Methodology and Recommended Number of Cores -- 1.6.1 Organization of the Evaluation Approach -- 1.6.2 Recommended Number of Cores -- References -- 2 How to Identify the Recommended Number

of Cores? -- 2.1 Introduction -- 2.2 Theoretical Principles-Strength Assessment Precision and Risk Curves -- 2.2.1 Considering Risk in Non-destructive Concrete Strength Assessment -- 2.2.2 Risk of a Wrong Estimation -- 2.2.3 Most Influencing Factors -- 2.2.4 Risk Curves -- 2.2.5 Multi-objective Risk Curves and Recommended Number of Cores -- 2.3 How Risk Curves Are Built -- 2.3.1 The Principles of Synthetic Simulations -- 2.3.2 Application Domain and Assumptions.

2.3.3 Illustration of Risk Curves in a Specific Case and Illustration of the Influencing Factors -- 2.3.4 From Risk Curves to Recommended Number of Cores -- 2.4 Modeling Risk Curves and Deriving the Required Number of Cores -- 2.4.1 Modelling Risk Curves -- 2.4.2 Identification and Validation of Risk Models -- 2.4.3 Analysis of the Risk Models and of Their Influencing Factors -- 2.4.4 Identification of the Required Number of Cores -- 2.5 Recommendations Regarding the Prescribed Minimum Number of Cores -- 2.5.1 Preliminary Statements -- 2.5.2 Illustrating the Effect of EQL and TRP -- 2.5.3 Influence of How the Targets Are Expressed -- 2.5.4 How Are the Tables Giving the Minimum Number of Cores Organized and How Can They Be Used? -- 2.6 Tables Providing the Recommended Minimum Number of Cores -- References -- 3 Evaluation of Concrete Strength by Combined NDT Techniques: Practice, Possibilities and Recommendations -- 3.1 Introduction -- 3.2 How Variations of the Concrete Properties Influence the NDT Measurements -- 3.3 How to Combine NDT Measurements -- 3.3.1 Multiple Regression Methods -- 3.3.2 Artificial Neural Networks -- 3.3.3 Data Fusion -- 3.4 Applying the RILEM TC 249-ISC Recommendations and Combining Several NDT -- 3.5 Conclusion -- References -- 4 Identification of Test Regions and Choice of Conversion Models -- 4.1 Introduction -- 4.2 Identification of TR -- 4.2.1 TR Identification in a Continuous Structure -- 4.2.2 TR Identification in a Real Case Study Building -- 4.2.3 Conclusions -- 4.3 Choice of Conversion Models -- 4.3.1 Description of the Process -- 4.3.2 Example of Application on Three Case Studies -- 4.3.3 Conclusions -- References -- 5 Identification and Processing of Outliers -- 5.1 Context and Principles -- 5.2 Outlier Identification -- 5.2.1 General Considerations and Methods.

5.2.2 Identification of Candidate Outliers for Univariate Data Sets (Situation A) -- 5.2.3 Identification of Candidate Outliers for Bivariate Data Sets (Situation B) -- 5.3 Dealing with Outliers -- 5.3.1 General Considerations -- 5.3.2 Outlier Accommodation Techniques for Univariate Data Sets (Situation A) -- 5.3.3 Outlier Accommodation Techniques for Bivariate Data Sets (Situation B) -- References -- Part II Applications -- 6 How Investigators Can Assess Concrete Strength with On-site Non-destructive Tests and Lessons to Draw from a Benchmark -- 6.1 Introduction -- 6.1.1 Original Idea of Benchmark and Methodology -- 6.1.2 Synthetic Simulations for Assessing Strategies -- 6.2 Presentation of the Benchmark: Case Study and Rules to Be Applied -- 6.2.1 Case Study -- 6.2.2 Resources and Cost -- 6.2.3 Resources Available -- 6.2.4 Cores and Conservation -- 6.2.5 What is Expected from Each Benchmark Participant -- 6.3 Generation of Synthetic Data -- 6.3.1 How Simulation Works -- 6.3.2 Analysis of Synthetic Data -- 6.3.3 How to Model the Assessment Methodology -- 6.4 Feedback from the Benchmark Contributions-Defining Strategies -- 6.4.1 Participants -- 6.4.2 Analysis and Modelling of the Investigation Strategies -- 6.4.3 Short Note About Precision and Representativeness of Test Results -- 6.5 Feedback from the Benchmark Contributions-Deriving Strength Estimates -- 6.5.1 Approaches Using a Prior Model Without Calibration -- 6.5.2

Approaches Developing a Specific Model -- 6.5.3 Composite Approach  
-- 6.6 Comparison of Results and Discussion -- 6.6.1 Assessment  
of Strength Properties at the Various KL -- 6.6.2 Important Issues  
Identified Thanks to the Benchmark -- 6.7 Conclusions  
and Contribution of the Benchmark to the Preparation of RILEM TC  
249-ISC Recommendations -- References.

7 How Investigators Can Answer More Complex Questions About  
Assess Concrete Strength and Lessons to Draw from a Benchmark --  
7.1 Introduction -- 7.2 Presentation of the Benchmark: Case Study  
and Rules to Be Applied -- 7.2.1 Case Study -- 7.2.2 The Investigation  
Strategy -- 7.2.3 What Can Be Measured -- 7.2.4 Available Resources  
for the Investigation -- 7.2.5 What Is Looked for? -- 7.3 Generation  
of Synthetic Data -- 7.3.1 How the Simulation Process Works -- 7.3.2  
Simulation of Material Properties -- 7.3.3 Simulation of NDT Properties  
-- 7.3.4 Simulation of Test Results -- 7.3.5 What Was Simulated-What  
Are the Right Answers? -- 7.4 Analysis of Investigation Methodologies  
-- 7.4.1 Comparison of Methodologies at the Three Knowledge Levels  
-- 7.4.2 Resource Distribution Between DT/NDT and Between Tanks --  
7.4.3 Resource Distribution Between Different Types of NDT Methods  
-- 7.4.4 What Would Be an "Average Investigation Program"? -- 7.5  
Description of Data Processing Methodologies -- 7.5.1 Description  
of the Assessment Methodology for All Contributions -- 7.5.2  
Synthesis About the Definition of Core Location -- 7.5.3 Synthesis  
About the Data that Can Be Used for Correlation with Cores -- 7.5.4  
Synthesis About the Identification of Conversion Models -- 7.6 Analysis  
of Assessments Provided by the Contributors -- 7.6.1 Specific Problem  
Due to Carbonation Effect on Rebound Test Results -- 7.6.2 Answer  
to Question 1: The Four Tanks Have Similar Properties? -- 7.6.3 Answer  
to Question 2: Provide Average and Standard Deviation of Strength --  
7.6.4 Answer to Question 3: Can You Identify Defective Areas in Tank A  
-- 7.6.5 Summary of Contributor Performances Regarding All  
Objectives -- 7.7 Synthesis of What Can Be Derived for RILEM  
Guidelines -- 7.7.1 Example of a Successful Investigation  
with a Limited Amount of Resource (KL2).

7.7.2 Lessons Regarding the RILEM Recommendations -- Appendix 7.1:  
Number of Tests of Each Type for KL1 and KL2 Investigations --  
Appendix 7.2: Recommendations Regarding the Conversion Model  
Identification and Validation -- Appendix 7.3: Repeatability of Test  
Results (or Test Result Precision, TRP) -- References -- 8 Illustration  
of the Proposed Methodology Based on Synthetic Data -- 8.1  
Description of the Case Study -- 8.1.1 The Synthetic Structure -- 8.1.2  
The Synthetic Investigation Program -- 8.2 Organization of the Chapter  
and Content -- 8.3 Developing the Investigation and Assessment --  
8.3.1 Task 1. Defining EQL -- 8.3.2 Task 2. Performing NDT  
Measurements -- 8.3.3 Task 3. Assessing the Test Results Precision  
(TRP) -- 8.3.4 Task 4. Identifying Test Regions -- 8.3.5 Task 5.  
Defining the Number of Cores -- 8.3.6 Task 6. Defining the Location  
of Cores -- 8.3.7 Task 7. Choosing a Conversion Model -- 8.3.8 Task  
8. Identifying and Calibrating the Conversion Model -- 8.3.9 Task 9.  
Estimating Concrete Strength and the Uncertainty on Strength Estimates  
-- References -- 9 Illustration of the Proposed Methodology Based  
on a Real Case-Study -- 9.1 Description of the Case Study-Original  
Methodology -- 9.2 Critical Analysis of the Expert Methodology  
and of Its Results-What Could Be Improved -- 9.2.1 Interesting Ideas  
Developed in the Original Study -- 9.2.2 What Would Have Deserved  
Further Attention -- 9.3 Concrete Properties Assessment of the Same  
Structure Following the RILEM TC 249-ISC Recommendations -- 9.3.1  
T1. Defining EQL -- 9.3.2 T2. Carrying Out NDT Measurements --

9.3.3 T3. Assessing Test Result Precision -- 9.3.4 T4. Identifying Test Regions -- 9.3.5 T5. Defining the Number of Cores -- 9.3.6 T6. Defining the Location of Cores -- 9.3.7 T7. Choice of a Conversion Model -- 9.3.8 T8. Model Identification and Calibration. 9.3.9 T9. Strength Estimation and Estimation of Strength Assessment Uncertainty (Model Prediction Error).

---