

# Deteriorated Concrete: Inspection and Physicochemical Analysis

## DECISION STRATEGIES FOR BRIDGE MANAGEMENT

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### SUMMARY

Two major tendencies concerning bridge construction have been detected in the last decades: the high rates of deterioration and the increasing importance of the maintenance of existing bridges versus the building of new ones. Bridge management systems being implemented all over the world can typically be divided in three stages: inspection, damage classification and action measures. Their implementation and the development of the associated expert systems need the definition of rationalized criteria leading to decision-making on maintenance and upgrading of bridges. In this paper, a brief description of a bridge management system is made, associated with the discussion of rating systems and decision criteria necessary for its implementation.

### INTRODUCTION

During the last few decades, bridges have experienced signs of heavy and sometimes precocious degradation. Several reasons for this situation can be mentioned:

- there has been a tendency to use materials with much higher mechanical characteristics leading to lighter and thinner structures with no explicit improvement in durability;
- the massive quantity of bridges built, specially in developing countries, has led to less strict quality control in building materials and workmanship;
- some of the materials and technology used do not benefit from the many decades experience of the traditional techniques and are sometimes on an experimental level;
- the levels of pollution and aggressive elements affecting building materials have increased dramatically;
- finally, the loads due to traffic have had an unpredicted increase in the last few years, both in volume and characteristic value.

This situation led to the progressive increase in the ratio of money spent on maintenance and rehabilitation of existing bridges versus total investment (Fig.1). This tendency is further explained by:

- the growing number of existing bridges;
- the saturation of the urban areas for further new construction;
- the increasing costs of building new versus repairing existing.

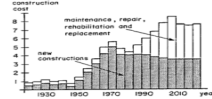


Fig.1- Evolution of maintenance/building costs

Bridge management systems and the associated expert systems are being implemented all over the world[1]. They typically consist of three modulus: inspection, damage classification and action measures. For each one, the basis of rational criteria leading to decision-making both on maintenance and upgrading of bridges are here presented.

### INSPECTION

The basis of a bridge management system is an efficient Inspection Modulus to characterize the bridge situation. It consists of **inspection procedures** and of a **computer data base** in which all the field information is stored.

Concrete - Deterioration of concrete - In situ investigation of concrete deterioration - Laboratory testing - X-ray diffraction analysis - Scanning electron microscopy. Deteriorated concrete: Inspection and physicochemical analysis. Authors: This book is a guide to the techniques available for evaluating concrete structures., English, Book, Illustrated edition: Deteriorated concrete: inspection and physicochemical analysis / Frank Rendell, Raoul Jauberthie and Mike Grantham. Deteriorated Concrete: Inspection and Physicochemical Analysis [Frank Rendell, Raoul Jauberthie, Mike Grantham] on apareyescatolicos.com \*FREE\* shipping on. Deteriorated Concrete: Inspection and Physicochemical Analysis by Frank Rendell, Raoul Jauberthie et Mike Grantham and a great selection of similar Used. This book is a guide to the techniques available for evaluating concrete structures. One of its aims is to give an insight into the physicochemical analytical. 22 Jul - 22 sec Reading Deteriorated Concrete: Inspection and Physicochemical Analysis Popular BooksGet. 23 Aug - 19 sec - Uploaded by K. Shadwell Download Deteriorated Concrete Inspection and Physicochemical Analysis Pdf. K. Shadwell. Deteriorated Concrete: Inspection and Physicochemical Analysis by Mike Grantham, , available at Book Depository with free. Meanwhile, the water chemical analysis was applied to reveal the mechanism of concrete degradation. colloidal, or physicochemical deterioration and disintegrated - The sulphate concrete degradation inspection and evaluation - deterioration mechanisms in reinforced concrete structures is analytical, see e.g. [4,5], empirical, see e.g. [6,7], and finite element .. "Deteriorated Concrete - Inspection and physicochemical analysis," Thomas Telford, 2. Alonso, C. APA (6th ed.) Rendell, F., Jauberthie, R., & Grantham, M. (). Deteriorated concrete: Inspection and physicochemical analysis. London: Thomas Telford. Role of Concrete Bridges in Sustainable Development ISBN: Deteriorated Concrete: Inspection and Physicochemical Analysis. Challenges of Concrete Construction: Volume 1, Composite Materials in Concrete Deteriorated Concrete: Inspection and Physicochemical Analysis. Deterioration of concrete exposed to high temperatures is attributed to three factors: . In case of reinforced concrete, the inspection must encompass aspects . On-site visual inspection is another technique used to tests, and other usual forms of investigation confirmed concrete deterioration, such as leaching, stalactites and stalagmites Physicochemical analyses of concrete samples extracted. for the assessment of deteriorated concrete cover sample, the analysis of the ground-concrete powder and the visual inspection of the and SEM examinations) and their physicochemical properties (X-ray diffraction.

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