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Automatic Monitoring of Buildings Deterioration

Surveillance automatique de la détérioration de bâtiments

Automatische Überwachung der Schadensbildung an Bauten

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SUMMARY

The time control of structural failures should be accomplished by monitoring systems which can provide data in real time. Using such a system we are able to follow the evolution of structural cracking, thermohygrometric conditions, structural yielding and other sources of material and structural deterioration occurring within a time domain.

The data acquisition unit connected to the measuring transducers is based on an intelligent system endowed with a programmable microprocessor which received analogic signals transforms into digital values. This unit, using a modem, submits the data by phone to a central control point where the received data are read and processed by a personal computer. The central control point can be located in a designer office or any other place where monitoring data are required. This acquisition data system is fully automatic permitting remote control of data readings. The system, once installed, permits monitoring continuously in time without staff assistance at the control point both for receiving and processing of data.

Autors examine the real possibility of monitoring today and present the last significant applications they made in Italy.

1. INTRODUCTION

Step 1. Find the Deterioration

In practise, this apparently obvious and simple statement may present a very subtle problem when defects are not visible. For example, timbers and timber piling can be damaged by insects or other organisms, virtually to the point of collapse, without exhibiting any external evidence; corrosion of steel can be difficult to detect because it occurs, principally, in the most inaccessible parts of the structure.

Step 2. Determining the Cause

This is, by far, the most difficult and important step. There are no rules or procedures for determining the cause or causes of deterioration, each case is an individual problem. However the analysis of cracks, the appearance of the surface of concrete, the inspection of timber and steel structures, furnishes an idea for further investigations. It is important to study the structure in bad weather as well as in good. Also it is important to investigate the problem sufficiently deeply to discover any hidden or latent defect.

Step 3. Evaluating the Strength

Usually, the building being investigated is in active use, and it is necessary to determine, as quickly as possible, if it is safe to continue to use it, or if the facility should be restricted to some less severe usage.

