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ABSTRACTS

Intelligent Monitoring of Civil Engineering Structures

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Abstract

In Germany, monitoring of civil engineering structures as basis for the condition evaluation and the estimation of the remaining lifetime is a central task in engineering geodesy. Especially bridges (currently, there exist more than 120.000 motorway and 25.000 railway bridges) are subject of intensive observation, because they often suffer on ageing and are exposed to constantly rising traffic loads. In extension to existing monitoring methods, e.g. the main checks which are periodically performed all 6 years amongst others by geodetic and structural engineering measurements focusing on settlements and bending in single object points, new mostly contact-free laminar or profile-wise methods are developed which aim to improve the effectiveness, the economic performance but also the knowledge about the inner structural conditions. Major goals are the fast evaluation of structural safety and operational reliability but also the detection and localization of damages within a condition-based maintenance concept.

The presentation gives an overview of such new intelligent monitoring concepts dealing with static and dynamic deformation processes. Different methodical approaches (e.g. non-parametric and parametric approaches) will be presented to analyze the collected monitoring data with regard to condition evaluation and damage detection. Especially the last aspect is currently subject of intensive research activities and the problem is still not solved.