



Bridge Information Modeling - Approach for Improving Safety and Serviceability from the Design Phase throughout the Life Cycle

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Summary

Building information modeling has recently become an often-used catchword. In fact, data management of large buildings with a variety of functional requirements and utilization demands is a challenging task. Several attempts to improve the integrity and error rate by automatic procedures have been allowed for by the fast-paced development of the information technology capabilities.

In support of the development of similar capabilities for bridge engineering, this paper describes efforts currently underway to evolve the concept of bridge information modeling (BrIM). The authors are actively involved in all aspects of this effort which includes definition of the physical bridge model and the enabling of a complete suite of bridge engineering applications that encompass the entire bridge life cycle from planning, design, fabrication, construction and operations/maintenance, to operate seamlessly with the bridge information model. A description of the work accomplished to date is included to help illustrate the concept.

Keywords: bridge information modeling, bridge engineering, safety assessment, regular checks, strengthening and upgrading

1. Abstract

Building information modeling has recently become an often-used catchword. In fact, data management of large buildings with a variety of functional requirements and utilization demands is a challenging task. Several attempts to improve the integrity and error rate by automatic procedures have been allowed for by the fast-paced development of the information technology capabilities.

In bridge engineering, the workflow and management requirements are slightly different in detail. However, a bridge information model with comprehensive design capabilities and automated data exchange between the involved parties is equally important in order to allow for an economically efficient design and construction as well as for complying with the safety requirements in the erection phase and throughout lifetime.



Fig. 1. Bridge Information Model

A respective approach has recently been started in the bridge engineering group of Bentley Systems, Inc. The objective is to have a central bridge information model that drives the entire process, cf. Fig. 1. This model is from step to step complemented with the appropriate data. These steps include feasibility studies at the very first beginning, preliminary design for the tendering process, bid assessment, detailed design, erection management and control, as-built drawings, approval, regular checks, and any strengthening and upgrading measures if



required later within life time.

The heart of the solution is the comprehensive bridge design software package RM. It is integrated with graphic platforms, visualization tools, road and rail software, foundation design, software aided data management and other special tools. The model shall be primarily established and managed by the bridge owner and made accessible via Internet for use by the involved parties.

The paper explains in detail the functionality of this bridge information model, the supported tasks of the workflow and the data exchange and compatibility issues.

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