The development of a BIM data structure for bridge maintenance

Sebastian Baumgartner, Omar El-Mahrouk, Michaela Kopp, Markus Vill

University of Applied Sciences FH Campus Wien, Austria

Contact: sebastian.baumgartner@fh-campuswien.ac.at

Abstract

The application of Building Information Modeling is based on the definition of basic classifications to create a clear data structure in which specific parameters can be defined. In building construction, such basic classifications are already in use. However, there are no standardized definitions of the data basis concerning the transport infrastructure stock. Therefore, a data structure is needed to capture all planes of design, construction, and maintenance. In the course of this work, a BIM data structure was developed together with Austrian infrastructure owners –Austrian Federal Railways and Highways Agency. Within the research group, the University of Applied Sciences "FH Campus Wien", Vienna, was responsible for the topic of bridges and bridge maintenance. A consistent data structure is the basis for BIM implementation in infrastructure engineering. The potentials range from the use of BIM models for static calculations to their application in maintenance management.

Keywords: BIM; bridge maintenance data structure; interoperability; semantic information; transport infrastructure.

1 Introduction

Governments, states, large organizations, magistrates and communities are responsible for large infrastructural facilities ranging from huge underground networks to sophisticated structures and road systems. [1] This infrastructure is an essential influencing factor for the economic development of a country. It is, therefore, a basis for being able to connect successfully to global progress. The term infrastructure can be understood to mean different branches such as water and sewage supply, roads, rails and rail networks as well as energy supply networks. The characteristics of these systems and networks are the high capital expenditure associated with construction and the considerable service life. Thus, errors in planning show long-term and cost-intensive effects that frequently involve intricate corrective measures. An improvement in infrastructure can lead to improved economic strength and it is necessary to facilitate the national economy as well as a high standard of living. [2]

In order to guarantee services related to infrastructure, its maintenance is crucial. [3] Maintenance aims at securing and increasing the service life of structures. The result of proper maintenance is usage of the asset to extent the current period of life cycle process. Yet, it should already be implemented at the project start. [4] The service life of building equipment components normally ranges from 5 to 35 years; the load bearing structure is planned for a service life of 50 years according to current Eurocodes. In the case of transport infrastructure, assets like bridges are nowadays designed for a service life up to 100 years. The maintenance and repair infrastructure assets are associated with high and rapidly growing costs for industrialized countries. These costs are

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