Keynote Lecture 3

BIM for Infrastructure – Current state and future challenges

André Borrmann

Professor, Ph.D., Chair of Computational Modeling and Simulation, Leonhard Obermeyer Center, Technical University Munich, Germany. Email: andre.borrmann@tum.de

Abstract:

In recent years, the concept and technology of Building Information Modeling (BIM) has seen tremendous upwind and has been adopted by a large share of the Architecture, Engineering and Construction (AEC) industry around the entire world. It has been shown that a comprehensive digital representation of the asset to be built or refurbishment provides an excellent basis for all kind of computational analysis tasks while at the same time allowing to reduce the complexity and errors of design and engineering tasks.

An important requisite for the further adoption of BIM, in particular in the frame of public projects, is the concept of Open BIM which is based on the usage of vendor-independent, standardized interfaces for communicating geometric-semantic building information models among different software applications. The most mature and relevant Open BIM standard today is the Industry Foundation Classes (IFC).

While the BIM concept has been originally developed for buildings, the principles behind it can be directly transferred to the infrastructure domain. However, a number of specifics and particularities have to be taken into account, among them the typically very large extent of infrastructure facilities and their linear characteristics.

The keynote lecture will report on the current state of BIM for infrastructure. On one hand, this will include the discussion of BIM-based infrastructure projects in the international context. On the other hand, the ongoing development of the IFC for Infrastructure standard will presented, including a detailed look on IFC-Alignment and the upcoming IFC-Road, IFC-Rail and IFC-Bridge standards. In this context a particular emphasis will be put on the data exchange between Geographic Information Systems (GIS) and BIM systems.

The lecture will conclude with identifying the needs for further research and give an outlook on the fully digitized design, construction, and operation of infrastructure assets in the future.

Keywords: Building Information Modeling, Infrastructure, Industry Foundation Classes, Road, Rail, Bridge, Tunnel
Profile of Prof. André Borrmann

André Borrmann is Full Professor for Computational Modeling and Simulation and chairs the Center of Digital Methods for the Built Environment at Technische Universität München. His research focuses on developing computational methods and tools for supporting the design and engineering of complex systems and products, in particular buildings and infrastructure facilities. His research interests cover the fields of Building information modeling, Geometric design and analysis, Design automation, Construction process simulation and Pedestrian Dynamics. He published more than 200 peer-reviewed papers and won several awards, among them the Best Paper Awards of the ASCE Journal of Computing in Civil Engineering in 2009, the European Conference on Product and Process Modeling (ECPPM) in 2010, and the International Conference on Computing in Civil and Building Engineering (ICCCBE) in 2014.

Professor Borrmann acts as an Editorial Board Member of Advanced Engineering Informatics and the International Journal of 3-D Information Modeling. He is currently the Chair of the European Group of Intelligent Computing in Engineering (EG-ICE) and the Vice Chair of the German Association of Computing in Civil Engineering (GACCE). He is actively supporting the construction industry’s shift towards the adoption of advanced digital technology and acts as advisor for the German government concerning the broad introduction of Building Information Modeling in public construction projects. Related to this, he is pushing forward the international standardization activities of buildingSMART, in particular in the infrastructure domain.