

# Application of 3D Bridge Information Modeling in the Life-cycle of Bridges

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## 1 Abstract

Building information modeling (BIM) is a new technology in the bridge construction industry. 3D models can provide perfect numerical expression of drawings from design results. 3D information models for bridge structures improve design quality in terms of accurate drawings, constructability, and collaboration. However, there are lots of challenges to apply these techniques to actual bridge projects. For instance, bridge engineers are facing the challenge of making the vast information generated by their structural model useful for professionals further down the line in the lifecycle of the bridge. Contractors and inspectors require a 3D model which is created after the design process to add extra information related to activities and store that information in the same model. In this paper, technologies available to generate, manage, and enrich the bridge 3D model with intelligent information from construction to design and inspection are proposed.

**Keywords:** BIM, BrIM, CAD, Analysis, Fabrication, Operating, Maintenance, Life-cycle of Bridges.

## 2 Introduction

Nowadays, despite the advantages of collaboration software tools, bridge and roadway designers still perform their work in islands or silos with a very little share of information. Terrain data, alignments, profiles, and superelevation, are elements that are automatically generated by the roadway engineers, but when bridge engineers request them, the transfer of information is thru a paper copy, a set of plans. There is no sharing of the electronic information.

This introduces a great risk into the project as the wrong information could be keyed-in, or not updated, causes project delays and runs into extra cost as there is no time for trying different structure alternatives. Still, in the traditional bridge process, a 3D model of the bridge is created but only use for

visualization and marketing purposes. The same model cannot be used to perform any structural calculations because there is no connection between this physical model to an analytical model which is needed for the consumption of analysis software, and none of them could be used for plans production. The challenge for bridge designers is to make the vast information generated by their structure useful for the other project team members further downstream in the bridge lifecycle.

## 3 Bridge Information Modeling (BrIM)

BIM (Building Information Modeling), which began as a catchphrase in the engineering world, is today a proven concept that continually evolves and improves. BrIM proposes a similar workflow applied