



Scanning of Existing Structures – an Entry into BIM

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Abstract

The idea of Building Information Modelling (BIM) is a new challenge when re-evaluating existing structures. Reconfiguring or adapting the digital model of a structure can be extremely valuable over its lifespan, as there is always an actual reference. The further development of structures like industrial plants or bridges, leads inevitably to the idea of a central digital model. The field of existing structures however lies on the wayside of the advancement and development of BIM and its possibilities for new constructions.

To enable the idea of BIM to existing buildings, someone faces new challenges and it is currently unknown, if the additional effort is even worth the benefits of a digital building model. This is where this paper ties in. The authors derive a three-dimensional model of a bridge, using common scanning methods. The scanning methods used in this paper are airborne photogrammetry and classical terrestrial laser scanning (TLS). Using the generated information, dense point clouds are developed and prepared for further use by different parties in order to create a complete Building Information Model.

Keywords: BIM, existing buildings, bridges, scanning, photogrammetry

1 Introduction

It is rare that a structure or building lasts its entire lifespan without modernisation, repurposing or refurbishing. All of which can be minor works from a new paint job up to adding new sections. Additionally, public buildings or structures of high importance like e.g. bridges, need re-evaluations and checks performed at intervals ([1], [2]). For many of these tasks a sighting of the original construction plans is key in getting answers on the load bearing capacity and other valuable details. In our modern days the construction plans could be accompanied by three dimensional numerical models that are used for numerical calculations. This is one of the key concepts of building information modelling (BIM). While BIM is currently being advanced and partly integrated

into new projects, there is a big unknown when existing structures are concerned. Especially industrial plants, where the production is in constant improvement and development, the need to adapt the building to facilitate new equipment and machinery might be vital for the company's survival. Another example that could improve a central digital model are bridges where regular inspections are performed. Until all currently existing structures are replaced by BIM created new ones, we need to find a solution on how to deal with them in today's digital society.

This article is going to outline a concept on how a digital model of an existing bridge can be created. In order to present the concept, different scanning technics are used to record an existing bridge at the testing facilities of the University of the Bundeswehr Munich. The process with its pros and