

Digital Support for Bridge Inspectors through Mixed Reality BIM Data Visualizations

Urs Riedlinger,¹ Florian Klein,² Marcos Hill,³ Sonja Neumann,⁴
Ralph Holst,⁴ Leif Oppermann,¹ and Sascha Bahlau³

¹Fraunhofer Institute for Applied Information Technology FIT, Schloss Birlinghoven 1, 53757 Sankt Augustin, Germany; e-mail: urs.riedlinger@fit.fraunhofer.de, leif.oppermann@fit.fraunhofer.de

²HHVISION | Hoersch & Hennrich Architekten GbR, Vogelsanger Straße 321a, 50827 Cologne, Germany; e-mail: florian.klein@hh-vision.de

³LIST Digital GmbH & Co. KG, Friedrich-Ebert-Straße 55, 45127 Essen, Germany; e-mail: marcos.hill@list-digital.com, sascha.bahlau@list-digital.com

⁴Federal Highway Research Institute, Brüderstraße 53, 51427 Bergisch Gladbach, Germany; e-mail: neumann@bast.de, holst@bast.de

ABSTRACT

We describe an interactive Augmented and Virtual Reality (AR/VR) system that supports bridge inspectors during in-office preparation, on-site inspection, and follow-up work back in the office using Building Information Modelling (BIM) data. Originating from the process steps required to perform a digitally supported bridge inspection, we focus on our prototypes' implementation, a combination of VR and AR methods in a prototypical development. Our goal is thus to present one possible realization of these processes on a technological level. Therefore, the collaborative aspect between on-site inspection and in-office preparation and debriefing plays an important role. Several issues of data synchronization and communication techniques need consideration and proper integration into the entire system. It is essential to consider the bridge inspectors' needs, requirements, and working environment to avoid losing track of the target group of such an application. Low initial hurdles and user-friendliness require seamless integration of different tools and additional resources. For that reason, we aim to link engineering tools and game engine environments in an operationally and reliable application. We believe that our application may serve as a starting point for further discussions on user-friendly digital support and broader usage of innovative technologies bearing in mind the evolution and tradition of structural inspections.