



Implementation of an interoperable platform integrating BIM and GIS information for network-level monitoring and assessment of bridges

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Monitoring of critical civil engineering infrastructures, and especially viaducts and bridges, has become a priority nowadays as the ageing of construction materials may cause damages and collapses with dramatic consequences. Following recent bridge collapses, specific guidelines on risk classification and management, safety assessment and monitoring of existing bridges have been issued in Italy, by the Minister of Infrastructure as a mandatory code [1]. Accordingly, several laws and regulations have been issued on the same topic, emphasizing the crucial role of BIM-based procedures for the design and management of civil infrastructures [2, 3]. Within this context, monitoring operations are generally conducted by on-site inspections and specialized operators, and rarely by high-frequency ground-based Non-Destructive Testing methods (NDTs). Furthermore, the implementation of satellite-based remote sensing techniques, have been increasingly and effectively used for the monitoring of bridges in the last few years [4]. Generally, these crucial pieces of information are analyzed separately, and the implementation of a multi-scale and multi-source interoperable BIM platform is still an open challenge [5].

This study aims at investigating the potential of an interoperable and upgradeable BIM platform supplemented by non-destructive survey data, such as Mobile Laser Scanner (MLS), Ground Penetrating Radar (GPR) and Satellite Remote Sensing Information (i.e. InSAR). The main goal of the research is to contribute to the state-of-the-art knowledge on BIM applications, by testing an infrastructure management platform aiming at reducing the limits typically associated to the separate observation of these assessments, to the advantage of an integrated analysis including both the design information and the routinely updated results of monitoring activities.

The activities were conducted in the framework of the Project "M.LAZIO", approved by the Lazio Region, with the aim to develop an informative BIM platform of the investigated bridges interoperable within a Geographic Information System (GIS). As on-site surveys are carried out, a preliminary multi-source database of information is created, to be operated as the starting point for the integration process and the development of the infrastructure management platform. Preliminary results have shown promising viability of the data management model for supporting asset managers in the various management phases, thereby proving this methodology to be worthy for implementation in infrastructure integrated monitoring plans.

Acknowledgements

This research is supported by the Project "M.LAZIO", accepted and funded by the Lazio Region, Italy. Funding from MIUR, in the frame of the "Departments of Excellence Initiative 2018-2022", attributed to the Department of Engineering of Roma Tre University, is acknowledged.

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