

Use of Cyber-Physical Devices for the Implementation of Virtual and Augmented Realities in Bridge Construction

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Abstract : The bridge construction industry has been revolutionized by the applications of Virtual Reality (VR) and Augmented Reality (AR). In this article, the author has focused on the field applications of digital technologies in structural, especially in bridge engineering. This research analyzed the use of VR/AR for the assessment of bridge concepts. For this purpose, the author has used Cyber-Physical Devices, i.e., Oculus Quest (OQ) for the implementation of VR, Trimble Microsoft HoloLens (THL), and Trimble Site Vision (TSV) for the implementation of AR/MR by visualizing the models of bridge planned to be constructed in Poland. The visualization of the models in Extended Reality (XR) is based on the development of BIM models of the bridge, which are further uploaded to the platforms required to implement these models in XR. This research helped to implement the models in MR so a bridge with a 1:1 scale at the exact location was placed, and authorities were presented with the possibility to visualize the exact scale and location of the bridge before its construction.

Keywords : augmented reality, virtual reality, HoloLens, BIM, bridges

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