

INTEROPERABILITY OF CIVIL ENGINEERING BIM MODELS WITH VIRTUAL REALITY TOOLS

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SUMMARY

Technology evolves rapidly and constantly, and nowadays it plays a very important role in our society as it optimizes resources, time and money. In the civil engineering field, one of the most current examples is the use of Building Information Modeling (BIM), a collaborative methodology that makes it possible to design, build and manage in a more efficient way. The model created with BIM when developing the project can be linked with Augmented Reality (AR) technology, which allows the user to interact with it. AR superimposes the virtual 3D model to the real environment to increase the information, and that is why combining them both could be very beneficial for civil engineering, but its implementation is still scarce. This paper illustrates the current state of the applications of BIM and AR into the civil engineering field, and proposes some solutions based on a particular case analysis: a bridge model developed with Revit.

Keywords: *BIM, augmented reality, interaction, 3D model, bridge model, visualization.*

1. INTRODUCTION

Nowadays, technologies are in constant and rapid evolution, reaching all fields of study and even situations of our daily lives. Its importance increases significantly, since most of them serve to optimize resources, time and money, so they play a very important role in society. In the field of civil engineering it could not be less, and that is why new work methodologies arise, such as Building Information Modeling (BIM).

BIM is a collaborative work methodology in which projects are created and managed through a multidisciplinary 3D digital model. This model forms a large database with information, such as the geometry of the object, physical data, cost, execution time, maintenance procedures, etc. With this database, any element of the infrastructure can be managed during its entire life cycle. Moreover, BIM provides all professionals involved in the project with the tools to plan, design, build and manage buildings and infrastructures more efficiently, which translates into a reduction in both operating time and costs.

In addition, there are other technologies that improve the visualization and understanding of elements, and they even allow the user to interact with them, such as Augmented Reality (AR). Despite being relatively modern, it is already quite implemented in the tourism or video games sectors. It is also starting to be used in architecture studios and real estate agencies, as it is a simpler and a more striking way to show a product to a customer. However, in the field of civil engineering its use is very scarce, and it is been proved that increasing its implementation is very beneficial, since it is a quick and efficient way to obtain the necessary information on site, visually and accurately, throughout the life of the structure. Some of these examples of BIM-AR interaction are; the development of an application to facilitate support in on-site operations [1]; or the application of AR to create a project control system based on human-machine interactions to improve decision making, approval process and information management [2].

Both BIM and AR are still under development, and the combination of the two has been briefly studied, but it is attracting the attention of the civil engineering sector and growing interest in recent years. That could be a possible cause of why augmented reality is not currently used much in the civil engineering, since people don't