A user-friendly VR interface for digital building information models

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Small mistakes and miscalculations made in the design stage of a construction project can develop into large and costly problems for the project. But with VR technology connected to building information modeling (BIM), you can find and fix any design errors already at the drawing stage—before they reach the construction site.

Mikael Johansson and Mattias Roupé of the Department of Architecture and Civil Engineering have developed a user-friendly VR interface that can be connected to digital building information models, so-called BIM models. With a VR headset on, it allows the user to virtually step inside and walk around inside of the model of a construction project, alone or with fellow users. In this way, the various professions within the production staff, who hold the accumulated knowledge from the design stage, can review and refine their work themselves before moving on to the next step. The method has been tested by professionals, planners, and staff from the site management of six different organizations and projects where design and production have taken place in parallel.

"The evaluation have shown that the method is very effective when it comes to identifying opportunities for improvement and increasing quality and construction safety. The participants found pure design mistakes, and were also able to identify opportunities to streamline the rules of procedure between disciplines and find alternative solutions to benefit progress," says Mikael Johansson, Research Engineer at the Division of Construction Management.

The participants especially highlight the fact that the model is experienced on a 1:1 scale as a great advantage, as it gives a completely different understanding and sense of real proportions, spaces, and details compared to looking at the model on their regular computer screen. The ability to collaborate and discuss solutions in so-called multi-user mode was another factor that the users felt increased understanding and improved communications.

"The experience gained during the pandemic has made us accustomed to working from different geographical locations, and the multi-user mode enables participants from design and production to connect and collaborate inside of the model, both in their different professional roles and areas of responsibility—and from different locations," says Mattias

Roupé, Associate Professor at the Division of Construction Management.

Aside from downloading the software, the user needs a gaming computer and a set of VR goggles, which makes the technique fairly easily accessible. The study has shown that VR technique combined with BIM not only provides great value for the industry but that the method is mature enough to use in projects.

More information: The final report of the project is available in Swedish: "Kan VR förbättra kunskapsåterföring från produktionen under projektering?"

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