

The digital face of construction sites of the future

Construction sites are becoming increasingly digital. Clouds and digitization are helping to optimize efficiency and customer focus and reduce costs. Building Information Modeling (BIM) is also key to saving time and money. A BIM research project currently being conducted by the Fraunhofer Building Innovation Alliance describes complex factory processes, which can be integrated into BIM and used for factory planning.

By Jan Westphal

“Fully networking cloud-based infrastructures for the construction of the new British high-speed railway HS2 has reduced the costs involved in setting up and removing servers. However, the project’s efficiency, safety and implementation speed have also simultaneously been maximized,” argues Marco Xaver Bornschlegl, Head of the IT Services (Infrastructure) department at Strabag Austria. “This is the only way to execute complex construction projects on time whilst ensuring the required level of quality.”

Revolutionizing the construction of underground structures

At the heart of the research project [GeoProduktion 4.0](#) being conducted by the Institute of Construction Informatics of the Technical University of Dresden is a cyber-physical system (CPS), embedded in BIM, for dynamically adapting production in the construction of geotechnical structures. It is set to revolutionize the construction of all types of underground structures (excavation pits, tunnels, subway tunnels and culverts).

An automated, manually minimized ICT process automatically generates and computes thousands of scenarios, which can be continuously compared with measurements. The material laws and related material properties of these model variants are varied, i.e. mechanical structure-related scenarios are generated and the best scenario is identified based on a comparison with the measurements



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BIM is heralding the advent of digitization

“The digitization of the world of real estate in Germany is still in its infancy,” summarizes Thomas Kirmayr, Managing Director of the Fraunhofer Building Innovation Alliance. He points to the research focus (BIM). “Similar to modeling building engineering services, complex factory processes can also be simulated in order to plan production sites.” The “BIMFab Demonstrator” supports the testing of different factory planning alternatives on the basis of IFC models. In the joint project Future Construction (FUCON 4.0), integrated digital process chains for industrial construction are being researched together with industrial partners in order to identify innovation potential and optimize interfaces throughout the entire value chain.

Cloud-integrated construction sites

Alongside the new holding company Datengut, RIB Software SE is focusing on integrated solutions (smartphone and tablet) for model-based planning and construction. “RIB’s new mobility solutions enable full integration into the iTWO and iTWO 5D world,” says Erik von Stebut, Managing Director of RIB Deutschland GmbH. “The programs for digital construction sites connect all construction site activities with the iTWO solution via the cloud. They significantly optimize cooperation between construction sites and a company’s management.”

As a global player, the building materials company Cemex offers Cemex Go, a full end-to-end digital services platform, in 18 countries. The platform monitors all of the customer’s administrative processes – transactional processes are transparent as all parameters can be tracked in real time via GPS.

Vehicle schedules can be optimally created with integrated solutions for managing fleets of truck mixers. A sensor, which registers the drum's direction of rotation, records the unloading operation. The data flow via the LINK.connect interface to the vehicle tracking device TomTom LINK 510 and then directly to the dispatch controller (TomTom WEBFLEET).

Cost increase issue now resolved

Until now, unplanned cost increases in the construction phase of a project were difficult to estimate and therefore uninsurable. However, in collaboration with RIB Software, the insurer Munich Re has developed the world's first IT-based insurance product for construction projects: [iTWO Project Cost Insurance](#).

The solution is based on the iTWO 5D technology developed by RIB. It is designed for model-oriented planning and construction with integrated cost and time controls. This technology enables construction projects to be planned, simulated and monitored virtually and, for the first time ever, makes it possible to provide insurance cover for additional costs in construction projects.

Even safety helmets can now be digital

Digital solutions are also set to be used to increase safety for construction site workers as the statistics are alarming. Almost 40% of all fatal work-related accidents occur on construction sites. Collisions with construction vehicles and falls are the main causes. Swift aid in the event of an emergency can save lives. Vodafone recently unveiled a networked safety helmet fitted with sensors that reports accidents and their locations to a safety center.

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