

Practical applications for BIM

27 January 2017 by PERI

Tangible applications in formwork and scaffolding technology

PERI is currently planning the formwork and scaffolding solution for the construction of the Filstal Bridge on the Wendlingen-Ulm rail connection. This bridge was defined by the Federal Ministry of Transport and Digital Infrastructure (BMVI) as one of four pilot projects whereby the application of Building Information Modeling (BIM) is being tested and scientifically evaluated. This article describes some specific BIM practical applications which PERI has defined and implemented on this bridge in close collaboration with the contracting JV, Max Bögl / Porr.

PERI sees BIM as the future leading planning standard and has been working intensively on the possibilities and advantages of this working method for several years now. The seamless flow of information along with the documentation of construction processes and access to constantly updated data for all project participants make a decisive contribution to safe, efficient and legally certain execution of construction work especially for large-scale projects.

Previous PERI activities

The uninterrupted flow of information within the PERI Group has always played an important role. By this it is meant time and location-independent access to all data and information relevant to the construction work so that this can be processed at any time, for example, at different PERI national subsidiaries. For this purpose, PERI has developed and used its own project data management system which has also been offered to external customers since the beginning of 2016: at the last bauma, IT experts from the PERI subsidiary CENTRIO presented the digital solution CENTRIO CLM (Construction Lifecycle Management), that bundles together all data and documents for the entire life cycle of a construction project in a structured form. CENTRIO PDM, so to speak, provides the basis for BIM applications as the database contains, among other things, all 3D formwork models as well as information such as the assembly instructions of the PERI systems.

For a number of years now, a PERI team has also been working intensively on the benefits and possibilities of BIM applications in formwork and scaffolding solutions. In various collaborations - with construction companies and software providers among other things - concepts and solutions for concrete practical

applications have been developed. Then, only through such an approach can the necessary cooperation be realized beyond company boundaries.

In addition, PERI is involved in the buildingSMART working group which was formed by the GSV - the Güteschutzverband Betonschalungen (Concrete Formwork Quality Protection Association). In this working group, well-known suppliers of formwork and scaffolding systems together with other industry stakeholders have developed, among other things, a BIM business model which has bindingly defined overriding topics such as required interfaces and the like. Through this, a standardized exchange of data between the contractor and the formwork or scaffolding planner should be created.

Furthermore, PERI is a supporter of the BIM CLUSTER STUTTGART Initiative which has set itself the goal of collectively meeting the challenges presented by BIM in parallel to the efforts made by the Task Group BIM which has been set up by Alexander Dobrindt, Minister of Transport and Digital Infrastructure. In doing so, existing competencies are to be brought together and highlighted by means of a common platform through targeted actions. Through regular, clearly structured meetings, as many interest groups as possible should identify, discuss and initiate common issues and actions. The cluster relies on voluntary commitment, is open to everyone and is non-obligatory. In addition, the initiative presents the annual BIM Award in categories such as "Special Prize", "Research and Teaching", "Processes" and "Special Project". The award recognizes projects that show the added value and potential of the BIM method in digital-based cooperation and taking action in corporate cooperation or scientific networks.

Specific application for the Filstal Bridge

As part of a phased plan, the BMVI has named four pilot projects for introducing BIM in the area of infrastructure construction. With these projects, the application of BIM is being tested and scientifically evaluated. One of the pilot projects is the Filstal railway bridge. This Deutsche Bundesbahn construction project is being realized within the framework of the new Stuttgart - Wendlingen – Ulm high-speed rail link; the 485 m long railway crossing features two single-track bridges. With a maximum height of 85 m, it will be the third highest bridge construction in Germany.

For the structural work currently taking place, PERI is focusing on three application possibilities:

- fast access to the 3D formwork model as well as a wide range of linked data and information,

- continuous documentation of a number of assembly processes by means of defined checklists as well as
- "issue management" as fast assistance for the contractor.

Through QR codes on the pre-assembled formwork and scaffolding units, construction site personnel can directly access a wealth of data linked to the physical product via a tablet. This includes, for example, fabrication and assembly drawings as well as the Instructions for Assembly and Use. Furthermore, the position of the respective unit in the overall construction can be directly visualized via the QR code. Advantages on the construction site include, among other things, simplified and faster processes regarding the logistics and on-site assembly. In addition, instant access to instruction materials ensures accelerated working operations - without requiring any additional organizational effort.

Working with checklists for defined workflows on the construction site also has one particular benefit. To this end, processes such as the moving procedure of the climbing formwork are sub-divided into individual work steps which then have to be realized by those responsible on site and are ticked off accordingly on the checklist. By "checking off" these work steps along with signature confirmation, the process described is simultaneously documented - and can be found directly on the model at any time. This form of simple documentation and continuous information consequently reduces the risk potential and increases safety levels as well as enhancing the quality of the construction work.

As additional and particularly fast assistance for the construction site team, the "Issue Management" feature in the BIM model is used. Along with the respective project participants, the aim here is to quickly solve any problems that occur, issues still to be resolved and collisions. A problem situation is recorded digitally in the formwork model on-site or on the corresponding drawing; the responsible party and other parties involved are immediately informed about the open issues. The resulting solution is then fully explained and documented for everyone in the model. This high level of transparency as well as the fast and continuous flow of information of all parties involved ensure considerable time and cost savings along with minimizing interface losses.

Prospects

PERI considers the pilot project as a very special opportunity to implement diverse ideas and theoretical possibilities of the BIM methodology along with the associated working operations in other practical applications. The goal of the Federal Ministry is, in particular, to gather important experience for concrete

applications of the BIM methodology.

Source: PERI