Forschungsinitiative Zukunft Bau

STRUCTURE / FORMATION SUMMARY REPORT

Title

Long-term title: „Detailed development of BIM-based processes for the operation of building for integration into a lifecycle-spanning process chain"

Occasion/ initial situation

brief description of the problem and the solution approach

With an average building service life of 50 years in building construction, about 45 years is allotted to the operation of the property; with regard to the operating costs of the property life cycle, this corresponds to approx. 80% of the total costs. Against this background, the application of the BIM method in real estate operations has great potential. By analysing the processes of the operating phase, it should be determined to what extent BIM can already be integrated into operations at the present time. Furthermore, the framework conditions and connecting points, especially for the usability of building data models and the consistency of information, are to be considered and evaluated.

Subject of the research project

Description of the work steps and the solution path

The research project "BIM based operation" is part of the process map of the Chair of Construction Management and Economics of the University of Wuppertal (BUW) with the focus on building operation. The BUW process model pursues the approach of making all processes and information traceable over the entire life cycle of a building and thus represents the efforts of the research team to create transparency and standardise the BIM method.

Within the context of the research project, the professional information flow of the information necessary for real estate operation and the information generated during operation was recorded, analysed and modelled. For this purpose, the scenario was first determined by describing the framework conditions for the real estate operation. During the process recording and analysis, BIM use cases of the operating phase were identified, of which six use cases (three use cases for each technical and infrastructural building management) were modeled down to attribute level.

After modelling the professional process, the possibilities for using the information, in particular the BIM use cases created, were examined. For an easy identification of the attributes created in the BUW process model, the connection to an existing and publicly accessible attribute list with the focus on real estate operation, namely the CAFM-Connect-Gesamtprofil of the CAFM RING, was set: For this purpose, the research team built a crawler and parser which synchronizes and compares the published data on GitHUB with the database of the BUW process model. Furthermore, various evaluations and exports of the BIM use cases from the BUW process model were created in order to be able to output the information according to the structure of DIN EN ISO 29481 (Manual of Information Delivery) for instance. On this basis, BIM profiles could then be developed which represent the digital exchange standard or digital requirement templates for the information requirements of BIM use cases in real estate operations.

To consider the integration, consistency and usability of information in CAFM target systems, the possibilities of building data acquisition were first put in focus and be analysed; two approaches identified showed to be suitable for the provision of building information in the form of building data models for use in target systems. Furthermore, the data exchange of the construction and real estate industry was considered with a focus on classification systems and data formats. For the investigation of the integration of building data into CAFM target systems and thus the data continuity and usability, a building information model was created, which was uploaded into different target systems. The subject of the investigations was not the comparison of different software solutions but rather the demonstration of the currently available possibilities.

Within the context of the research project, two project extensions were also carried out: With the BIM SME guideline, an approach was created to answer the question of how much BIM a medium-sized construction project can tolerate with participants from the SME sector. The guideline accompanies and documents the concrete course of the project using the example of a BIM pilot project and at the same time forms a general handbook with an explanation of the relevant BIM management principles that are specifically required for the implementation of BIM. After the systematic preparation of the BIM pilot project, the guideline concludes with a checklist for project implementation, which can serve as a concrete guide for the implementation of one's own projects. The second project extension is the visualisation of an excerpt of the BUW process model via a VR application. Here the user was in a building

data model and was able to see the development of the depth of detail of the presentation requirements as well as the integrated information depending on the selected life cycle phase. The VR application was exhibited and presented at the BAU 2019 trade fair in Munich.

Conclusion

Description of the planned aims and reached results

As a result, the technical flow of information was recorded, analysed and integrated into the BUW process model. Various BIM use cases were identified, six of which were modeled down to attribute level; these can be output from the process model and made available, for example on the basis of the structure of DIN EN ISO 29481 (Information Delivery Manual). In addition, the current state of the art from the provision to the integration and data consistency of building information in CAFM target systems was examined and thus problems and potentials were addressed.

Key data

Short title: BIM based operation

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Total costs: 468.051,72 €

federal grant: 249.939,22 €

Project duration: 28 months

PICTURES:

7 printable image data as a separate file (*.tif, *.bmp, ...) with a resolution of at least 300 dpi in the image size (e.g. width 10 - 20cm). Images free of rights of third parties.
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