

Zukunft Bau

SHORT REPORT

Title

Optimisation of the sustainability of buildings by integrating sustainability requirements into the digital method Building Information Modeling

Occasion / Initial situation

Certification of sustainability is currently associated with a great deal of manual work. Depending on the certification institution, the assessment systems are subdivided into various sustainability topics. At a fixed reporting date, the degree to which the subject areas have been fulfilled is evaluated and an overall result is determined by weighting the individual influences. The information required for the documentation and preparation of the supporting documents must be extracted from a large number of data sources and planning documents, whereby the information situation often turns out to be inconsistent. An adjustment of the data due to planning changes or concretisation of assumptions is also connected with high expenditure. In order to meet these challenges in the certification process and to optimise sustainable building planning in all project phases, sustainability considerations were carried out in this research project using the digital method Building Information Modeling (BIM).

Object of the research project

The aim of the research project is to be able to exert a targeted influence on the sustainability of the later structure by applying the BIM method already in the early phases of planning. BIM offers the possibility of mapping sustainability aspects as object content in the digital building model. In the different phases of planning, the information content of the model objects varies, so that requirements for the content and the mapping of sustainability requirements in the model were developed. The provision of retrievable object information in a consistent data and information model serves as a basis for significantly simplifying the assessment of sustainability. The prerequisite for this is a corresponding attribution of the model objects, which represent the parameters required for sustainability certification.

The investigations are based on developed process models of the conventional certification process and their further development into a BIM target process for mapping sustainability requirements in digital building models. From this, information requirements for the model are identified, which were transferred to a reference model as a pilot project and tested.

By applying a consistent data structure, it was possible to identify requirements and possibilities for (partial) automation of certification processes and to develop a methodology for translating sustainability requirements into model content. The process-related and model-specific requirements were prepared logically and structured and validated in an example project.

A Common Data Environment (CDE) was used as a common project platform for the communication and collaboration of all certification participants.

For the exemplary implementation of the sustainability requirements, the criteria SOC2.1 "Accessibility" and ECO2.1 "Flexibility and reusability" of the DGNB criteria catalogue were examined and translated into digital model content, which was laid down in attribute matrices. In doing so, the approach of a comprehensive information mapping about the model was chosen.

Conclusion

Through structured and standardized data management and optimized information logistics based on a BIM model, it was possible to increase the efficiency of the collaborative cooperation of all project participants in sustainability certifications and the semi-automated verification of sustainability criteria. On the elaborated methodical basis standards for model enrichment with sustainability content have to be developed for the comprehensive application of sustainability maps in digital building models within the framework of an openBIM approach. This enables the application to be used by building owners and planners and creates the basis for the creation of native and open software applications that map the certification process holistically and thus contribute to more sustainable buildings.

Key data

Short title:	Digital building and sustainability
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Project Leadership:	Leibniz University Hanover Institute of Construction Management and Digital Engineering
Total cost:	277.152,20 €
Share of federal contribution:	138.725,00 €
Project duration:	07/2017 – 12/2019