

BIM-Guide for Germany

Information und guidebook

Abstract

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BIM guide for Germany

Building Information Modelling (BIM) has captured an important position in planning, the building industry and maintenance of buildings abroad already. Even in Germany the need for and the interest in information on this model-based working method is growing. The BIM Guide is of interest for all in Germany having to do with the BIM method. It offers a first practical introduction to the topic and to the associated requirements.

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Initial Situation

Building Information Modelling is seen as the cultural change in the construction industry since the adoption of working CAD-based and has been obligatory in a lot of countries like USA, Norway, Finland, Denmark, Singapore and Korea. In Germany BIM is currently used predominately in projects driven by a few private, institutional clients, the public clients and authorities do not have sufficient experiences and do not state their requirements for utilizing BIM yet.

The BIM guide is based on numerous inquiries and analyses of completed BIM projects. Regional and international BIM guidelines and BIM standards were consulted as well. It is remarkable that compared to Germany where mostly private clients are using their own BIM standards, in other countries it's mostly public clients that demand the usage of BIM.

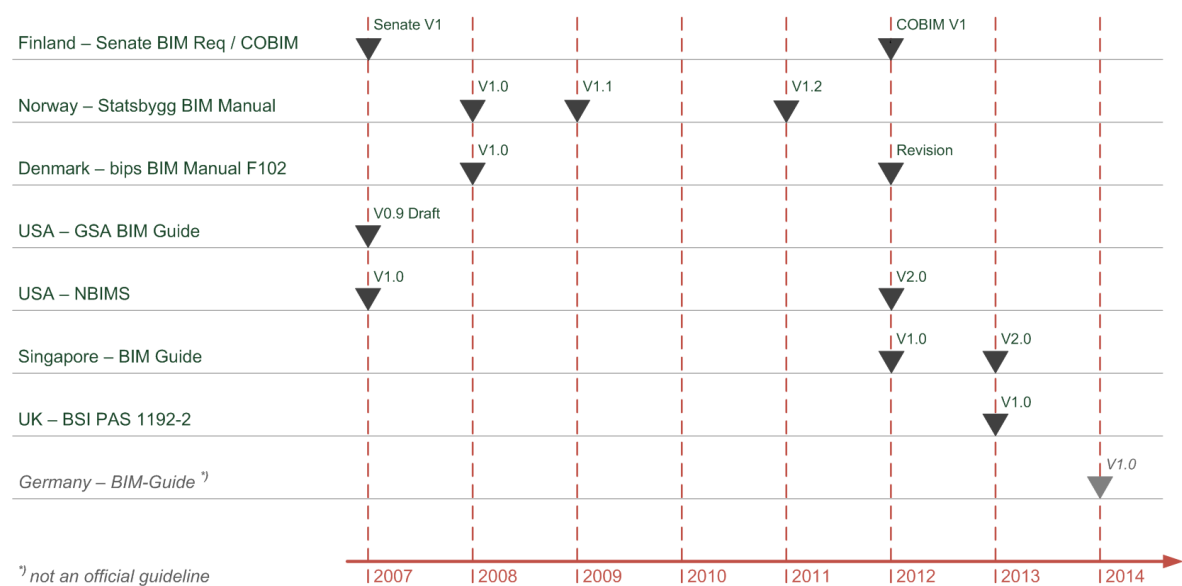


Figure 1: Overview about the timeline of BIM guideline publications in selected countries

The research has shown that the way to describe the BIM usage is quite similar in all international BIM guidelines. But the shown aspects and the target groups varied quite a lot. Some of the documents are already more than ten years old and have been revised several times. The BIM guide for Germany profits from their experiences as well.

The research was done to have a practical base for an evaluation of the current situation and the knowledge level regarding BIM and to be able to deduct the requirements for a BIM guide for Germany. The results show, that there are not only knowledge gaps (guidelines, know-how, contracts) but also a great number of insecurities when it comes to the usage of BIM and modern software systems. A remarkable result was that a lot of users had their own and distinct concept and definition of what BIM is all about. The most of the stumbling blocks and problems that were uncovered in the research weren't of a technical nature but had more often to do with the information, process and communication structures.

Goals

This BIM guide provides all participants with the first steps into Building Information Modelling (BIM) as a working method. A general overview takes into account clients, planners, construction companies, the building industry, crafts men, product manufacturers and software-companies. It explains the terms that are necessary to find one's bearings in this context and shows the different domestic and foreign activities around BIM. It also answers the essential questions in order to facilitate a successful and correct implementation of the BIM method. In all of this, the practical aspect plays a major role.

Practical experience shows, that BIM necessitates a different way of thinking and behaviour compared to the tradition project handling. Especially in the early stages of the project some essential things have to be taken into account that are crucial for the project's success. At that time the foundation for the successful use of BIM is laid.

Topics included in the BIM guide are concerned with how BIM has to be implemented in the different fields. How does the client have to phrase the BIM requirements for the different parties involved in the construction project? What do planners have to know about the BIM method to be able to collaborate more efficiently and to offer the client a BIM based project execution? How do the construction companies have to deal with BIM? What new way of information delivery does BIM offer product manufacturers? How can Facility Management profit from it?

The advantages that the BIM method offers to all project participants are most decisive when it comes to implementing BIM at a greater level. The BIM method has one big goal: To increase the project information's quality, up-to-dateness, and transparency in order to guarantee a project's main goals as cost-effectiveness, sustainability, or budget and schedule reliability. But this guide does not only list the advantages of the respective others in the project but points out its requirements as well.

It is recommended and seen as essential that a complete BIM manual and also obligatory BIM guidelines will be developed for Germany. In an outlook a structure is recommended how this BIM guide for Germany can be developed into a formal BIM guideline for Germany.

Concept

The BIM guide provides all those with the first steps that are interested in BIM and that want to implement this working method. It comprises a lot of ideas, suggestions and best practices, but no authoritative statement on how to implement BIM in Germany in general.

Next to a basic introduction to the BIM topic, an explanation of the used terminology and a research on the current state of the BIM implementation at home and abroad, the BIM guide also shows the influences BIM has on the German planning culture. It also covers the basic requirements of BIM projects and contains a short introduction to the BIM method.

The key question raised however is about the overall benefits of BIM to the project execution and the particular benefits to the various participants. The benefit for the client is thereby of uttermost importance.

The influence of BIM on the planning culture

BIM as a working method constitutes a cultural change in the construction industry by using an integrating approach. The joint project responsibility and the project's success are the main objectives. The project has to be prepared in a strategically consistent way, the planning has to be planned extensively and all of the participants' problems and weaknesses have to be dealt with commonly and openly. The BIM guide provides the basics and some preliminary considerations and shows the requirements that have to be met when implementing BIM within an office or during a construction project.

Its consistent, central and object-based way of managing and coordination project information triggers a far reaching change compared to the traditional way of working far more than just changing the software. A basic difference to the current building culture is the full life cycle consideration of the facility, from the conception of needs, to the design, construction and maintenance phase, up to the final demolition.

By focussing on the universal and consistent documentation of information in every single phase and the supply as a machine-readable database, the BIM method has a strong influence on the way of how information will be procured and maintained. This systematic approach to information management is also in focus of each of the analysed BIM guideline, as it is the base for the economic success. Valuable, openly accessible, and verifiable information enables well-founded decision making.

The success of a new method in the building industry depends essentially on the four parts: people, processes, guidelines, and technology. When introducing BIM it is also important to equally enhance the capabilities within all those parts and to foster the long term development. That's the only way for an efficient and sustainable use of the BIM method. The BIM guide concludes that while the technology is already well advanced, the other three factors often represent the bottlenecks. Partially this can be traced back to the lack of professional training and the absent of official BIM guidelines in Germany.

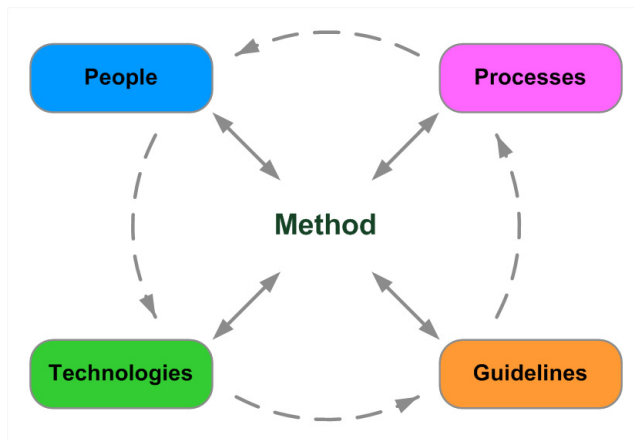


Figure 2: Main factors of influence on the use of the BIM method

Conditions for the introduction of BIM

The general introduction of BIM puts high demands on all participants in the construction process and leads to a long-term change management process. The BIM transition phase provides the building industry with the time needed to adapt itself to the new culture of working. This is in many respects a development and learning process. Until the building information model will be used exclusively for the contractual deliveries and for the project hand-over in future, 2D-documents continue to play an essential role, but will now be consistently generated out of the building information model.

Using building information models information of higher quality and consistence is provided and administered. This is crucial to avoid misunderstandings, design mistakes can now be identified earlier and change order can be avoided. The BIM guide gives an overview about the changes and the potential benefits to be expected.

As part of the analysis for this guide many problems were identified that occurred in early realizations of BIM in projects. Beyond misunderstandings and lack of knowledge, often existing contract documents were not adapted to BIM requirements at the beginning of the project. Traditional CAD guidelines focussing on 2D deliveries or strict obligations to use certain software solutions create complications or disallow the use of BIM. Lack of experiences and too high expectations at the beginning often lead to an increase of efforts, to difficulties in the project execution and finally disappointments of the parties involved.

In BIM projects a high number of information is coordinated in between different partners. That's why well-defined activities and collaborative working are extremely important. The need for new roles in project is observed and those are described within the BIM guide. It includes the BIM manager, the BIM coordinator and the BIM author. Each of these roles has own requirements for knowledge, education and responsibilities. The way in which such roles are required depends on the project size, it is also not finally clear, how such roles are finally established in terms of job profiles.

Results

In consequence BIM means a change in the way project will be executed at several levels, the coordination processes, the organisational structures, and the technology uses, all leading to a more collaborative way of working. The BIM guide includes several appendices comprising data sheets and check lists that can be used in preparing for the utilization of BIM in offices and projects.

Project execution using BIM

A BIM implementation often requires a change in information management. The BIM project execution plan is the central document where the goal, uses, roles and responsibilities, collaboration processes and technical means are defined at the beginning of the project and that is guiding the utilization of BIM during the project execution. Defining the right and realistic BIM goals is a crucial part and the influencing factors are discussed.

The BIM guide provides an understanding of the way to work with the specific discipline models and the strategy on how to coordinate and manage a BIM-based project. This BIM guide provides information on how to go about the quite often 3D discipline models, their levels of detail and the comprised BIM objects. Other important topics are the collaboration across the different disciplines, the way decision making has to be coordinated, the new arisen roles and responsibilities and the necessary new educational profiles. The BIM-based coordination processes and the usages, such as visualisation, creation of consistent drawings and schedules, model-based quantity takeoff and simulations, and collision checking are described in more detail. It requires highly efficient interfaces to coordinate the dataflow across different (software-) platforms and to the client. While concentrating on IFC this guide describes and evaluates them.

BIM is already reality. Especially in some neighbouring countries, using BIM is already mandatory. But even in Germany there are more and more BIM projects, mostly initiated by private clients. Architectural offices and construction companies that are doing business abroad have to be able to compete there. That is why it is time to gain some background knowledge in order to be able to evaluate one's chances and risks and to draw the necessary consequences.

It's quite a common assumption still in Germany that BIM is a method only for larger projects, big offices and construction companies. But in contrast to that this guide also shows the usage in small and medium businesses and thus in structures that are typical for Germany. The approaches towards implementing BIM vary in regard to the project sizes, but in all cases an added value can be achieved by utilizing the BIM-method the right way. Another assumption raised by newcomers is that BIM will lead to higher overall design costs, but there was no evidence proving this. It is however well acknowledged that BIM will lead to a shift of efforts and costs from the later to the earlier project phases.

Guidelines and accompanying measures for BIM in Germany

The BIM Guide offers recommendations and knowledge for all in Germany that are interested in using the BIM method. The guide indicates the possibilities according to the current state of technology and the general basic conditions of the German building industry. The BIM guide is a non-binding recommendation; it is no mandatory directive to execute construction projects using BIM.

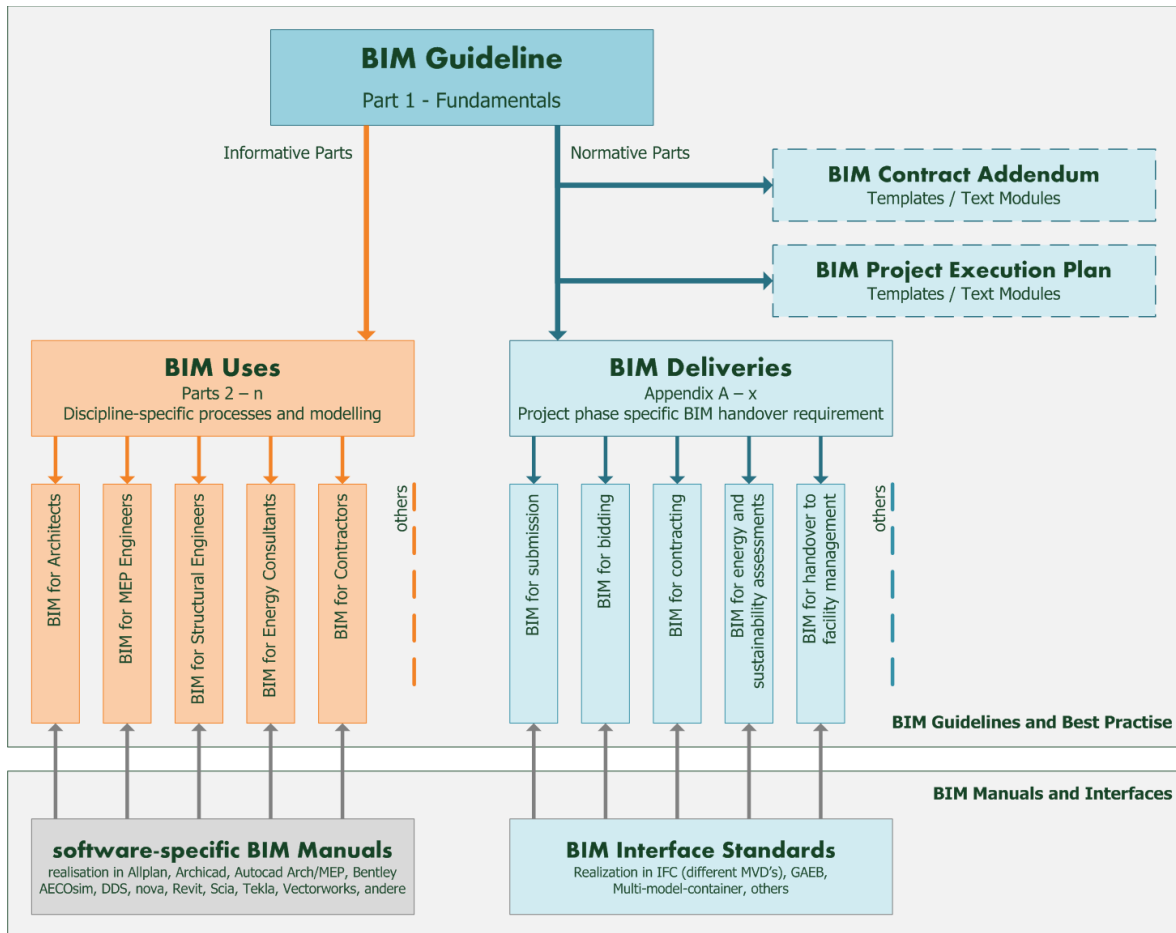


Figure 3: Recommended structure for BIM guidelines for Germany

But reliable parameters are necessary to facilitate the lasting creation of appropriate organisational structures and new collaboration processes. That's why this guide ends with recommendations on how to proceed to develop the guide further into an official BIM guideline for Germany and what accompanying measures are deemed appropriate.