

Application of the Building Information Modeling Planning Approach to the Factory Planning

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Abstract : Factory planning is a systematic, objective-oriented process for planning a factory, structured into a sequence of phases, each of which is dependent on the preceding phase and makes use of particular methods and tools, and extending from the setting of objectives to the start of production. The digital factory, on the other hand, is the generic term for a comprehensive network of digital models, methods, and tools - including simulation and 3D visualisation - integrated by a continuous data management system. Its aim is the holistic planning, evaluation and ongoing improvement of all the main structures, processes and resources of the real factory in conjunction with the product. Digital factory planning has already become established in factory planning. The application of Building Information Modeling has not yet been established in factory planning but has been used predominantly in the planning of public buildings. Furthermore, this concept is limited to the planning of the buildings and does not include the planning of equipment of the factory (machines, technical equipment) and their interfaces to the building. BIM is a cooperative method of working, in which the information and data relevant to its lifecycle are consistently recorded, managed and exchanged in a transparent communication between the involved parties on the basis of digital models of a building. Both approaches, the planning approach of Building Information Modeling and the methodical approach of the Digital Factory, are based on the use of a comprehensive data model. Therefore it is necessary to examine how the approach of Building Information Modeling can be extended in the context of factory planning in such a way that an integration of the equipment planning, as well as the building planning, can take place in a common digital model. For this, a number of different perspectives have to be investigated: the equipment perspective including the tools used to implement a comprehensive digital planning process, the communication perspective between the planners of different fields, the legal perspective, that the legal certainty in each country and the quality perspective, on which the quality criteria are defined and the planning will be evaluated. The individual perspectives are examined and illustrated in the article. An approach model for the integration of factory planning into the BIM approach, in particular for the integrated planning of equipment and buildings and the continuous digital planning is developed. For this purpose, the individual factory planning phases are detailed in the sense of the integration of the BIM approach. A comprehensive software concept is shown on the tool. In addition, the prerequisites required for this integrated planning are presented. With the help of the newly developed approach, a better coordination between equipment and buildings is to be achieved, the continuity of the digital factory planning is improved, the data quality is improved and expensive implementation errors are avoided in the implementation.

Keywords : building information modeling, digital factory, digital planning, factory planning

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