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SUPER INTEGRATED BIM FOR INDUSTRIAL PRODUCTION PLANTS

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ABSTRACT

The complexity of CAPEX projects in the process industry requires an integrated, model-based and digitally connected project delivery approach, with Building Information Modeling (BIM) serving as the fundamental method for both planning and execution. "Super Integrated BIM" incorporates all involved disciplines into a harmonized data environment and ensures a consistent Single Source of Truth for all project data throughout the entire project lifecycle and for all project stakeholders. BIM Mgmt. governs "Super Integrated BIM" through a holistic consideration of processes, tools, and interfaces. Based on a clear strategy, innovative technologies, and continuous development, it optimizes CAPEX projects by ensuring data consistency, enabling automated data flows across all planning phases, and providing a central platform for information exchange and CAD-models management.

BIM STRATEGY

Super Integrated BIM is our approach to the efficient and future-oriented delivery of planning and executing projects for all industrial production buildings and facilities. PPE defines this as the seamless integration of all relevant project data from databases, data sheets, schedules, and similar sources, combined with geometric information from CAD-models of all disciplines involved in the planning process, available at any time throughout every phase of a CAPEX project. BIM applications, including the use of methods such as 4D and 5D, are already established in construction projects with a leading role in the CSA (Civil, Structural, and Architectural) discipline. The MEP (Mechanical, Electrical and Plumbing) discipline has meanwhile also been integrated into BIM applications.

Process-related disciplines often fall behind in the context, even though their requirements and their associated impacts have a significant influence on the planning of building construction disciplines. Super Integrated BIM at PPE provides a structured response and a targeted solution to the integration of process-related disciplines. Super Integrated BIM addresses this challenge by consistently applying a Single Source of Truth within a purpose-oriented tool landscape, governed by strong BIM Management. This approach ensures data consistency and completeness across all project phases and thereby creates significant added value in the delivery of CAPEX projects in an industrial environment.

The high complexity of CAPEX projects requires a diverse and precisely orchestrated tool landscape. The Engineering Intelligent Platform (EIP), developed in-house by PPE, serves as the leading data source for all functional and technical information and represents the Single Source of Truth. Within the EIP, process equipment and their associated requirements and data are maintained. A visual representation provides a simplified schematic, which is used to validate process equipment data, thereby improving planning quality already at the data provisioning stage.

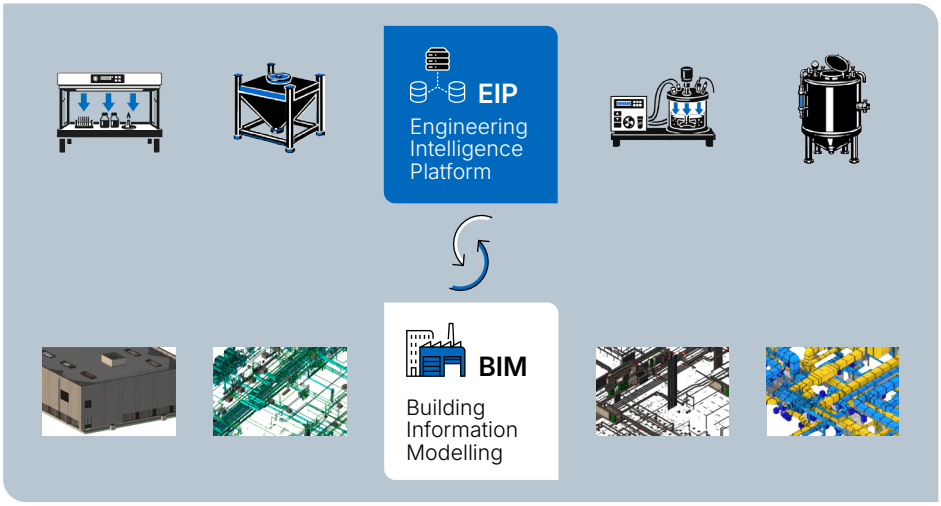

Fig. 1: Super integrated BIM is the integration of all process-related disciplines in the classical BIM method, and therefore the EIP becomes the Single Source of Truth (source: images created by AI)

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DATA SYNCHRONIZATION

The CAD-models in Revit have the central role for the geometric modeling of building, laboratory, process and plant structures. By integrating the geometric information source with the functional and technical data source, redundant data maintenance is avoided while data quality is simultaneously improved. Automated synchronization between the EIP, the CAD-models, and the schematics resolves the interfaces and data transfer across all disciplines and fully integrates the process discipline into BIM applications.

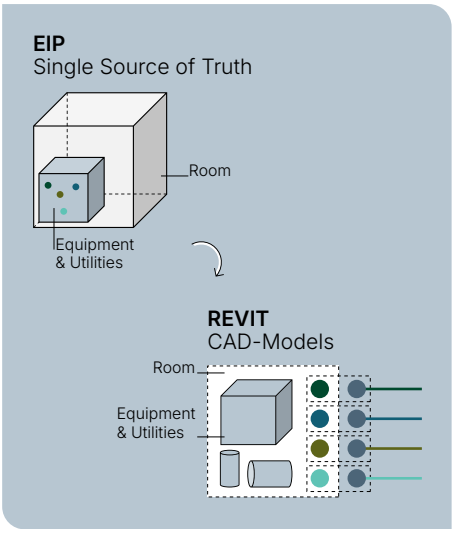

Fig. 2: Automated data synchronization EIP – Revit

As a complementary platform for the exchange of information and CAD-models, Autodesk Forma is used, bringing document management, collaboration, model coordination, and issue tracking together within a single common environment. Forma enables structured document storage, clear definition of attributes, and the implementation of project-specific approval and review workflows.

A key challenge lies in the integration of various tools. The interfaces between Revit, EIP, and Forma require structured and traceable data flows. To ensure this, automated workflows are implemented to enable the transfer of parameters between systems. Automated data flows reduce duplicate data maintenance, increase consistency, allow rapid adaptation to project changes, and enhance the quality of technical representation. To ensure a consistent and transparent view of the diverse tool landscape, a centralized tool overview is maintained. This overview documents responsibilities, phases of use, interfaces, and use cases for each application and facilitates communication with internal stakeholders such as project management and engineering management, as well as with external partners and clients.

BIM STRATEGIC INTEGRATION

BIM Management has a central role within the digital project organization and establishes the foundation for a cross-disciplinary, integrated way of working to ensure the achievement of strategic BIM project objectives through reusable templates, workflows, and guidelines. This strategic integration is realized through a team structure embedded within project management, bringing together competencies from CSA (Civil, Structural, and Architectural), MEP (Mechanical, Electrical and Plumbing), process engineering, laboratory & factory planning, and engineering management. Through close alignment

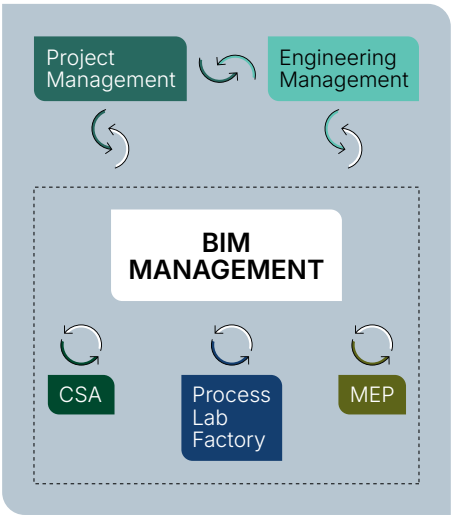

Fig. 3: Super Integrated BIM collaboration – BIM Management Team connects all project disciplines

with project management and the individual disciplines, a unified approach, continuous knowledge development, and a structured, transparent overall communication are ensured.

INTERDISCIPLINARY COLLABORATION

Collaboration in CAPEX projects is the key success factor and requires continuous, interdisciplinary coordination between all involved disciplines involved. Super Integrated BIM serves as a unifying communication and coordination instrument that enables model-based collaboration, thereby ensuring a consistent approach across all project phases and creating a superior understanding of the project objectives.

WHAT'S IN IT FOR YOU

"Super Integrated BIM" integrates all involved disciplines with a strong focus on the process discipline into a harmonized data environment, ensures a Single Source of Truth, and is governed by BIM Management.

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NICE TO KNOW

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