CASE STUDY · FACTORY PLANNING

Site Development – Realignment of Production at DEHN

The impressive outcome of site development: The new production site at Start of Production (SOP), driven by data, standardisation, and continuous factory modelling with visTABLE®.

CLIENT

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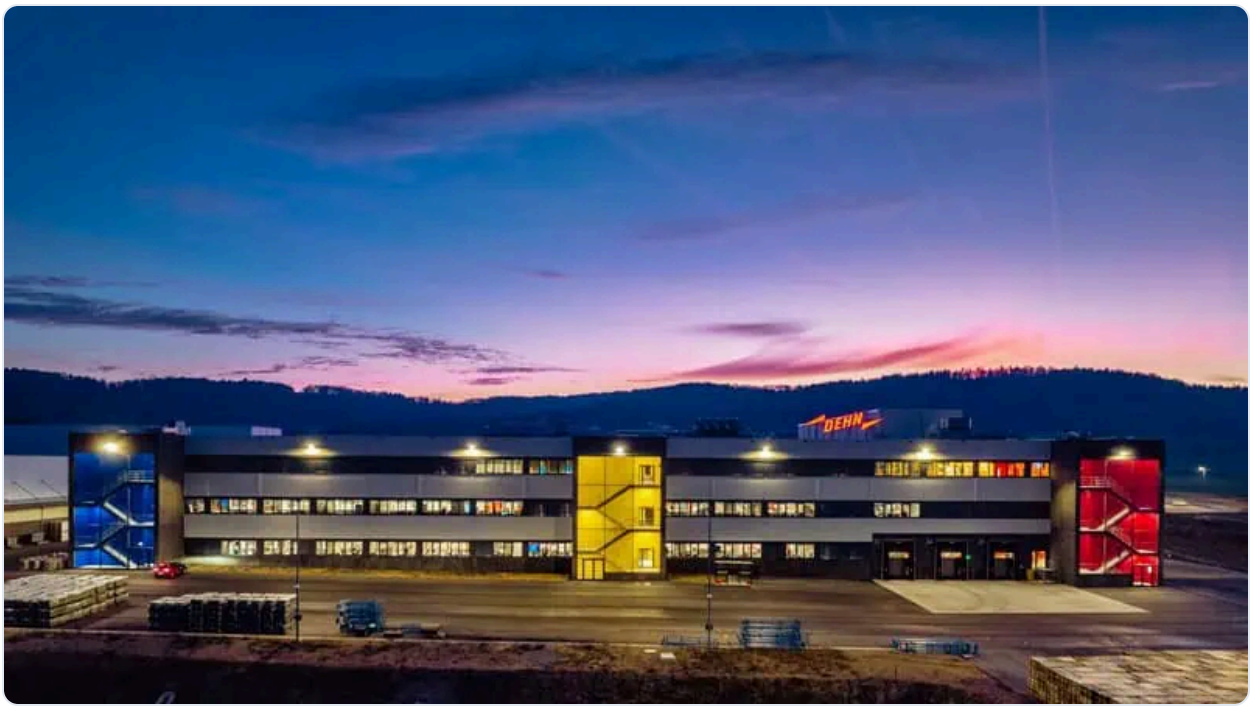
CONTENTS

Table of Contents

SECTION 01

Company Profile: DEHN SE



The new DEHN production site in Mühlhausen at SOP (Image source: DEHN SE).

DEHN is a leading, internationally active family-owned electrical engineering company based in Neumarkt i. d. Oberpfalz, Germany. With a comprehensive portfolio, DEHN addresses current megatrends – from electromobility and renewable energies to the protection of critical infrastructure.

The company provides solutions and services for lightning protection, surge protection, and safety equipment. More than 1,100 patents make DEHN an innovation leader in these fields. Their products protect people and buildings, plant and telecommunications technology, the process industry, as well as photovoltaic and wind power plants.

With more than 2,400 employees worldwide, the DEHNgroup achieved a turnover of approximately 460 million euros in the 2022/2023 financial year. This continuous growth is based on over 114 years of experience, the highest quality standards, and a consistent global focus on customers and markets.

SECTION 02

The Challenge of Site Development

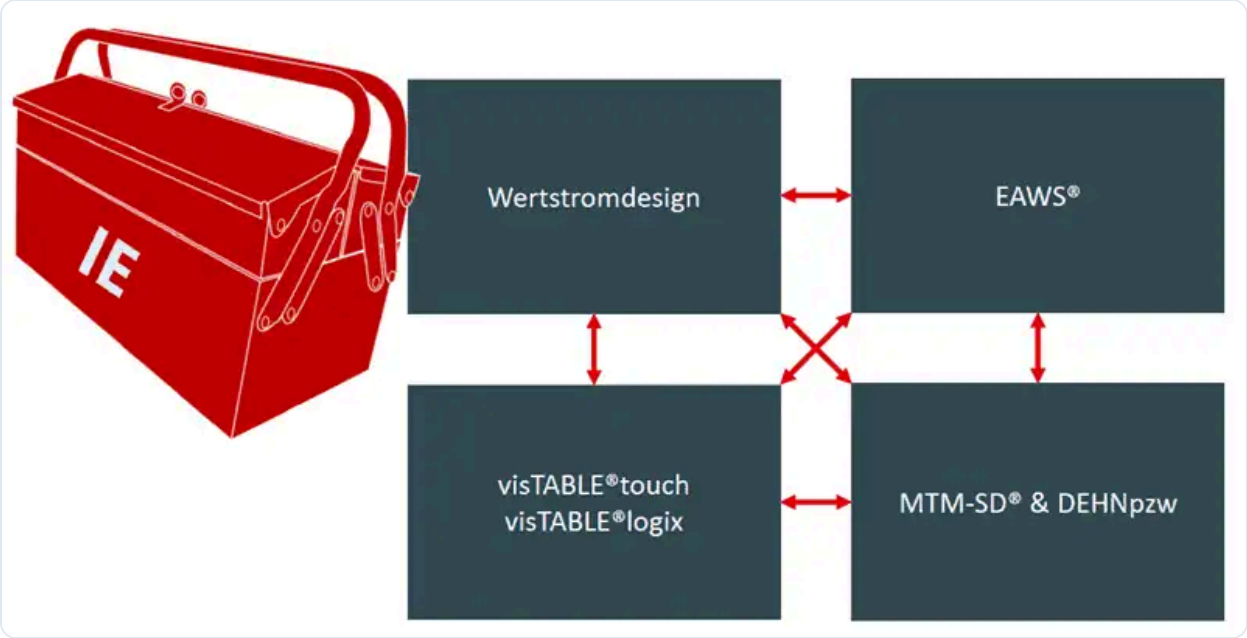
Despite several organisational changes and expansions, every growing mid-sized enterprise eventually reaches a point where existing capacities are no longer sufficient. The decision-makers at DEHN knew this point would come. A commercial plot of land was acquired early enough in the vicinity of the headquarters, which not only accommodated the new logistics centre required at the time, but also provided a defined development axis. The prospect of electronics production relocating there was already being considered when relocation thoughts still seemed very distant to many DEHN employees.

> The owner and architect already had a clear vision for the development of the plant at the new site. The factory was to grow in defined stages in a flexible manner. The production and logistics concept had to be modular and adaptable.

The design of the new production structure followed key premises:

- **Value Stream Focus:** Each end product should be manufactured as independently as possible so that its product lifecycle has minimal impact on other products. Product-specific segments were formed, whilst task-oriented processes were centralised in "centres".

- **Standardisation:** Work systems are developed to be largely interchangeable. A standardised structure makes it easier for employees to familiarise themselves with and switch between different tasks, especially in assembly.
- **Data-driven Planning:** Processes and structures are justified based on analyses, digital models, and key performance indicators (KPIs).
- **Interdisciplinary Teamwork:** Planning teams for IT, buildings, logistics, and production aligned the new site together.



The Industrial Engineering (IE) toolbox at DEHN includes visTABLE® for process and layout planning.

> "We work data-driven, with standardised structures and an understanding for the employees. This feeds the experience of our IE team."

— Michael Berschneider, Head of Industrial Engineering at DEHN

visTABLE® is an established tool at DEHN. Alongside software components for process modelling (visTABLE®logix) and layout planning (visTABLE®touch), the IE team uses value stream design and MTM-based ergonomic process planning with the help of EAWS® and MTM Standard Data (MTM-SD®).

SECTION 03

Framework Conditions and Methodology

When visTABLE® was introduced at DEHN in 2018, it quickly became apparent how much potential could be unlocked through its consistent use for process and layout planning at a new site. However, site and relocation planning on this scale was uncharted territory for almost everyone involved. With an investment sum of around 50 million EUR, it represented the largest single investment in the company's history.

Michael Berschneider succinctly summarises the challenge:

> "Plan hard to work smart."

As-Is vs. To-Be Comparison: Purpose and Necessity

Initial thoughts focused on using digital data for logistics aspects, quickly identifying the ERP system as the data source. However, project coaching from software provider plavis revealed that generating a comparative baseline purely from existing ERP data was a misstep.

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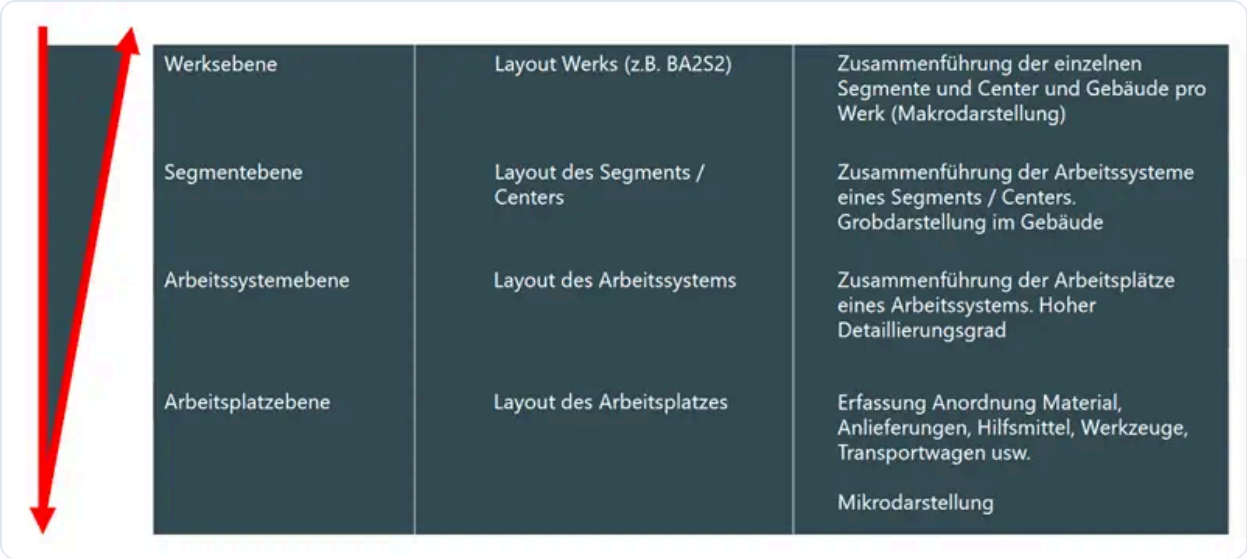
ERP systems can only provide limited data for site development. Missing information had to be manually supplemented.

ERP data often lacks sufficient logistics information, as it is oriented towards production control and order generation. Crucial elements like transport intensity and transport lot sizes were missing and had to be added manually. Consequently, the decision was made to abandon the exhaustive As-Is analysis and instead focus entirely on designing the new To-Be process structures.

SECTION 04

Top-Down & Bottom-Up Modelling

Methodologically, the process and layout design followed the principle: "Design top-down; model bottom-up".



Top-down / Bottom-up modelling approach for site development at DEHN.

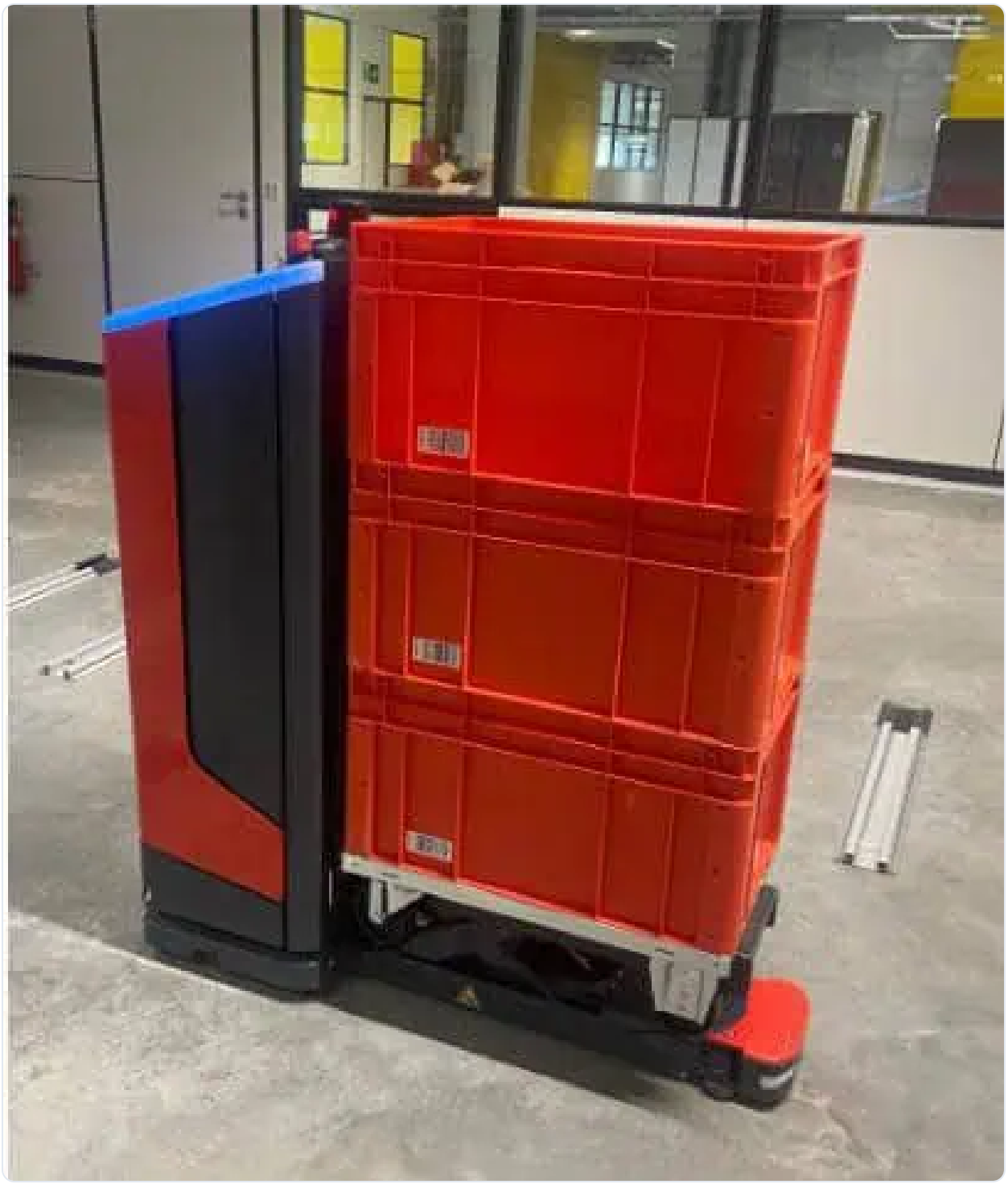
Detailed layouts for work systems were assembled from universally designed standard workplaces. Their micro-layout was validated using MTM process building blocks and EAWS® analyses. The vivid 3D visualisation of the work systems in visTABLE®, which was also made available in a VR system, helped production employees understand the new work systems early on.

Standard workplace in electronics production at DEHN (Screenshot from visTABLE® 3D view).

SECTION 05

Focal Point: Logistics Concept

Alongside the model-based design of the value creation side, a digital model was created for their logistical interlinking. A fundamental consideration was to make variant diversity manageable by forming process families. Based on planned quantities, the output volumes per process family and year were determined.



Automated Guided Vehicle (AGV) system for intralogistics.

Securing the Factory Structure

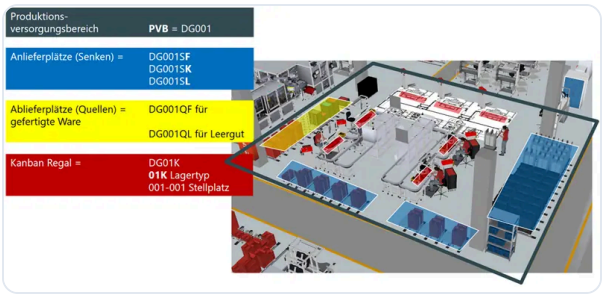
By linking the process families with block layout objects, an experimental model for the factory structure was generated in visTABLE®. The block layout was then

supplemented with logistical axes. The optimal arrangement of segments per floor was identified using the visTABLE® "Arrangement Optimisation" function, considering the high number of transports to the two lifts.

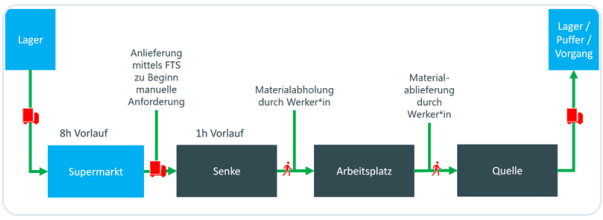
Arrangement optimisation serving as structure discovery for site development.

Material Flow Design and Data Acquisition

Segments were subdivided into Production Supply Areas (PVBs). The arrangement of work systems as well as delivery and dispatch areas within the segments formed the next planning focal point. Every flow of goods followed the same pattern, allowing standard process graphs to be easily duplicated and adjusted.

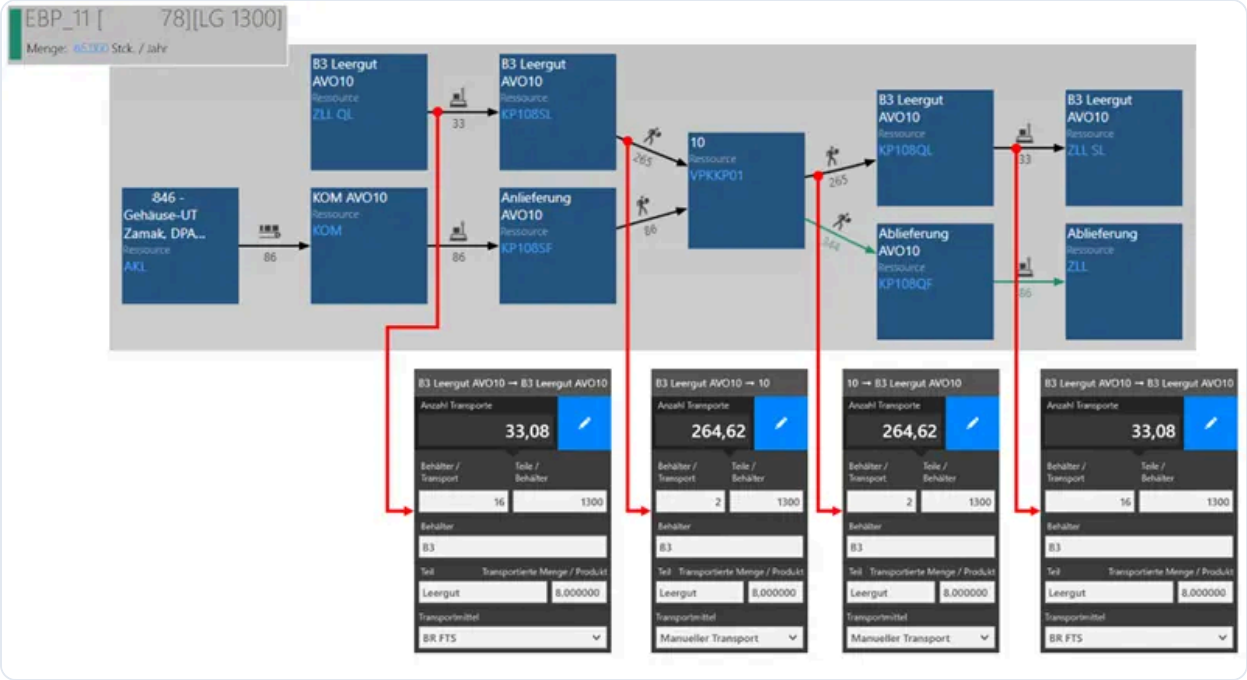


The PVB is the smallest functional unit for structure planning.



The material supply scheme for electronics production.

This standardisation enabled data acquisition to be distributed across multiple departments using uniform Excel templates exported from visTABLE®logix.



Modelling the flow of empty containers in visTABLE®logix.

Planning the supply and disposal via AGVs also required meticulous empty container management. Empty containers, unlike customer-order-driven materials, could be handled independently of orders using the maximum transport capacities of the logistics system.

SECTION 06

The Trial by Fire: The Relocation

In the meantime, production has moved into the site as planned – by no means a given for large projects. The digital factory model proved enormously valuable for the relocation planners.

> "In practice, the structure of the layout (PVB structure, workplace structure, and detailed designation of sources and sinks for the AGVs) had a very positive effect on how we worked when setting up plant and machinery."

— Josef Wittmann, Relocation Team at DEHN

The visTABLE®Viewer was particularly helpful during the move. The project management team and colleagues on site all had it installed, providing access to the layout and all necessary information at any time. The layout effectively served as the primary communication tool.

SECTION 07

Conclusion & Lessons Learned

One key realisation from this project was that layout planning with visTABLE® will form the global standard at DEHN moving forward. Chief Process Planner Michael Mohren made it clear that the methodology and motivation of project participants must go hand-in-hand to succeed.

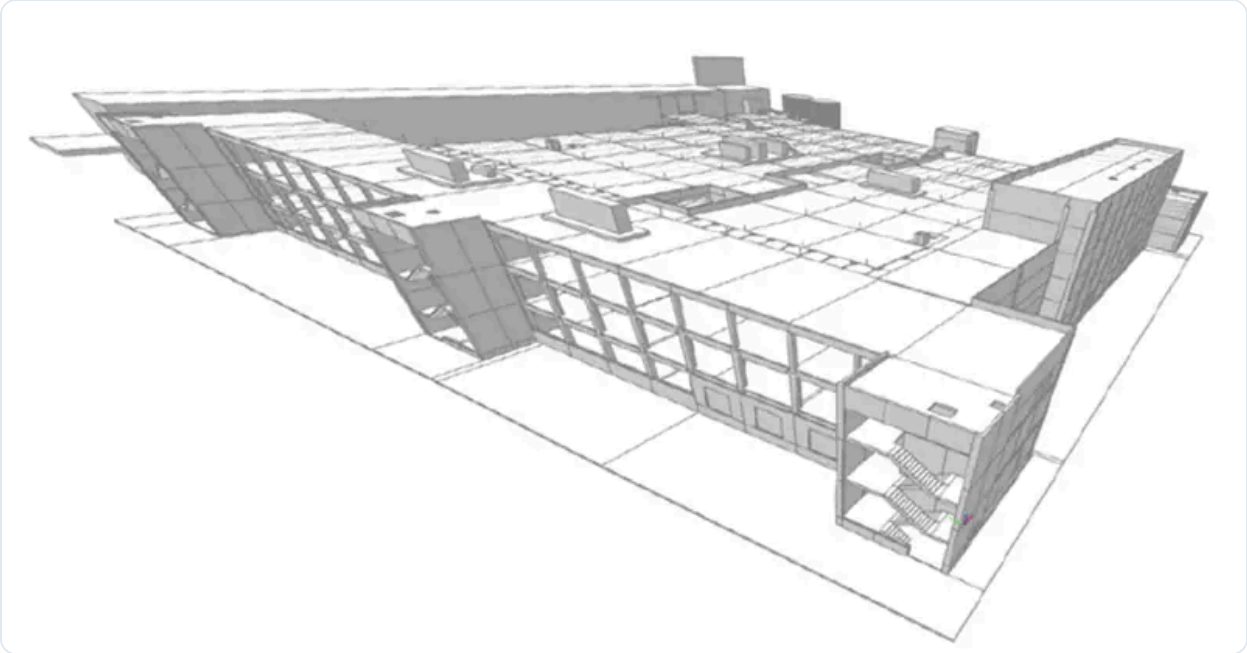
> "Comprehend instead of copy."

For the production staff, understanding the planned work systems was crucial for their active and constructive participation. 3D and VR visualisations were among the decisive success factors in building acceptance.

To conclude this experience report, a quote from the DEHN project team should not go unmentioned. It was spoken spontaneously at a time when the shell of the

building was just being erected:

"Today, we know our future site better than our existing one."



Building Information Modelling (BIM) is essential today for site development projects.