



PROGRESS: 100% - COMPLETED
GERMANY/MÜNCHEN/2016-18

STATE-OF-THE-ART PLANNING WITH BIM AND LEAN



The OST BMW Freimann office building in Munich

Author: Roman Galler

For the BMW Freimann project, PORR Design & Engineering prepared the design, tender and execution planning. Cost and time constraints were tight.

The scope of services included planning and consulting services for a four-storey office building with an underground car park and a conference and catering area. PORR relied on integral planning, building information modeling (BIM) and LEAN design

Background

The new OST office building in Freimann will serve to combine in one building the various sectors of the BMW bank, BMW sales and all the departments of the leasing provider Alphabet International, which have previously been distributed across numerous sites. The construction boasts a gross floor area of around 72,500m², containing 2,229 flexible work spaces for 3,120 staff.

The design, tender and execution planning elements were carried out from October 2016 through the efforts of PORR Design & Engineering GmbH (PDE) with the support of the specialist fire protection department and PDE Design Studio.

Project data

Employer	BMW AG
Contractor	PORR Design & Engineering GmbH
Order type	General planning
Project type	Design & Engineering, Building Construction
Project scope	General planning of design, tender and execution
Construction start	10/2016
Construction end	02/2019

This project was realised from June 2017 in a joint venture with the PORR Bau GmbH . Major Projects department and PORR Deutschland GmbH. PORR operated during the planning and execution phases using building information modeling (BIM), LEAN management and integral planning methods to form a holistic project approach incorporating all key trades.



The new office complex occupies a built area of approx. 19,700m². Source: PORR

Tight time and cost constraints

From the very beginning of the implementation of this project, PORR was presented with very clear concepts and specifications from the employer. The architect's original design exceeded the budget by some 10 million euros. As a result, after the second work phase, PORR Design & Engineering received the contract to use value engineering to identify optimisation potentials, so as to be able to meet the requirements of the costing framework. The successful completion of this challenging assignment secured not only the general planning contract, but also subsequently the contract for the construction of the office building for PORR. In the role of general planner, PDE then had to adhere strictly to the time and budget limitations from work phase 3. For the best possible operating result within the specified cost framework, PORR chose a design-to-budget approach for the design planning. This required all work elements of the overall project to implement project goals within the cost framework specified by BMW.

The tight time constraints necessitated the reversal of the design and building application processes. The building application was submitted initially on the basis of the preliminary draft. The design process took place alongside this application process and, in large part, after it. This meant that incorporated changes from the design phase had to be approved via a modified planning application.

An additional specification by the client was that the construction scheme was, so far as possible, to be implemented as a modular construction with the use of prefabricated system elements. This included the use of prefabricated concrete sections for ceilings, walls, façade elements and stairways, as well as complete shafts with prefabricated building services installations, among others.

From project participant to project partner

In the course of the BMW Freimann project, PORR realised what has been, with many other construction projects, nothing more than a nice idea: the new BMW complex is a genuine joint project. The client worked closely together with PORR and its partner subcontractors in a partnership model, from the planning right through to the turnkey completion of the project. In addition, they brought their specific knowledge, experience and know-how to bear. Contrary to widespread fears, this partnership model did not displace any of the project participants, but instead significantly improved collaboration. In this way, the participants became true project partners.



A REAL JOINT PROJECT, IN WHICH CLIENT AND ALL PROJECT PARTICIPANTS WORKED CLOSELY TOGETHER FROM THE VERY BEGINNING.

Roman Galler
GP4 Team Leader, PORR Design&Engineering

Integral planning

An important aspect of a joint construction project is the integral planning, the simultaneous participation of all the relevant technical disciplines in the planning process. An important element of this is the early inclusion of all important experts in the planning team and their simultaneous and concerted effort in completing planning tasks. On the basis of this concept, project planning for the Freimann project was carried out together with all participating professional groups. Close teamwork among

PDE, PORR Major Projects, PORR Deutschland Munich branch and the companies responsible for executing the most important works (such as building services planning, façade, interior fittings and building automation) was a crucial factor in this process. The people responsible for the project in all these specialist areas were involved in the planning process from the very beginning. They participated actively in the planning process, regular planning conferences and the creation of planning-relevant documents and papers. The know-how of the executing works was integrated into the design planning process and, further along, in the execution planning as well.

BIM and LEAN

In order to streamline and optimise the planning process from the very beginning, and to implement the required cost savings, PDE made use of LEAN design methods. This meant the various teams worked in a collaborative production plan on concrete preview and work packages. These plans were evaluated together every week in a so-called “PEP” talk (production-evaluation-planning), and new work packages were determined for the next week. In this way obstacles, deviations and idle periods could be identified early and eliminated.

Further along the process, this collaborative planning resulted in a digital building model with the application of BIM. All relevant construction data were digitally modelled, combined and measured and geometrically visualised as a virtual model with BIM. This three-dimensional building model included the architectural works as well as the structural framework planning. Owing to the abundance of data in the area of mechanical & electrical engineering, a separate model was established, which was then integrated into the main model. The use of BIM was a fundamental requirement of the client, with a view to controlling the later operation of the building with the digital building model and linking with the requirements of the BMW facility management system.



Active exchanges of ideas are expected in the many project areas.
Source: PORR Design & Engineering

Impressive result

The new building complex extends across a length of more than 248m and a width of 96m, and is divided in a comb-shape with four wings and connecting structures. The building structure required regular atriums, which provide plenty of daylight to the office areas.

The offices are designed as open-plan flexi-offices and include so-called think tanks for uninterrupted conversations, conferences and group work. The ground floor area contains additional usage spaces for the dining facilities, cafeteria, conferences and presentations (closed room) as well as a BMW Group fitness centre.



The internal areas of the connecting wings house communication zones with kitchenettes. Source: PORR Design & Engineering

The exterior of the building is designed as a perforated façade with light façade plaster, which forms a marked contrast to the darker face of the ground floor.

The building uses state-of-the-art building services technology and provides the office, meeting and conference areas with regulated mechanical ventilation combined with a heating-cooling ceiling. The single-storey underground car park covers the full area of the building complex.

The grounds will provide a pleasant recreation area with plenty of trees and greenery in the open air. The underground car park will contain spaces for around 450 passenger vehicles and 85 bicycles. Additional parking places for cars and bicycles will be located outside the building.



The area outside the main entrance, as well as the foyer, is intended to contain vehicle display areas. Source: PORR Design & Engineering

Sustainable construction

The building is subject to BMW's own evaluation system for sustainable construction, which is similar to the requirements of the international LEED label and the German DGNB standard. PDE paid particular attention to material selection, water and energy supplies from the very beginning of the project, with a view to environmentally friendly planning. PORR's own "Sustainable Construction" reference system determined the integration of sustainability aspects such as user comfort, material ecology and local supply.

Result

Through the partnership model and the integral planning approach, the works carried out were incorporated into the planning right from the beginning of the project. This means that the requirements specified by the client were able to be implemented within the required cost and time limitations. Through the application of LEAN principles in the project development, PDE ensured that the construction work was ready to begin in June 2017, as desired by the client.

Technical data



19.700m²

Built-up area

72.500m²

Gross surface area

35.700m²

Plot area

Total number of staff	3.120
Bicycle parking spaces	412
Flexible workspaces	2.230
Desk sharing factor	1:1,4
Car parking spaces	665