

ANNEX 3-B

Case study

Office 2015

office 2015 - as its name clearly says - projects into the future the potential and functionality of a new concept for a modern and efficient office. For the famous group of architects 3L architects + industrial designers it was not enough just to reorganise the staff, with the aim of improving planning phases and data archiving, they also wanted to redesign the spaces that were to house the new headquarters in Menden (Germany). Steel is the guiding material for the building: the joint between the metal bearing structure is the heart of the construction technique patented by 3L architects + industrial designers. The metal structural work corresponds to an overall weight of 62 tons, assembled on site by a small assembly team in a record time of just 5 days. The amount of steel structural work, if we refer it to the useful surface of the building, corresponds to a steel sheet of just 7.3 mm thickness. The easily assembled bolted joint allows rapid dismantling of the structure in case of extension or rebuilding elsewhere.

office 2015

3L architects + industrial designers, Menden (Germany)



Building and Service Technology

Using innovative assembling techniques and avoiding wet construction methods, the erection time could be reduced to only 7 months. This could be achieved by a high degree of prefabrication based on steel-frame and lightweight constructions.

Thus only for the slab system was there a concrete topping necessary as a wet technique. The concrete topping is also used for heating and cooling the building through so-called "structural element activation". A core of concrete with a thickness of 10 cm contains water-filled polymer tubes. As a special kind of floor-heating system they warm up the slab and

take care of heating in winter and by cooling in summer. Applying this system a cement screed becomes redundant.

More than 600 m² of the facade consist of steel and glass. By using a system of posts and rails made of special profiles a maximum of transparency could be reached for the glass parts. By mounting high-quality glass on it a value for heat transmission resistance of 1.1. W/m²K could be achieved, thus ensuring a convenient interior climate in winter and summer. The non-transparent parts of the building's façade are all produced with dry wall constructions using gypsum fibreboard and core insulation. The outer layer is a weather-resistant and ventilated

façade of wood panelling or fibrated cement plates. This construction achieves a value for heat transmission resistance of 0.22 W/m²K.

Flexible ground floor design

A new field of application for steel was already discovered in the second half of the 19th century, besides typical civil engineering tasks like bridges and hall constructions. From 1879 multistorey dwelling houses were built in Chicago and other cities using steel-frame constructions that allowed a flexible ground floor design. This was a result of bold visions on the part of architects who preferred this kind of system after having experienced devastating urban fires. Thus the way for high-rise buildings in steel construction was paved.

In the following years erecting multistorey houses became more and more complicated with rules and laws aiming for fire protection of the buildings. So considering cost-effectiveness steel-frame constructions lost the competition. The formerly missing database on buildings

physics, especially considering fire protection systems, is nowadays explored. During recent years several details have been developed to satisfy the demands of up-to-date standards.

So in 1998, the government of the Federal State of North Rhine-Westphalia gave 3L architects the mission to develop economical building concepts that should lead to an enormous reduction in erection time because they are based on steel-frame and lightweight constructions. The aim of cost savings of up to 30% without loss of quality was easily fulfilled while achieving the highest degree in flexibility of ground floor design. The architects of 3L's "office 2015" departed from the traditional way of masonry for inner and outer walls and chose walls made of gypsum board with even better characteristics in terms of sound and heat insulation, but with one decisive advantage: the lightweight construction of walls is free of tasks of bearing structure and thus it is possible to put the walls where ever within the system – even removable during utilisation time.

Application Benefits

- Speed of construction
- Flexible floor design
- Service integration opportunities
- Recyclability of the building
- Minimised energy consumption
- Intelligent Service integration

Project Team

Client:

3L Architekten + Industriedesigner
Menden

Architects:

Dipl.-Ing. Klaus Th. Luig
Dipl.-Ing. Veronika Lenze

Structural Engineer:

Ingenieurbüro Krause, Menden

Project Coordinator:

Dipl.-Ing. Ariane Walter

Technical Data:

- Built-up area: 380 m²
- Usable area: 1.080 m²
- Construction time: 7 months
- Completion: March 2002
- Building costs: € 1,3 million



Impressions from the building process and from the decking system HOESCH Additiv Decke