Main Station, Stuttgart, Germany

Project description by author

The heyday of railway stations in the 19th century saw bold engineering feats for the new halls for train terminals in all major European cities. The stations were erected in the expansion areas of the historic cities, which continued to grow around them. Many years later, of course, the rail tracks would become a hindrance to further urban development.

Stuttgart is a particular case in point. The city lies in a valley, a geographic cul-de-sac, and the central station built by Paul Bonatz blocks any expansion of the narrow city centre. Moreover, Stuttgart station is a terminus, which makes it difficult to link the city to the high-speed rail network that is being developed throughout Europe. The new station design should go beyond breathing new life into the structures built during that earlier era with modern means and lead to the emergence of a new generation of railway stations.

The project was decided in a 3-phase competition with a participatory process, and the design was then presented to the public. The Schlossgarten park is the most important public green space in Stuttgart, and it extends smoothly above the new station; the roof of the station is as little as 1/100 of the span. The use of advanced high-strength concrete and cement grades means that the material properties can be selected so that the durable exposed concrete surfaces form the finished building.

Relevance to target issues (by author)

Quantum change and transferability

The continuous form of the shell-type concrete roof creates a highly efficient load-bearing structure which is only subject to pressure load and has a structural height which is as little as 1/100 of the span. The use of advanced high-strength concrete and cement grades means that the material properties can be selected so that the durable exposed concrete surfaces form the finished building.

Ecological quality and energy conservation

The use of natural energy resources means that a high level of visual and thermal comfort is achieved with hardly any consumption of primary energy. The station, with an average daylight quotient of over 4, has supplementary lighting in which a differentiated use of direct and indirect light enables a maximum specific connection value of 3 - 5 W/m² to be achieved. The natural ventilation and air extraction system using natural draughts in conjunction with thermal air flow creates a maximum air flow rate of 1.0 - 1.5 m/sec. on the platform. The high comfort is achieved without the addition of thermal energy, and this is reflected in a mean felt temperature on the platforms of 20-22°C in summer and 5-8°C in winter. About 20% of the supplied energy. The “zero-energy station” requires no heating, cooling or mechanical ventilation.

Economic performance and compatibility

The volume of the building is reduced to the minimum. The reusability of the framework elements and the prefabrication of modular components facilitated the efficient and profitable planning of the construction process. The functional requirements of the station were met by modular and replaceable finishing elements. This ensured a long service life for the building.

Contextual response and aesthetic impact

The unmistakable identity of the nature-like structure creates a long-lasting aesthetic elegance of the load-bearing structure. The intertwining of the public pedestrian paths in the station and the “concealed” building structure correspond to the simple urban spatial setting with its subtle lines of sight.

Comment of the Holcim Awards 2005 jury for Europe

The project presents an innovative scheme for recovering forfeited urban territory and at the same time creating a new spatial presence in the city. The work is significant because it contributes in an integrative manner to the disciplines of architecture, urban and landscape design, civil, urban and environmental engineering, and other related fields pertaining to construction. Equally important is the ethically-oriented stance toward environmental and cultural values. Of particular interest are the proposed “light eyes” that act as both an attractor and a creative means for distributing light to the station below. The project successfully demonstrates an efficient use of natural energy resources that are coordinated in such a way as to improve the experiential quality of the site and to increase material performance of the infrastructure. Serving to promote public transportation, the project is economically viable in that it implements a model for recycling existing structures while offering a functionally flexible platform that can accommodate future programmatic changes. The work responds in an aesthetically convincing way to establishing a dialogue between natural and man-made environments and manifests a sensitive approach to contextual restoration.