References

Schöck Isokorb® KST in use at Albion Riverside in London

The Albion Riverside in London

The imposing, eleven storey Albion Riverside, located next to the Thames at Battersea in London is a mixed-use development consisting of three buildings. The most dominant contains 186 apartments and penthouses, plus shops, a restaurant, art gallery, swimming pool and gymnasium for the use of residents; the low-rise office building is the UK headquarters of the Hong Kong developers, Hutchison Whampoa; and the low-rise apartment building provides 45 low-cost apartments for key workers.

Foster & Partners were the practice with overall responsibility for the project, but the Viennise office of Waagner Biro was responsible for the planning, construction and structural calculations for the complex 3,000 m^2 roof structure.

According to the planners, the real challenge of the design was how to integrate a relatively large residential building in an environment dominated by much smaller structures. The aim was to integrate nearly 250 apartments as harmoniously as possible, without being too "in your face". It was also very important to create an arresting form which would appeal to the kind of potential resident in the market for this type of luxury apartment. Of course, the roof in particular with its three-dimensional curvilinear form not only offers a dramatic silhouette when viewed from the outside, but it also provided the designers with the opportunity to create exciting living spaces inside as well.

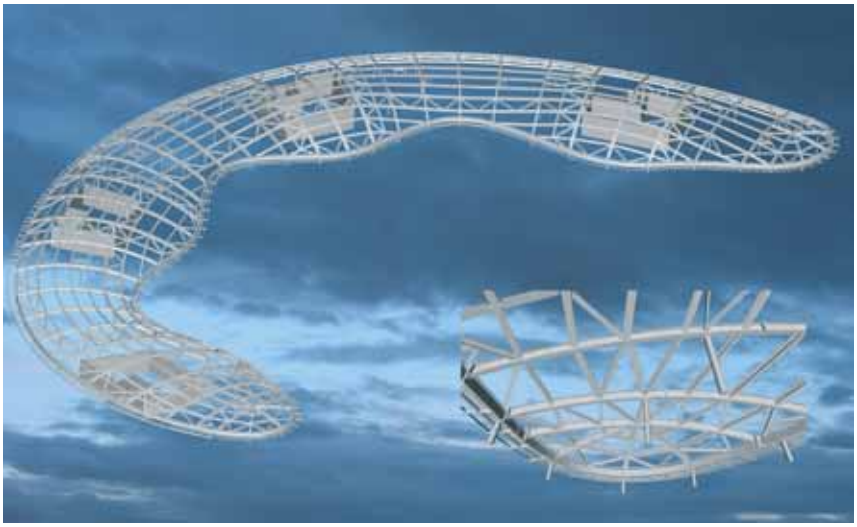
The building has a kidney-shaped outline with curved contours on all sides. The outer surface of the building follows three radii which are arranged tangentially in sequence, while the cross-sections of the roof are made up of two radii with variously positioned intersections. This results in peaks and troughs in the contour of the roof, without a flat surface in sight.

3,000 m² roof structure

Due to the special geometric nature of the roof, full planning took around seven months to complete. Four concrete cores form the base of the building, containing staircases, lift shafts and – and at the top – the supporting points of the steel structure. In addition there are a large number of concrete columns, to which the steel structure and the surrounding load bearing members are connected. The roof covers an area of around 3,000 m², with the steel structure weighing around 270 tonnes. The structure employs standard British profile cross-sections (universal columns and beams, UB, UC). The construction process took around 5 months, starting at the beginning of October 2002 and finishing in mid-March 2003. Standard trapezoidal sheet metal was attached to the load-bearing steel structure and this was followed by a layer of rubber matting which acts as a waterproof membrane and provides insulation against noise.

Spacers were attached to the trapezoidal sheet panels in order to attach the smooth curved tapered Kalzip sheets. These are an ideal solution in meeting the challenging requirements as it was possible to follow the profile of the roof perfectly from front to back and the curves could be accommodated from side-to-side by hinging on the seam where each strip of Kalzip is joined to its neighbour.

A larger air space (around 400 – 500 mm) is located between the ceiling of the body shell and the cold roof, offering additional thermal and sound insulation. The floor to the apart-ment area was hung with suspended structures and partially tensioned. Openings in the roof lead out to the plant rooms, where the building services and automation systems are housed.



Overview of the entire load-bearing structure, the individual bars with the main load-bearing members and the large bent I-members, plus the purlins and the continuous sway bracing which extends throughout the entire building.

Schöck Isokorb® type KST

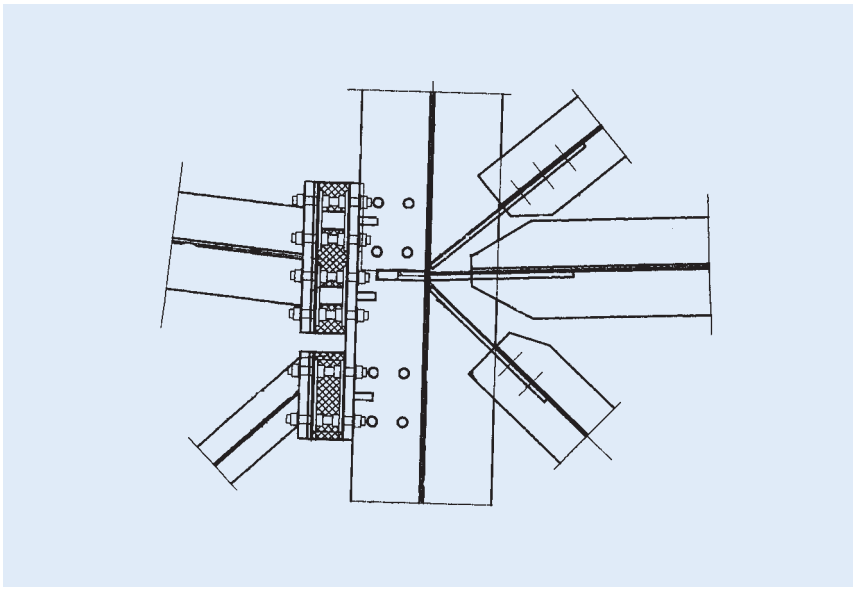
The architect has incorporated Schöck Isokorb® KST elements in the plant room area. Here the thermal break modules create a thermal barrier between the cantilever construction elements, preventing thermal bridges occurring and avoiding any resultant heat and energy loss and potential structural damage. The KST offers complete freedom of design when it comes to steel construction and the unit is able to withstand extremely demanding loads and is effective against bending moment and shear force. Its stainless steel components mean that the unit is completely protected from corrosion. The largest load-bearing cross-sections in this area are 400 x 460 mm and with these dimensions, it was necessary to combine several Isokorb elements, with polystyrene acting as insulation in between. The inclusion of several inclined connections has enabled the distribution of loads in several planes and directions.

Schöck Isokorb® type KST the thermal break for steel-to-steel construction

The Schöck Isokorb® KST offers complete freedom of design when it comes to steel construction

Fitting a Schöck Isokorb® type KST to a steel beam

Steel beam with Schöck Isokorb® type KST



Various special solutions were demanded by the Albion Riverside project. The insulating thickness of the modules needed to be adapted to meet special requirements and at the same time the exceptionally high lateral force loads had to be absorbed by means of a special structural design. In addition, there were also connection points which were subjected to three-dimensional loads, bending in two axes. In order to absorb these loads, it was necessary to connect two parts of the Isokorb element with each other and thanks to the modular nature of the cages, this could be done with ease. A further task was to convert all the calculations to British standards. The entire structural analysis was initially calculated by Schöck and then translated into British standards. Because of its height, open position and light steel structure, high wind loads were another factor which needed to be taken into account on the project.

Pictures: Foster and Partners, Waagner Biro
Drawings: Waagner Biro

Details:

Project:
Residential and office complex in London

Architect:
Sir Norman Foster and Partners, London

Consulting engineers:
ARUP, London

Steel contructor:
Waagner Biro, London / Vienna

Schöck product:
Schöck Isokorb® KST

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