



"Under one roof"

Metal and Glass Engineering with HiCAD

Modern architecture often uses forms and materials in an experimental, almost playful manner. The combination of elements from various industries poses great challenges to all parties involved, from design to components assembly. The example of a current prestige project realised in Bern, Switzerland, demonstrates how to tackle and master the technical difficulties.

Just in time for the Euro 08, a new city gate was built for the Swiss city Bern. The area of the most important Swiss connecting station besides Zurich was completely reconstructed after several years of planning. Its most striking feature is certainly the huge glass roof, the so-called baldachin. This complex project demanded great efforts from all parties involved, as it had to be realised right in the middle of the city centre, causing substantial inconvenience to the inhabitants of Bern. For instance, the station square had to be completely barred for car traffic for about one year. At project start, local councillor Regula Rytz compared the whole construction project



to an "open-heart surgery, affecting tens of thousands, if not even hundreds of thousands of people every day". Meanwhile, the project could be completed with a total expenditure amounting to approximately 97 million CHF. Meanwhile, the light glass construction of the baldachin has become one of the city's landmarks.

A baldachin of steel and glass

Especially the combined steel/glass construction of the baldachin posed great challenges to the design engineers. The curved, organic form of the huge construction could not be realised by conventional design methods. A sophisticated combination of box profiles, steel beams and glass elements was required to put the ideas of the architects into practice. Not only the design engineers, but also the CAD software used were pushed to their limit. Besides Tekla Structures, HiCAD was used for the construction of the baldachin. The Tuchschnid AG in Frauenfeld, Switzerland was charged with the design, delivery and assembly of the entire steel and glass construction.

» IN BRIEF

Tuchschnid AG

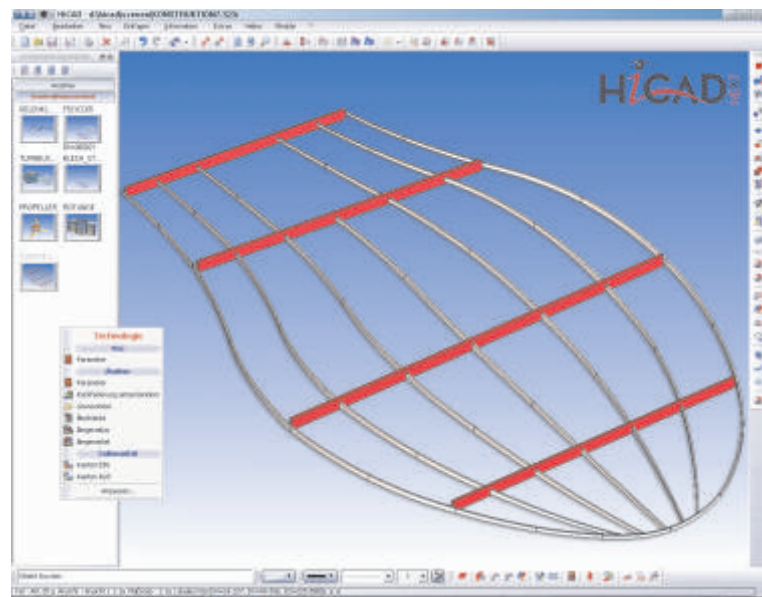
- Industry: Steel/Metal Engineering
- Software: HiCAD
- Products: Steel, glass and metal constructions
- Location: Frauenfeld, Switzerland
- www.tuchschnid.ch

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Founded as a metalworking shop in 1849, the company today realises complex projects in the fields of steel and glass engineering or road and rail traffic. Such customer-specific projects usually require a great deal of accurate planning. The Bern project is a typical example of modern architecture with its challenging curved forms and material combinations. The Tuchs Schmid AG describes the requirements of modern constructions as follows: "Today's and tomorrow's architecture demands transparency, easiness and elegance". The key to new and creative approaches are steel materials, which were used in many of the projects realised by Tuchs Schmid: "As a competent partner of Europe's most renowned architects, we are proud of the fact that we keep realising most complex steel and glass constructions, thus re-defining the limits of technical feasibility again and again."

Multi-curved beams

The basic design parameters alone are sufficient to convey an impression of the enormous complexity of the Bern station project: a roof surface of 2,470 sqm, 198 tons of steel, 1,950 glass pane holders, a total of 2,300 geometrically different single parts, including 550 different LSG panes. The total number of drawings required for the project amounted to 2,500. Tuchs Schmid planned and realised the load carrying construction consisting of welded, conical box profiles with tertiary flat steel girders placed on twelve columns and glass panes fixed to the construction. "The technically most demanding parts were clearly the secondary girders which were curved both in top and side view - not along a radius, but along a 3-D spline", explains Urs Kern, Project Manager at Tuchs Schmid. The end cross-section of each box girder is higher and broader than the start cross-

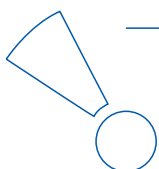


section, the webs are always vertical. These parts could only be realised with box girders (sheet thickness up to 35 mm), steel beams were unsuitable for this task.

The sheet metal-specific industry solution of the CAD software HiCAD provides a wide range of special functionalities which are perfectly suited for such or similar tasks. The scope of functions includes many sheet metal-specific functions and automatisms such as automatic sheet development, blank dimensioning, pre-defined stamping tools, adding and folding of flanges etc.

100% accuracy on a length of 40 m

One pivotal task for Tuchs Schmid was the exact development of the sheets. Each box girder consists of four single parts, two flanges and two webs, which were modelled and developed in HiCAD. The calculated data were, together with all production-relevant information, transferred to NC machines. The delivered parts were welded and pre-assembled in Frauenfeld. They were then transported to the Bern station, where the final assembly including



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meticulous dimensional checks took place. At this point, the construction had to pass the decisive test and prove its accuracy. Urs Kern was totally satisfied with the result: "The accuracy of the sheet developments was essential to the successful realisation of the project. Thanks to the precise planning, manufacturing and assembly of the curved box girders, not a single tertiary girder needed further adjustment. The glass panes, too, could be fitted without any problems."

Interfaces ensuring the data transfer from HiCAD to other systems further contributed to the perfect coordination of processes.



A reliable and competent partner

Tuchschnid has been using HiCAD since 2006. The decision in favour of HiCAD was in particular due to the fact that currently, more and more construction projects require complex sheet developments for which HiCAD provides the ideal tools. According to Urs Kern, "HiCAD represents the perfect supplement for steel and glass engineering to our internal CAD environment. No other sheet metal module is similarly

efficient, accurate and production-oriented, which ensures a maximum of planning safety and helps us save time and costs. In the field of metal engineering, the convenient Orgadata interface has proven very helpful. We are convinced that this module in conjunction with its excellent sheet metal applications will be the unrivalled market leader in the near future".

Besides, Tuchschnid appreciates the direct and uncomplicated contact with the software provider: In addition to the software, the ISD offers the entire range of accompanying services, from consulting and training to installation and hotline. This means that customer requirements can directly be communicated to the software developers, which provides further substantial advantage: "We particularly appreciate the prompt replies to technical questions and the optimal support via Deskshare. Particular issues concerning the software that may arise during the project can thus be clarified at once and without any disruptions of the workflow." concludes Urs Kern with evident satisfaction.

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