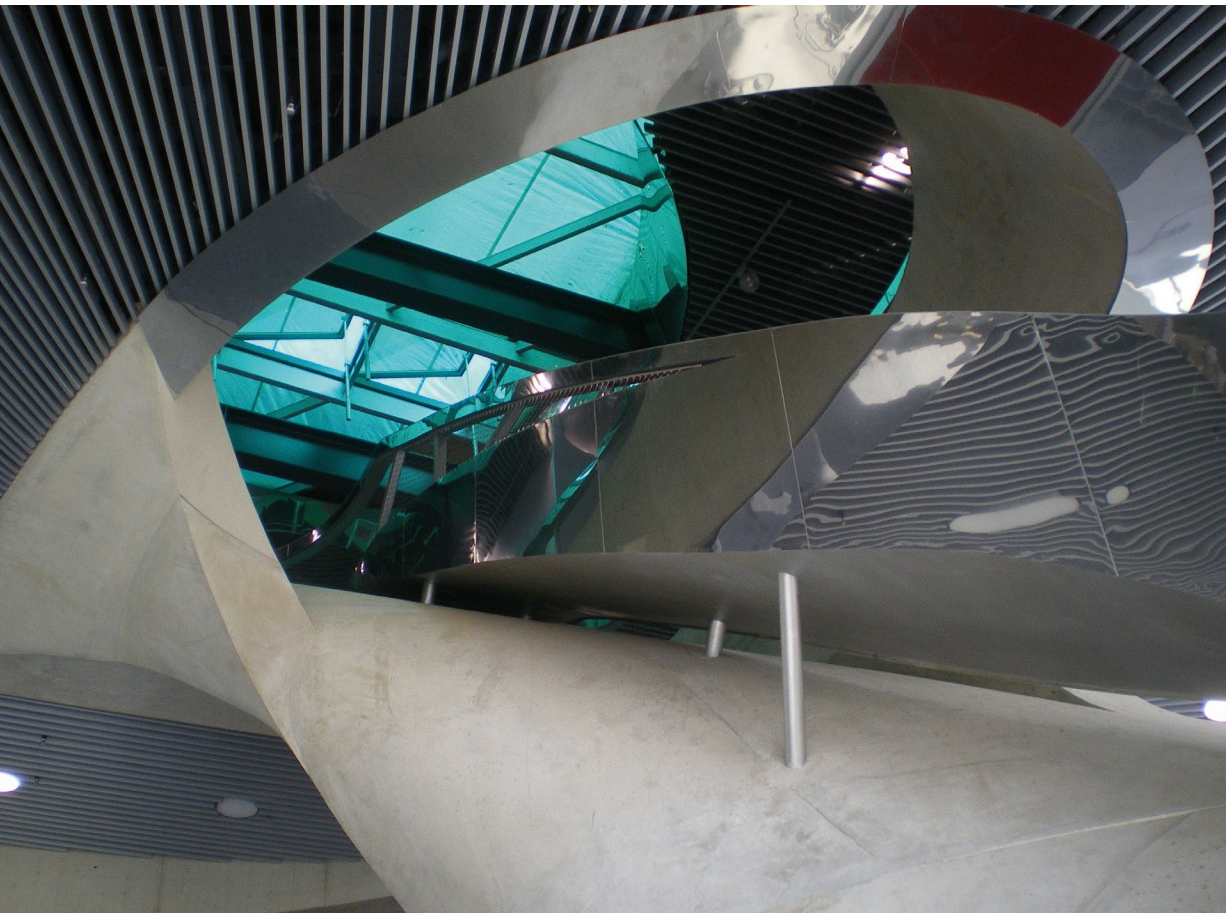


Music theatre Graz, Austria

Allplan in practice

FREE FORMS GIVE FIRM SUPPORT

Digital building models make it possible to realise unusual constructions that would otherwise require huge timescales to complete.

The Haus für Musik und Musiktheater (or Mumuth for short) in Graz falls into this category. Allplan Engineering and Allplan Terrain were the tools used by convex ZT GmbH to carry out the exceptionally complex supporting structure planning for this project.

The Austrian Federal Real Estate Company (BIG or Bundesimmobiliengesellschaft in German) commissioned the construction of a building for music and musical theatre (or Mumuth for short) for the Graz University of Music and Performing Arts. Planning activities for the building began in 2005. "The planning phase presented us with a few problems. The Mumuth proved to be extremely complex in many respects, including the supporting structure system, the building equipment, the building physics and the façade. As such, we were unable to rely on the traditional elements of structural engineering and were forced to develop and plan everything from scratch," comments Helmut Schwarzl, Project Manager at convex ZT.

The planning office was formed in 2006 when convex ZT GmbH merged with Graber-Szyszkowitz ZT GmbH and can look back on over 30 years of experience in domestic and international construction projects. With a team of around 35 emplo-

yees, the office's engineers' focus is on delivering high-grade supporting structures for the core sectors of power station construction, industry and structural engineering.

In order to produce sophisticated planning results with the maximum level of quality, convex ZT GmbH placed its trust in ALLPLAN solutions from the outset. "We decided to go with Allplan Engineering because this software supports us efficiently in all phases of support structure planning and implementation planning. In addition to using the Allplan Terrain package for structural and civil engineering projects on challenging terrain, we also use it to model complex geometries of building components," says Helmut Schwarzl.

Once blueprints for complex supporting structures become available, 90% of them are created as 3D models in Allplan. Only simple calculations are still carried out in 2D by the planning office. Helmut Schwarzl is in no doubt about the advantages of working in 3D. Once planning data has been entered into the digital building model, it is possible to derive all relevant cross sections, elevations and perspectives at the touch of a button. Furthermore, the 3D view (which is displayed in an animation window which opens in parallel during processing) also provides a function for optimal blueprint control. "This function is proving to be extremely useful. Not only does it help to avoid errors, it also makes it easy to visualise complex geometries. We use Allplan because of the level of certainty it provides us with during the planning phase."

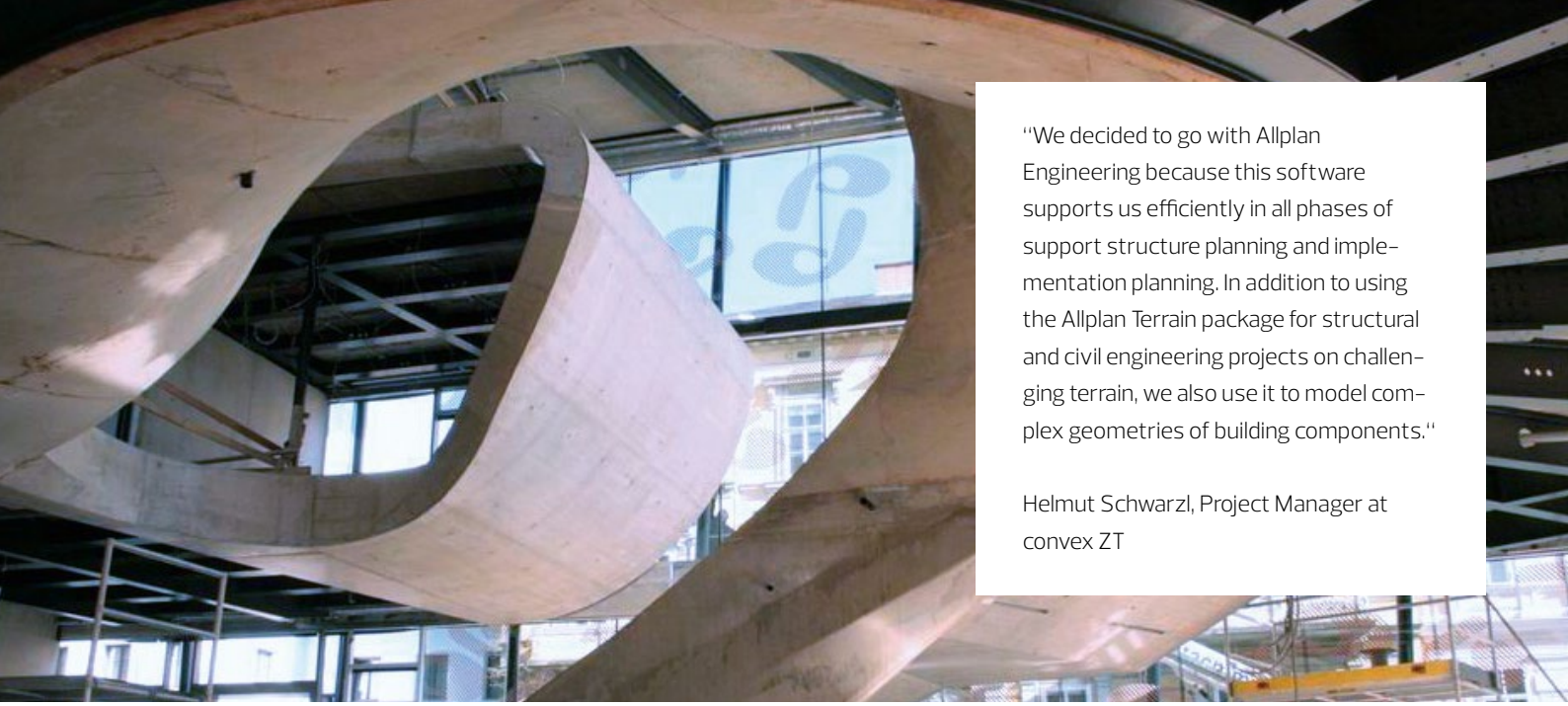
FREE FORM SUPPORT STRUCTURE

The right-angled plan of the music theatre consists of the foyer area at the front and the theatre area at the rear. The latter contains an events hall with 530 square metres of floor space, multiple rehearsal rooms for orchestras and musical theatre, dressing rooms, storerooms, repositories and study rooms.

One particular challenge during planning was posed by the 'Twist,' a freely defined spiral element which is the central component of the supporting structure in the foyer. This steel and concrete composite structure begins on the ground floor and spirals upwards through the first and second floors before merging with the ceiling above the second floor.

The Twist is more than just an architectural eye-catcher. Constructed as the main load-bearing element, it supports the foyer ceiling and is also the substructure for the staircase which extends from the first to the third floor.

Because the entire geometry consists of free forms, also known as non-uniform rational B-splines (NURBS), it was not possible to simply replicate the Twist in a 3D model without further ado. Instead, it had to be imported into the spatial building model via a less direct route. "We got round this difficult situation by diverting the Terrain module from its intended purpose and using it to model the complex, 3D entity. We then integrated



"We decided to go with Allplan Engineering because this software supports us efficiently in all phases of support structure planning and implementation planning. In addition to using the Allplan Terrain package for structural and civil engineering projects on challenging terrain, we also use it to model complex geometries of building components."

Helmut Schwarzl, Project Manager at convex ZT

this 3D data with the digital building model later on. In retrospect, I am still surprised that everything actually worked out alright!" sums up Helmut Schwarzl.

INTERDISCIPLINARY TEAMWORK

As an interdisciplinary planning office, convex ZT GmbH relies upon the continuous exchange of data with architects and engineers. "An architecture firm we work very closely with also uses ALLPLAN planning software. This enables us to import their data directly into our system and we thereby avoid practically any loss of information," explains Helmut Schwarzl.

The Workgroup Option from Allplan also ensures that internal cooperation is well managed. It allows planning projects to be administered centrally and staff can access all projects from any workstation. This tool guarantees that datasets are consistent and forms the basis for effective, synchronised teamwork.

ABOUT ALLPLAN

ALLPLAN is a global provider of BIM design software for the AEC industry. True to our "Design to Build" claim, we cover the entire process from the first concept to final detailed design for the construction site and for prefabrication. Allplan users create deliverables of the highest quality and level of detail thanks to lean workflows. ALLPLAN offers powerful integrated cloud technology to support interdisciplinary collaboration on building and civil engineering projects. Around the world over 500 dedicated employees continue to write the ALLPLAN success story. Headquartered in Munich, Germany, ALLPLAN is part of the Nemetschek Group which is a pioneer for digital transformation in the construction sector.

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