



Limmat Tower in Dietikon,
Switzerland

Allplan in practice

UNCONVENTIONAL BUILDING GEOMETRY EFFICIENTLY PLANNED WITH ALLPLAN ENGINEERING

“With the 3D visualisation feature in Allplan Engineering, the number of error sources could be reduced compared with 2D. Thanks to 3D visualisation, we can identify when something isn’t reinforced. It isn’t as clear in 2D.” – Karl Heinz Hamel, Design Engineer, Synaxis AG, Zurich

With its unconventional geometry, the 80-metre-tall Limmat Tower in Switzerland's Limmat Valley provided the engineers of Synaxis AG with a few challenges, which were efficiently overcome with Allplan Engineering. The challenges mainly related to the folding of the façade and the building recesses in the 10th and 15th floors. When it came to planning

the supporting structure, Allplan Engineering proved that it was the ideal solution to spatially present sophisticated details and to optimally plan the reinforcement in a way that suited the construction site – and it was all thanks to its 3D visualisation and model-based shell and reinforcement planning features.



THE CHALLENGE

Robert Sigrist, Chief Engineer at Synaxis AG in Zurich, lists the major challenges encountered during the Limmat Tower project: "Direct force transmission was impossible in various places due to the façade folding and the projections and recesses. The support forces also needed to be absorbed or diverted at the building recesses. And, in terms of fire protection, in high-rise buildings the fire must be prevented from spreading by the circumferential parapet." With the selected load-bearing concept, the civil engineers tried to meet the conditions listed in the simplest way possible. They moved the columns, which had previously been planned as interior features, to the ceiling edge and only made those columns that were positioned one on top of one another in all floors load-bearing. The remaining columns are not load-bearing and are only required as window rabbets and to support the vertical façade elements. The concrete parapets between the columns were built using reinforced concrete and connected to the columns around the entire circumference. To be able to absorb the support loads in the building recess area, on the floor below individual residential partition walls were made of concrete and designed to be load-bearing so as to guide the load to the load-bearing façade columns.

Connecting the prefabricated concrete columns to the parapets created on site, and in particular structurally connecting the core that had been climbed previously and the ceilings being subsequently connected, were the biggest challenges for Robert Sigrist and Design Engineer Karl Heinz Hamel with respect to the structural requirements and reinforcing them.

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- > **Implement a complex load-bearing concept by making plans**
 - > **Spatially present and deal with sophisticated details**
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THE SOLUTION

One advantage of Allplan Engineering that became clear during the Limmat Tower project was the 3D visualisation feature. It could be used to spatially present and subsequently deal with challenging areas in the reinforcement. And it's fair to say that this project had quite a few of those. So, for example, there was hardly any contact length left for the ceiling due to the shafts for lifts and stairwells that were arranged around the core and due to the recesses for the riser zones. That's why so-called "wall extensions" were arranged on the shafts. These are additional wall panels designed to support the ceiling. Screw reinforcements and end anchors were used in places with a high level of static stress both at the walls and in the ceiling connection area at the core.

The civil engineers working on the ground floor, meanwhile, dealt with a special structural highlight. Above two tracks running in the basement and spanning just under 19 metres wide, the wall panels on top had to be heavily reinforced according to the distribution of forces, just like in a half-timbered construction. Robert Sigrist is extremely enthusiastic about this aspect of the project: "A job like this one is every civil engineer's dream!" Thanks to the model-based development of the formwork and reinforcement plans with the Allplan Engineering software and the possibility of 3D visualisation, the engineering firm Synaxis was able to optimally deal with the sophisticated details in particular in a way that suited the construction site. "With the 3D visualisation feature, the number of error sources

could be reduced compared with 2D," reports Karl Heinz Hamel, a Design Engineer, discussing his experiences, before going on to add another example: "Thanks to 3D visualisation, we can identify when something isn't reinforced. We don't see that as clearly in 2D."

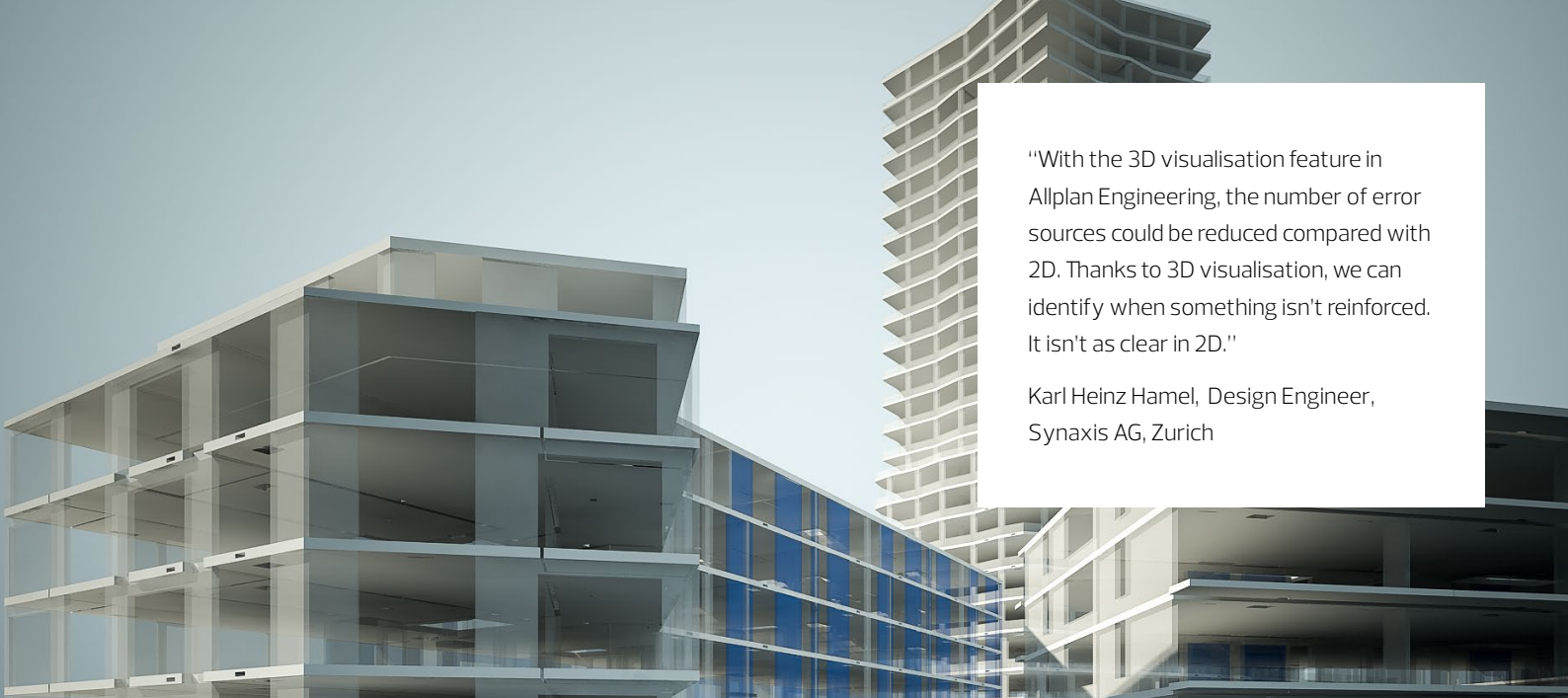
BENEFIT

Thanks to Allplan Engineering and the model-based work method, the Swiss civil engineering firm Synaxis AG significantly reduced the number of error sources during the Limmat Tower project and thus achieved a high level of planning quality in a complex project with an unconventional building geometry.

Particularly sophisticated details were spatially presented using the high-performance 3D visualisation feature in Allplan Engineering, which made the subsequent reinforcement process much easier. This meant that areas that were not reinforced could be identified quickly and that reinforcement gaps could be closed at an early stage.

> **Reduction in error sources due to model-based work method**

> **3D visualisation for spatial presentation of sophisticated details**



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Karl Heinz Hamel, Design Engineer,
Synaxis AG, Zurich

ABOUT THE CUSTOMER

Synaxis AG is a modern civil engineering firm that employs around 70 members of staff and that has operated successfully in Switzerland and abroad for more than 80 years. Synaxis plans and implements ambitious projects in the fields of structural engineering, bridge construction, infrastructure construction, underground engineering, building preservation, foundation engineering, geotechnical engineering or natural hazards.

The company wants to be the first choice in its core areas. With its well-coordinated services and qualified employees, Synaxis is capable of planning and implementing both small and large projects to a high quality level.

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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