

Zaha Hadid Tower in the CityLife district, Milan (Italy), Redesco Progetti S.r.l.

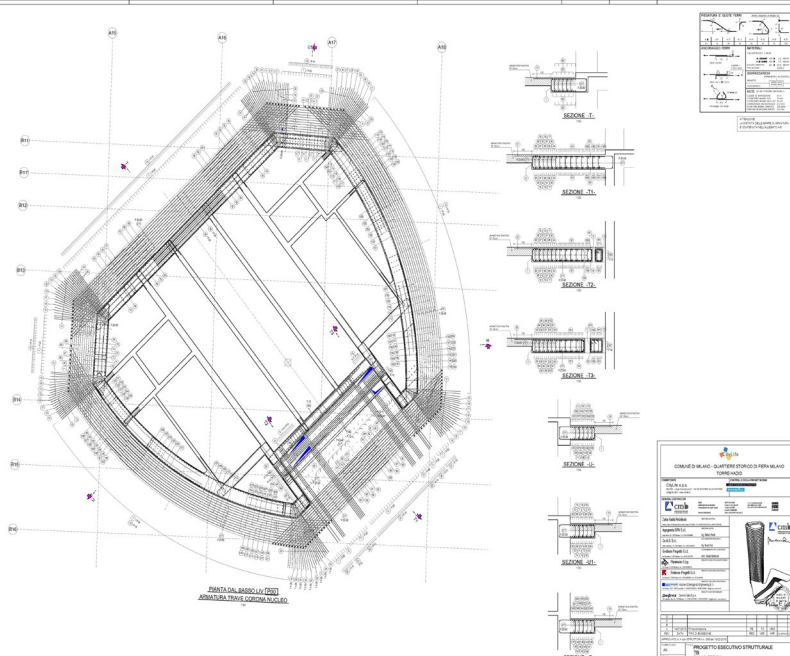
Allplan in practice

THE SKYSCRAPER THAT TWISTS INTO THE SKY

A couple of figures about the Zaha Hadid tower illustrates the structure's significance. The tower rises 170.36 meters above the level of the square. In total, there are 44 floors and 3 subfloors. The total area of the building is about 70,000 m²

Due to the different orientation of the subsequent floors, the building's geometry depicts a rotational movement along the vertical axis. The structure mainly consists of concrete with some steel-concrete composite elements. The central core ensures the necessary building resistance to horizontal impacts. The inclination of the piers causes a torsion, which leads to considerable tension in the walls of the core. In order to counteract this, metal frames were connected with re-tensioning rails at the main openings. The tensions were dissipated downwards through GEWI piles and inclined girders. The slabs

are made of reinforced concrete that are cast on site, while the outer piers consist of reinforced concrete elements with a high level of reinforcement. The foundation is composed of a 2.5 meter thick concrete slab and 64 columns each 36 meters in length with a diameter of 1.5 meters. The base of the building consists of a freeform slab with a steel structure, which offers room for commercial space. The new skyscraper designed by Zaha Hadid will stand side by side with the Allianz Tower by Arata Isozaki and will enrich the Milan skyline. This fascinating tower has a central vertical core (with stairs,

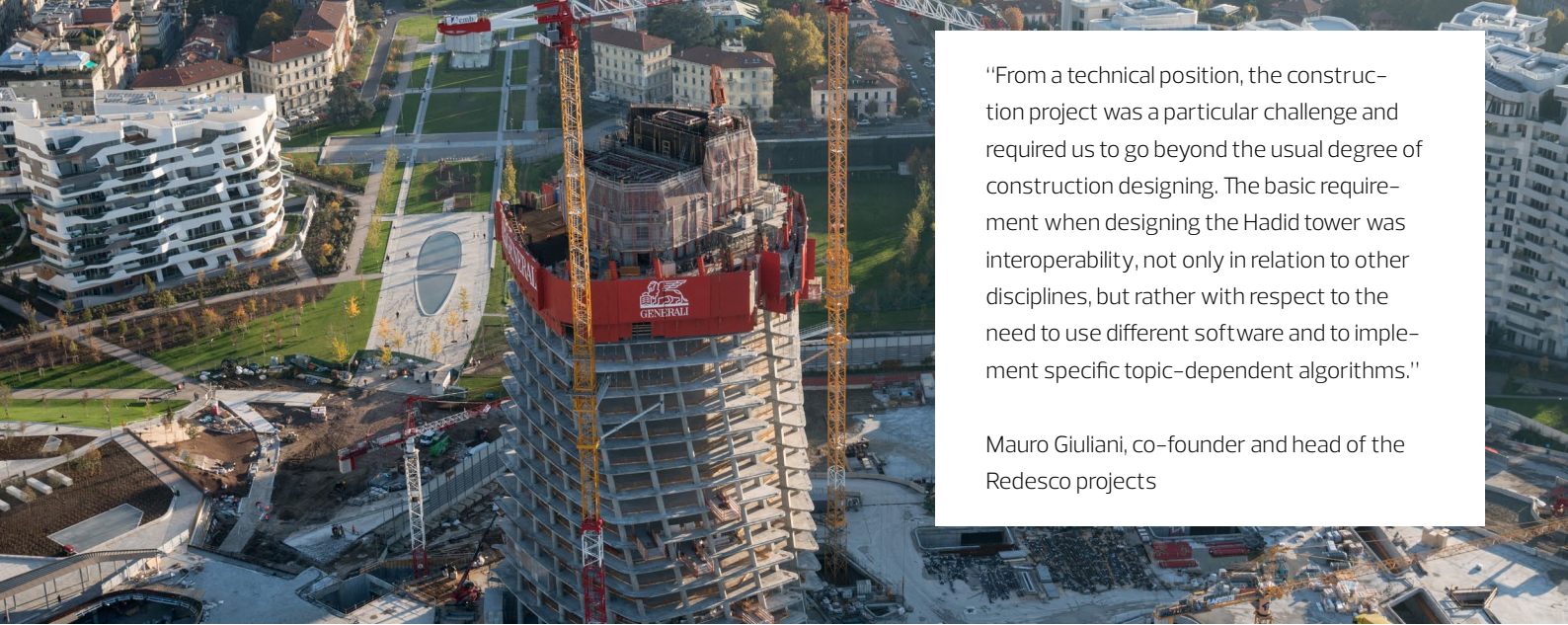


elevators and technical rooms), which not only supports the intermediate floors and must withstand horizontal impacts, but also has to compensate for the torsion transmitted by the oblique enclosing piers. This central structure will be shaped by special formwork, which progresses in an automated way. The piers, on the other hand, have a spatial inclination, which gradually decreases while going upward. The client's (CityLife) and general contractor's (CMB) ambitious target consisted of constructing the entire reinforced steel structure within 14 months and completing the tower, (including all the finishing and electrical work) within 26 months. For this purpose, it was necessary to develop a construction and execution plan that simultaneously records, parameterizes and as far as possible, simplifies all variables of the construction work, in repetitive diagrams. For example, there were the challenges in planning the oblique enclosing piers as in, designing the formwork and in defining the reinforcement, since the inclination makes the piers unique elements. In this case, the three-dimensional Allplan model made it easy to solve this task. The implementation of the construction project benefited from the Allplan functions. Thanks to the Allplan functions, it was possible to develop a complete reinforcement design with an automatic removal of the individual reinforcement bars and to produce tailor-made parametric components (SmartParts). In addition to reducing the production

time for the components, thanks to Allplan it was possible to discover and rectify any discrepancies, collisions and other problems before the construction work started. In practice, the 3D model in Allplan Engineering was used to precisely reproduce the reinforcement of the elements and all "critical" components in the structure. Thanks to this type of construction design, the unknowns were reduced and the processes on the construction site could be optimized so that the ambitious target (building one floor per week) could be achieved.

BRIEF INFORMATION ABOUT THE CONSTRUCTION PROJECT

- > **Key concept:** Building construction technology
- > **Software used:** Allplan Engineering
- > **Participants in the construction project:**
- > **Structural design:** Zaha Hadid Architects – London
- > **Client:** CMB S.c.a.r.l. – Carpi – Italy
- > **General contractor:** CityLife S.p.a.
- > **Start of the construction work:** 2014
- > **End of the construction work:** 2016
- > **Usable floor area:** 70,000 m²
- > **Building costs:** EUR 30,000,000.00
- > **Services provided by Redesco:**
Construction planning – from the design to execution planning, value engineering



"From a technical position, the construction project was a particular challenge and required us to go beyond the usual degree of construction designing. The basic requirement when designing the Hadid tower was interoperability, not only in relation to other disciplines, but rather with respect to the need to use different software and to implement specific topic-dependent algorithms."

Mauro Giuliani, co-founder and head of the Redesco projects

THE CUSTOMER

Redesco (Research-Design-Consulting) is a company who specialize in building construction. "We work both for investors as well as for construction companies, because we like to accompany projects from the first diagrams until realization: We optimize our competencies both in creative thinking as

well as in implementation. We believe that research, theory and creativity must be accompanied by practical experience." Building, tower, infrastructure, bridge and footpath construction, special structures, construction methods and research form the focus of Redesco's work.

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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