

The project building - the CUBE: Objectives and use concept



As a 'lighthouse' and beacon, the CUBE project will present the results of the whole C³ project visibly and effectively as good publicity in the form of a usable carbon reinforced building near the Fritz-Förster-Platz in Dresden. The building has a planned gross floor area of approx. 220 m², it will be an experimental building and at the same time it will also be a test rig. It will significantly serve the research of the long-term suitability of carbon reinforced concrete from a construction, structural and building physics point of view. The running and life cycle costs will also be evaluated. Equally, it serves as a representative site for carbon reinforced concrete construction and contains areas for exhibition objects, furniture and presentations to an audience.

The CUBE is essentially made up of two parts: TWIST and BOX. The TWIST elements are two shells arranged symmetrically opposite each other, which each twist out of the wall into a roof and thus at the same time form the side and top room enclosure. The BOX is the main part of the test rig and provides the opportunity for exchange and long-term monitoring of structural members such as façade panels, wall elements and multifunctional carbon reinforced concrete elements, outdoors and indoors, in order to be able to continuously test and present the latest state-of-the-art. In line with the timetable, the design was completed by August 2019 and the application for a building permit was submitted.

At the same time, under the overall construction supervision of Matthias Tietze, the structural member development took place, including various technology tests on the production and jointing of the elements. The project-related approval (ZiE) for the BOX and the TWIST has already been obtained. By January the structural design and the construction structural calculations had been carried out by the checking engineer. The civil engineering work has already been completed. Now the contract for the executing company will be awarded (probably end of July 2020). The precast concrete elements for the BOX will be produced at the end of August 2020, so that the shell can be erected by the end of 2020. The two-stage TWIST roof structure will then be realized with a slight time delay: the first TWIST shell will be produced at the end of November 2020 and the second at the end of February 2021. According to current planning, this is due to be followed by further work such as glazing, the interior fitout and finishes, the technical fitout such as building services including the external works with the end of construction in June 2021.

Location of the building: Einsteinstraße 12/Zellescher Weg 1, 01069 Dresden

The CUBE and its objectives]

The first building worldwide made of of carbon reinforced concrete will be built at the end of 2019/start of 2020 in Dresden. With the CUBE project, the intention is for the new type of carbon reinforced concrete construction to be presented to the public impressively and should have a major symbolic effect. The so-called 'results building' is intended to present impressively the numerous advantages and potential of carbon reinforced concrete and all the results achieved to date in the C³ project:

- high efficiency
- lightweight due to slender and freely formable structural members

- long durability due long-lasting, high-quality surfaces
- potential for multifunctionality
- sustainability through resource savings

The building is intended to show how various construction tasks can be solved by the C³ construction method ? in addition to freely shaped structural members (up to one third maximum), the aim is also to demonstrate the suitability of the construction method for mass implementation (mainly straight areas, with modular structuring capability).

The main objectives of the project include:

- Presentation and run through the entire process chain ? from the planning and design, approval, estimating, contract award through to supervision, erection and operation
- Demonstration of the everyday practicability and suitability for mass-implementation of the material
- Demonstration and evaluation of the long-lasting suitability of carbon reinforced concrete as a construction material, enclosure of space and material for building fitout items
- Merging the results of the individual C³ projects

Use concept]

The spaces and areas created will be used on the one hand as workplaces for scientists and researchers. In addition, laboratories are to be created, which continuously inform about the latest findings concerning the innovative construction method and are intended to illustrate these by means of examples, for example, function-integrated prototypes for energy production, heatable structural members with carbon fabric, structural members with integrated lighting and embedded photovoltaics and building envelopes with autonomous shading system. On the other hand, open spaces both indoors and outdoors are to be used for exhibitions, private art previews and numerous other event formats, so that not only the scientific personnel but also the broad public can experience directly the building and the C³ construction method.

Indoor use concept:]

Presentation room (approx. 112 m²): for approx. 20 persons, accessible, access for delivery, around 45 m² for 5 workplaces, meeting room, kitchenette

Ancillary rooms (approx. 25 m²): WC rooms for men and women and a toilet for the disabled (approx. 15 m²), service connection room, building services plant room (approx. 10 m²)

Test laboratories (approx. 36 m²): three rooms each with 12 m² with interchangeable test areas, use for building physics measurements

Other key data:

- Total use area: approx. 173 m²
- Circulation area: approx. 17 m²
- Construction area: approx. 10 m²
- Gross floor area: approx. 200 m²

Outdoor use concept:]

Parking spaces (approx. 60 m²): 2 car parking spaces, at least 4 covered bicycle parking spaces, bin area

Outdoor furniture: e.g. seating for 10 to 20 persons made of carbon reinforced concrete with the option of holding small information events

Areas for demonstration objects: e.g. the works made of textile reinforced concrete of the artist Hans-Volker Mixsa and segments of a textile reinforced concrete bridge

Paths (up to approx. 180 m²): Access paths and roads to the building, site and car parks (up to approx. 120 m²) and paths to the outdoor furniture (up to approx. 60 m²)