



## The Construction of a New Icon in Düsseldorf

Ingo Müllers, Ralf Tesch, Michael Stahl, Guido Hulbert

Schüssler-Plan, Düsseldorf, Germany

Contact: [imuellers@schuessler-plan.de](mailto:imuellers@schuessler-plan.de)

### Abstract

In the city centre of Düsseldorf, Germany, a new shopping destination with an extraordinary design and an impressive structure is currently realized. The site delivers all possible boundary conditions a structural engineer needs for sleepless nights. The project will be located between a listed high-rise building, the popular listed theatre of Düsseldorf, a road tunnel and a metro station. The main building consists of 5 floors above ground and up to 5 floors below ground. The load bearing structure will be made of reinforced concrete. As a consequence of the different usages the column grid is quite irregular with spans up to 15 m. Significant challenges are double curved, inclined walls and a bracing system on the existing road tunnel to carry a column force of 15 MN. In order to minimize construction time, the structural engineers proposed the dig-and-cast construction method in which the building is growing up and down simultaneously.

**Keywords:** Dig-and-cast, water pressure, reinforced concrete, diaphragm wall, listed neighbourhood, double curved walls.

### 1 Introduction

Every vivid city is getting new icons from time to time. This statement applies also for Düsseldorf, one of the cultural and economic centres in the western part of Germany. In the city centre of Düsseldorf a joint-venture of the real estate developers Centrum group / B&L group realizes together with ingenhoven architects and the engineering company Schüssler-Plan a new shopping centre with an extraordinary design and an impressive structure. Even the site delivers all possible boundary conditions a structural engineer needs for sleepless nights. The shopping centre will be located between a listed high-rise building, the popular listed theatre of Düsseldorf, a road tunnel and a metro station. Furthermore, the structure has to resist to a ground water pressure up to 140 kN/m<sup>2</sup>.

This article starts with the description of the environment (Section 2) and the building itself (Section 3). Section 4 is focused on the dig-and-cast construction method. This generally expensive construction method was chosen because of its shorter construction time. Section 5 describes the structural analysis of the building and its construction pit. Furthermore, Section 6 completes the article by showing some of the chosen details.

### 2 The environment

The project's spot is located in the commercial centre of Düsseldorf. Directly situated at the Schadowstraße one of the most frequented shopping streets of Germany, it is an ideal place to build a new iconic structure for retail and office use. The architectural challenge was enormous, but the challenge for the structural engineers is also not to be sneezed at.