

## Technum-Tractebel Engineering

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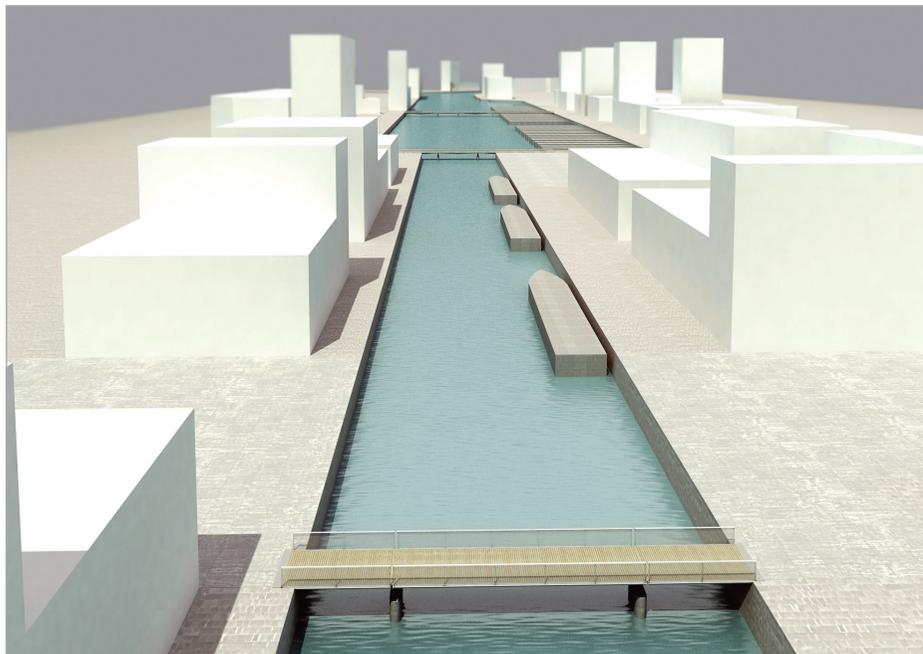


Technum-Tractebel Engineering is a multi-disciplinary engineering and consultancy provider with international ambitions.

Our services include project management, studies, design and consultancy in: buildings, port & hydraulic engineering, transport infrastructure & urban development and strategic consultancy & analysis.

The combination of our strong position in Flanders and GDF SUEZ through our mother company, Tractebel Engineering provides international players with extraordinary support.

Efficiency and innovation are the keywords in our offer focused on providing you with a sustainable solution to your project.



Software: Scia Engineer

## Bridges 'Oude dokken' - Ghent, Belgium

This site used to be the harbour of Ghent. Over time the activities of the harbour moved north and the industrial site was left without much life.

This project ground will become the new home for many 'Gentenaars'. But also due to the good (public) mobility and access points there will be new offices, places for recreation, culture and parks.

All functions for a new city part of Ghent.

### Project description

The old docks separate the site into two areas, west and east. Three bridges, reserved for pedestrians and bicycles, connect the quays of the channel and form the link between the two parts. The bridges seem, as horizontal pontoons, even breakwaters of the docks.

The main question was how to make of these bridges 'landmarks' in this new developed site.

The constraints in terms of slopes for disabled persons and vertical clearance for waterway traffic brought the solution for a movable bridge.

The movement of the bridges is a symbolic reference to the dynamic urban evolution of the site. Using long slopes makes it possible to have access to the bridge at all times.

The slope starts at quay level and will only rise for waterway traffic. The slope depends on the passing ship: the bridge only rises as high as needed for passage.

### Design approach

All three bridges have the same approach, even with their difference in length. The longer bridges are 110 m long and have a width of 6 m.

The long bridges consist of two bridge parts, a moveable and a fixed part, while the shorter bridge only consists of the moveable part.

The first part exists of three bridge decks. The smaller middle part is the table that lifts to let waterway traffic pass. Both larger adjacent decks are connected to the table with hinges and roll on a set of wheels on the quay wall and on the fixed part of the bridge.

The second bridge part also consists of three bridge parts, equal in size and shape, but all fixed together.

The structure of the bridge is formed by a steel caisson variable in height, with the highest section in the middle of the span. This head caisson lays perpendicular to the supports of the bridge. Viewed sideways, it forms a triangle. Together with smaller transverse beams, also variable in height, and longitudinal beams with continuous section, they form the framework on which lays the wooden bridge deck.

The lifting table has vertical supports at both ends of the central girder. The deck is fixed on top of these two piles, which contain the electro mechanic jacks.

The piles under the lifting table each roll between two sets of wheels which take on the horizontal forces, so the jack only takes on a vertical force.

The vertical supports of the fixed bridge part are also on the central girder. These piles are fixed in the ground unlike the piles of the lifting table which have a housing of larger circular tubes.

A system of rails and sliding plates guarantees a safe passage for pedestrians and bicycles.

### Design with Scia Engineer

The design of the bridge was split into two models: one where the bridge is open and one where the bridge is closed for waterway traffic. Other Scia Engineer models were used to calculate ground parameters and details.

Scia Engineer made it possible to insert the project as how it would be in reality, with variable sections, all fixed details and with the existing ground parameters. Internal forces and reactions obtained from Scia Engineer were used to calculate the connections (steel connections and electromechanical parts).

In this project the deformation, the forces on details, temperature differences and a dynamic design were the most essential determining factors.

With this calculation the demands of the architect could be met, respecting all determining factors to keep the design of the structure as thin and elegant as possible.

# Bridges 'Oude Dokken'

Ghent, Belgium

## Project information

Owner	Waterwegen en Zeekanaal NV
Architect	Feichtinger Architectes
General Contractor	Herbosch Kiere
Engineering Office	Technum-Tractebel Engineering
Construction Period	From March 2010 to ...
Location	Ghent, Belgium



## Short project description

*The project is about three new moveable pedestrian and bicycle bridges across the 'Oude Dokken' in the old harbour of Ghent. The bridges are part of a larger project which combines living, shopping, schools and parks in this old industrial site.*

*The bridges are moveable but remain accessible during the movement. This was made possible by the use of very long slopes. The bridges are wide, but are only supported by central columns.*

*Scia Engineer was used for the calculation and dimensioning of the steelwork.*

