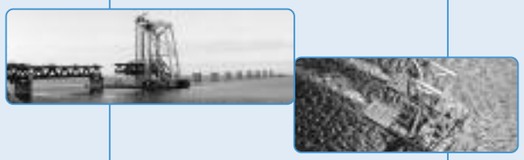
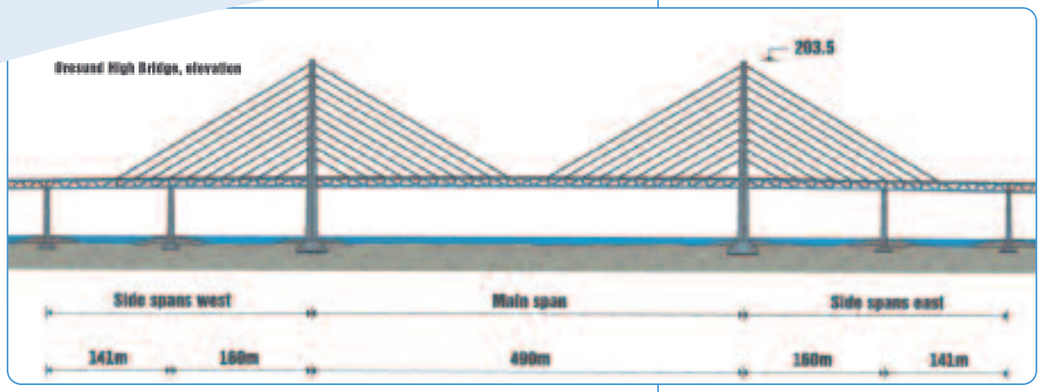
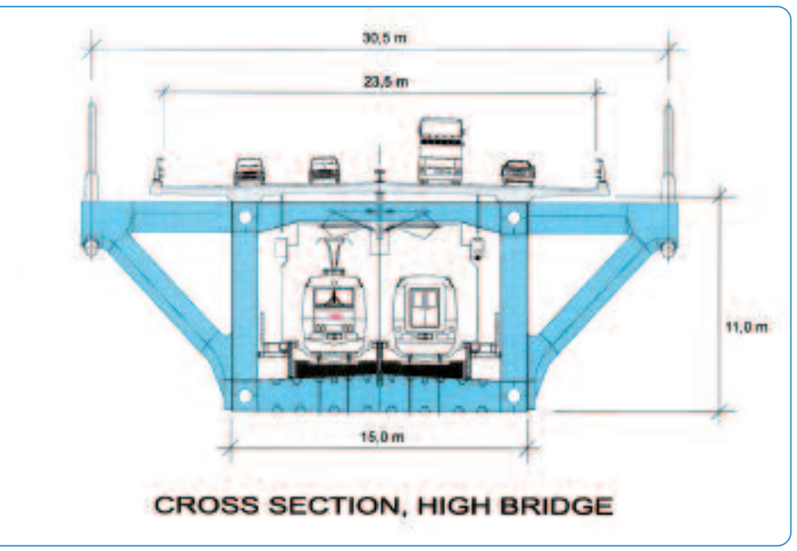


SWEDEN

The Öresund Bridge





CROSS SECTION, HIGH BRIDGE

Project data

Client: Öresundkonsortiet A/S

Contractor: Sundlink Contractors
HOCHTIEF Construction
share: 26 percent

Contract value: EUR 877.9 million

Scope of work: Design & Build Contract,
fully functional structure

Key quantities: Structural steel 82,000 t
Cable steel 2,300 t
Reinforcement steel 60,000 t
Concrete volume 320, 000 m

Period of performance: 11/1995–3/2000
completion 4 months ahead of schedule

The idea of creating a permanent connection between Denmark and Sweden was first put forward in 1872. But it was not until 1991 that the Danish and Swedish governments signed an agreement to build a 16 km fixed link across the Öresund, the Sound between the two countries. Work on this link, which consist of a tunnel, a bridge and an artificial island, began four years later.

The 7.8 km bridge was built by an international joint venture in which HOCHTIEF Construction AG was the second-biggest partner, with a 26 percent stake.

The link, which was officially inaugurated on July 1, 2000, shortens the journey between Malmö in Sweden and Copenhagen in Denmark to just 20 minutes.

It not only connects two nations but brings the whole of Europe closer together, making it possible to travel on land from the tip of Italy to the North Cape.

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HOCHTIEF
CONSTRUCTION AG

High over the **Baltic Sea**

The link is geared to both road and rail traffic, so the Öresund Bridge is a two-level structure, with the top deck carrying a 23.5 m wide four-lane highway and the lower deck a twin-track railroad.

The bridge, total length 7,845 m, consists of three elements: a steel cable-stayed bridge, the longest for heavy railroad traffic at that time, over the Flint Channel, and two approach bridges. The Eastern Approach Bridge is 3,739 m and rests on 27 piers. The central element, the High Bridge, is 1,092 m in length. The Western Approach Bridge, which is supported by 21 piers, is 3,014 m long. The 490 m main span of the High Bridge has a clearance of 57 m over the main Malmö fairway, permitting unhindered shipping from the North Sea to the Baltic. The dimensions involved are superlative—the pylons, for instance, with a height of 203.5 m, are the tallest structures in Sweden.

Not least because of its experience in building the Eastern Bridge over the Great Belt, HOCHTIEF Construction was in charge of the Engineering Office. It was also responsible for the offshore work and supervised the production in Cadiz of the girders for the approach bridges.

On firm **foundations**

Nearly all the bridge elements were prefabricated on land and then floated out for placement.

This called for precision just-in-time delivery, often in the face of gale-force winds, and careful planning, since the girders for the approach bridges were produced in Spain and brought to Malmö by sea, with a cycle time of three weeks for two girders, while the eight girders for the superstructure of the High Bridge were prefabricated in a Swedish shipyard.

The bridge is designed to last at least a hundred years. Trains can reach a velocity of 200 km/h whereas vehicles are limited to 120 km/h. So everything is on a gigantic scale. The pylon caissons, for example—precast in dry dock in Malmö—each weigh 20,000 t and had to be brought into place by means of a specially built catamaran. All other placing works required the use of the world's biggest pontoon crane, "Svanen", ("The Swan"), owned by HOCHTIEF's Dutch associated company, Ballast Nedam. On August 14, 1999, this put the final bridge section into place.

Substructure

Prefabricated and submerged caissons for piers and pylons, founded on limestone at down to –19 m; prefabricated pillar shafts, weighing upto 4900 tons

Superstructure

Two-level composite structure with steel trusses and a concrete top deck. The lower rail deck consists of U-shaped concrete troughs in the approach bridge sections and a steel box-gider in the highbridge section.

Elements, with mainly regular spans of 140 m, had been prefabricated including the conccrete deck and lifted into the final position, weighing up to 6800 tons.

Elements, had been welded together to get a multi-span-girder and the concrete top deck had been prestressed in transversal direction in order to get a slender slab and to save weight.