THE LAY OF THE LAND CHANGES

IN NORTHERN EUROPE

Rescon Mapei products played their part in the Oresund Connection. The huge structure consisting of 16 km of tunnels, bridges and an artificial island, opened on July 1 2000, linking Sweden and Denmark - also Rescon Mapei products were used.

The Oresund Connection, which links Copenhagen in Denmark and Malmo in Sweden, consists of sixteen kilometres of tunnels, suspended bridge spans and an artificial island. The decision to build the Connection was taken in 1991, work began in 1995, and it was officially opened on July 1 2000, having cost around 7,000 billion lire. It is the 10th longest construction of its kind in the world and consists of an artificial Danish peninsula (430 metres), an undersea tunnel (5,510 metres), an artificial island (4,055 metres), and a bridge (7,845 metres).

The Oresund Connection also includes a double-track railway and a four-lane motorway. It may be crossed on foot, by bike, car, or train. It is estimated that in its first year, the Connection will be used by an average of 12,000 cars each day. Each car will pay a fee of around Lit. 60,000 while buses will pay 250,000. The bridge should pay for itself within 27 years. "The most difficult thing was to comply with the very strict environmental impact restrictions that the Swedish and Danish governments imposed on us, especially where the construction of the artificial island was concerned," says Jacob Vestergaard, the man who led the building of the bridge. "We had to guarantee that the flow of water between

Photo Olympia

July 1 2000: the opening of the Oresund Connection. Prince Frederick of Denmark and Princess Victoria of Sweden meet at the halfway point on the bridge which links their two countries.

Photo Olympia

A view of the 7.8 km Oresund bridge which links Sweden and Denmark. It opened to traffic on July 1 2000.

Below, the underground stretch of the new tunnel.

the Baltic and the North Sea would not be affected and so we had to dig out the same volume of earth as we put in for the various foundations." The opening of the Oresund Connection has made Europe a bigger place. Like Britain on the advent of the Channel Tunnel a few years ago, Scandinavia now finds itself much less isolated. And with the building of a bridge across the Strait of Messina, it is now possible to drive all the way from Trapani to the North Cape overland. Or drive from London to Moscow, via Paris, Frankfort, Warsaw and Moscow.

A larger Europe also changes the geopolitical centre of gravity of the continent, with Germany, point of convergence of the East-West and South-North axes, taking pride of place once again.

Rescon Mapei's contribution to the construction of the Oresund Connection began in 1995 when it began developing epoxy materials suitable for the bridge on behalf of Dab Domifle AB, a Swedish company specialising the manufacture of different types of asphalt and the main asphalting contractor for the bridge. Naturally enough, the epoxy-based membrane had to meet the Swedish standards. And the Rescon Mapei solutions were actually sent by Dab Domiflex AB to the Swedish Road Authorities Laboratories (VTI) for evaluation. The material was given the following names: Beta R Epoxy, Beta R Epoxy Tix, Beta Primer for steel, and Beta Primer for cement.

Research and development on the cementitious primer began in 1997 in collaboration with the Swedish laboratories. And since the Swedish standards for this material are based principally on German and Danish regulations and standards, over 100

solutions were tried over six months in the Rescon Mapei laboratories. In the end, 10 were sent to the VTI for testing. In March 1999, the product passed the final test and production began. In the space of just a couple of months, 80 tons of Beta Primer for cement were sent to DAB in a 1,000 containers, all for use on the Oresund Bridge.

The epoxy material was applied using a special treatment. Two layers of around 0.7 kg/m² per layer were applied with dry sand quartz sprayed over each layer.

The Oresund Connection consists of a long bridge and a tunnel. The tunnel is made up of 20 178-metre long prefabricated sections. Each prefabricated section in turn consists of eight elements, each 22 metres long, 8.5 metres high, and 42 metres wide During the project, these huge elements had to be moved along a series of 400 metre slips.

To reduce friction, a steel plate was initially bond to each skid. This system did not work as well as it should have and Rescon Mapei was contacted to trouble-shoot the problem.

The solution it came up with was to remove the steel plates from the skids which were then treated with Epoxy LL primer sprayed with quartz sand to improve adhesion to the next layer. A layer of Rescon Epoxy L (3 kg per m²) was applied over the primer. This layer was levelled as required and the cement structures slid over the epoxy product. When the prefabrication work was finished, the skids were checked and there wasn't even the tiniest hint of abrasion on the epoxy surface. A French company involved in the work, GTM, even went on to use the Rescon Mapei solution on two other occasions: in building Disneyland in Paris and for a bridge in Great Britain.

Other Mapei products were also used in the building of parts of the imposing Connection. They were selected, years before the Rescon take-over, in what was considered to be a dry run for the Oresund Connection: the building of two three-lane each way bridges in the Store Baelt Channel which opened in 1998. These were the West Bridge which covers the tract between the Danish peninsula and the small island of Sprogo, and the East Bridge, which, at 1,624 metres, is the second longest bridge in the world suspended between two concrete piers and links the island of Sprogo with the island of Zeeland. The products used were Mapefill and Mapelastic.