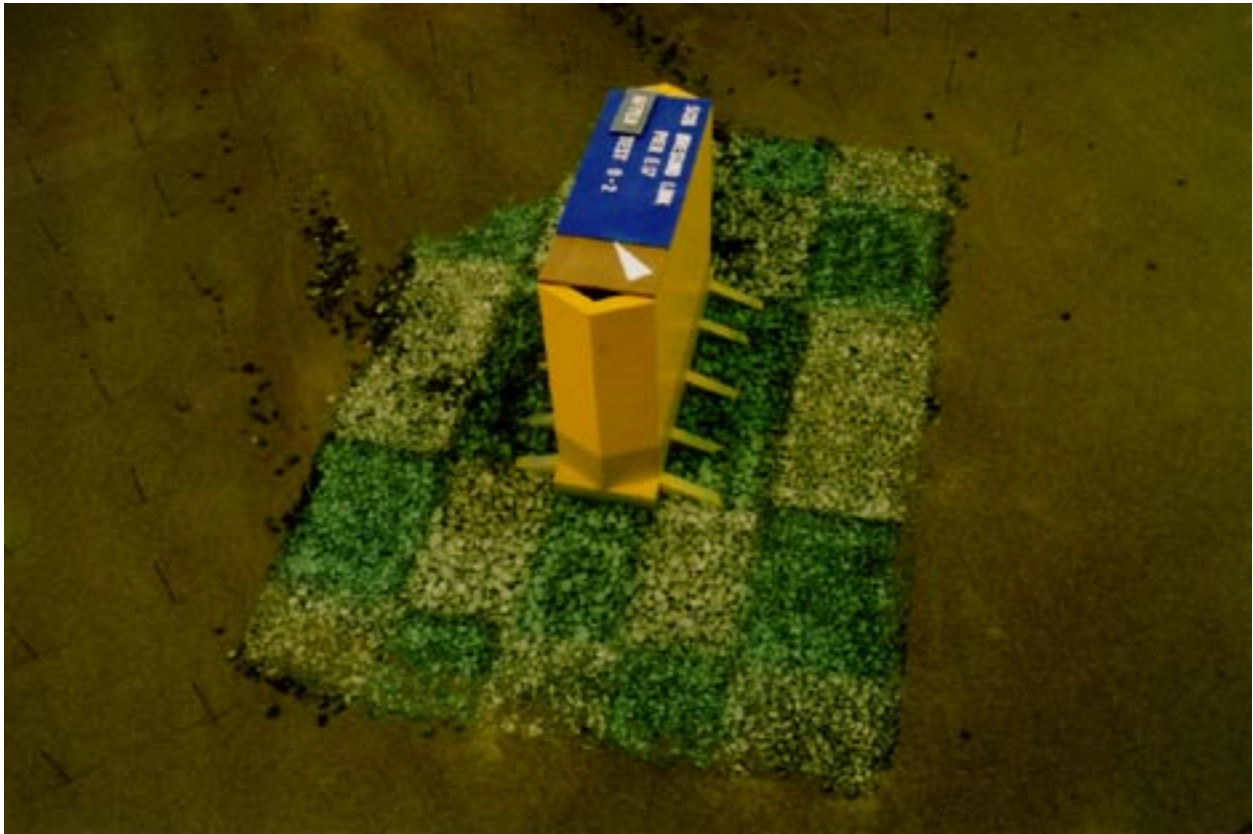


Design of Scour Protection around Bridge Piers. The Øresund Link, Denmark-Sweden



Picture showing the damage pattern in the physical model after a 10,000 year event (Courtesy of DHI).

As a part of the major Øresund Link project between Denmark and Sweden, the Company was responsible for the Contractor's design of an appropriate scour protection for the approach bridge piers. The physical model tests required for the design were carried out by the Danish Hydraulic Institute (DHI).

The hydraulic conditions in the narrow sound between Denmark and Sweden are dominated by large current velocities in the north-south direction. However, these conditions vary considerably along the bridge alignment and it was found feasible to apply a differentiated design. The 45 piers were divided into three groups according to the wave/current impact expected on the basis of numerical calculations of the shear stress at the sea bed.

For each pier group the most exposed pier was tested in the physical model for extreme combinations of critical waves and current. Special tests were made for piers where the seabed consisted of a shallow layer of erodible material on the top of firm limestone.

The final design of the scour protection is based on the results of the physical model tests and evaluation of the actual soil conditions at each pier, and is adjusted to meet the Contractor's requirements.

The project tasks included specifications for the physical model tests, evaluation and modification of design conditions, design construction requirements, definition and supervision of the physical model tests, review of results and report from DHI, evaluation of the geotechnical conditions, and final design of scour protection.

In connection with the above mentioned project for the permanent structures, the scour protection for two large construction towers founded on sunk barges and caissons was reviewed. The towers were used for installation of the cable stayed main spans.

Project period: 1996 - 98

Client: Sundlink Contractors HB

Financing: The Client