

## Lifting and lowering of two 20,000 t caissons



▲ Caisson hanging on lifting strands between two barges being towed out of fabrication dock.

In April 1997, VSL (Switzerland) Ltd. has successfully carried out a contract for lifting and lowering 2 concrete caissons, which set a world record in weight handled by means of a hydraulic strand lifting system.

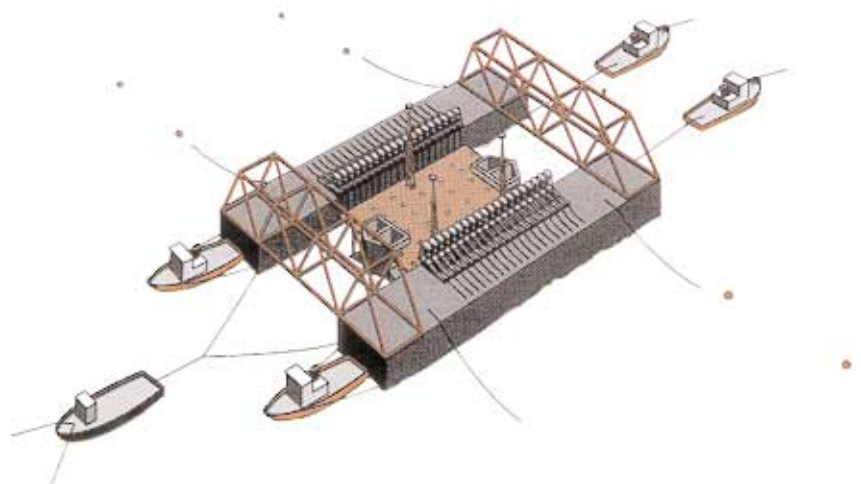
The 2 caissons form the foundations of the main pylons of the new Øresund bridge between Copenhagen and Malmö. Each caisson having plan dimensions of 35 m by 37 m, is 22.5-m high and has a dry weight of 20,000 t. The caissons were prefabricated in a dry dock in Malmö and later relocated.

VSL used 40 strand lifting/lowering units type SMU-330 to safely handle the loads. Thanks to sophisticated controls only one person was required to operate the hydraulic system and supervise the movements.

During the tow out, fenders prevented horizontal swing of the caisson, which

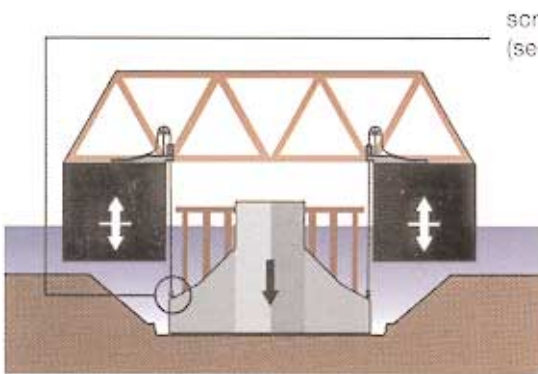
hung free on the lifting cables. Wind and wave conditions could have entailed up to 200,000 load cycles with load fluctuations of up to  $\pm 18\%$  on the strand cables. Therefore, extensive

fatigue calculations were carried out with respect to the barges and the suspension system.





▲ Lowering operation with 20 VSL strand lifting / lowering units SMU-330 on each barge.



▲ Screw-type couplers connected each strand bundle with a stressing head of the vertical VSL caisson post-tensioning cables. Thread size and thread tolerance as well as greasing

were designed to ensure an easy and fast uncoupling operation which had to be carried out by divers in 12 m water depth after each caisson placing.

## Main Participants

### Owner:

Øresund Konsortiet  
( 50% Denmark / 50% Sweden )

### Consulting Engineers:

Cowl Consult AS / VBB Anläggning AB

### Main Contractor:

Sundlink Contractor HB

### Heavy Lifting:

VSL ( Switzerland ) Ltd

Year: 1997

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