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Comfort Criteria for High Speed Trains on the Øresund Bridge

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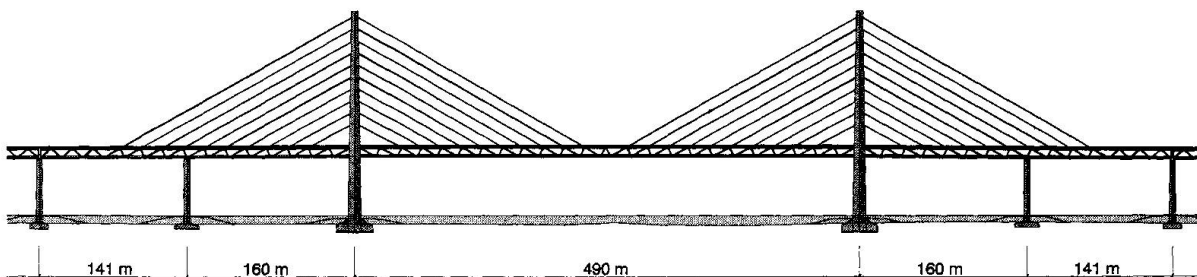
Abstract

The comfort criteria for the Øresund Bridge are based on the ORE reports, which specify rules for limitation of:

- vertical accelerations
- torsional deformations
- deformations at expansion joints

The Danish and Swedish Railway Authorities had furthermore specified that the wheel pressure shall be at least 75% of the static wheel pressure for all train types:

During the pre-tender phase ASO Group carried out a comprehensive study of the effects of these requirements on the design of the two-level bridge.



The 490m main span is the longest cable-stayed span in the world carrying both road and rail

Four types of passenger trains were specified to travel at a design speed of 200 km/hour, they were:



- the Swedish X 2000 train
- the Danish IC 3 train
- the Danish IR 4 train
- the Euro City train

Furthermore a heavy freight train travelling at 120 km/hour was investigated. Due to poor spring characteristics of the wagons in this train it was found that the wheel relief requirement mentioned above could not be fulfilled, when an empty wagon of this train passed an expansion joint. It was finally decided to waive this requirement as being unrealistic.

The analyses aimed at simplifying the requirements for the number of investigations to be carried out by the Contractor's designer in the detailed design. This would be possible if it was demonstrated that some of the trains would always experience smaller accelerations than other trains, or if the requirements for vertical accelerations were more onerous than the requirements for deformations at expansion joints or vice versa. It was, however, found that no such simplification could be made.