On the evaluation of shear critical beams with sequentially linear analysis

Anne van de Graaf, Max Hendriks and Jan Rots

Civil Engineering and Geosciences

Delft University of Technology

Stevinweg 1, 2628 CN Delft, The Netherlands

Contact: A.V.vandeGraaf@TUDelft.nl

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ABSTRACT

Many bridges and viaducts which are part of the main infrastructure in the Netherlands have been built in the 70's of the last century. The state of these aging structures is subject to an increased interest due to the enormous replacement costs involved. However, several studies have shown that due to conservative assumptions during the design these structures often have an additional load-carrying capacity which implies that replacement is not always necessary. Therefore, the Dutch Ministry of Public Works (RWS) has decided to reevaluate as much as 1200 reinforced and prestressed concrete viaducts to assess the load-carrying capacity according to the latest standards. In this way, it may be shown that the load-carrying capacity of many structures is still sufficient despite the higher loads due to increased traffic.

One part of this project concerns the numerical evaluation of four shear critical beams which have been tested experimentally. So far, the numerical evaluation has been carried out with nonlinear finite element analysis based on an incremental-iterative solution procedure. In this presentation results of the numerical simulation of these beams with sequentially linear analysis will be shown.