

Abstract

Structural appraisal of existing box girders

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The Dutch Ministry of Infrastructure and Environment manages several concrete bridges which no longer meet the current requirements. Most of these bridges were built before 1975. As long as the current road and lane layout is maintained, there is no problem with respect to structural safety. When the Dutch Ministry of Infrastructure and Environment wants to change the road geometry on a concrete viaduct, first additional research is needed to ensure that the structural capacity is sufficient.

Commissioned by the Dutch Ministry of Infrastructure and Environment, TNO and TU Delft have carried out a detailed assessment of the shear capacity of an existing box girder bridge. The assessment will be used in the development of a guideline for the structural assessment of existing concrete structures. The assessment of the existing box girder bridge has focused on the shear capacity of the walls and the cross beams on basis of Dutch building codes and a check of the principle tensile stress. The shear capacity of the walls and the cross beams was found to be sufficient, however the connection between the walls and the cross beams is critical since there is no hang-up reinforcement.

The structural capacity of the connection between the walls and cross beams was assessed by 3D finite element analyses in DIANA. Although hang-up reinforcement is missing, the structural capacity of the connection between the walls and cross beams was found to be sufficient. Also the durability requirements with respect to maximum crack width are met.