Shear tests on large T-shaped Prestressed Concrete Beams

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Abstract:

The experimental results of four shear tests on two large T-shaped prestressed concrete beams are presented. These beams have been part of previous experiments at the Stevin II lab at Delft University after which they have remained undamaged. The beams are a 1:2 scale model of the approach bridge of the Van Brienenoord bridge in Rotterdam in the Netherlands. However the reinforcement and prestressing is not an exact scale of the real bridge beams and was designed with requirements of the aforementioned previous experiments.
The beams have a length of 12 m and a depth of 1.3 m. The shear reinforcement consist of stirrups Ø10 at an average distance of 114 mm. The beams are prefabricated in a factory and each beam is pre-tensioned using 24 strands Ø15.7 mm. Empty ducts in the top flange, used in previous experiments for transverse prestressing, are filled with high strength concrete to prevent a premature failure of the compression zone.
The four shear tests consist of a single point load at a distance of 2.1d from the support. The results of the shear tests are compared to NLFEA and design formula.