

Strengthening of rc beams using prestress with anchorages by bonding

Summary

This experimental research focus on the study of a strengthening system, for reinforced concrete beams used in bridges and/or viaducts, using prestress with anchorages by bonding. The proposed strengthening system will allow the reduction of deformations and cracking control, as well as the reduction of bending and shear forces.

The anchorages by bonding have advantages in relation to the traditional strengthening with external prestress anchorages, since in this system the stresses in the anchorage zones will be transmitted to the concrete gradually along the anchorage length. On the other hand, the anchorages by bonding are protected from the environment aggressivity and, consequently, are more durable and require less maintenance than the external ones. The study will be complemented with a theoretical analysis that will evaluate the response of this system on some case studies.

During the research, experimental work will be done in order to analyze and evaluate the behavior of reinforced concrete beams strengthened with external prestress using anchorages by bonding. For this study, different full-scale systems of beams with T cross sections will be tested, where the prestress will be applied with the aid of mechanical devices. Preliminary tests will be carried out to characterize the materials, pull-out tests will be performed to characterize the bonding, as well as long-term tests to analyze the behavior of the anchoring system throughout its useful life.

To analyze and evaluate the behavior of the strengthening solutions, the following tests will be carried out in the anchorages by bonding: monotonic pull-out tests, long-term creep tests, anchor fatigue tests, tests on 4 beams, one of which is a reference and 3 reinforced beams with different layouts of prestressing strands.

Keywords

Structural strengthening, Strengthening with prestress, bridge beams, prestress anchorages, prestress anchorages by bonding.



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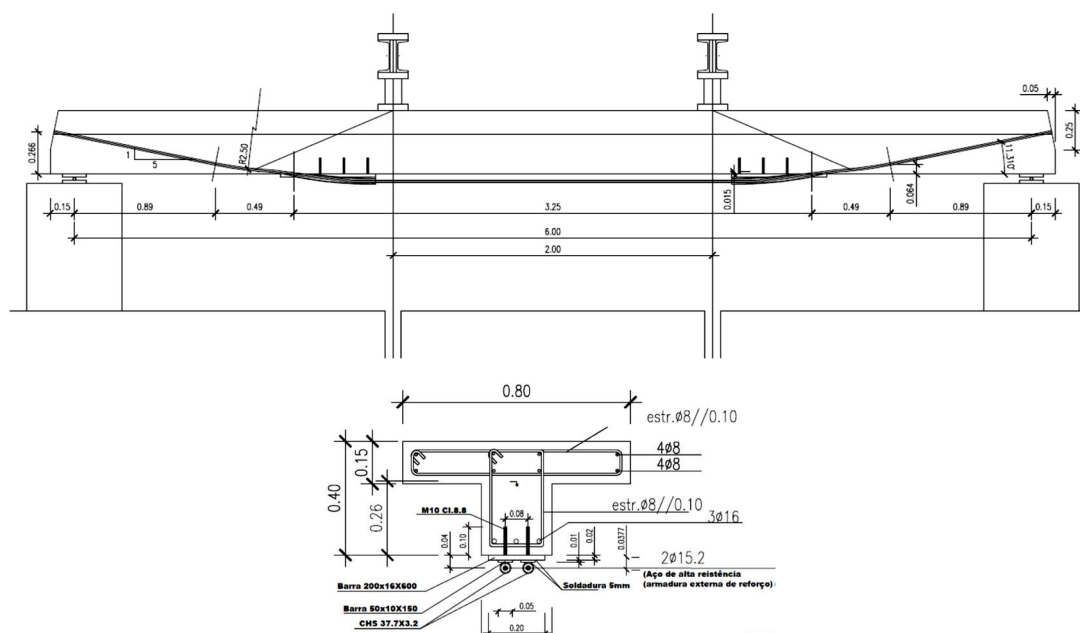
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Funding

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Testing beam strengthened using prestress with anchorages by bonding.