

Flexural Strengthening of Reinforced Concrete Girders using Post-Tensioned Concrete Jackets

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Abstract

This study discusses the flexural behavior of reinforced concrete girders strengthened using posttensioning embedded in concrete jackets. The concept benefits from the external jacket to help increasing the cross-section inertia as well as to host the post-tensioning tendons without the need of external deviators. This results in a significant enhancement to the strength and stiffness of the original girder. The experimental phase of the study was conducted on two stages the first deals with girders loaded on their original section firstly and then strengthened with the jacket and loaded to failure, while the second had the girders that were strengthened before being subjected to loads. In addition to the stage of jacket introduction, the difference between the original girder and the jacket's concrete compressive strength was also studied. In the analytical phase of the study, a numerical model was built using the finite element method to simulate the response of the tested girders in the two experimental stages. This paper presents findings of the experimental program as well as the comparison with the analytical results of the model which showed a close correlation. This model may then be used with confidence to conduct an extensive analytical study for untested parameters

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