

## **RC beams strengthened using SWM SCC concrete jacketing and an external steel plate, Experimental and FE Modelling Study**

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**Abstract:** Strengthening of reinforced concrete (RC) beams with Self-compacting concrete (SCC) jacketing reinforced with galvanized welded steel wire mesh (SWM) has been an important area of study so far. Increasing the mechanical properties of (RC) beams to maintain the required service life and load capacity of any (RC) structure is considered as an interesting area of study. In this paper, a Finite Element (FE) investigation is conducted on a (RC) beam which was previously strengthened experimentally with Self-compacting concrete (SCC) jacketing reinforced with galvanized welded steel wire mesh (SWM). A (FE) model using the commercial program ABAQUS was created to predict the load-deflection behavior and crack/failure pattern of the strengthened beams. Based on both experimental and numerical model achieved results, all jacketed samples showed ductile mode of failure and flexural cracks pattern. The FE model results were in good agreement with the experimental results. It was found that adding an external steel plate will increase the ultimate capacity and stiffness of the jacketed samples, but it will change the mode of failure to brittle shear cracks, the strengthened jacketed samples with an external steel plates restored on average 172 % of the original control beams load capacity.

**Keywords:** RC beams, SCC, SWM, External Steel Plate, Strengthening, FEM, CDP