

THE EFFECT OF STRUCTURAL REPAIR MORTAR ON THE RETROFIT OF REINFORCED CONCRETE COVER

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ABSTRACT

Damage to the concrete cover of reinforced concrete beams caused by aggressive environments, reinforcement corrosion, or repeated loading can reduce the capacity and structural performance, particularly in resisting flexural forces. One repair method that can be applied is the use of structural repair mortar as a retrofit material to restore the strength of degraded structural elements. This study aims to analyze the effect of using structural repair mortar on reinforced concrete beams with U-shaped removal of the concrete cover on the flexural capacity of the beams. The test specimens consisted of reinforced concrete beams measuring 140 cm × 15 cm × 20 cm, concrete cylinders measuring 15 cm × 30 cm, and concrete cubes measuring 15 cm × 15 cm × 15 cm, with a designed concrete compressive strength of $f'_c = 25$ MPa. The research method was experimental, involving flexural testing of reinforced concrete beams. After casting, the concrete cover in the tensile region of the beams was removed in a U-shaped cross-section according to the planned variation. The beams were then cured for 28 days to achieve the designed concrete strength. After the concrete reached the age of 28 days, the retrofit process was carried out using Mapefill GP structural repair mortar on the removed sections. The retrofitted beams were subsequently cured for another 28 days to allow the repair material to achieve its optimum strength and develop good bonding with the existing concrete. After the curing period, flexural testing was conducted to determine the maximum load capacity, deflection, and crack patterns of the reinforced concrete beams after retrofit using Mapefill GP.

Keywords: retrofit, structural repair mortar, U-shaped concrete cover removal, flexural capacity, reinforced concrete beam, 56-day age.