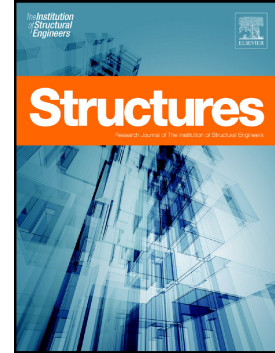


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Improvement of Flexural Strength of Precast Concrete Spliced Girder Using Reactive Powder Concrete in Splice Region

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ABSTRACT

This paper presents an experimental study of improvement of flexural strength of precast concrete spliced girders using reactive powder concrete (RPC) in splice region. Experimental work has been carried out on testing of eight full scale rectangular reinforced concrete girders divided into two groups, four of them were simply supported and the other four were continuous supported. Two of these girders (one of each group) were cast as one unit without splice region as a monolithic while the other were cast of three segments for each of them and then connected in the splice region by using hooked dowels and cast-in-place splice region. All the spliced and non-spliced girders has total length of (2800 mm) and have rectangular section of (150 mm width, 230 mm height). The parameters studied in this experimental work were the concrete types of the splice region (normal concrete, RPC with 1% of steel fiber ratio, and 2% of steel fiber ratio), supports type and comparing with normal concrete non-spliced girders. Experimental tests had been carried out to investigate the behavior of each girder like first cracking load, crack width, failure load, maximum deflection and failure modes. The test results showed that the value of ultimate load capacity of the girder with normal concrete splice region is less than the value of non-spliced girder for all cases that have been tested. Furthermore, the obtained results indicated a significant increase in stiffness and ultimate load of the spliced girders due to the effect of using RPC in the spliced regions resulting in a clear improvement in the overall performance of these girders. Also, the increase of steel fiber ratio from 1% to 2% in case of RPC splice was efficient in minimizing crack width and meanwhile reducing the possibility of corrosion of steel reinforcement.

Key words: Spliced girders, Reactive powder concrete RPC, Precast concrete

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