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The impact resistance and mechanical properties of self-compacting concrete reinforced with recycled CFRP pieces

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Abstract

This paper presents extensive experiments on self-compacting concrete reinforced with recycled Carbon Fibre Reinforced Polymer (r-CFRP), studying the impact resistance and mechanical properties of the reinforced self-compacting specimens. The impact resistance and mechanical properties include compressive and flexural strength of 252 reinforced cementitious specimens with different fibre volume fractions. Based on the large obtained experimental database, analytical analyses were implemented to correlate and predict mechanical properties of self-compacting concrete reinforced with recycled carbon fibres. Furthermore, statistical studies were carried out to investigate the distribution of mechanical properties.

Results of this study revealed that compressive strength, flexural strength, and impact resistance of reinforced self-compacting concrete specimens follow a normal distribution. Furthermore, it indicated that reinforcement of plain self-compacting concrete with using r-CFRP fibres improves mechanical properties and impact resistance of specimens.