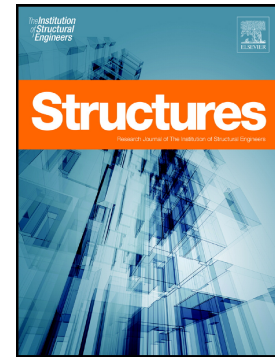


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Rehabilitation of Corroded Steel Beams Using BFRP Fabric

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Abstract

There are many structurally deficient parking garages, bridges, and other structures in service all around the world. These bridges are in desperate need of replacement or rehabilitation. Flexural rehabilitation of corroded steel beams using Carbon Fibre Reinforced Polymer (CFRP) and Glass Fibre Reinforced Polymer (GFRP) have been studied in the past. However, studies have not been conducted on the rehabilitation of corroded steel beams using Basalt Fibre Reinforced Polymer (BFRP). This research examined the feasibility and effectiveness of using BFRP fabric for the rehabilitation of corroded steel beams by performing lab tests and developing finite element models. The study found that both yield and ultimate load capacities of a corroded steel beam can be fully restored provided sufficient thickness of BFRP fabric is used. It may be difficult to fully restore the ductility of a corroded steel beam; however, the ductility can be improved and the improvement depends on the thickness of BFRP fabric.

Keywords: rehabilitation; basalt fibre reinforced polymer fabric; corroded steel beam; load-deflection behaviour; ductility; optimum thickness of fabrics; non-linear finite element modeling

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