

Evaluation of repair materials for functional improvement of slabs and beams with corroded reinforcement

Almusallam, A.A., Al-Gahtani, A.S., Maslehuddin, M., Khan, M.M., Aziz, A.R.
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Abstract: The effectiveness of epoxy resins and cementitious repair materials, including silica fume cement, in improving the functional performance of beams and slabs with corroded reinforcement was evaluated. Reinforcement corrosion in the beams and slabs was accelerated by application of a direct current for various periods of time. The deteriorated specimens were repaired and tested for flexural strength. The results indicate that not all the repair materials are able to restore the original strength of the components. The improvement in the load-carrying capacity was related to the increase in the bond between the parent concrete and the repair material, inter alia, the steel reinforcement for an effective load transfer. One of the epoxy resin mortars investigated, as well as silica fume cement concrete, to some extent, were able to restore the original strength of the component. Furthermore, the improvement in the functional performance of the repair materials, vis-à-vis, epoxy resin mortar, was observed to be dependent on the degree of reinforcement corrosion. The repair using this material was only effective when the degree of reinforcement corrosion was less than 10%.