عنوان مقاله:

Strengthening of RC Beams Using SCC Jacket Consisting of Glass Fiber and Fiber-Silica Fume Composite Gel

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خلاصه مقاله:

In this paper, strengthening of RC beams with self-consolodating concrete (SCC) jacket containing glass fiber (GF) and fiber-silica fume composite gel (FSCG) were investigated. FSCG can use as a substitute for a part of the cement that contains silica fume powder, polypropylene fibers, superplasticizer, concrete waterproof, and some other admixtures. In order to evaluate the performance of the proposed jacket, twelve beams were strengthened and a control beam was made. The variables included the amount of glass fibers consumed in the jacket (۰, ۰.۲۵, ۰.۵, ۰.۷۵, ۱ and ۱.۲۵% by volume) and the amount of FSCG gel (۰ and ۷.۵%), respectively. Fresh and hardened concrete properties and flexural capacity of RC beams were investigated. The use of FSCG in RC jackets can compensate well for the deficiency in strength due to the GF entry into the concrete matrix. High affinity of these materials improve the cohesion between cement and GFs. RC jackets containing GF and FSCG increased the beams' energy absorption capacity by about ۸۹ to ۴۶۳%, depending on the percentages of GFs. RC jacket containing GF and FSCG delays the growth of the primary crack and it can significantly increase the maximum load. Also, GFRP sheets have poorer performance compared to the proposed method due to separation from the surface of the strengthened beams, and .their load-bearing capacity and energy absorption are lower

کلمات کلیدی:

strengthening, Reinforced Concrete Jacket, Fiber-silica fume composite gel, glass fiber, GFRP sheet, Beam