عنوان مقاله:

Production Economical Reinforced Concrete Slabs using Eco-Friendly Material

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خلاصه مقاله:

Concrete is a material that is strong in compression but weak in tension. To overcome this issue, reinforcement must be used to improve the tensile strength of the concrete. However, it is acknowledged that steel has its drawbacks, such as the fact that it has a high cost and corrosion potential, and the rebar is heavy, non-renewable, and non-environmentally friendly. Thus, this experimental study investigates the potential product of economical reinforced concrete slabs using eco-friendly materials. Firstly, to enhance the concrete properties, a compressive, tensile, and flexural test, also a concrete with the addition of polypropylene fiber outlasted the control mix design in terms of strength and durability. The results included the control mix (CM), F١ ٠.٢٥%, F٢ ٠.٥٠%, F٣ ٠.٧٥%, and F۴ ١%. The specimen with the highest compression and tensile strength was ٢۴.٢٨ MPa and ٣.١۵ MPa, respectively, for the F١ specimen with ٠.٢۵% short fibers. Secondly, the bending test was carried out on ten slabs to check the structural behavior of these slabs reinforced with reed rods as the eco-friendly material. The good results of the bearing capacity of a partially reinforced concrete slab with a reed have been obtained at ٢٣.٨ kN. Meanwhile, to obtain better results, this research has enhanced the behavior of the concrete slab by improving the concrete's properties by adding polypropylene synthetic microfiber to the mixed concrete. In addition, giant reeds treated with epoxy increase the bonding strength with concrete, improve tensile strength properties, and reduce the absorption of reeds. Therefore, the bearing capacity results of the reed-reinforced concrete slab became the best, which were ٣۵.٨٣ kN. Thus, reinforcement of one-way slabs by reed partially with appropriate diameters could be substituted to obtain good performance in the reconstruction of low-cost buildings. As a result, economical reinforced concrete slabs have been produced using eco-friendly materials. Doi: ١٠.٢٨٩٩١/CEJ-٢٠٢٣-٠٩-٠۶-٠١٠ Full Text: PDF

کلمات کلیدی:

.Treated Reed; Epoxy: Polypropylene Fiber; Concrete; Slab; Central Line Loading