Recycled plastic waste fibers for reinforcing Portland cement mortar

Laboratory experiments were conducted to investigate the effects of recycled plastic (RP) waste fibers on the flexural strength, flexural toughness and plastic shrinkage cracking characteristics of Portland cement mortar. Parameters investigated include fiber content and fiber length and tests performed include flexure and plastic shrinkage tests. Experimental results showed a substantial increase in flexural toughness, about 26 to 61 times, and a considerable increase in flexural strength ranging from 6% to 84% of mortars reinforced with RP fibers compared to plain mortar. Test results also showed a significant reduction in width, and total area of plastic shrinkage cracks of slabs reinforced with an increased amount of RP fibers compared to control slabs without fibers. No plastic shrinkage cracks were observed on the surface of mortar slabs reinforced with 1.5% (by volume) of 50 mm long, RP fibers. Besides reducing the cost of plastic waste disposal, this investigation recommends adding about 1.5% of locally produced; 50 mm long recycled plastic fibers to ordinary cement mortar for improving the ductility and crack arresting mechanism of the mortar matrix.