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IMPROVED CONCRETE BLOCKS WITH DISPERSED FIBERS AS CONTRIBUTION FOR ENVIRONMENTAL PROTECTION

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Abstract

The constructions using concrete material significantly contribute to global environmental pollution as a result of the consumption of both natural resources and carbon dioxide emissions in their life cycle. Therefore, it is necessary to develop materials that ensure an increased durability for a longer life cycle of the constructions, in order to reduce their impact on the environment. This study aims to analyze the use of polypropylene fibers as dispersed reinforcement of concrete used in the manufacture of concrete paving blocks as an option to increase their durability by improving their mechanical properties and minimizing the cracking process, while the environmental pollution is reduced by recycling the polymeric waste from which these fibers are made. There were performed experimental tests, according to the SR EN 1338:2004 stipulations, over the splitting tensile strength at 3, 7, 14, and 28 days for paving blocks made of dispersely reinforced concrete with polypropylene fibers, executed by two different methods: by casting and vibration, and by vibration together with pressure-applying. The results showed an increased efficiency, as an average of improvements in the physical mechanical characteristics of the tested elements relative to the reference specimens without fiber addition, with values between 32% and 56%, which means higher mechanical strengths even from early ages, higher compaction and, implicitly, low cracking rates, resulting an extended service life and reduced or partially reduced maintenance, repair or replacements.

Keywords: fiber reinforced concrete, paving blocks, polypropylene fibers

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