

Properties of Sustainable Self-compacting Concrete Containing Treated and Modified Waste Plastic Fibers

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This study aims to improve different properties of sustainable self-compacting concrete SCC containing treated and modified polyethylene terephthalate PET fibers. For this purpose, gamma ray surface treatment and geometric modification were utilized for the used PET fibers. Concrete fresh properties include slump flow, T500mm, L-box and sieve segregation while mechanical properties include compressive, split tensile strength, flexural strength, static modulus of elasticity and impact strength. Further, physical properties and related durability properties comprise dry density, ultrasonic pulse velocity, porosity and water absorption. The results obtained demonstrated that the treatment and the modification used for the PET fibers slightly reduced the fresh properties of produced sustainable SCC (slump flow, T500 mm, L-Box and sieve segregation). However, they were within the limits of the SCC specification as reported in EFNERC guidelines. Further, concrete hardened properties in terms of compressive strength, splitting tensile strength, flexural strength, modulus of elasticity, impact strength, ultrasonic pulse velocity, decrease in the dry density, decrease in porosity and water absorption increased significantly.