

ABSTRACT

Incorporating polypropylene fibers and replacing a portion of fine aggregates with foundry sand in self-compacting concrete (SCC) can enhance both its mechanical properties and sustainability. Studies have shown that adding polypropylene fibers improves compressive strength, tensile strength, and flexural toughness of SCC. For instance, an optimal fiber content of 0.5% by volume has been found to significantly enhance performance, with higher contents potentially leading to decreased strength due to fiber agglomeration. Replacing 25% of fine aggregates with foundry sand, a by-product of metal casting, not only promotes sustainability by utilizing industrial waste but also contributes to the durability of SCC. This substitution has been associated with improved resistance to environmental effects and enhanced mechanical properties. The combination of polypropylene fibers and foundry sand in SCC formulations offers a promising approach to producing durable and eco-friendly concrete, making it a viable option for sustainable construction practices. Incorporating PPF up to 2.0% by weight of cement enhances compressive and tensile strengths. Beyond this percentage, strength may decrease due to fiber agglomeration and increased porosity.