

## Improvement of Compressive and Tensile Strengths of Concrete Using Polypropylene Fibers

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**Abstract :** Concrete is one of the essential elements that used in different types of construction these days, but it has many problems when interacts with environmental elements such as water, air, temperature, dust, and humidity. Also concrete made with Portland cement has certain characteristics: it is relatively strong in compression but weak in tension and tends to be brittle. These disadvantages make concrete limited to use in certain conditions. The most common problems appears on concrete are manifested by tearing, cracking, corrosion and spalling, which will lead to do some defect in concrete then in the whole construction, The fundamental objective of this research was to provide information about the hardened properties of concrete achieved by using easily available local raw materials in Jordan to support the practical work with partners in assessing the practicability of the mixes with polypropylene, and to facilitate the introduction of polypropylene fiber concrete (PFC) technology into general construction practice. Investigate the effect of the polypropylene fibers in PCC mixtures and on materials properties such as compressive strength, and tensile strength. Also to investigate the use of polypropylene fibers in plain cubes and cylindrical concrete to improve its compressive and tensile strengths to reduce early cracking and inhibit later crack growth. Increasing the hardness of concrete in this research is the main purpose to measure the deference of compressive strength and tensile strength between plain concrete and concrete mixture with polypropylene fibers different additions and to investigate its effect on reducing the early and later cracking problem. To achieve the goals of research 225 concrete test sample were prepared to measure it's compressive strength and tensile strength, the concrete test sample were three classes (A,B,C), sub-classified to standard , and polypropylene fibers added by the volume of concrete (5%, 10%, 15%, and 20%). The investigation of polypropylene fibers mixture with concrete shows that the strengths of the cement are increased and the cracking decreased. The results show that for class A the recommended addition were 5% of polypropylene fibers additions for compressive strength and 10 % for tensile strength revels the best compressive strength that reach 26.67 Mpa and tensile strength that reach 2.548 Mpa records. Achieved results show that for classes B and C the recommend additions were 10 % polypropylene fibers revels the best compressive strength records where they reach 21.11 and 33.78 Mpa, records reach for tensile strength 2.707 and 2.65 Mpa respectively.

**Keywords :** polypropylene, effects, compressive, tensile, strengths, concrete, construction

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