

Effect of Using Natural and Polypropylene Fibers on Fresh and Hardened Concrete Properties

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The first goal of this study is to investigate the effect of using natural fibers such as date palm fibers (DPF), flax fibers (FF) and date palm spikelet fibers (DPSF) on properties of fresh and hardened concrete. This study was conducted to investigate the use of different percentages of DPF (0.25, 0.5 and 0.75%), percentages of FF (0.15, 0.3 and 0.45%) and percentages of DPSF (0.5, 1.0 and 1.5%) as a volume fraction. **The second goal** is using hybrid fibers by adding constant amount (0.9 Kg/m³) of polypropylene fibers (PF) to the above specified percentages of DPF, FF and DPSF mixes (DPFP, FFP and DPSFP). Proportions of mixes determined using ACI 318-2019 recommendations. Beams have a dimension of 100*100*500 mm were chosen to study flexural strength of concrete. The tested samples were curing in pure water. The concrete beams were tested at ages of 28 days. Slump and compacting factor tests were carried out to check the effect of using natural fibers and polypropylene fibers on consistency and workability of concrete. From results, it was observed that the slump and compacting factor decreased with increasing percentage of DPF, FF and DPSF. With increasing proportion of DPF, flexural strength increases. Optimum proportion of DPF is 0.75%. With adding DPF with PF to concrete, flexural strength decreases than using PF only in concrete. Optimum percentage of FF and FFP is 0.3%. With increasing proportion of DPSF, flexural strength decreases. Optimum percentage of DPSF and DPSFP is 0.5%. With adding PF to FF and DPSF mixes, flexural strength increases than using FF and DPSF only in mixes.

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