

Assessment of Compressive Strength of Concrete Produced from Different Brands of Portland Cement

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Abstract

Concrete is basically a mixture of two components: aggregates and paste. The paste, comprised of Portland cement and water, binds the aggregates (usually sand and gravel or crushed stone) into a rocklike mass as the paste hardens because of the chemical reaction of the cement and water. In our society today some of the cement brands that are being sold are not up to standard and this may be traced to negligence on the part of the manufacturers by paying very little attention to the quality and also the regulatory body does not put strict measures to enforce the required standard. This problem has led to the production of poor quality concrete that increases the risk of collapse of building structures. This research determined the cement brands that have the highest compressive strength to enhance the quality and durability of the structures being built in the country. Different brands of Portland cement were used to produce concrete varying with 1:2:4 and 1:3:6 mix ratio respectively with a curing date of 3, 7, 14, 21, and 28 days respectively. No additive was used in any of the mix. The tests carried out include slump test at its fresh state while compressive strength was carried out for the hardened concrete, also the vicat test was carried out on the cement brands to determine the setting time. Compressive strength at 28 days showed that Dangote 3X cement produced 25.27 N/mm², Ibeto cement 38.89 N/mm², Purechem cement 24.58 N/mm², Unichem cement 21.16 N/mm² and Elephant cement 27.9 N/mm² for 1:2:4 mix ratio respectively. For 1:3:6 mix ratio at 28 days Dangote cement produced 18.89 N/mm², Ibeto cement 22.07 N/mm², Purechem cement 11.63 N/mm², Unichem cement 15.86 N/mm² and Elephant cement 16.71 N/mm² respectively. The study concluded that Ibeto cement has the highest strength at 28 days for 1:2:4 and 1:3:6 mix ratios respectively.

Keywords: Cement, Compressive strength, Concrete, Fresh Property, Portland Cement