
Experimental investigation of compressive strength of lathe waste fiber concrete

Nawarathna W.M.D.H., Pabasara W.G.A.* , Liyanage D.N. and
Lakshitha W.D.R.

Department of Engineering Technology, University of Ruhuna, Kamburupitiya, Sri Lanka.

Industries are expanding at a faster rate due to the rapid growth of the population result in a surge of trash without proper management. Lathe steel scrap is a major waste material generated during different industry operations such as drilling, cutting, and boring carried out by lathe machines. Lack of sound waste management practices for lathe waste has created enormous environmental issues such as soil and ground water contamination. These industrial waste fibres can successfully be utilized for making high-strength low-cost Fiber Reinforced Concrete (FRC) after exploring their suitability. FRC is a composite material comprised of hydraulic cement, coarse aggregate, sand, water and randomly distributed short discrete fibers. In this research work, a variable weight fraction of fiber (i.e., ratio of weight of fiber to weight of concrete) of 0.5%, 1.0%, 1.5% and 2.0% is incorporated into M25 concrete grade and variations in compressive strength were investigated. According to the results, the specimen containing 1% of lathe waste fibres offered the maximum compressive strength of 52.2 MPa. It was a 33.3% increase compared with the plain concrete sample (34.8 MPa). In the second part, the variable weight fraction of cement was reduced from the 1 % lathe waste contained specimens up to 20% at a gap of 5% (i.e., 5%, 10%, 15%, 20%) and compressive strength was examined. According to the results, compressive strength values were beyond the plain concrete even after a 15% reduction of cement. After reducing the 15% of cement, the cost of concrete was reduced by 13% compared to the cost of the plain concrete mixture. In conclusion, the compressive strength of the concrete can be enhanced by incorporating lathe waste scrap while reducing the cost as well as the environmental burden.

Keywords: Lathe waste scrap, Compressive strength, Fiber reinforced concrete, Waste management

*Corresponding author: ayomiwalagedara@gmail.com