

Compressive strength of lightweight aggregate concrete containing crushed cockle shell as partial sand replacement

Sharifah Maszura Syed Mohsin, Hanis Nadia Ruslan, Khairunisa Muthusamy, Nur Farhayu Ariffin*

^a Faculty of Civil Engineering Technology, Universiti Malaysia Pahang, Lebuhraya Tun Razak, Pahang, Gambang, 26300, Malaysia

ABSTRACT

The widespread use of natural sand mined from the river for concrete production worldwide causes environmental degradation. The cockle shell waste from aquaculture industry which discarded at dumpsite also pollutes the environment. Utilization of cockle shell as partial sand replacement in concrete would reduce the harvesting of sand from the river and limit the waste dumping from cockle industry. The experimental research investigates the effect of different sizes crushed cockle shell (600 μ m and 2.36mm) as partial sand replacement on the workability and compressive strength of lightweight aggregate concrete. 5 types of concrete mixes consisting various percentages of crushed cockle shell ranging from 0%, 5%, 10%, 15% and 20% were used in this research. All specimens were water cured until the scheduled testing time. The workability and compressive strength of concrete were determined via slump test and compressive strength test respectively. The outcome shows that the use of different sized crushed cockle shell as partial sand replacement influences the workability and strength of concrete. The concrete becomes more workable when larger quantity of crushed cockle shell is used. Integration 5% of 600 μ m and 10% of 2.36mm crushed cockle shell forms concrete with the targeted strength. Using crushed cockle shell as mixing ingredient in concrete reduces quantity of waste thrown and contributes to cleaner surrounding.

KEYWORDS

Compressive strength; Crushed cockle shell; Lightweight aggregate Concrete; Partial sand replacement; Workability

ACKNOWLEDGEMENTS

The authors would like to thank for the financial funding from Universiti Malaysia Pahang through the internal grant PGRS 200385.