

Transforming Defective Collapsed Concrete into Recycled Aggregate for Sustainable Concrete Production: A Case-Study on Coastal Land Reclamation Using Eco-Units and Geotube Technology

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Abstract

Some areas face difficulties like wars, earthquakes, or infrastructure changes, causing concrete waste. Those areas need innovative ideas to turn this waste from an obstacle waste into a useful material for construction and growth. This study aims to produce sustainable concrete from concrete waste. An experimental program was done by replacing natural aggregate with recycled concrete in percentage of 10%, 20%, 30%, 40%, and 50% of the total natural aggregate by weight. The mechanical properties were studied by compressive, flexural and splitting tensile strength tests, and the durability was studied by density test and absorption test. A theoretical case-study was also prepared on the use of recycled concrete to produce concrete units to be used in offshore protection and land reclamation using Eco-Units and Geo-Tube. The experimental program results showed a decrease in the mechanical properties of sustainable concrete using recycled concrete aggregate especially for the ratio of 50% replacement. The results proved that the resulting sustainable concrete has acceptable properties, especially for non-structural uses such as off-shore protection and coastal land reclamation, slightly weaker than natural aggregate concrete. more than one benefit such as natural resource conservation, and coastal land reclamation are important reasons for using recycled concrete aggregate, especially when found in disaster areas.

Key words; Recycled concrete, Recycled aggregate; Land reclamation, Geo-tube, Eco-Units

