Abstract

In recent years, there have been increasing efforts to utilize agricultural waste, such as rice husks and bagasses, as fuels for electricity generation. It was found that ash from rice husks and bagasses is suitable for partial replacement of cement, with added value. This research aimed to use such waste materials in the development of concrete blocks with enhanced sound absorption properties, as an alternative to the relative expensive conventional sound absorbing concrete blocks.

The objective of this research was to study the factors affecting the compressive strength and the sound absorption coefficient of the non-load bearing concrete block in comparison with the normal concrete block and the conventional sound absorbing block available in the market. The variables were the replacement percentage by weight of rice husk and bagasse ash in Portland cement Type 1. The replacement percentage of unground ash was between 10 and 40, and that of 6-hour ground ash was between 10 and 30 for investigating the compressive strength of mortar samples.

The result indicated that the factors affecting the compressive strength were the water to cementitious materials ratio (w/c), the replacement percentage of ash in Portland cement, the ash type, the fineness of ash and the curing period. A higher replacement percentage of ash decreases the compressive strength. An increase in the fineness of ash increases the compressive strength and decreases the water requirement. In terms of costs and general properties, the selected ingredient for producing sound absorbing concrete blocks was rice husk ash, with a replacement percentage in Portland cement of 20% by weight and a w/c ratio of 0.6. The test result showed that the sound absorbing coefficient of the concrete block mixed with rice husk ash is better than that of the normal concrete block at all frequencies, especially in a higher frequency range. The sound absorption efficiency can be further improved by the use of other sound damping materials such as fiberglass.