

Performance of Autoclaved Aerated Concrete Containing Recycled Ceramic and Gypsum Waste as Partial Replacement for Sand

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Abstract : Today, municipal solid waste (MSW), noise pollution, and attack fire are three ongoing issues for inhabitants of urban including in Malaysia. To solve these issues, eco-friendly autoclaved aerated concrete (AAC) containing recycled ceramic and gypsum waste (CGW) as a partial replacement for sand with different ratios (0%, 5%, 10%, 15%, 20%, and 25% wt) has been prepared. The performance of samples, such as the physical, mechanical, sound absorption coefficient, and direct fire resistance, has been investigated. All samples showed normal color behavior, i.e., grey and free crack. The compressive strength was increased in the range of 6.10% to 29.88%. The maximum value of compressive strength was 2.13MPa for 15% wt of CGW. The positive effect of CGW on the compressive strength of AAC has also been confirmed by crystalline phase and microstructure analysis. The acoustic performances, such as sound absorption coefficients of samples at low frequencies (500Hz), are higher than the reference sample (RS). AAC-CGW samples are categorized as AAC material classes B and C. The fire resistance results showed the physical surface of the samples had a free crack and was not burned during the direct fire at 950°C for 300s. The results showed that CGW succeeded in enhancing the performance of fresh AAC, such as compressive strength, crystalline phase, sound absorption coefficient, and fire resistance of samples.

Keywords : physical, mechanical, acoustic, direct fire resistance performance, autoclaved aerated concrete, recycled ceramic-gypsum waste

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