NCON-PGR_2022_022

Impact of Micro POFA and Nano POFA in Cementitious Material: A Review

***Y. X. Liew*[1], *S. I. Doh*[1] *and* *S. C. Chin*[*1,2]**

[1]Faculty of Civil Engineering Technology, University Malaysia Pahang, 26300 Gambang, Pahang, Malaysia.

[2]Center of Research in Advanced Fluid and Processes (Fluid Centre), University Malaysia Pahang, 26300 Gambang, Pahang, Malaysia.

**Corresponding author:* scchin@ump.edu.my

Abstract

The utilization of palm oil fuel ash as cement replacement in concrete and mortar mix design could be a solution for reducing the demand for cement. However, according to previous investigations palm ash-based concrete and mortar had lower fresh properties and hardened properties than usual concrete. Thus, modification of the ash's particle sizes, as well as the mix design, was made and eventually nano palm ash was introduced into the mix design. This review article provides a detailed examination of the impact of particle size; micro and nano palm ash in concrete and mortar mix design to explore the potential of nano palm ash in future work. A detailed comparison between micro and nano palm ash in terms of ash particle characteristics, mix design, fresh properties and hardened properties are presented. Nano palm ash possesses lower unburnt carbon, higher silica content and smaller particle size than the micro palm ash. This led to the improvement in the nano palm ash-based concrete's fresh properties and the early age-hardened properties of concrete. Overall, the purpose of this review article is to provide a detailed understanding of the impact of micro and nano palm ash in cementitious materials.

Keywords: Comparison; Impact; Micro POFA; Nano POFA; Palm oil fuel ash.