

Pozzolanic activity of nanosized palm oil fuel ash: A comparative assessment with various fineness of palm oil fuel ash

ABSTRACT

As the nanosized POFA (nPOFA) is expected to be a better supplementary cementing material (SCM) compared to conventional POFA, the comparative assessment of pozzolanic activity with various fineness of POFA was investigated. The assessment of pozzolanic activity of as-received POFA (rPOFA), microsized POFA (mPOFA) and nPOFA were conducted via electrical conductivity, lime consumption (LC) and strength activity index (SAI) test. The particle size of nPOFA acquired from TEM analysis is in the range of 20 nm to 90 nm. The nPOFA-lime system demonstrates the highest relative loss of conductivity (RLC) and LC value compared to rPOFA-lime and mPOFA-lime system through the electrical conductivity and LC test, respectively. At 28 days curing age, the nPOFA mortar possesses a 96.9% of SAI as it shows the highest SAI value compared to mPOFA and rPOFA which has 93.8% and 73.6% of SAI values, respectively. The RLC and LC results indicated the high pozzolanic activity of nPOFA compared to mPOFA and rPOFA due to high fineness and specific surface area, resulting in enhancing the degree of pozzolanic reaction. The results confirmed that the high fineness of nPOFA accelerates the pozzolanic activity as it shows the suitability as better SCM compared to the conventional POFA.