

Feasibility of using Metakaolin as a Self-Compacted Concrete Constituent Material

Abstract

By minimizing the Portland cement (PC) content in concrete using supplementary cementitious material, reducing the CO₂ emission to the atmosphere is occurred. Metakaolin is one of these environmentally friendly materials. One of the most promising types of concrete is Self-compacted concrete (SCC). This research intends to investigate and assess the fresh and hardened properties of SCC containing Metakaolin by studying the impact of utilizing different cement and Metakaolin contents on concrete flow-ability, passingability, and compressive and tensile strength. Fresh properties were investigated using new developed test named MSF Apparatus test and compared with the standard tests slump flow test and J-Ring test. The new developed test was highly accurate in SCC indication. Results showed adequate improvements by increasing Metakaolin content and cement content on the compressive and tensile strength. 15% Metakaolin content by the weight of cement as adding or replacement gives the best results.