Moment Redistribution & Ductility of Self ï Compacting Lightweight Reinforced Concrete Continuous Beams

mahmoud ramzy ,Abdelwahab Elghandour;Osama Hamdy;Mohamed Nabil

Abstract

This research presents an experimental investigation in the flexural behavior and ductility of reinforced self-compacting lightweight concrete (LWC) continuous beams. A total of five medium scale reinforced LWC continuous beams were cast and statically tested to failure under the effect of a mid-span concentrated load. The main test parameter was the percentage of negative to positive reinforcement to allow for moment redistribution. Key test results first showed that higher negative than positive tension steel amounts resulted in deficiently low moment redistribution and ductility index values, due to the associated unstable double cantilever mechanism at failure. On the other hand, increasingly lower negative than positive tension steel amounts resulted in increasingly higher moment redistribution and ductility indices values, due to the stable simply supported mechanism at failure. These moment redistribution and ductility levels were even better than these obtained in normal density reinforced concrete continuous beams. Nonetheless, the latter enhancements were limited by the over reinforcement of the positive section and the associated limited ultimate strain of its LWC compressive block.

IABSE Conference, Sharm El Sheikh 2012, January