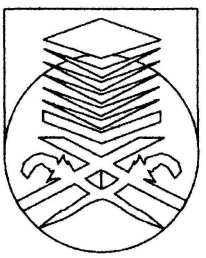
EXPERIMENTAL STUDY OF COMPOSITE COLD-FORMED STEEL C-SECTION CONNECTED BACK-TO-BACK



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CANDIDATE DECLARATION

We declare that this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. The work is our own and that appropriate credit has been given where reference has been made to the work of others. This topic has not been submitted to any other academic or non-academic institution for any degree or qualification.

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ABSTRACT

This thesis describes the results of an experimental investigation involving the testing of push out specimens. This study was aimed to develop a new type of shear connector that is easy to construct for a composite beam. The test specimens were designed to study the effect on the different shapes of shear connectors that have been applied for cold-formed steel lipped C-sections connected back-to-back. The test specimens have been categorized into two series which are four numbers of specimens for the first series and two numbers of specimens for the second series. For the first series variations of shear transfer mechanisms were tested, where prefabricated bent-up tabs of square shape and prefabricated bent-up tabs of triangular shape were employed at the surface of the flanges embedded in the concrete to provide shear transfer capacity. Second series of specimens were selected based on the results from the first series. The primary differences between the specimens are the shapes of the shear connectors and angles of bent-up. Failure mechanisms also were observed during testing. In this study, longitudinal cracks were observed from most of the specimens that were tested. Results show that the shear capacities of specimens with proposed type of shear connectors increase and the slips reduce compare to control specimen that only relies on natural bond (i.e. without shear connector) between steel and concrete to resist shear. Between the two types of shear connectors used, prefabricated bent-up tab (square shape) provides better performance in-term of strength, compare to the prefabricated bent-up tab (triangular shape). Concerning the angle of bent-up tab, higher degree of bent-up gives better performance.

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