

Experimental & theoretical behavior of thin walled composite filled beams

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ABSTRACT

The behaviour of thin walled composite (TWC) filled beams with normal (NC) and lightweight volcanic pumice concrete (VPC) as in-fill, is described based on comprehensive series of tests. The strength and failure modes of the beams are found to depend on the interface connections. The effect of various modes interface connections are co-related to the generation of shear bond between sheeting and concrete using both experimental and theoretical results. Analytical models for the design of beams are developed and their performance is validated through experimental results using both full and partial connection. Appropriate design recommendations and practical design charts have been developed so that the designer can check whether the strength will be governed by buckling or yielding of steel and be able to design the beam accordingly.

KEYWORDS

Volcanic pumice, beam, thin walled, buckling, strength, lightweight, composite, flexural, analytical, interface, shear bond
