Abstract

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The effect of degree of composite action on flexural behavior of precast concrete sandwich panels

Precast prestressed concrete sandwich panels are primarily used in building construction to take advantage of both strength and thermal resistance. A composite steel shear connector is typically used to structurally tie the outer concrete wythes together. These shear connectors produce different degrees of composite action (DCAs). This paper studies the effect of DCA on flexural behaviour of the sandwich panels based on a combination of bending test and Finite Element (FE) analysis. A bending test was conducted on a 3.05 m x 7.01 m precast prestressed concrete sandwich panel. A non-linear FE model was created. Good correlations can be observed between the test and FE results. The FE model was further employed to study panels with 0% and 100% DCA. It can be concluded that DCA varies as the load on the structure increases and has a significant effect on both stiffness and flexural strength of the sandwich panel.