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STEEL-CONCRETE BONDING CONNECTION: AN EXPERIMENTAL STUDY AND NON-LINEAR FINITE ELEMENT ANALYSIS

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Abstract

We present characterisation interface tests results obtained by push-out tests adapted to a steel-concrete bonded connection. The sizes of the concrete slabs and areas of the bonding zone are the primary studied parameters. It is shown that the behaviour observed during the push-out tests strongly depends on these parameters. Additionally, the measurements are compared to numerical results obtained from 3D FE models accounting for the non-linear behaviour of the constitutive materials. In particular, the numerical results confirm that the shear stress in the concrete slabs along the bonding joint and near the interface is not uniform and varies with the level of the applied load. Moreover, the shear stress may be accompanied by a strong compression stress perpendicular to the interface, which is mainly due to the possible friction between the bottom face of the concrete slabs and the steel rigid plate of the hydraulic press. This stress induces a favourable double state of stress in the bonding joint and a high failure load. Therefore, these tests and numerical results show that the state of stress in a push-out test is complex, varies with the load and seems to be most likely not representative of the

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