

## **Finite element 3D analysis of the slab-column connection**

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### **SUMMARY**

This paper presents the results of the three-dimensional nonlinear finite element analysis of the reinforced concrete slab-column connections. The shear strength and ductility of interior slab-column connections with and without shear reinforcement are investigated.

The analysis is performed by the numerical implementation of the general nonlocal microplane model for concrete into the finite element code. In this material model, the concrete behaviour is simulated through a number of planes called microplanes. The microplane model is extended to cycling loading including the rate effect. The fracture mechanics is introduced by the use of the nonlocal strain concept.

The slab is first loaded by the service level vertical load, introduced through the normal column force, followed by ten cycles of the service bending moment introduced through the shear column force to simulate service level load repetition. The slab is further loaded by vertical load up to a certain level followed by the bending moment up to failure. The results obtained by the finite element analysis are compared with the previously published test results. The numerical results indicate diagonal shear failure mode, similarly as in the experiment, and a significant influence of the damage introduced through the cycling loading on the bearing capacity.

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