Abstract

There are numerous cases of slabs with corrosion in their joists, in which the constructive elements that rest on them do not show remarkable damage. Sometimes, even with all the lower reinforcement corroded in all the joists there is no alarming cracking in flooring or partition walls.

This research provides support for making expert decisions about the corroded slabs, from the initial tasks of diagnosis until late intervention criteria, by evaluating the remaining safety of the most common slabs in residential buildings: the reinforced concrete one-way slabs with in-situ and precast joists, having the most usual thickness.

The remaining safety assessment has been performed by the analysis of complete building models with the most usual spans in dwellings. In this analysis, each of the active and passive reinforcements are in their real position, and each of the structural and constructive elements appear in the model when real construction dictates. The entire load range to the collapse is checked through steps that take into account the real constructive process: dead loads, service load, corrosion, and load to failure. Models contemplate the material and geometric nonlinearity, with concrete crushing and cracking and steel yielding.

ACI-318 load test is used as a criterion for acceptance or rejection of an existing structure. The assessment of the Load Factor, which quantifies the remaining safety and gives the necessary order of magnitude in the intervention, is developed in this research.

Results have been validated in simpler models and are in accordance with reality. In the cases of up to three contiguous joists with complete corrosion, the slab have practically not deformed and can remain in use performing an intermediate intervention. And where the lower reinforcement of all the joists of a slab is corroded, it still remains standing, having certain load-bearing capacity (Load Factor is close to 1.40 when there is one healthy level of tendons and 1.60 when there are two healthy levels of tendons), but it is necessary to perform a comprehensive structural reinforcement.