E-ISSN 2410-8693
ISSN 2410-3918

Academic Journal of Business, Administration Law and Social Sciences

Vol. 11 No. 3
November, 2025

INTERNATIONAL INSTITUTE FOR PRIVATE COMMERCIAL AND COMPETITION LAW (IIPCCL - AUSTRIA)

Research Article

© 2025 Enkeleda Kokona
This is an open access article licensed under the Creative Commons Attribution-NonCommercial 4.0 International License (https://creativecommons.org/licenses/by-nc/4.0/)

Reinforced Concrete slabs designed by Finite Element Methods - A Case study

PhD Enkeleda Kokona
Polytechnic University of Tirana, Albania

DOI: https://doi.org/10.2478/ajbals-2025-0031

Abstract

The traditional methodology for designing slab systems typically commences with manual calculations of support and span moments based on linear elastic theory. These moments are subsequently redistributed according to the adopted design framework to achieve an optimal balance between structural performance and cost efficiency. The reinforcement areas are then computed for each region of moment distribution, with supplementary reinforcement introduced to control cracking and mitigate punching shear effects.
Contemporary computer-aided design approaches, employing finite element (FE) analysis, determine internal forces at the elemental level under the same linear elastic assumptions. The resulting reinforcement requirements are provided for each mesh element. Accurate control of internal force magnitudes, particularly bending moments is essential when employing linear elastic FE analyses. The quality of the FE mesh is a critical factor, requiring attention to parameters such as element shape, aspect ratio, and the relative size of adjacent elements. Mesh-related irregularities may also arise in slabs supported by interior, edge, or corner columns, as well as in areas containing openings. In the case study below, the design sequence of reinforced concrete slabs using the SAP2000 program (FEM analysis) is described to meet the requirements of flexural behavior, punching shear capacity and overall deformation performance according to the Eurocodes.

Keywords: slab, finite element, reinforced concrete, Eurocodes.

Full Text: PDF

This work is licensed under Creative Commons Attribution 4.0 License.

Academic Journal of Business, Administration, Law and Social Sciences ISSN 2410-3918 (print)

ISSN 2410-8693 (online)

Copyright © IIPCCL-International Institute for Private, Commercial and Competition law