

Flat Plate Voided Slabs: A Lightweight Concrete Floor System Alternative

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In structural engineering, it can be challenging to incorporate a sustainable design without sacrificing structural integrity. However, flat plate voided concrete slabs are an interesting alternative to standard flat plate concrete slab systems due to the reduction in concrete and the recycled plastic void formers that are located inside the slab. This research is necessary because an increased use of voided slabs in concrete structures would help resist climate change by reducing the CO₂ emissions caused from cement production.

This report will discuss the advantages and disadvantages of implementing plastic void formers into solid flat plate slabs and examine a parametric study comparing voided flat plate slabs to solid flat plate slabs in terms of design and construction. The design of the voided slabs follows the CRSI Design Guide for Voided Concrete Slabs while also referencing the ACI 318-14 Building Code Requirements for Structural Concrete. Three different slabs for typical square bay sizes of 25 feet, 30 feet, and 35 feet are designed to compare the effectiveness of voided slabs to traditional solid slabs in this parametric study.

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