



Cairo University

BEHAVIOR OF LIGHTWEIGHT REINFORCED CONCRETE BEAMS WITH OPENINGS IN SHEAR ZONE

By

Eng. Mohamed Ibrahim Mohamed Ahmed

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
In
Structural Engineering

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Title of Thesis:

Behavior of Lightweight Reinforced Concrete Beams with openings in Shear Zone

Key Words:

Lightweight concrete; Simply-support beams; Openings; Shear zone; Stiffness.

Summary:

The construction of modern buildings requires many pipes and ducts to accommodate necessary services such as air conditioning, electricity, telephone, and computer network. Presence of openings in reinforced concrete beams enables the installation of these services, minimizes the required floor height, and decreases the construction cost. However, the presence of these openings in reinforced concrete beams affects their structural behavior. Thus, this thesis investigates the behavior of simply supported beams with openings in shear zone subject to two symmetrical-concentrated loads.

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