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Ain Shams University
Faculty of Engineering

SHEAR DIAPHRAGM WITH
LIGHTWEIGHT CONCRETE FILL

By *ahmed*

KARIM MOHAMMED M. EL-DASH

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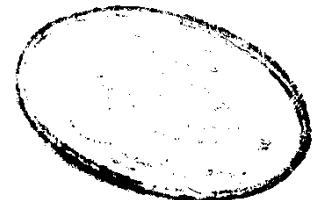
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Supervised by
Dr. MOSTAFA K. M. ZIDAN

Assoc. Prof. of Struct. Eng.
Faculty of Engineering
Ain Shams University



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بسم الله الرحمن الرحيم



Statement

This dissertation is submitted to Ain Shams University for the degree of Master of Science in Structural Engineering .

The work included in this thesis was carried out by the author in the Department of Structural Engineering , Ain Shams University, from October 1986 to November 1988.

No part of this thesis has been submitted for a degree or a qualification at any other University or Institution .

Date : 4/12/1988

Signature : Karim El-Dash

Name : Karim M. M. El-Dash

Examiners Committee

Name and Affiliation

Signature

- 1- Prof. Dr. SAAFAN ABD EL-GAWAG SAAFAN
Professor of Structural Engineering
Faculty of Engineering
Ain Shans University
- 2- Prof. Dr. EL-SAYED BAHAA EL-DIN MASHALY
Professor of Structural Engineering
Faculty of Engineering
Cairo University
- 3- Assoc. Prof. Dr. MOSTAFA K. M. ZIDAN
Associate Professor of Structural Engineering
Faculty of Engineering
Ain Shams University

S. A. Saafa

El-Sayed Bahaa El-Din Mashaly

M. K. M. Zidan

Date : / /198

To

my mother

and my wife

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ABSTRACT

In the present thesis an analytical study of the elastic behaviour of corrugated steel shear diaphragms with lightweight concrete fill under in-plane forces is investigated using the finite element method through out a comprehensive and powerful computer package which was used to solve the large number of equations of the finite element model , to display the nodal displacements and to obtain the distribution of stresses through the different elements of the model .

The composite diaphragm is simulated in the finite element model by an equivalent orthotropic plate elements . The derivation of the elastic properties of these equivalent orthotropic plate element is given .

A parametric study on the behaviour of the composite diaphragm under different conditions of fastening , and different geometrical and structural parameters is presented .

The effect of using such composite diaphragms as roofs on the structural behaviour and on the internal forces of rectangular steel structures is also presented . A comparison between the use of composite decks and the use

of pure steel diaphragms (without lightweight concrete fill) as roofs of these structures is investigated .

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