Ain-Shams University
Faculty of Engineering

CORRUGATED SHEET SHEAR DIAPHRAGMS CONNECTED BY EPOXY

By

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A Thesis

Submitted in partial fulfillment for the

requirements of the degree of Master of Science

in Structural Engineering

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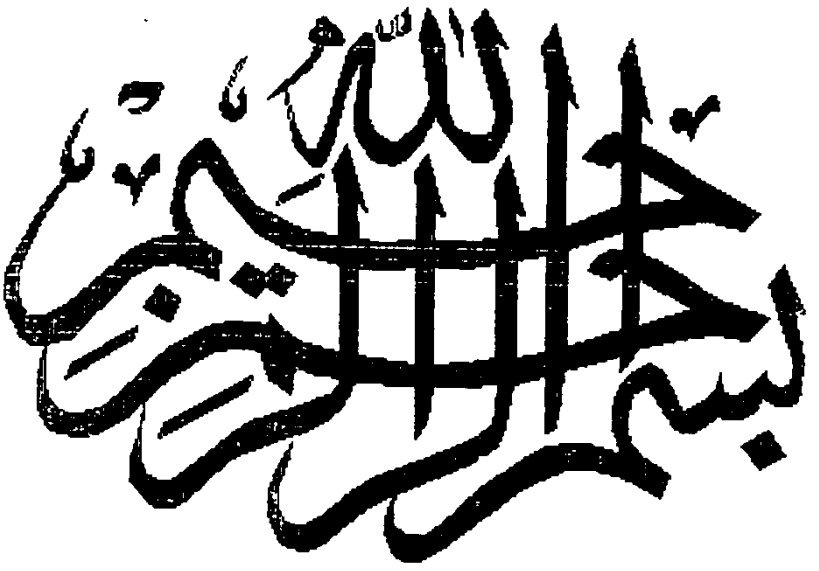

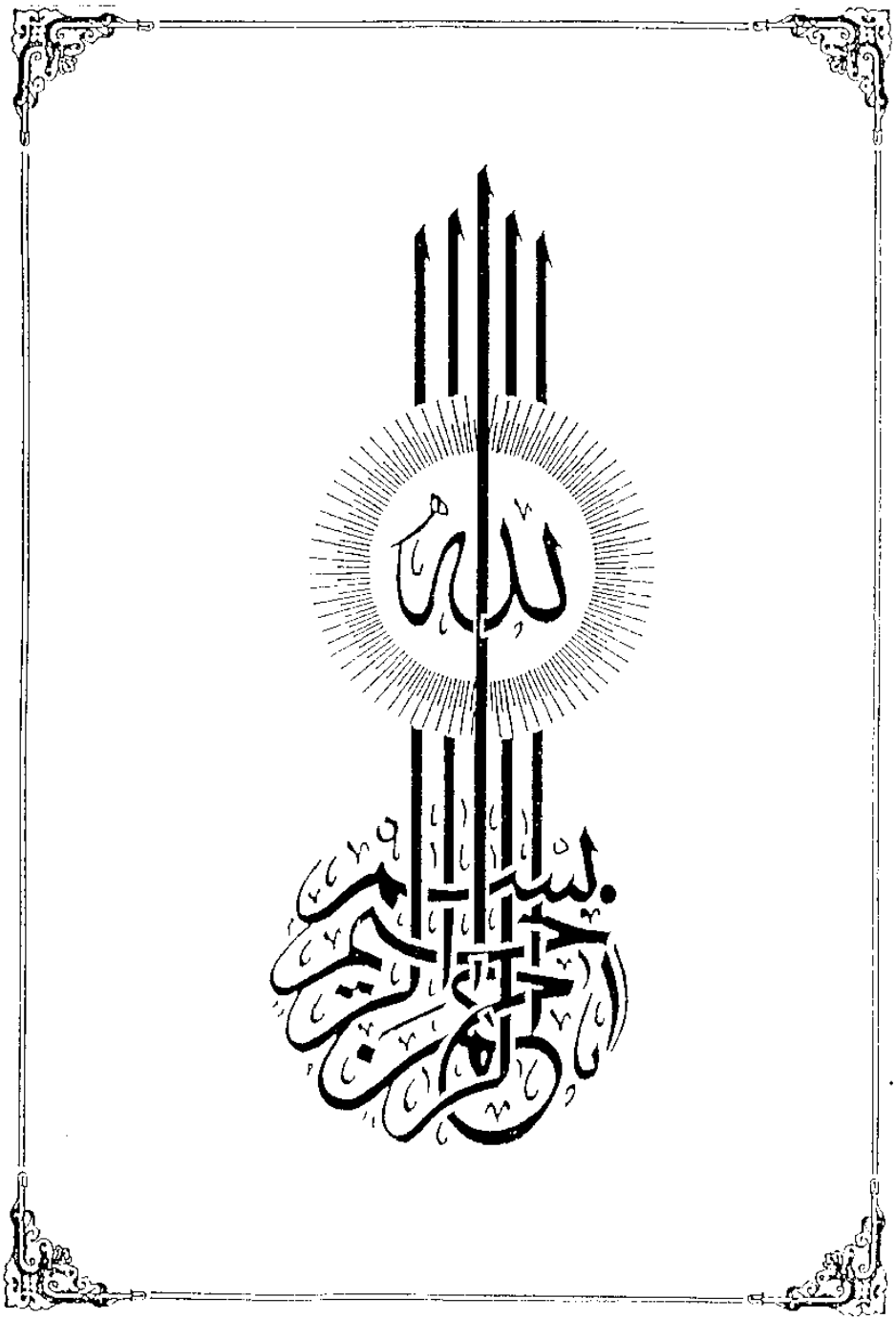

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Statement

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 departement of Structural Engineering, Ain Shams University, from November 1983 to August 1988.

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

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DEDICATION

TO MY PARENTS,

AND TO MY WIFE

NOTATIONS

A	The shear panel dimension in direction parallel to corrugation.
a	The dimension of rectangular plate element in direction of corrugation.
A_r	Cross sectional area of parallel members.
B	Shear panel dimension in direction perpendicular to corrugation.
b	Dimension of rectangular plate element in direction perpendicular to corrugation.
$2b_1$	Trough width of one corrugation.
c	Total flexibility of the shear panel.
$c_{1.1}$	Flexibility due to profile distortion.
$c_{1.2}$	Flexibility due to shear strain of sheets.
$c_{1.3}$	Flexibility due to slip of sheet to purlin connections.
$c_{2.3}$	Flexibility due to slip of sheet to frame connections.
c_3	Flexibility due to axial strain of parallel members.
d	Depth of one corrugation.
D_x	Bending stiffness of sheet per unit length perpendicular to corrugation.
D_y	Bending stiffness of sheet per unit length parallel to corrugation.
Δ	The deflection of the shear panel.

E Modulus of elasticity of steel.

E_{xx} Modulus of elasticity of sheets in direction parallel to corrugation.

E_{yy} Apparent modulus of elasticity of sheets in direction perpendicular to corrugation.

F_{sh} force carried by unit length of sheet to sheet connection.

F_{sp} Force carried by one glued area of sheet to purlin connection.

F_{sr} Force carried by unit length of sheet to rafter connection.

G_{xy} Shear modulus of a shear panel.

g_{sh} Number of unit lengths of sheet to sheet connection.

H Flange width of beam element *(used with friction element)*

h height of corrugation.

$\bar{K}$ Nondimensional factor to calculate the flexibility due to distortion of sheets.

k_n Normal stiffness of friction element.

k_s shear stiffness of friction element.

l corrugation width.

n_p Number of purlins.

n_{sh} Number of sheets per shear panel.

n_{sp} Number of sheet to purlin glued areas.

n_{sr} Number of sheet to rafter unit lengths of glue.

ν Poisson's ratio for steel.

ν_{xy} Poisson's ratio relating included strain in X direction to imposed strain in Y direction.

ν_{yx} Poisson's ratio relating included strain in Y direction to imposed strain in X direction.

Q Shear load affecting shear panel.

s_{sh} Slip of sheet to sheet connection.

s_{sp} Slip of sheet to purlin connection.

s_{sr} Slip of sheet to frame connection.

T Friction element thickness.

t Sheet thickness.

u Perimeter width of one corrugation.

Z One glued area between sheet and purlin.

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