Cairo University

AN INVESTIGATION ON SANDWICH LIGHT WEIGHT FERROCEMENT ONE WAY SLABS

By

ISLAM MOHAMED RABIE MAHMOUD

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirement for Degree of
MASTER OF SCIENCE
in
STRUCTURAL ENGINEERING

FACULTY OF ENGINNEERING, CAIRO UNIVERSIT
GIZA-EGYPT
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Under the Supervision of

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Title of Thesis: AN INVESTIGATION ON SANDWITCH LIGHT WEIGHT FERROCEMENT ONE WAY SLABS

Key Words: Sandwich Panel; ferrocement; Stress-Strain; Flexure Capacity.

Summary:

An experimental investigation was conducted on sandwich light weight ferrocement one way slab specimens each of 1200 mm X 600 mm with varying parameters such as slab thickness (8 & 10 mm), number of layers of steel mesh, interface surface condition between layers, and concrete mix. All the slabs were tested under the effect of one line load acts at mid span. The results were investigated in order to discuss the effect of different parameters on cracking propagation, cracking pattern, ultimate deflection, and ultimate failure load. The conclusion of this research may be useful to find solutions for new design techniques and method of constructions.

Dedication

There are a number of people without whom this work might not have been written, and to whom I am greatly thankful. To my mother, her support, encouragement, and constant love have sustained me throughout my life. To my father, Prof. Dr. Mohamed Rabie, for being there for me throughout my entire education and intellectual development.

To my beloved brother and sister ; particularly my dearest brother, Mahmoud, who stands by me when things look bleak.

This thesis is also dedicated to my wonderful friend, Ziw Wabbit, without her support I could not complete this task. I remain ever her devoted friend.

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Abstract

Ferrocement is a form of reinforced concrete which is made of single or multiple layers of mesh and/or small-diameter rods completely infiltrated with or encapsulated in mortar. The mortar matrix usually comprises more than 95 percent of the ferrocement volume and has a great influence on the behavior of the final product.

The durability and serviceability of ferrocement was recognized by engineers and builders throughout the world who endorsed it as suitable and economical material for construction. Recently, extensive research has been carried out on the efficiency and the feasibility of using ferrocement as a repairing material for damaged or partially damaged concrete structural elements and the results were promising.

In this experimental investigation, sandwich light weight ferrocement one way slab specimens each of 1200 mm X 600 mm with varying parameters such as depth of slab (8 & 10 mm), number of layers of weld mesh (0,1), interface surface condition between layers, and concrete mix. All the slabs were tested under the effect of one line load acts at mid span and the results were studied. The effects of different parameters on cracking propagation, cracking pattern, ultimate deflection, ultimate failure load were discussed and evaluated. This is useful to find solutions by searching new design techniques and method of constructions.