SHEAR BEHAVIOR OF SELF-COMPACTING HIGH STRENGTH CONCRETE INVERTED T-BEAMS

BY

Ahmed Mohamed Mamdouh Mohamed Youssef

A Thesis Submitted to the

Faculty of Engineering, Cairo University

In Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

In

STRUCTURAL ENGINEERING

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2016

SHEAR BEHAVIOR OF SELF-COMPACTING HIGH STRENGTH CONCRETE INVERTED T-BEAMS

By

Ahmed Mohamed Mamdouh Mohamed youssef

A Thesis Submitted to the

Faculty of Engineering, Cairo University

In Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

In

STRUCTURAL ENGINEERING

Under the supervision of

Prof. Dr. Hatem Mostafa Mohamed

....

Professor of Concrete Structures
Structural Engineering Department
Faculty of Engineering,
Cairo University

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2016

SHEAR BEHAVIOR OF SELF-COMPACTING HIGH STRENGTH CONCRETE INVERTED T-BEAMS

By

Ahmed Mohamed Mamdouh Mohamed Youssef

A Thesis Submitted to the

Faculty of Engineering, Cairo University

In Partial Fulfillment of the

Requirements for the Degree of

MASTER OF SCIENCE

In

STRUCTURAL ENGINEERING

Approved by the

Examining Committee

Prof.Dr. Hatem Mostafa Mohamed — Thesis Advisor

Prof.Dr. Mohamed Talat Mostafa — Internal Examiner

Prof.Dr. Hatem Hamdy Gaith — External Examiner

Housing and Building National Research Centre

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2016

Engineer: Ahmed Mohamed Mamdouh Mohamed

Date of Birth: 10 / 08 / 1988

Nationality: Egyptian

E-mail: el-gammal_2010@hotmail.com

Phone: +2 01111240310

Address: 3A Warqa Ebn Nofal St.-6’October city - Giza

Registration Date: 01 / 10 / 2010

Awarding Date: / /

Degree: Master of Science

Department: Structural Engineering

Supervisors: **Prof. Dr. Hatem Mostafa Mohamed**

Examiners: **Prof. Dr. Hatem Hamdy Gaith** (External examiner)

(Housing and Building National Research Centre)

Prof. Dr. Mohamed Talat Mostafa (Internal examiner)

Prof. Dr. Hatem Mostafa Mohamed (Thesis main advisor)

Title of Thesis: **Shear Behavior of High Strength Self-Compacting Concrete Inverted T-Beams.**

Key Words: Shear strength – Self-compacting concrete – High strength concrete

Summary:

The shear behavior of self-compacting reinforced concrete inverted T-beams - with and without diaphragm - was tested in four-point bending configuration considering the thickness of the flange, and the width of the flange. The response of the tested beams was assessed based on the results of crack patterns, load at first cracking, ultimate shear capacity, and failure modes. The Egyptian code of practice -based shear resistance predictions for RC beams were considered. The ECP and ACI code provisions for shear strength and resistance of R.C. can be applied safely to the SCC.

ACKNOWLGMENTS

First of all, I would like to thank Allah for his hospitality in giving me the strength, knowledge and success to finish this research, overcome any obstacles and difficulties I faced during my work.

I would like to express my sincerest appreciation to my advisor Prof. Dr. Hatem Mostafa for his continuous support, valuable guidance, and for giving me the opportunity to be involved in such an interesting research.

I also would like to express my gratitude for Dr Ahmed Youssef for his support to finalize the thesis.

I would like to thank the Concrete Research Laboratory staff at Cairo University for their support and hard work during my experimental research.

Last but not least, I would like to extend my warmest gratitude to all my family especially my parents and sisters whose love and care brought me to this level. I would like to thank them for supporting me in every step of my life and for their assistance, encouragement and support.

Table of contents

List of Tables

List of Figures

CHAPTER (4)

CHAPTER (5)