بسم الله الرحمن الرحيم

MONA MAGHRABY

شبكة المعلومات الجامعية

التوثيق الالكتروني والميكروفيلم

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جامعة عين شمس

التوثيق الإلكتروني والميكروفيلم

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MONA MAGHRABY

Ain Shams University
Faculty of Engineering
Civil Engineering Department-Structural Dept.

Study on The Structural Behavior of Precast Concrete Dapped-End Beams with Different Reinforcement Detail

By
Eng. Osman Mohammed Ezzat
B.Sc. Civil Engineering (Surveying)
Benha University, 2007

A Thesis
Submitted in Partial Fulfillment for Requirements of the Degree of
Master of Science in Civil Engineering (Structural)

Prof. Dr. Ayman Hussein Hosny Khalil
Professor of Reinforced Concrete Structures, Department of Structural Engineering,
Ain Shams University

Prof. Dr. Ashraf Mahmoud Samy Biddah
Professor of Reinforced Concrete Structures, Department of Structural Engineering,
Ain Shams University

Dr. Ayman Sayed Abu-Beiah
Assistant Professor of Reinforced concrete, Department of Structural Engineering,
Ain Shams University

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Faculty of Engineering

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By: **Osman Mohammed Ezzat**

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Examiners Committee:	**Signature**
Prof. Dr. Mohamed ElSaid Issa Professor of Reinforced Concrete Structures, Faculty of Engineering, Cairo University.	…….
Prof. Dr. Ahmed Hassan Ghallab Professor of Reinforced Concrete Structures, Faculty of Engineering, Ain Shams University.	…….
Prof. Dr. Ayman Hussein Hosny Khalil Professor of Reinforced Concrete Structures, Faculty of Engineering, Ain Shams University.	…….
Prof. Dr. Ashraf Mahmoud Samy Biddah Professor of Reinforced Concrete Structures, Faculty of Engineering, Ain Shams University.	…….

INFORMATION ABOUT THE RESEARCHER

Name: Osman Mohammed Ezzat

Birth: Cairo, 2nd November 1985

Degree: Bachelor of Science in Civil Surveying Engineering
Shoubra Faculty of Engineering – Benha University – 2007

Current Job: Senior Structural Engineer
Hard Precast Building System L.L.C. – Dubai – U.A.E

Signature: _____

Date: **19/04/2021**

STATEMENT

This thesis is submitted to the Faculty of Engineering - Ain Shams University for the Degree of **Master of Science** in Civil Engineering (Structural Engineering).

The author carried out the work in this thesis in the Civil Engineering (Structural Section) department, Ain Shams University, from 2015 to 2021.

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

Date : 19/04/2021

Name : Osman Mohammed Ezzat

Signature : _____

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ABSTRACT

MSc Thesis submitted by Engr. Osman Mohammed Ezzat

Reinforced concrete dapped-end beams are mainly used for precast element construction. Generally, the dapped end is recessed at their end parts and supported by columns, beam ledges, or corbels. The geometric discontinuity of dapped-end beams evokes a severe stress concentration at re-entrant corners that may lead to shear failure. Therefore, stress analysis is required at the re-entrant vicinity for the design requirement of these beams.

Objectives were set and the research methodology was put forward to attain such objectives.

This thesis summary describes the design of dapped ends of the precast concrete beam based on an experimental program to identify the reinforcement schemes' effectiveness. In this research, four reinforced concrete dapped end beams with eight ends having a cross-section corresponding to a (400 mm) deep (200 mm) wide and 2m long.

In the experimental program, four R.C. beams with eight different reinforcement schemes were prepared, cast, and tested up to failure and investigated in the experimental program: the PCI-1, PCI-2, Inclined A_s with welded plate, inclined A_s with Practical anchorage, inclined A_s with proper anchorage, 200% A_s with 50% A_{sh}, 200% A_{sh} with 50% A_s, and practical details under which reinforcement schemes were tested, is described in this Thesis summary. Four Dapped end beams specimens were prepared, cast, and tested up to failure. Finite element modeling was done to verify the results.

The parameters were investigated: amount, arrangement & anchorage of flexural reinforcements, Shear Friction Reinforcement, and Hanger reinforcement at the dapped-end area.

Finite element analysis using ANSYS was also conducted to predict the behavior of the dapped end beams. It has been found that the highest stress concentration factors occur at the re-entrant corners and their vicinity. the control specimen was following the PCI design handbook reinforcement arrangement.

The results were presented on charts so as tables and discussed. During the thesis study, conclusions were drawn, and recommendations for future research and Engineering practice were suggested to improve the dapped end reinforcement scheme practices were recommended.

KEYWORDS: Behavior; reinforcement schemes; ultimate; dapped ends.

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