Cairo University

NUMERICAL INVESTIGATION ON SHEAR STRENGTH AND DESIGN REQUIREMENTS OF TAPERED END WEB PANELS

By

Omar Ashraf Omar Abdel-kawy Sediek

A Thesis Submitted to the
Faculty of Engineering at Cairo University
in Partial Fulfillment of the
Requirements for the Degree of
MASTER OF SCIENCE
in
Structural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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Under the Supervision of

Prof. Dr. Sherif S. Safar

……………………………….

Professor of steel structures and Bridges
Structural Engineering
Faculty of Engineering, Cairo University

Dr. Maha M. Hassan

……………………………….

Assistant Professor
Structural Engineering
Faculty of Engineering, Cairo University

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Approved by the
Examining Committee

Prof. Dr. Sherif Saleh Safar	Thesis Main Advisor
Prof. Dr. Hazem Mostafa Ramadan	Internal Examiner
Prof. Dr. Abdel-Rehim Khalil Desouki Professor, Ain Shams University	External Examiner

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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2017

Engineer's Name: Omar Ashraf Omar Abdelkawy Sediek
Date of Birth: 16/10/1992
Nationality: Egyptian
E-mail: civilomarashraf@gmail.com
Phone: +201012050358
Address: 198 Ashgar Compound, Wahat Road, Giza

Registration Date: 1/10/2014
Awarding Date: /   /2017
Degree: Master of Science
Department: Structural Engineering

Supervisors:

Prof. Dr. Sherif Saleh Safar
Dr. Maha Modather Hassan

Examiners:

Prof. Dr. Abdel-Rehim Khalil Desouki
(External examiner)
Prof. Dr. Hazem Mostafa Ramadan (Internal examiner)
Prof. Dr.Sherif Saleh Safar (Thesis main advisor)

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Title of Thesis:

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Key Words:
Tapered Plate girder; Critical Buckling Shear Stress; Ultimate Shear Strength; Tension Field Action.

Summary:

The aim of this research is to investigate the elastic and ultimate shear strengths of tapered steel end web panels. Many codes neglect the effect of the post buckling strength at end web panels since the diagonal tension field was thought to be anchored at flange and adjacent web panels. The effect of several geometric parameters were studied namely: the aspect ratio of the panel, depth–to-thickness ratio, dimensions of intermediate stiffeners and the angle of tapering. The numerical investigation has been conducted using three-dimensional numerical models using ANSYS 11.0 [1] finite element analysis program. The results of the parametric analysis were used to formulate elastic and ultimate shear strengths of tapered end web panels and determine suitable design requirements of intermediate stiffener. The proposed design equations were also validated by comparison to other numerical results that were not included in the parametric study.

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Omar A. Sediek

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