COMPARISON BETWEEN ASD & LRFD EGYPTIAN STEEL CODES FOR BEAM-COLUMNS UNDER DIFFERENT LIVE TO DEAD LOAD RATIOS

By

Abdelrhman Mostafa Awd

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
GIZA, EGYPT
2015

COMPARISON BETWEEN ASD & LRFD EGYPTIAN STEEL CODES FOR BEAM-COLUMNS UNDER DIFFERENT LIVE TO DEAD LOAD RATIOS

By
Abdelrhman Mostafa Awd

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

Under the Supervision of

Dr. Fouad Fayez Aly

Associate Professor of Structural Engineering
Structural Engineering Department
Cairo University

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2015

COMPARISON BETWEEN ASD & LRFD EGYPTIAN STEEL CODES FOR BEAM-COLUMNS UNDER DIFFERENT LIVE TO DEAD LOAD RATIOS

By
Abdelrhman Mostafa Awd

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

Approved by the
Examining Committee

Prof. Dr. Nabeel Mahmoud, External Examiner

Prof. Dr. Ahmad Fouad Sabry, Internal Examiner

Assoc. Prof. Dr. Fouad Fayez Aly, Thesis Main Advisor

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
2015

Engineer's Name: Abdelrhman Mostafa Awad

Date of Birth: 25/12/1980

Nationality: Egyptian

E-mail: Abdlerhman80@yahoo.com

Phone: +201114701881

Address: 19A Omarat El Obour Salah Salem

Registration Date: 1/10/2011

Awarding Date: / /

Degree: Master of Science

Department: Structural Engineering

Supervisors: Assoc. Prof. Dr. Fouad Fayez Aly

Examiners: Prof. Dr. Nabeel Mahmoud, (External examiner)

Prof. Dr. Ahmad Fouad Sabry (Internal examiner)

Assoc. Prof. Dr. Fouad Fayez Aly (Thesis main advisor).

Title of Thesis:

COMPARISON BETWEEN ASD & LRFD EGYPTIAN STEEL CODES FOR BEAM-COLUMNS UNDER DIFFERENT LIVE TO DEAD LOAD RATIOS

Key Words:

ASD; LRFD; ECP CODE, STEEL; BEAM-COLUMN.

Summary:

This Thesis presents a study of the structural design of beam-columns in accordance with the latest Egyptian steel codes (ASD & LRFD) under the effect of different live to dead load ratios. Extracted design charts are produced to determine the relation between different Live to dead load ratios versus different unsupported member lengths. While focusing on regions where either LRFD or ASD shall give an optimum designed section based on the different design parameters. Different cross sections, member spans, steel grade and buckling lengths are introduced. It is shown clearly the significant effect of different sharing of axial compression force to the applied moment for the output results. Great influence is also observed for the unsupported length "Lu" and of course the live to dead load ratio. Generally it is concluded that, ASD" method is more reliable than "LRFD" method for beam-column section with bigger unbraced length "L_u", and for higher N ratios, while LRFD method is much optimum for smaller Lu values, smaller N ratios, smaller cross sections and smaller L/D ratios.

Acknowledgments

I would like to express my deepest gratitude and appreciation to my supervisor Prof. Dr. Fouad Fayez for his precious guidance, support and encouragement, and it makes me proud that he supervised this thesis. I would also like to express my deepest gratitude to him for his great effort and help to complete the research and his insistence on following the progress weekly till the end of the research. Grateful thanks to the staff of the steel Department of the faculty of Engineering. Finally, I cannot express my deepest appreciation to my dear mother for her support and encouragement through my entire life.

Dedication

I Dedicate This Thesis To My Dear Mother.

Table of Contents

List of Tables

List of Figures