ULTIMATE STRENGTH OF TAPERED PLATE GIRDERS UNDER COMBINED SHEAR AND BENDING

By

Farah Fayrouz El Dib

A Thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the degree of
DOCTOR OF PHILOSOPHY
in
Structural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA – EGYPT
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Under the Supervision of

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Title of Thesis:

Ultimate strength of tapered plate girders under combined shear and bending

Key Words:
Tapered plate, Buckling, Ultimate Load, Pure Shear, Pure Moment, Interaction

Summary:

A procedure is developed, presented and evaluated to consider geometrical shape and structural imperfections in tapered web plate girders to calculate the ultimate bending strength under uniform stresses. The adjusted residual stress distribution in tapered web plates is used to determine ultimate loads, considering structural imperfections, using FEM / ANSYS 13, in addition to their corresponding elastic critical Eigen-Values, with and without residual stresses. Several figures represent the accurate as well as the approximate solutions, given by an equation or by ultimate pure and interaction stresses respectively.

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This study consumed huge amount of work, research and dedication. Still, it would not have been possible to present thesis in it's current form if we did not have a support of many individuals and organizations. Therefore we would like to extend our sincere gratitude to all of them.

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