AIN SHAMS UNIVERSITY
FACULTY OF ENGINEERING

THEORETICAL CONTRIBUTION TO THE ASPECT OF ELASTO-PLASTIC ANALYSIS AND DESIGN OF STRUCTURES

BY

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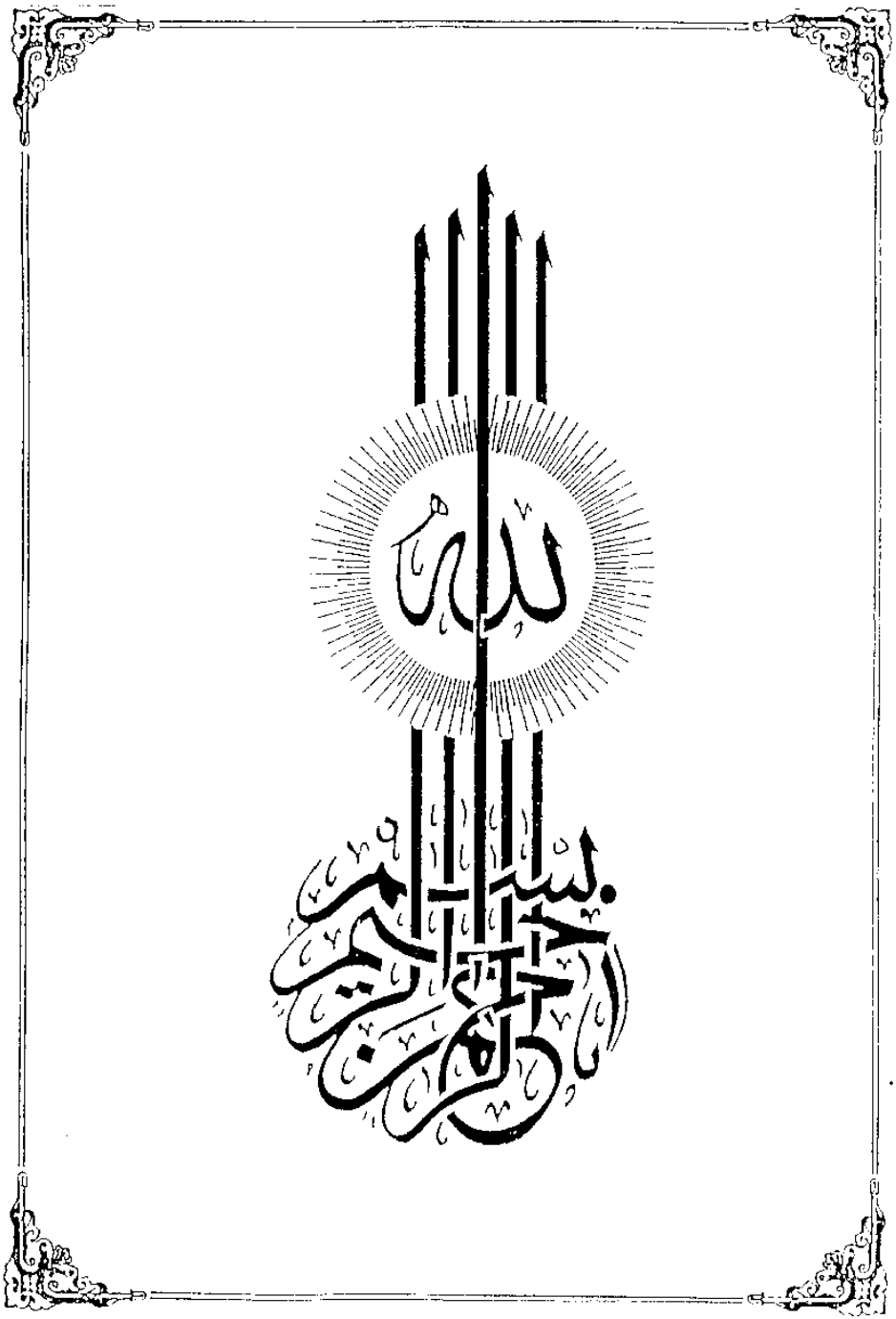

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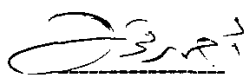

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STATEMENT

This dissertation is submitted to Ain Shams University for the degree of **Master of Science** in Civil Engineering (Structural).

The work included in this thesis was carried out by the author in the department of Civil Engineering (Structural Division), Ain Shams University, from February 1994 to August 1996.

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

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Name AYMAN REFAAT AHMED MOUSTAFA

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ABSTRACT

The present research is considered as a survey for the different methods used in the analysis and design of steel frames, whatever these methods are elastic, non-linear elastic or plastic analysis.

The research starts with representing the analysis methods used previously and also represents the different methods used for optimum design and their classification. The research concentrates especially on the non-linear elastic analysis of steel frames as this analysis will be used in the optimum design. The research also reviews the Refined Plastic Hinge analysis method as it is the method used in this thesis for plastic design check..

The thesis introduces a method of optimum design considering stress and buckling constraints, this method uses the moment of inertia as the design variable.

Different shapes of structural steel frames are analyzed to apply the analysis and optimum design method. Effect of using the section

The thesis analyzes the optimally designed frames using the refined plastic hinge method and get the factor of safety against plastic collapse for these frames. Finally the research represents the basic results obtained, the conclusions of this research and recommendations for the future studies.

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