UNIVERSITI TEKNOLOGI MARA

STEEL BOX GIRDER WITH PROFILED WEBS

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of the requirements for the degree of
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AUTHOR'S DECLARATION

I declare that the work in this thesis was carried out in accordance with the regulations of Universiti Teknologi MARA. It is original and is the result of my own work, unless otherwise indicated or acknowledged as referenced work. This thesis has not been submitted to any other academic institution or non-academic institution for any other degree or qualification.

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ABSTRACT

Rotation capacities obtained by a steel box girder with flat webs compare to the equivalent steel box girders with profiled webs are different. One of the objectives of the research presented in this thesis is to investigate if there is any improvement of plastic section rotation capacities steel box girder with profiled webs. All the tested specimens were loaded under four point bending. Three dimensional (3D) computer models analysed using the finite element method were used throughout the study. Results from pre-existing experimental work for I- section steel girder were used to validate the results obtained from the finite element analysis. Consequently, establishment of steel box girders were made and then validated with the classical beam theory. Failure mode of steel box girders with profiled webs starts with yielding followed by local buckling of the compression flanges. Incline folds in profiled webs at the compression area are able to cope with higher stresses as compared to horizontal folds. Rotation capacity percentage increament of steel box girder with flat webs as compared to the equivalent steel box girders with profiled webs was about 99.55% with 0.16 standard deviation. The increment is about,double the rotation capacity of a girder with flat webs to the girder with profiled webs. Hence, the contribution from webs was significant to the rotation capacity. Rotation capacities increase significantly as the flange thickness and web thickness increase. While, as the yield stress, flange internal element width and flange external element width of steel plate box girders with the profiled webs are increased, the rotation capacities experience reduction.

TABLE OF CONTENTS