

## **LATERAL TORSIONAL BUCKLING OF BEAM WITH TRAPEZOID WEB**

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### **ABSTRACT**

The use of corrugated sheets to replace flat sheets as webs of a built-up steel plate girder can stiffen the web without the use of intermediate stiffeners as in the conventional design using flat web. In addition, it reduces the total weight of the structure, thus allowing longer spans and savings in foundation design. For a long span beam, a design criteria which is of importance is its performance under lateral torsional buckling moment. However, there are very few researches carried out on this subject, hence it is studied here. The objectives of the study is to determine the lateral torsional buckling capacity of trapezoid web profile in comparison with normal flat web beams using experimental and analytical method. In the experimental work, six beam sections with nominal dimension 200 x 80 mm and 5 m length were tested. Two beams were of full corrugation, two with half-corrugation and another two with flat web. They were loaded vertically with their lateral deflections were unrestrained to allow for lateral deflection. A specially designed loading device was developed to apply load on the beam in such that the beam can deflect laterally while the load is applied on its neutral axis. The moment buckling is determined using "knee method" from the graph of bending moment versus lateral deflection.

From the study, it is concluded that steel beams with trapezoidally corrugated web section have higher resistance to lateral torsional buckling compared to that of section with flat web. The sections with full corrugation were stronger than the section with half corrugation, which implies that the corrugation of the web contributes to the increased resistance to lateral torsional buckling. The finding is also in correspondence with other study which found that the moment of inertia about flat web.