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Comparison of Safety Factor Evaluation Methods for Buckling of High Strength Steel Welded Box Section Columns

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Abstract : In the research praxis of civil engineering the statistical evaluation of experimental and numerical investigations is an essential task in order to compare the experimental and numerical resistances of a specific structural problem with the proposed resistances of the standards. However, in the standards and in the international literature there are several different safety factor evaluation methods that can be used to check the necessary safety level (e.g.: 5% quantile level, 2.3% quantile level, 1‰ quantile level, γM partial safety factor, γM* partial safety factor, β reliability index). Moreover, in the international literature different calculation methods could be found even for the same safety factor as well. In the present study the flexural buckling resistance of high strength steel (HSS) welded closed sections are analyzed. The authors investigated the flexural buckling resistances of the analyzed columns by laboratory experiments. In the present study the safety levels of the obtained experimental resistances are calculated based on several safety approaches and compared with the EN 1990. The results of the different safety approaches are compared and evaluated. Based on the evaluation tendencies are identified and the differences between the statistical evaluation methods are explained.

Keywords : flexural buckling, high strength steel, partial safety factor, statistical evaluation
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