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Steel structure optimization through the performance based design: Case study using push over analysis

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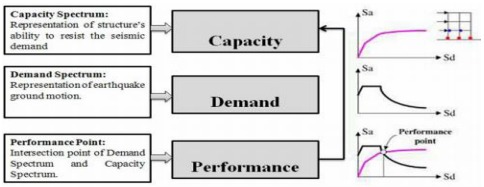

Steel structures became fastest and attractive construction strategy for the industrial building all over the world form the two decades ago. However, the many countries followed their own codes to design the steel structures based on experience. However, most of the design has been done based on the local design philosophy and country accepted codal provision given. In this research it has been discussed the performance based design of steel building to predict the global behavior in order to optimize the steel structures over the global behavior. The two case studies have been done to evaluate the structural performance of the steel structures. The both studies have been carried out under the same loading (lateral) and output compared by using push over analysis. Elastic spectrums have been derived and it has compared with demand curve produced. However, local structural elements also be evaluated based on the codal provision given in order to make sure the ultimate and serviceability limit state. It clearly show that convectional design proceedings for the steel structures has been shown less performance compare to performance based design. The performance based analysis were compared and show significant impact on the design phase where the critical analysis of the structure became the lateral loading condition. The plastic hinge formation of structure used to predict the overall structural performance. Finally, it has been compared foundation, super structural element separately for the purpose of doing the cost comparison. In Sri Lanka, the most of the construction are focus to reinforced concrete and however most of the client brings realizing the advantages of steel structure. Only challenge is the structural stability over the ductility which earns more on concrete. But, it has been addressed over this design for moderate condition where the Euro code 8 specified respect to the Ecurocode 3 (steel design). The loading combinations of each structure have been considered as per the BS 6399 and it is more conventional to have lateral loading condition.

Recent Publications

1. Michelangelo Laterza, Michele D'Amato and Laksiri Pradeep Thanthirige (2013) Franco Braga, Rosario Gigliotti, Critical regions of RC primary elements detailed in according to provisions rules for curvature ductility: comparisons and numerical analyses. *Open Construction Journal*; 8: 129-141.

Biography

T L Pradeep has more than 10 years research experience and comprehensive industrial commitment in engineering discipline. He has completed his PhD in Structural Engineering at University of Basilicata, Italy under the European Commission Merit Scholarship Program (EUNICE) and Master of Science, Bachelor of Science in University of Perdeniaya, Sri Lanka and University of Ruhuna, Sri Lanka, respectively. He is pioneer in structural engineering, seismic engineering, sustainable material and green construction, dynamic analysis and design, high rise building design and renewable sector.

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