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SEISMIC DESIGN OF STEEL MOMENT RESISTING FRAMES-EUROPEAN VERSUS AMERICAN PRACTICE

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Abstract:

This paper provides an overview on the design philosophy of moment resisting frames (MRF) according to the seismic provisions of Eurocode 8 and American Institute of Steel Construction (AISC). A synopsis of the main recommendations of the two codes is briefly described. Then in order to examine the structural efficiency of the design principles of MRF according to the aforementioned codes, a case study is developed in which spatial and perimeter moment resisting frames of 12, 6 and 3 storeys residential building are considered. In the case of EC8, Ductility Class Medium (DCM) with behaviour factor of 4 and Ductility Class High (DCH) with behaviour factor of 6.5 for 6-storey frames are used, while only DCH is employed in the design of 12 and 3 storey frames. When dealing with AISC/American Society of Civil Engineers (ASCE) code, special moment resisting frame (SMF) with response modification factor of 8 is employed in the design. The outcomes from the design are illustrated in terms of frame performance, section profiles, strength-demand to capacity ratios, drift-demand to capacity ratios and structural weight, thus allowing the understanding of pros and cons of the design criteria and the capacity design rules of the two codes. The main purpose of the current paper is to compare the seismic design rules of the two codes with a parametric analysis developed by a case study in order to let the technician knows about the importance and influence of some important parameters which are given in the capacity design rules of the two codes. This study will be a benchmark for further analysis on the two codes for seismic design of steel structures.

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