

Optimal Load Factors for Seismic Design of Buildings

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Abstract : A life-cycle optimization procedure to establish the best load factors combinations for seismic design of buildings, is proposed. The expected cost of damage from future earthquakes within the life of the structure is estimated, and realistic cost functions are assumed. The functions include: Repair cost, cost of contents damage, cost associated with loss of life, cost of injuries and economic loss. The loads considered are dead, live and earthquake load. The study is performed for reinforced concrete buildings located in Mexico City. The buildings are modeled as multiple-degree-of-freedom frame structures. The parameter selected to measure the structural damage is the maximum inter-story drift. The structural models are subjected to 31 soft-soil ground motions recorded in the Lake Zone of Mexico City. In order to obtain the annual structural failure rates, a numerical integration method is applied.

Keywords : load factors, life-cycle analysis, seismic design, reinforced concrete buildings

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