



Influence of Building Occupancy on Seismic Life Cycle Cost

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Abstract

Past studies show that seismic hazard related losses have negative implications on the economy of the nation and society. Seismic loss estimation methodology based on next generation “Performance Based Earthquake Engineering (PBEE)” is used for evaluating seismic losses. Repair and replacement costs, casualties, injuries, and repair time are the various performance metrics used to quantify seismic hazard related losses. Seismic hazard related losses will also depend on the type of occupancy such as commercial, residential, hospital, educational, hospitality, research, and warehouse as the non-structural components of the building will vary as per the occupancy type. In this study, seismic hazard related losses are compared for structural steel buildings considering different occupancy types. Buildings with the same plan and elevation are designed, with the site location adopted as Los Angeles, California, USA. State of art modeling technique is used for non-linear modeling of the steel buildings and non-linear time history analysis is used for their structural analysis. The case study buildings are perimeter special moment-resisting frame buildings. This study will help us determine the influence of occupancy type on different seismic hazard related loss performance metrics.

Keywords: Steel buildings, PBEE, Seismic life cycle cost, Building occupancy