



Effect of yielding dampers on the damage potential of steel frames under near-fault and far-field ground motions

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Abstract

This paper investigates the damage potential of steel moment resisting frames equipped with metallic yielding dampers. For this purpose, steel frames with a different number of stories (i.e., 3, 6, 9, and 12) have been considered and nonlinear incremental dynamic analyses (IDA) have been carried out on the models with and without damper system using OpenSees software. The damage potential of the models is investigated by fragility curves coming from IDA results. The results show that IDA curves obtained from the near-fault ground motions have the less initial stiffnesses and PGA levels correspond to the predefined limit states than those correspond to the far-field ones. This trend is kept for all models with and without damper system. Comparison of the fragility curves shows that the damage potential of the models equipped with the damper systems is reduced. However, increasing the damper system stiffness does not always lead to a lower damage probability.

Keywords:

Damage potential, Fragility curve, Incremental dynamic analysis, Steel frame, Yielding damper.

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