



A State-of-the-art Review on Metallic Dampers based on Different Yielding Mechanism

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Abstract

Conventional seismic design approach primarily relies on the strength and ductility of the structure. The structure remains elastic under low magnitude earthquakes; however, during high magnitude earthquakes, the structure undergoes large inelastic deformation to dissipate the energy and rely on the ductility of the structure. Thus allow the formation of hinges at the predefined locations in primary lateral load resisting members, which may lead to the collapse of the structures. For the last few decades, structural response control devices such as dampers have been extensively used to alleviate these damages. These devices have become more prevalent due to their ability to mitigate the structural response caused by wind and seismic load. Response control devices can be broadly divided into three parts 1) Active, 2) Passive, and 3) Semi-active. Active and semi-active devices depend on the external power supply and require skilled labor for installation and replacement. Passive devices are easy to install and replace, and no external power supply is needed to operate them during dynamic loading. Among all passive devices, metallic yield dampers are widely recognized and accepted owing to their easy installation, workability, resistance to ambient temperature, cost-effectiveness, and stable hysteretic behavior. Metallic yield dampers dissipate energy by inelastic deformation of the metals. The present article focuses on the state-of-the-art literature review, including development, yielding mechanism, comparative performance, and modeling of metallic yield dampers based on previous studies.

Keywords: Metallic dampers, Ductility, Hysteresis, Yielding mechanism, Energy dissipation