

عنوان مقاله:

Comparative Performance Study of Tuned Liquid Column Ball Damper for Excessive Liquid Displacement on Response Reduction of Structure

محل انتشار:

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خلاصه مقاله:

The tuned liquid column damper (TLCD) having a uniform cross-sectional tube of U-shaped, occupied with liquid is used as a vibrational response mitigation device. The tuned liquid column ball damper (TLCBD) is a modified TLCD, where, an immovable orifice, positioned at the middle part of the horizontal portion, is replaced by a metal ball. Different studies on the unconstrained optimization performance of TLCBD subjected to the stochastic earthquake have been performed where limitations on the maximum amplitude of liquid present in the vertical portion of the tube were not imposed. In the case of the high magnitude of earthquake and space constraint, the excessive liquid movement might get generated in the vertical portion of the tube which can create challenging circumstances. This can be taken care of by restricting the liquid movement up to a certain limit. The present investigation considers the optimum performance of the structure with TLCBD for mitigating the vibrational response with limited liquid movement in the vertical portion of the tube. A numerical study has been carried out to demonstrate the difference between constrained and unconstrained optimization of structure-TLCBD system. Numerical results show the influence of .constraining cases on optimum parameters and performance behavior of the structure-TLCBD system

کلمات کلیدی:

constrained optimization, Limited Liquid Displacement, Response Reduction, Tuned Liquid Column Ball Damper

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