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Seismic Vibration Control of Jacket Platform with the aid of Tuned Liquid Dampers

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Abstract

For the offshore platform located in an active fault zone, earthquakes are a significant additional burden to the wave load. When mining and producing resources from the ocean, jacket platforms are frequently exposed to a variety of environmental stresses, including waves, strong winds, earthquakes, tsunamis, etc. Jacket platforms are more susceptible to seismic loads because of their inflexible design. The goal of the current investigation is to determine how well Tuned Liquid Dampers (TLD) manage the earthquake-induced responses of jacket platforms. A linear time history analysis is performed in SAP2000, with and without TLDs. The TLD behavior has been simulated using a simplified lumped mass model. The efficiency of TLD was evaluated for three different seismic excitations in order to determine its durability. For the purpose of examining the impact of various factors on the functionality of the TLD, the effectiveness of TLDs is explored for variable depth ratio, mass ratio, and structural damping. The general conclusions of the numerical investigation show that TLD has the ability to regulate the jacket deck vibrations under seismic excitation.

Keywords: Jacket platform, Tuned liquid damper, Seismic load