

Abstract

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Earthquake vulnerability assessment of a mobile jackup platform in the Gulf of Suez

The vulnerability of an existing jackup platform, in the Gulf of Suez region, to earthquake ground loads, is investigated in this paper. A case study for the earthquake response assessment of a typical mobile jackup platform located in the Gulf of Suez area is presented. The seismic performance of the jackup rig is assessed using the finite-element method. A nonlinear finiteelement model of the jackup rig is constructed taking into account the effect of structure to soil interaction. The platform is first assessed for environmental loads including waves and currents. Earthquake ground motion is then incrementally applied using a time-domain dynamic pushover response analysis. Member stresses resulting from environmental loads are combined with seismic stresses. Results show that the platform is able to resist low-to-moderate seismic activity up to 0.30g after which the integrity of the platform could be compromised. The Gulf of Suez is a seismically active region. Jackup platforms operating in this area should be assessed for earthquake loads.