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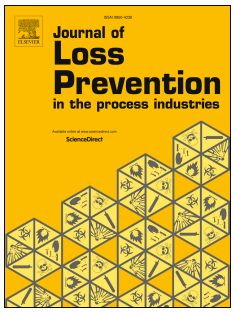

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Estimation of oil overflow due to sloshing from oil storage tanks subjected to a possible Nankai Trough earthquake in Osaka bay area

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ABSTRACT

Sloshing of oil storage tanks is a great threat to industrial complexes when huge earthquakes occur. Overflow of oil due to sloshing could lead to serious tank fire and to oil dispersion due to Tsunamis. Since liquid sloshing is characterized as a highly nonlinear free-surface flow, numerical approaches are more suitable than theoretical ones to estimate the overflow from oil storage tanks caused by sloshing. The moving particle simulation (MPS) method, which is a mesh-free and Lagrangian particle method, is applied to the sloshing simulation. Thanks to the perfect mass conservation of the particle method, the overflow amount of oil can be accurately estimated by simply counting the number of overflowed fluid particles.

There is high-possibility of occurrence of huge earthquakes along the Nankai Trough subduction zone, and the worst scenario is presumed as M_W9.0, which is the same as the 2011 Tohoku earthquake. In order to simulate sloshing of oil storage tanks subjected to a possible Nankai Trough earthquake, ground shaking characteristics of the site need to be evaluated. Therefore we carried out microtremor measurements with high density in an industrial complex in Osaka bay area. A strong ground motion during a scenario earthquake with M_W9.0 along the Nankai Trough is