

Foundation Retrofitting of Storage Tank under Seismic Load

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Abstract : The different seismic behavior of liquid storage tanks rather than conventional structures makes their responses more complicated. Uplifting and excessive settlement due to liquid sloshing are the most frequent damages in cylindrical liquid tanks after shell buckling failure modes. As a matter of fact, uses of liquid storage tanks because of the simple construction on compact layer of soil as a foundation are very conventional, but in some cases need to retrofit are essential. The tank seismic behavior can be improved by modifying dynamic characteristic of tank with verifying seismic loads as well as retrofitting and improving base ground. This paper focuses on a typical steel tank on loose, medium and stiff sandy soil and describes an evaluation of displacement of the tank before and after retrofitting. The Abaqus program was selected for its ability to include shell and structural steel elements, soil-structure interaction, and geometrical nonlinearities and contact type elements. The result shows considerable decreasing in settlement and uplifting in the case of retrofitted tank. Also, by increasing shear strength parameter of soil, the performance of the liquid storage tank under the case of seismic load increased.

Keywords : steel tank, soil-structure, sandy soil, seismic load

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