

ANALYSIS OF SLOSHING IMPACT ON OVERHEAD LIQUID STORAGE STRUCTURES

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ABSTRACT

This paper presents analysis to study the effects of sloshing in overhead liquid storage tank. In such structure a large mass concentrated at the top of slender supporting structure makes the structure vulnerable to horizontal forces e.g. due to earthquakes. This study focuses mainly on the response of the elevated Intze type water tank to dynamic forces by both equivalent static method and finite element analysis using commercial software. To find out the design parameters for seismic analysis and also the importance in the sloshing effect consideration during the design. Here an elevated Intze type water tank is analysed and designed. The analysis is carried out for two cases namely, tank full condition considering only the hydrostatic effects and tank full condition considering the sloshing effect using STAAD Pro. From the analysis it is concluded that, to consider the sloshing effect along with the effect of hydrodynamic pressure on container wall of the tank during the design is very important in earthquake prone regions. The results obtained from analyses are discussed considering the importance of the structure during seismic activity.

KEYWORDS: Sloshing, Hydrostatic Load, Convective Mass, Impulsive Mass, STAAD Pro Modelling