

# ICES 2024

TITLE OF PROJECT:  
**Dynamic Analysis of Elevated Water Tank**

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## ABSTRACT (150-300 words):

A water tank is a container which is used for storing water. They are used to provide storage of water for various uses such as drinking purposes, irrigation, agricultural, fire suppression, chemical manufacturing, food preparation as well as many other uses. Storage reservoir and overhead tank are used to store water. Elevated water tanks are also known as a water tower, constructed at certain height so as to create sufficient pressure in the water distribution system, this tanks are considered as important town services in many cities. Their safety performance during the strong earthquakes is of critical concern. They should not collapse during and after the earthquake, so that they can be used in meeting the essential requirements like drinking water and extinguish fire. Many studies focused on the seismic behavior, analysis and design of elevated water tanks considering the dynamic analysis. In the present study, the elevated water tank is analysed using four methods namely response spectrum method using IS 1893 (part1): 2016 recommended spectrum, response spectrum method using average response spectrum, Endurance Time (ET) Functions and Time History method using EL Centro earthquake record. Average response spectrum is obtained using ground acceleration time history of ten earthquakes recorded in northern part of India. Seismo-signal and Seismo-match software are used to obtain IS compatible response spectrum. It is observed that the base shear and maximum lateral displacement of the tank obtained using response spectrum method and ET functions are in close agreement with each other. The base shear calculated from average response spectrum is much less than that obtained using IS recommended response spectrum which directly indicate the safety margin in the design.

**KEYWORDS:**

Dynamic Analysis, Time History Method, Endurance Time Functions, Average Response Spectrum, Response Spectrum Method

**CATEGORY:** Structural Engineering