



# A Research on Seismic Analysis of Elevated Water Tank with Variations of H/D Ratio and Container Shape

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## Abstract—

*Water tank is considered to be an important structure and they should remain functional during earthquakes to overcome the water demand due to fire etc. Water tanks are different from buildings, in the sense that a huge mass of water is concentrated at top supported on slender staging. As known from very upsetting experiences, liquid storage tanks were collapsed or heavily damaged during the earthquakes all over the world. The economic lifetime of concrete or steel tanks is usually in the range of 40 to 75 years. Damage or collapse of the tanks causes some unwanted events such as shortage of drinking and utilizing water, uncontrolled fires and spillage of dangerous fluids. Due to this reason numerous studies done for dynamic behavior of fluid containers; most of them are concerned with cylindrical tanks. In this study, Seismic forces acting on an Elevated water tank e.g. circular Tank and rectangular tank are studied with constant staging height. Seismic forces acting on the tank are also calculated changing the Seismic Response Reduction Factor(R). IS: 1893-1984/2002 for seismic design and then checked the Design of Tanks by using the software STAAD PRO.*

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## 1. INTRODUCTION

Water is life line for every kind of creature in this world. All around the world liquid storage tanks are used extensively by municipalities and industries for water supply, firefighting systems, inflammable liquids and other chemicals. Thus Water tanks plays a vital role for public utility as well as industrial structure having basic purpose to secure constant water supply from longer distance with sufficient static head to the desired location under the effect of gravitational force. Storage reservoirs and overhead tank are used to store water, liquid petroleum, petroleum products and similar liquids. The force analysis of the reservoirs or tanks is about the same irrespective of the chemical nature of the product. All tanks are designed as crack free structures to eliminate any leakage. Water or raw petroleum retaining slab and walls can be of reinforced concrete with adequate cover to the reinforcement. Water and petroleum and react with concrete and, therefore, no special treatment to the surface is required. Industrial wastes can also be collected and processed in concrete tanks with few exceptions. The petroleum product such as petrol, diesel oil, etc. are likely to leak through the concrete walls, therefore such tanks need special membranes to prevent leakage. Reservoir is a common term applied to liquid storage structure and it can be below or above the ground level. Reservoirs below the ground level are normally built to store large quantities of water whereas those of overhead type are built for direct distribution by gravity flow and are usually of smaller capacity. Elevated tanks should remain functional in the post-earthquake period to ensure water supply is available in earthquake-affected regions. Never the less, several elevated tanks were damaged or