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A Survey on Dynamic Analysis of RCC Elevated Water Tank

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ABSTRACT:

Water tanks are essential Lifeline components. They are essential components of fire suppression systems, municipal water supplies, and several industrial water storage facilities. Elevated water tanks are important and strategic structures, and damage to those structures during earthquakes may jeopardise the availability of drinking water by making it impossible to prevent the damage to a significant number of above water tanks in the past earthquakes. Therefore, it is necessary to thoroughly analyse the seismic behaviour of certain structures during earthquakes.

Keywords: Elevated Cistern, Kobe Earthquake, Modal Analysis

1.Introduction

Water could be a necessity for daily life. The design of a cistern in a particular area is necessary for adequate water distribution. Municipalities And Industries Widely Utilize Elevated Water Tanks To Store Water, Flammable Liquids, And Other Chemicals Water tanks are therefore essential for public utility. Elevated water tanks are important strategic structures, and earthquake damage to these structures could jeopardise drinking water supplies. Elevated water tanks contribute to the failure to successfully prevent significant economic losses and large fires.

There are several steps in the current study, including:
1. Static Analysis Using Indian Standard Codes (Is3370, Is11682, Is456, And Is875)
2. Response Spectrum Method for Dynamic Analysis (Is1893 Method)
3. Dynamic Analysis by the Fem 368 Method of the Displacement Coefficient.
4. Computerized Evaluation
5. A Comparison of the Results Achieved Using Different Approaches.

Earthquake, Drought, Flood, Cyclone, and Other Natural Disasters Are Very Prone To The Indian Subcontinent. The majority of States or these Natural Disasters Are Responsible For Numerous Casualties And Countless Property Losses Each Year. The first spot in the vulnerability code for earthquakes is 1893(Part I): 2000; following an earthquake, property losses are frequently partially recouped, but life losses are not. The collapse of structures is the most fatal loss.

2. Literature Review

It would be challenging to provide a comprehensive review of the literature on dynamic analysis of elevated RCC circular liquid storage tanks, so this literature review concentrates on recent contributions that are most closely related to the requirements of the current work. If structural failures result in the release of hazardous materials, earthquakes represent equipment or constructions. Qra, or Quantitative Risk Analysis Provides A Guide For The Analysis Of Commercial Risk; If Ground Motion Related Malfunctioning (I.E. Failure) Rates For Components Are Available, This Assessment May Include The Seismic Threat [2].Steel tanks for oil storage are standardised structures from a structural standpoint, both in terms of design and construction [3, [4,] [5]. Review Of International Standards For The Development Indicates That The Design Evolved Slowly; As a Result, An Excessive Amount Of Post-Earthquake Damage Observations [6] Are Available, and Empirical Vulnerability Functions Have Been Created [7]. Water and sewage treatment plants as well as other industrial wastes are primarily used in liquid containment structures (loss) as part of environmental engineering facilities.

They are often built out of reinforced concrete in rectangular or circular configurations. In North America, there are currently few codes and standards available for seismic design of loss. The Houser's Model (Houser, 1963) has been used for dynamic analysis of loss in the majority of codes and standards. The Impulsive and Convective Components of the Hydrodynamic Pressures Induced by Earthquakes Are Separated Into Two Parts, which Are Approximated by the Lumped Added Masses..

To simulate the effect of sloshing motion, the added mass in terms of convective pressure is assumed to be connected to the tank wall using flexible springs, while the added mass in terms of impulsive pressure is assumed to be connected to the tank wall rigidly. The condition is treated as rigid in this

model when calculating hydrodynamic pressures. Even though the Seismic Design of Loss has used the Hoosier's Model. In the past, recent studies have demonstrated that this method yields results that are excessively conservative since it assumes the lumped added mass and, consequently, the rigid tank wall. Kansh and Chen (2005).

3. Scope of the Study

Various techniques for the dynamic study of a water tank are examined in this paper. These are the study's most important areas of focus.

1. To review the various techniques for water tank analysis and design.
2. To develop a study on the standards for the dynamic analysis and design of liquid-retaining structures in accordance with IS Code.
3. To comprehend the design philosophy for a safe and cost-effective water tank.
4. To examine if the computer software is appropriate and applicable for the dynamic analysis of RCC liquid storage tanks.
5. To determine whether the displacement coefficient method is appropriate for the dynamic analysis of RCC liquid storage tanks.

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