

Design Of Elevated Water Tank Using Stadd Pro Software

PROF. PRITAL KALASUR¹, SAHIL GADEKAR², OMKAR RANDHAVAN³, ABHISHEK JAJAGE⁴, SHREEYASH GAIKWAD⁵

^{1, 2, 3, 4, 5} Department Of Civil Engineering, Dr. D.Y. Patil College Of engineering, Akurdi, Pune, Maharashtra, India.

Abstract— Due to the huge demand, water must be stored and supplied according to the needs of the people. Water consumption changes during the day. It varies from one hour to the next. To give a consistent volume of water, we need to store water. As a result, a water tank will need to be constructed to meet the public water demand. A water tank is a structure used to hold water for the purposes of giving drinking water to people, cooling water to businesses, and irrigational water for agricultural crops in some locations. The shape and structural position of water tanks are used to classify them. We reviewed how to use Staad pro to create and analyse water tanks, both above and below ground, in rectangle, square, and circular shapes. The study's findings highlight the significance of shape element on design loads, as well as how tank shapes influence design, stress distribution, and overall cost. Using STAAD PRO V8i, this project explains the idea behind the construction of a water tank.

Index Terms- Water tank construction, STAAD PRO V8i, Rectangular, square, and circular water tanks, Design loads, Stress Distribution

I. INTRODUCTION

Water tanks play a vital role in ensuring a consistent and reliable water supply for various needs, including drinking, industrial processes, and irrigation. Elevated water tanks, supported by columns, are particularly important as they utilize gravity to distribute water efficiently. Designing these structures requires careful consideration of various factors to ensure their stability, safety, and functionality.

This study focuses on the design and analysis of elevated water tanks using STAAD PRO software, a

powerful tool for structural engineering. STAAD PRO allows for precise modeling and analysis of different design parameters, helping engineers optimize the tank's performance under various conditions. This research aims to evaluate the structural integrity and performance of elevated water tanks with different heights and configurations.

By using STAAD PRO, we can simulate real-world scenarios and assess key factors such as base shear, overturning moments, and displacement. This approach enables us to identify the most effective design strategies, balancing considerations such as construction cost, material efficiency, and practical feasibility. The ultimate goal is to develop robust and reliable design practices for elevated water tanks, ensuring their safety and operational continuity.

Through this study, we aim to provide valuable insights into the behavior of elevated water tanks supported by columns, contributing to the development of more resilient infrastructure. The findings will be particularly relevant for regions with fluctuating water demands and varying environmental conditions, where the reliability of water supply systems is crucial.

II. PROCEDURE FOR PAPER SUBMISSION

A. Review Stage

Submit your manuscript electronically for review. prepare it in two-column format, including figures and tables (until it doesn't fit properly and data is not visible).

B. Final Stage

After your paper has been accepted. The authors of the accepted manuscripts will be given a copyright form and the form should accompany your final submission.

C. Figures

As said, to insert images in Word, position the cursor at the insertion point and either use Insert | Picture | From File or copy the image to the Windows clipboard and then Edit | Paste Special | Picture (with —Float over text| unchecked).

OBJECTIVES.

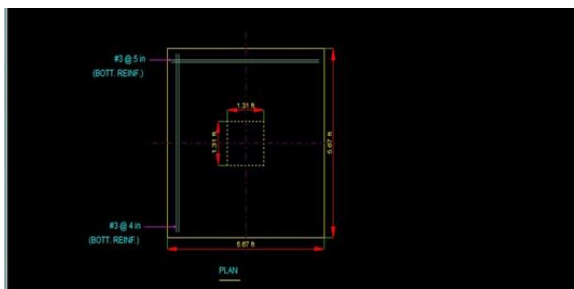
- 1) Study of structural parameters.
- 2) Analysis and design of water tanks.
- 3) Design Economic water tank structure.
- 4) Using Staad Pro for analysis and design.
- 5) Ensure Water Supply Reliability

III. RESEARCH METHODOLOGY

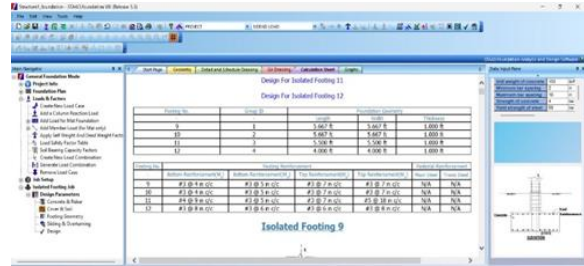
1. Topic selection
2. Literature survey.
3. Study of water tank.
4. Collection of required data.
5. Manual desgin.
6. Desgine using Staad pro.
7. Analysis and output.
8. Result discussion.
9. Conclusion.
10. Documentation and Reporting.
11. Review And Iteration.

1.General Specifications:

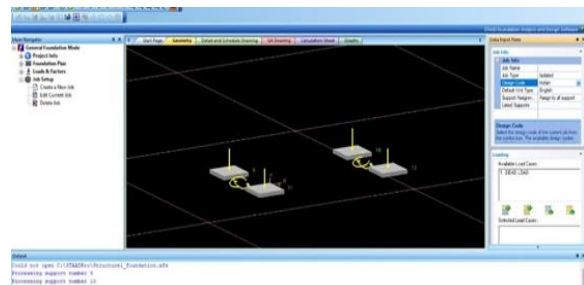
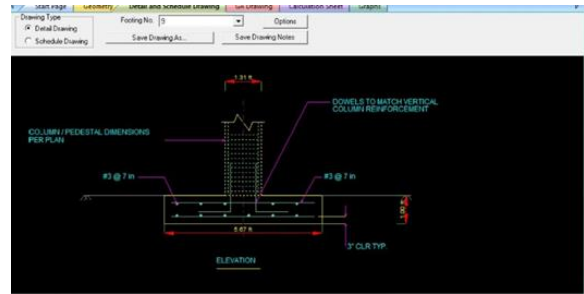
- Capacity: 54 cubic meters (m³)
- Dimensions:
- Length: 6 meters (m)
- Width: 3 meters (m)
- Height: 3 meters (m)
- Freeboard: 0.3 meters (m)
- Column Height: 5 meters (m)
- Material:
- Concrete Grade: M30
- Steel Grade: Fe415.



PLAN AND ELEVATION OF FOOTING



ISOLATED FOOTING



CONCLUSION

Conclusion on Designing an Elevated Water Tank Using STAAD.Pro Software

Using STAAD.Pro software for designing an elevated water tank greatly improves the design process. This powerful tool makes the work easier and more accurate in several ways:

Accurate Load Calculations:

STAAD.Pro automatically calculates various loads, such as dead loads, live loads, wind loads, and seismic loads. This reduces errors and ensures precise results. It also handles complex load combinations effectively, ensuring the tank can withstand different conditions.

Efficient Structural Analysis:

The software uses advanced methods to analyze the tank structure, showing how it will handle stresses and deflections. Its 3D modeling capability helps visualize how the tank will perform under different loads, ensuring a solid design.

Optimized Design:

STAAD.Pro helps optimize the use of materials, making the design cost-effective while maintaining safety. It calculates the necessary properties and reinforcement details accurately, ensuring the structure meets all requirements.

Compliance with Standards:

The software includes various international design codes like IS 3370, ACI 318, and Eurocode. This ensures the design meets all necessary standards. Automatic code checks identify any issues, allowing for quick corrections.

Streamlined Process:

With its user-friendly interface, STAAD.Pro makes modeling, analyzing, and designing more efficient. It can also integrate with other design tools, making the workflow smoother and faster.

Detailed Documentation:

STAAD.Pro generates detailed reports on the analysis and design, providing clear documentation for review. It also offers detailed reinforcement drawings and specifications, ensuring accurate construction.

Safety and Reliability:

Using STAAD.Pro ensures the design meets all safety requirements, reducing the risk of structural failure. Its comprehensive analysis identifies and addresses potential issues early, leading to a durable and reliable water tank.

In summary, using STAAD.Pro for designing an elevated water tank enhances the accuracy, efficiency, and reliability of the entire process. It ensures the tank is safe, cost-effective, and compliant with standards, providing a robust and durable structure.