

Design of Over Head Tank for KLS Vdit Haliyal

Prof. S.G.Hiremath¹, Prof. Harshavardhan²

¹Aalam Bombaywale, Department of civil engineering, KLS Vdit Haliyal

²Satwik Metri, Department of civil engineering, KLS Vdit Haliyal

³Shreyas Nagathan, Department of civil engineering, KLS Vdit Haliyal

⁴Varadraj Halammanavr, Department of civil engineering, KLS Vdit Haliyal

Abstract - The present work deals with the structural design and analysis of an Intze-type overhead water tank, which is one of the most commonly used systems for dependable water storage and distribution both in urban and rural areas. The configuration of the Intze tank, consisting of a top dome, cylindrical wall, conical dome, and a bottom ring girder, represents an extremely efficient structural form that reduces material consumption while maximizing strength and stability. An optimal determination of dimensions, reinforcement details, and supporting components has to be derived to resist safely the water load, self-weight, wind forces, and seismic effects within the stipulation of applicable design standards.

A comprehensive structural analysis is performed to check all stresses, bending moments, and axial forces arising on each component of the tank. Great care has been taken to ensure durability, serviceability, and economy by selecting appropriate materials and reinforcement. The staging system design forms part of the project, which supports the tank at the desired height to give proper distribution pressure. In general, the aim is to provide a safe, economical, and strong overhead tank design with ample community water supply requirements and adhering to the latest engineering practices and provisions.

Key words: Limit state method(LSM), modeling with the help of STAAD PRO, total station.

1. INTRODUCTION

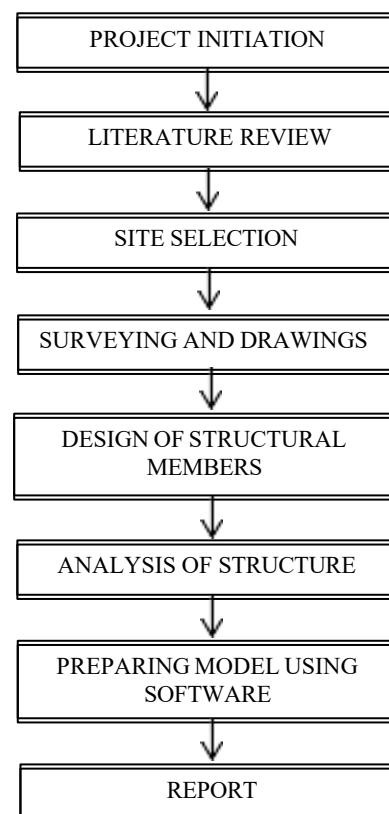
An Intze-type overhead water tank is one of the most adopted structural systems for storing and supplying water in residential, commercial, and industrial sectors. Primarily designed to ensure safety, durability, and efficient distribution, the Intze tank is characterized by a specific arrangement comprising a top dome, cylindrical wall, conical dome, and a bottom ring girder. This arrangement efficiently distributes the forces and minimizes bending moments, making the tank more economical and structurally sound compared with simple cylindrical tanks.

The Intze design offers high resistance to wind and seismic forces, which is particularly important in areas prone to such conditions. The bottom dome and the ring

beam work together in carrying the load of the water with the least amount of material, hence a structurally efficient system. The location of the tank is sufficiently elevated to provide adequate pressure in distributing water without requiring excessively high pumping.

Intze tanks are widely employed in municipal water supply systems owing to their durability, long service life, and low maintenance requirement. Their design also accommodates large storage capacities, making them suitable for expanding urban populations. Overall, the Intze-type overhead tank combines engineering efficiency with practical functionality; it remains one of the most dependable solutions there exists for the storing and distribution of water.

2. Body of Paper

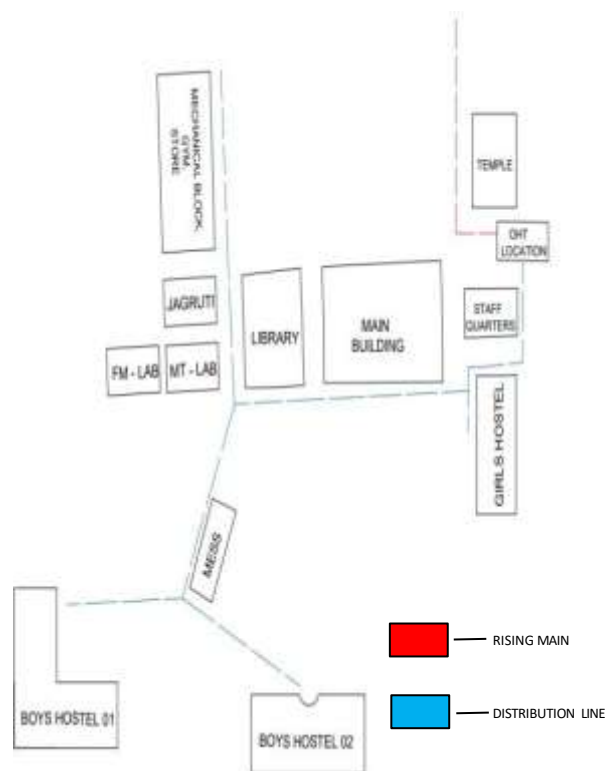


1. Capacity and dimensions :

** Capacity = 1 lack leters

Sl. no	Members	Dimension / no. Of members
01	Height of supporting tower	7.5 m
02	No. of columns	6
03	Depth of foundation	1 m below GL

Design of members	Reinforcement provided
Design of top dome	Provide 8 mm dia @ 200 mm c/c
Design of top ring beam	Provide 8 mm dia 2LVS @ 200 mm c/c
Design of tank wall	Provide 12 mm dia @ 100 mm c/c (T = 150 mm)
Design of base slab	Provide 20 mm dia @ 200 mm c/c (Ast = 1570.8 mm ²)
Design of bottom ring beam	Provide ring beam of 300x350 mm and 8 mm 2LVS @ 200 mm c/c
Design of columns	Provide 6 columns of 5 bars of 16 mm dia (1005.3 mm ²)
Design of steel reinforcement	Provide 12 mm dia bars @ 170 mm c/c both the ways



Water distribution pipe line inside the campus

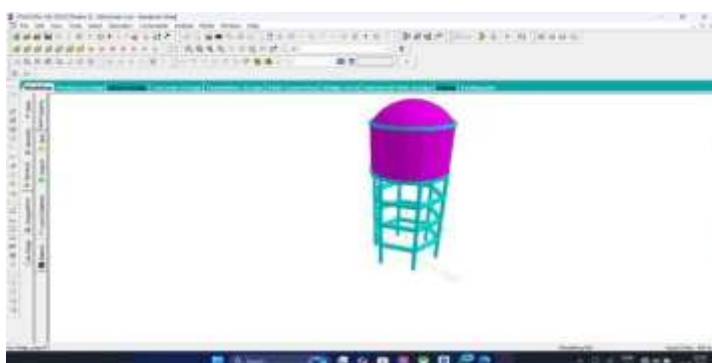
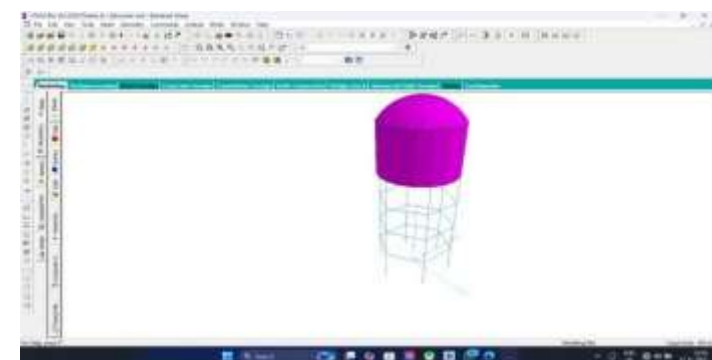
OBJECTIVES

1. Detailed study on existing design method of overhead tanks.
2. Proposing overhead tank for VEDIT campus by carrying out surveying and determining the capacity of tank for projected population.
3. Designing the structural elements of overhead tank by limit state method.
4. Design using the software STAAD Pro.

3. CONCLUSIONS

The design of the overhead water tank for the KLS VEDIT campus, with a storage capacity of 1,00,000 liters, has been successfully executed based on appropriate standard engineering principles along with relevant IS codes. The structural members, such as the container, staging, foundation, and supporting elements, were thoroughly analyzed to ensure adequate strength, stability, and durability for various loading conditions like dead load, live load, wind load, and water pressure.

The proposed design provides reliable and sufficient water storage for the college for the future years also. Hence the entire steps are carefully taken into the consideration and designed. For the future population also the stored will be sufficient. By adopting the appropriate materials, design steps, reinforcement detailing and safety of factor the tank structure is capable of performing effectively.



Modle prepared using STAAD PRO

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