International Journal of Scientific Research in Civil Engineering
© 2019 IJSRCE | Volume 3 | Issue 2 | ISSN : 2456-6667

Re-Strengthening of INTZE Tank Using Steel Jacketing

Vivek Soni[1], Vinay Kumar Singh Chandrakar[2]

[1]Department of Civil Engineering, Patel Institute of Technology, Bhopal, Madhya Pradesh, India

[2]Assistant Professor, Department of Civil Engineering, Patel Institute of Engineering and Science, Bhopal, Madhya Pradesh, India

ABSTRACT

Overhead tanks and capacity supplies are utilized to store water, fluid oil and comparable fluids. Repository is a general term used to fluid stockpiling structure and it very well may be underneath or over the ground level. Supplies underneath the ground level are ordinarily worked to store expansive amounts of water. The overhead tanks are upheld by the section which goes about as stage. This Overhead sort of water tanks are worked for direct dissemination of water by gravity stream and are more often than not of littler limit. Capacity overhead tanks are utilized to store water. These overhead water tanks are planned by utilizing of IS: 3370. BIS has drawn out the modified variant of IS: 3370 (section 1& 2) after quite a while from its 1965 form in year 2009. The target of this exposition is to reveal insight into the distinction in the structure parameters of Intze water tanks without considering seismic tremor powers. What's more, Intze water tanks structured with quake powers. First plan depends on Indian standard code: 3370-1965 and second structure depends on Indian standard code: 3370-2009 and draft code 1893-Part 2, (2005).Design of water tank in present days following every one of the criteria of new IS Code: 3370-2009 and new Draft IS Code: 1893-2005 (section 2) at that point I will discover that Weather the water tanks is sheltered or not which were configuration by utilizing IS: 3370-1965 without considering tremor forces. After getting the data which is-climate safe-"it's sound" Or not reasonable retrofitting strategy will be contemplated and wherever required will be connected.

Keywords: Overhead Tanks, IS: 3370, IS Code: 1893-2005, Indian Standard Code: 3370-2009

I. INTRODUCTION

The water stockpiling tanks are especially exposed to the danger of harm because of seismic-incited vibrations. Countless fluid holding tanks harmed amid past seismic tremors. Dominant part of them were shaft organizing while a couple were on casing arranging tanks. As of late the Muzaffarabad (J&K) seismic tremor 2005, Bhuj (Gujarat) quakes 2001and Jabalpur (M.P.) tremor additionally spoken to comparable harm. The vast majority of the harm was caused in light of the tanks were either planned without considering the quake powers or deficient seismic structure contemplations. To adapt to this need the seismic structure codes for over head water tanks have been modified and redesigned.

II. METHODS AND MATERIAL

- ✓ To study the comparison of changing parameters of IS: 3370-1965 and IS: 3370-2009.
- ✓ Conventional design of intze water tank as per IS CODE: 3370-1965 without considering earthquake.
- ✓ Seismic analysis of intze water tank considering two mass modal method as per draft code IS: 1893 Part- II (2005).
- ✓ Redesign of intze water tanks as per IS CODE: 3370-2009 by considering earthquake forces.
- ✓ Comparative study of designs of Intze water tanks between IS CODE: 3370-1965 (not considering

earthquake forces) and IS CODE: 3370-2009 (considering earthquake forces).

III. RESULTS AND DISCUSSION

In India diverse kinds of water tanks are accessible for capacity of water. The vast majority of them are RCC and truth be told, not many are basic steel. Water tank is a thin best substantial structure and its normal time of vibration is very high. Consequently, it is important to think about the hydrodynamic conduct while planning such structures.

The present examination investigates the likelihood of evolving powers, size of individuals and support by receiving new IS code of water tank and furthermore embraced new draft IS code of fluid holding tanks. In this postulation examined just intze tank upheld on casing arranging. This tank is likewise being planned by considering with and without seismic tremor powers. The seismic examination of these tanks has been finished by two mass modular techniques. The distinctive parameters of edge arranging have likewise been assessed by considering with and without seismic tremor powers. The result of this examination can be quickly condensed as pursues.

IV.CONCLUSION

Fortifying OF BEAMS

Fortifying of shafts is improved the situation the flexure and shear, to achieve the quality of the auxiliary part up to the require quality.

10.1.1 Strengthening of bars for flexure

Retrofitting is improved the situation pillars by including steel plate of proportional territory of fortified bars. Plate is intended for the extra territory of steel required.

Equal mellow steel territory:-

The extra region of fortification bars are found by the examination of investigation of the two cases, the acquired extra required steel is of tor steel. In any case, for the retrofitting mellow steel plate is required, the zone of comparable gentle steel plate can be found by power balance.

Shear connector must be plan for each pillar section joints for the most extreme minute in that bar. Shear connector will exchange the extra power coming at existing fortification dimension to the external plate which is intended for various bars. So the power which is to be exchange to the external plate is to be determined. These connectors are utilized for either top plate for hoarding minute or base plate for drooping minute. As each shaft will have distinctive extra minute, the power for which shear connector will configuration will be unique. Here shear connector is intended for the most extreme minute created among every one of the light emissions structure.

So for this, we have

To exchange the shear worries from existing shear fortification to external plate, Shear connectors are utilized by IS: 11384-1985.

As the greatest extra shear constrain among every one of the bars and from every one of the floors is 33.01 kN. So for this,

By table 1 of IS: 11384-1985 gives the Design quality of shear connectors for various solid qualities.

Quality of shear connector for 12mm dia. also, 62mm stature utilized in M25 is 25.50 kN. In this way, two shear connectors are expected to oppose shear power of 33.01 kN.

V. FORTIFYING OF COLUMNS

Fortifying of segments is clarified beneath for the extra minute because of seismic powers notwithstanding gravity powers.

The most extreme extra minute, Mz or My is looked over the segments of the structure. For these greatest minutes, steel areas are planned. Expect an I segment

for the computation of snapshot of opposition of section.

As though any segment has pivotal burden and minute all the while, it is structured by the bar twisting hypothesis. Along these lines,

By investigation of the codal arrangements of IS: 3370-1965 and IS: 3370-2009, found allowable cutoff of worry in steel is diminished 150 N/mm2 to 130 N/mm2.

All plan parameters of intze water tanks are changed because of the two fundamental reasons. First is the decreasing the allowable furthest reaches of worry in steel in new IS Code: 3370-2009 and second is the considering seismic tremor constrain.

In this investigation we are seeing that the when intze water tank is planned by considering new IS Code: 3370-2009 and Draft IS Code: 1893-2005 (section 2) Hoop Tension in a tube shaped divider, center ring pillar, funnel shaped vault and base arch are expanded by huge sum. In this way we can dissect that old plan of tank according to Seems to be: 3370-1965 without tremor powers isn't sheltered in loop pressure.

Meridional push in a funnel shaped vault and base arch is expanded when water tank is structured according to May be: 3370-2009 considering quake powers.

The thickness of tube shaped divider, funnel shaped vault and base arch of intze water tanks are expanded because of the contemplations of new IS Code: 3370-2009 and quake powers.

When intze water tank is structured by utilizing new IS Code: 3370-2009 and furthermore considering impact of seismic powers which is determined by utilizing Draft IS Code: 1893-2005 (section 2) discovered more difference in fortification prerequisites.

The twisting minute and shear powers determined because of seismic burden are more than the bowing minute and shear powers because of wind load for casing arranging.

When section of water tank is intended to oppose the seismic tremor stacks then width of segment and support in segment is comes expanded as a result of more noteworthy toppling minute is prompted in a base of segment.

When section supporting of tank is planned according to new IS Code of fluid stockpiling tank thinking about seismic powers at that point twisting minute and fundamental fortification is increment.

If water tank is planned in present days then we are following every one of the criteria of new IS Code: 3370-2009 and new Draft IS Code: 1893-2005 (section 2) at that point we see that water tanks are not sheltered which were structured by utilizing IS: 3370-1965 without considering tremor powers.

VI.FUTURE SCOPE

Retrofitting techniques can be financially savvy for old water tank as no compelling reason to destroy the entire structure while considering extra powers acting because of seismic tremor on water tank.

This theory will distinguish the reinforcing need of various segment of the structure exposed to seismic power.

By and by substantial quantities of intze water tanks are utilized for supply the water in common society or in businesses.

VII. REFERENCES

[1]. ACI 350.3-01 and Commentary ACI 350.3R-01.(2001) "Seismic Design of Liquid-Containing Concrete Structures" Reported by ACI Committee 350 Environmental Engineering Concrete Structures, 350.3/350.3R-1

[2]. BIS Draft code on IS: 1893-part 2, "Criteria for Earthquake Resistant Design of Structure, Liquid Retaining Tanks Elevated and Ground Supported (fifth revision of IS: 1893)", Workshop on Revision of IS Codes on LRS.

[3]. Dr. Shah H.J., (2012), "Reinforced Concrete Vol-II", Charotar Publishing House Pvt. Ltd., Anand, Gujarat, India.

[4]. Dutta S.C., Jain, S.K. and Murty, C.V.R., (2001), "Inelastic Seismic Torsional Behavior of Elevated Tanks", Journal of Sound and Vibration 242(1), pp.167

[5]. Dutta, S.C., Jain, S.K. and Murty, C.V.R., (2000). "Alternate Tank Staging Configurations with Reduced Torsional Vulnerability", Soil Dynamics and Earthquake Engineering 19, pp.199–215.

[6]. Dutta, S.C., Jain, S.K. and Murty, C.V.R., (2000). "Assessing The Seismic Torsional Vulnerability of Elevated Tanks with RC Frame Type Staging", Soil 7.Dynamics and Earthquake Engineering 19, pp.183–197.

[7]. Falguni, A., and Vanza, M.G., (2012). "Structural Control System for Elevated Water Tank", International Journal of Advanced Engineering Research and Studies.E-ISSN2249–8974.

[8]. Federal Emergency Management Agency, FEMA 273, (1997),NEHRP Guidelines for the Seismic Rehabilitation of Buildings, Issued by FEMA in furtherance of the Decade for Natural Disaster Reduction.

[9]. Housner, G. W., (1963), "The Dynamic Behavior of Water Tanks", Bulletin of The Seismological Society of American. Vol.53, No.2, pp.381-387.

Cite this article as :
Vivek Soni, Vinay Kumar Singh Chandrakar, "Re-Strengthening of INTZE Tank Using Steel Jacketing", International Journal of Scientific Research in Civil Engineering (IJSRCE), ISSN : 2456-6667, Volume 3 Issue 2, pp. 16-19, March-April 2019.
URL : http://ijsrce.com/IJSRCE19314