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Circular ESR analysis by Indian code and American codein STAAD-PRO

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Abstract - The ESR(Elevated service reservoir) Structure is analyzed as per Indian and American code of design for the specified load cases and load combinations defined accordingly. The observation for the steel requirement and the difference in steel requirement and the concrete requirement is noticed. As the design as based on the different code of practices, the design is based on different basis of the criteria for design. The structure concrete volume requirement and reinforcement steel requirement is more in the case of American code of practice whereas, it is lesser 25-28% approx. in the Indian code of practice.

Key **ESR, STAAD Pro, steel requirement, concrete requirement etc**.

1. INTRODUCTION

As water is our primary need, design of water tank is very crucial. Design of water and considering seismic parameters will essentially reduce the risk of failure of water tank even after minor hazards. As known from very upsetting experiences, liquid storage tanks were collapsed or heavily damaged during the earthquake all over the word. 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. Even uncontrolled fires and spillage of dangerous fluid subsequent to a major earthquake may cause substantially more damage than the earthquake itself. Knowledge of forces, pressures acting on the walls and bottom of containers during an earthquake is important for good design of earthquake resistance structure/facility - tanks. Although India is large country we use same design code for designing of structure which also needs revision in order to improve the construction practices. There is also scope for improving IS code as compared to developed countries' codes e.g. ASCE 7-10(American Code)

2. Objective

1. To compare Water Tank designed by Indian Standard Code and American Code.
2. To check effectiveness of Water tank with respect to different soil strata.
3. To work out amount of material required for water tank using different codes.
4. To suggest modifications in Indian Standard code with respect to Different codes.

3. Working data

In this model 500m^3 circular water tank is considered and analyzed in STADD pro software with

Indian code and American code with respect to following parameter

1) Total steel requirement

2) Total concrete requirement

3) Reaction diagram

4) Bending moment diagram

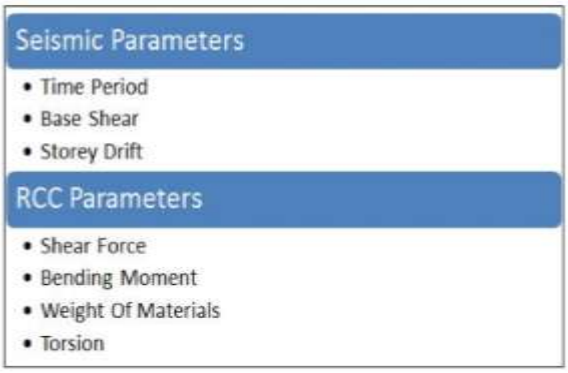

Fig-1 Design parameters

3. Modelling

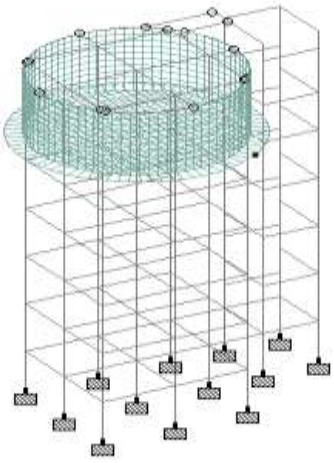

Fig-2 Beam with standard meshing

In the above ESR modeling the model is analyzed as per respective country code

The general analysis procedure consists of the following stages of e analysis:

1) To determine the exact quantities of concrete steel

2) TO compare bending moment diagram and shear force diagram of same beam of the codes.

3.1 Different country codes

Following are the different of codes of different country which is used for the analysis

Table -1: design codes

Sr. No	Country	Seismic Analysis Code	RCC Analysis code
1	India	IS 1893:2002	IS 456:2000
2	America	ASCE 7-10	ACI 318

The properties of sensors selected depending upon the accuracy and various parameter requirement.

4. Analysis

Following fig shows the bending moment diagram for Indian and American code.

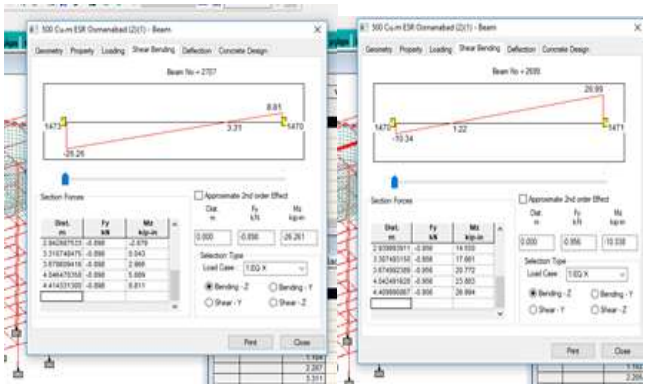

Fig-3 Bending moment comparison of American and Indian code Respectively

Following fig shows steel and concrete requirement of Indian and American code

Fig-3 Steel and concrete comparison of American and Indian code Respectively

5. Result

Code	Steel(kg)	Concrete(m3)
Indian	**8727.31**	**159.80**
American	**12131.00**	**227.60**

6. CONCLUSIONS

1) Concrete required for American code is more than Indian code.
2) Reinforced Steel required for American is more than Indian code

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