

SEISM 'O' CURE

DESCRIPTION

Testing of a working model of a building with base isolation technique on shake table which is made as per the specified dimension and materials .

Other Details

During 2001-Bhuj earthquake many structures collapsed and many people were injured .There was a huge loss of life and property. So for us behavior of structure under shaking needs attention for the safety of structure. In this event participants have to make a structure of given dimension.

It will be tested on shaking table for different level of shaking intensities.

1. Maximum frequency for test is 8Hz.
2. Frequency of your model in your design must be $< 8\text{Hz}$.

Team Specification

Maximum number of persons=3

Information About Event Test

1. To make a structure as per the specified materials and dimensions. Your main work is about safety of structure.
2. Provide base isolator in the main structure as per your knowledge & ideas.
3. During test we will give a tremor effect (earthquake shaking) with the help of shaking table with shaking intensity having frequency $< 8\text{Hz}$.
4. Note that you have to make the structure which has frequency $< 8\text{ Hz}$.
5. Adequate loading will be applied on model during its testing.
6. If main members (beams, columns, slab, etc) of structure will fail or crack during the test, you will disqualify.
7. You can apply "Capacity Design Concept" & principles of earthquake engineering.

Hint

1. Check the inter storey drift with and without base isolator.
2. Control stiffness of your base model.
3. Refer EQ tip no. 24 authored by C.V.R.MURTY. (visit www.bmtpc.org or www.nicee.org)

Specifications of SOCET Shake Table

1. Uni-axial motorized shake table.
2. Horizontal movement.
3. Size: 8 X 4 (approx, 2m X 1m) table platform for fixing model.
4. Frequency range 0 to 8 Hz.

5. Amplitude range from 0 to 100 mm, for testing adjusted at 25 mm.
6. Sinusoidal simulation.

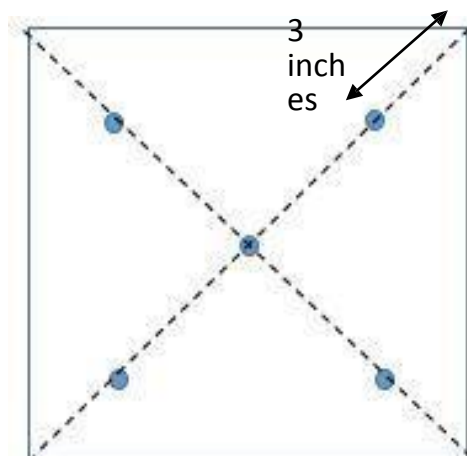
Rules and Dimensions

a) SUPER STRUCTURE

- 1) Prepare two storied model (ground+1) from wood of your choice. Additional weight $m_1=m_2=10\text{Kg}$. Thickness of base plate = 12-20mm. No. of columns = 4, Minimum Height Should be = 3' ft 5", maximum Weight = 20kg.
- 2) We will put 12-15Kg of external mass on the structure.
- 3) The vibrations given to the structure upto time 20 seconds.

b) FIXING ARRANGEMENT

- 1) In base plate- distance between each hole is 100mm from center/ center. Diameter of each hole is 10mm.
- 2) Joint between column and slab- it can be made up of any material. (give attention in stiffness of joint)
- 3) Make hole of 10mm diameter (minimum) at the centre of each slab, Make four holes of 10mm diameter on the diagonals as shown in the diagram below, which should be 3inch away from the corners on the top slab.
- 4) The dimension of the should be 400*400mm and the dimensions of base plate should be 500*500mm.



c) BASE ISOLATION SYSTEM

- 1) We are going to test your structure with base isolation and without base isolation so, base isolation and main structure must be attached in such a way that we can separate base isolation and main structure.
- 2) One can use any type of system for base isolation of any material.
- 3) Isolation system must be sandwiched between two plates on upper and lower sides.
- 4) Main structure should come to its main position at the end of experiment on shake table, in base isolation system.
- 5) Certain questions can be asked at the time of testing.

Note: Use of elastic material such as spring in superstructure is **NOT ALLOWED**.

Following multiplication factors for different system will be considered for points

- 1) Rubber base isolation system-1
- 2) Sliding roller system-0.7
- 3) Any other system-0.85
- 4) FORMULA FOR CALCULATION OF POINTS.

$P_c = (S_i / k) * (a_{wo} / a_w) * (f_{wo} / f_w)$ Where, P_c = final points

S_i = base isolation system (as defined above in multiplication factor from 1-3)

k = stiffness of the structure

a_{wo} = acceleration without base isolation system

a_w = acceleration with base isolation

f_{wo} = frequency without base isolation

f_w = frequency with base isolation

Student Coordinators:-

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