

Construction of Earthquake Shake Table

The shake table's base was made with good quality timber and additional wood blocks were used for support. It was equipped with a battery for providing charge, A switch to open and close the circuit, Wiring to make connections, wooden sticks used as axel for wheels, a small wooden plate for base of placing the building and moving it, plastic bottle caps to be used as wheels, a metallic spoke to connect the motor to the moving plate

Shake Table Construction: All the above-mentioned materials were joined together with the help of Copper wiring with cover, Hot Glue gun was used to stick the materials in their proper place. Simple wooden fences were created around the wood plate to prevent the moving plate from going in other directions. All this work was done by the combined effort of our teamwork and passion for the project

Structural Models: A Simple structural model simulating the shape of a G+3 storey building was made with the help of simple items such as ice cream sticks and threads. Which were glued together using simple adhesive glue. This model allows us to test the effects of an earthquake on a similar shaped building and how it gets effected with different weightings on its floors.





Preparation of Tensegrity Structure

Tensegrity structures are composed of tension and compression components, where the compression components (struts) are discontinuously enclosed within continuous tensile components (cables). In which the tension elements stabilize the compression elements. Tensegrity structures are built of bars and strings attached to the ends of the bars. We will adopt the words “strings” for the tensile members, and “bars” for compressive members. (The different choices of words to describe the tensile members as “strings,” “tendons,” or “cables” are motivated only by the scale of applications). Buckminster Fuller coined the word “Tensegrity” from two words: “tension” and “integrity”. The word tensegrity, is a contraction of tensile integrity. This term has been proposed to name the structural rules, involving the creation of complex systems elements which are only compression or tension. The bars can resist compressive force and the strings cannot. Most bar string configurations which one might conceive are not in equilibrium, and if actually constructed will collapse to a different shape. If well designed, the application of forces to a tensegrity structure will deform it into a slightly different shape in a way that supports the applied forces

Design:

It is carried away in two stages

- A service stage design ensures that the deflection criterion is met, while remaining within the acceptable limit for the stress in the element. Moreover, as tensegrity system are tension structure we ensure that none of the cables present in the structure be slack.
- An ultimate design state verification, ensure the overall stability of the structure under extreme loading. Self-stress is a permanent action with both acting and resistance characteristics at the same time. Thus, when the ultimate design state is carried out, both aspects must be taken into account. The former will reduce self-stress to check that the structure keeps on overall stability the latter.

As the Design goes further it consists of two square wooden frames which will be acting as the compression members in the structure followed by the iron chains which will be attached at the vertices of the square frame connecting them symmetrically. The iron chains will be acting as tension members to hold the structure still

Examples of tensegrity like structures in civil engineering

The tensegrity concept has found applications within architecture and civil engineering, such as towers, large dome structures, stadium roofs, temporarily structures and tents. Towers which composed of interconnected tensegrity modules are the best known as tensegrity structures. The first civil structure inspired to the tensegrity principle is the cable dome proposed by Geiger and first employed for the roofs of the **Olympic Gymnastics Hall** and the **Fencing Hall in Seoul**. An important example of tensegrity being employed in roof structures is the stadia at La Plata. The largest existing cable dome is the Georgia Dome designed for the **Atlanta Olympics in 1996**. Moreover double-layer tensegrity grids and foldable tensegrity systems has been in the development. The design of double grid systems has resulted in an interest in the application of tensegrity to bridge construction. A recent achievement in this regard is the

Kurilpa Bridge in Brisbane, Australia. It is the world's largest "tensegrity-like" bridge, which was opened on the 4th of October 2009

