ABSTRACT:

Civil engineering deals with the design, construction and maintenance of physical and naturally built environment, including works like bridges, roads, canals, dams and buildings. Construction of bridge has always been one of the most fascinating challenges to civil engineers. Materials like timber, iron, steel and concrete are used for construction of bridge. In India, mostly reinforced concrete bridges are existed. In this work, the analysis and design of suspension Cable Bridge is done by using STAAD pro with standard design details as mentioned in Indian codes. The planned suspension cable bridge is modeled in STAAD Pro. Various loads & combinations are included in the frame analysis also included lateral loads. Structural design is to be done using Limit state method.

INTRODUCTION:

A suspension connect is a kind of scaffold in which the deck (the heap bearing segment) is hung underneath suspension links on vertical suspenders. The principal current cases of this sort of extension were worked in the mid nineteenth century. Straightforward suspension spans, which need vertical suspenders, have a long history in numerous uneven parts of the world. This sort of scaffold has links suspended between towers, in addition to vertical suspender links that convey the heaviness of the deck underneath, whereupon activity crosses. This game plan enables the deck to be level or to circular segment upward for extra leeway. Like other suspension connect types, this compose frequently is developed without falsework. The suspension links must be tied down at each finish of the scaffold, since any heap connected to the extension is changed into a strain in these fundamental links. The primary links proceed past the columns to deck-level backings, and further keep on connections with stays in the ground. The roadway is upheld by vertical suspender links or bars, called holders. In a few conditions, the towers may sit on a feign or ravine edge where the street may continue straightforwardly to the primary traverse, generally the scaffold will typically have two littler ranges, running between either match of columns and the roadway, which might be bolstered by suspender links or may utilize a support extension to make this association. In the last case there will be next to no circular segment in the detachable principle links.

Objectives

- To identify the different types of bridges: arch, suspension, truss, beam, cantilever and cable stayed.
- Understand how each bridge structure works to carry the loads placed on the bridge.
- Discover how the different types of bridges fail and what modifications can be made to the bridge to increase its strength.
Appreciate the important aspects of construction such as strength and placement of materials. Develop an understanding of the requirements of the materials used in bridge construction. Relate the bridge models to real life situations.

**Types of suspension bridge:**
- Arch bridge.
- Bascule bridge.
- Beam bridge.
- Box girder bridge.
- Burr truss.
- Cable-stayed bridge.
- Canopy bridge.

**MATERIAL:**
- Grade of reinforcement : Fe415
- Grade of concrete : M25
- Density of concrete : 2500Kg/m²

**PLAN VIEW OF SUSPENSION CABLE BRIDGE:**

**LOADING:**

**Dead load:** Bridge deck and other external pillars, floor finish etc., as per the provisions of IS: 875-1987(part I)

**Superimposed load:** Uniformly distributed load of 5.00 KN/m²

**Wind load:** As per the provisions of IS: 875-1987(part III)

**CONCLUSION:**

This project deals with Analysis and design of a suspension cable bridge using STAAD Pro.

The planned suspension cable bridge is modelled in STAAD Pro Various loads & combinations are included in the frame analysis also included lateral loads.

In this project, the Analysis of frame is done by stiffness matrix method using Staad Pro Software.

The wind load can be calculated using the Indian standards IS: 875(Part 3)-1987. The basic wind speed corresponding to Guntur region is taken from the code IS:875 (Part 3)-1987.

**Reference:**

1. Finite Element Based Flutter Analysis of Cable-Supported Bridges, Ahmad Namini, Associate Member, ASCE; Pedro Albrecht, Member, ASCE. June 1992, Journal of Structural Engineering.
5. Analysis of target configurations under dead loads for cable-supported bridges, Ki-SeokKim, Hae Sung Lee, Volume 79,

7. Aerodynamic flutter analysis of suspension bridges by a modal technique, T.J.A. Agar, Volume 11, Issue 2, April 1989, Pages 75-82


