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Review on Cable and Suspension Bridge

Anjali G. Sawale[1], Dr D.H. Tupe[2], Dr Sunil Shinde[3], Dr. A.S. Pathan[4]

M. Tech Student, Department of Civil Engineering, Deogiri Institute of Engineering and Management Studies, Chhatrapati Sambhajinagar Maharashtra, India

Assistant Professor, Department of Civil Engineering, Deogiri Institute of Engineering and Management Studies, Chhatrapati Sambhjinagar Maharashtra, India

Assistant Professor, Department of Civil Engineering, Deogiri Institute of Engineering and Management Studies, Chhatrapati Sambhjinagar Maharashtra, India

Associate Professor, Department of Civil Engineering, Deogiri Institute of Engineering and Management Studies, Chhatrapati Sambhjinagar Maharashtra, India

ABSTRACT: A bridge is a structure built to span a valley, road, body of water, or other physical obstacle, for the purpose of providing passage over the obstacle. Nowadays suspension bridges are the pioneers in bridge technology. Of all the bridge types in use today, the suspension bridge allows for the longest span ranging from 2,000 to 7,000 feet. This type of bridge has cables suspended between towers & the cables support vertical suspender cables that carry the weight of the deck below. This arrangement allows the deck to be level or to arc upward for additional clearance.

KEYWORDS :SuspensionCable,SAP2000,SoftwareOutput,Design Calculations.

I.Introduction

Suspension bridge is a type of bridge that has a larger span than any other form of bridges. As it gets larger span it become more flexible structure. Major bridges were still built using a truss design until 1808, when an American inventor named James Finley filed a patent on an early version of a suspension bridge. In most jurisdictions, there is a dearth of suspension bridges compared to other bridge types. A short history of suspension bridges which deals with the evolution of suspension bridge design also is included . A suspension bridge is a type of bridge which is built by suspending the roadway from cables attached to a master cable which runs above the length of the bridge. The design of a suspension bridge is simple and straightforward, and takes advantage of several techniques to distribute the weight of the bridge safely and evenly.

II. REVIEW METHODOLOGY

A collection of research methods and strategies intended to comprehend social phenomena, cultural settings, and human behavior are collectively called qualitative methodology in research papers. Qualitative research offers in-depth insights through collecting and analyzing non-numeric data, such as words, images, and observations. Using qualitative techniques in SAP2000 bridge design analysis entails thorough approach encompassing the project's contextual, human, and experience components and numerical data. Engineers may increase the relevance and sustainability of the design by integrating qualitative data into SAP2000 models through document analysis

III. LITERATURE REVIEW

Suspension cable bridges are among the most recognizable and visually stunning designs (Li et al., 2018). A suspension bridge, renowned for its long span, supports the bridge deck using cables hung between towers. This bridge is famous for significant crossings worldwide since it blends engineering creativity with visual appeal. A suspension cable bridge's structural effectiveness comes from its application of tension and compression (W. Zhang et al., 2024). The main cables are under stress because they are extended over the towers and between the anchorages. However, the towers are compressed because they support the cables' vertical strain. The substantial span of the bridge is made possible by this force dispersion, which eliminates the need for many underwater piers or supports. Based on previous studies, the main parts of a suspension cable bridge are the towers, main cables, anchorages, hangers, and bridge deck (W. Zhang et al., 2024). The towers are the highest points of the bridge; these vertical constructions hold the suspension cables primarily.

IV. STUDY ON MATERIALS USED

OVERVIEW

An attempt to analyse a suspension bridge and account accurately for all aspects of behaviour of all the components and materials, even if their sizes and properties were known, would be virtually impossible. Simplifying assumptions are necessary to reduce the problem to a viable size. Although a wide variety of assumptions is viable, some more valid than others, the ones adopting in forming a particular model will depend on the arrangement of the structure, its anticipated mode of behaviour, and the type of analysis

Materials

The materials of the structures and thestructural components are linearly elastic. This assumption allows the superposition of actions and deflections and, hence, the use of linear methods of analysis. The development of linear methods and their solution by computer has made it possible to analyse the large complex statically indeterminate structures.

Participating Components:

Only the primary structural components participate in the overall behaviour. The effect of secondary structural components and nonstructural components are assumed to be negligible and conservative. Although this assumption is generally valid, exception occurs.

THE DECK

The decks are assumed to be rigid in plane. This assumption causes the horizontal plan displacements of all vertical elements at a floor level to be definable in terms of the horizontal plane rigid body rotation and translation of the floor slab. Thus, the number of unknown displacements to be determined in the analysis is greatly reduced.

Negligible Stiffness

Component stiffness of relatively small magnitude is assumed negligible. These often include, for example, the transverse bending stiffness of slabs, the minor axis stiffness cable etc. The use of this assumption should be dependent on the role of the component in the structure's behaviour.
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V. CONCLUSION

1. To achieve a good cable supported bridge, a full understanding of the cable behaviour in necessary.
2. Special considering during design should be taken into account since cables are very slender .

elements that are affected by external condition.

3. The design of bridge is to be selected based on span and site conditions.
4. They must be designed very carefully considering all forces of nature.

REFERENCES

1.Optimum Dimensions of Suspension Bridges Considering Natural Period Jewel Sarker, Dr. TanvirManzur.

2. cable-suspended pedestrian bridge design for rural construction by Avery Louise bang B.S. university of Iowa, 2007.

3. Introduction to cable suspension bridges By Theodore Hopwood II and James h. Havens

4. Suspension Bridges Professor Filip C. Filippo Department of Civil and Environmental Engineering University of California, Berkeley.

5. Response suspension bridges W.C. yuanS.B. wang L.C fan, department of engineering tongji university shanghai,20009