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ANALYSIS OF BRIDGE COMPONENT USING STAAD PRO SOFTWARE

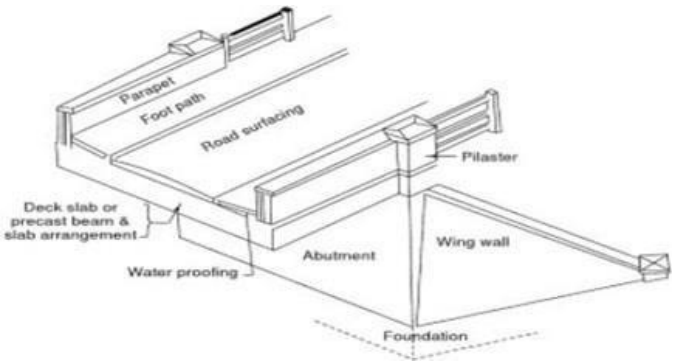
Shradha Hiremath, Srilaxmi Patil
Assistant Professor, S G Balekundri institute of technology Belagavi, Visvesvaraya Technological University
Rahul S. Palkar, Mallinath Reddy, Shreyas Wadappagol, Bangareppa Naik
UG Student, S G Balekundri institute of technology Belagavi, Visvesvaraya Technological University,

ABSTRACT
The bridge component under investigation is subjected to various loading conditions, including vertical load and lateral load to assess its structural integrity and performance. Through the utilization of STAAD-PRO, a widely used software in structural engineering, detailed modeling and analysis of the bridge component are conducted, providing insights into its behavior under different scenarios. The study aims to enhance the understanding of the structural response of bridge components, facilitating improved design and maintenance practices for ensuring safety and longevity of bridge infrastructure.

INTRODUCTION

A bridge is an amazing technical achievement that unites two previously separated locations by spanning natural barriers like rivers, valleys, or roadways. Apart from serving as a means of transportation, bridges are typically considered architectural marvels that exemplify human creativity and technological advancement.
Bridges are built in a variety of styles, from straightforward steel or wood beam bridges to more intricate suspension, cable-stayed, and arch bridges that are all tailored to fit certain regional and environmental requirements. Bridges have been essential to the development of societies throughout history because they have facilitated trade, cultural interchange, and civilizations.
Bridges have symbolic value in addition to their practical value; they are frequently used as metaphors for growth, connection, and conquering challenges. They serve as concrete representations of human ingenuity, tenacity, and cooperation, representing the difficulties as well as the successes of engineering projects.
The bridge structures consists and parts of bridge structures

- Superstructure or decking component
- Bearings
- Substructure components



Semi-Through Section of a Concrete Slab Road Bridge

Superstructure components of Bridges: The bridges superstructure consists a deck slab girder, truss etc. These compounds vary based on the type of bridge (whether concrete or steel or components). Superstructure of the bridge bears the load passing over it. This helps in transmitting the forces formed by the loads to the below substructures.
Decks: The decking is considered as the road or the rail surface of the bridge. The decks are supported by the girders or the huge beams that is in turn supported by the piers. The whole arrangement is supported with a deep foundation mainly piles and cap arrangement.

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Bridge

Bearings in Bridges: The loads received by the decks are properly and safely transmitted to the substructure with the help of bearings. These are components of bridge. Superstructure Components of Bridges: The bridges superstructure consist a deck slab girder, truss etc. These compounds vary based on the type of bridge (whether concrete or steel or components). Superstructure of the bridge bears the load passing over it. This helps in transmitting the forces formed by the loads to the below substructures. Types of prefabricated systems and components of bridge construction fast-tracked features for bridge construction, advantages and sequence of construction.

OBJECTIVES

- Analysis and design of bridge using STAAD PRO.
- To know the behaviour of simply supported RC T-Beam Bridge with respect tobending moment, shear force and displacement, deflection.
- To find the maximum load capacity of the Bridge deck.

METHODOLOGY

Methodology refers to the sequence of activities to be carried out in stream line to the workoutcome. Jotting out of steps to step process helps us to work on to acquiring the desired outcome from overall work in line to the objective set forth for best outcome.

- Selection of dissertation topic
- Literature review on research topic by journals
- Consideration of the various parameters before construction bridge
- Setting up dimens
- Examine the elements with STAAD PRO
- Conclusion
- Future scope

RESULTS AND DISCUSSION

STAAD PRO was used to generate the bridge model. to examine the specific details of the bridge's structure, including its displacement, bending moment, and shear force. We may better understand how loads are dispersed and passed across the bridge components by utilising the quantities of both bending moment and shear force. To be able to guarantee the fact that the bridge satisfies safety performance requirements, these results help identify crucial places that might need to be reinforced or redesigned.

Displacement

Displacement: 0.005m

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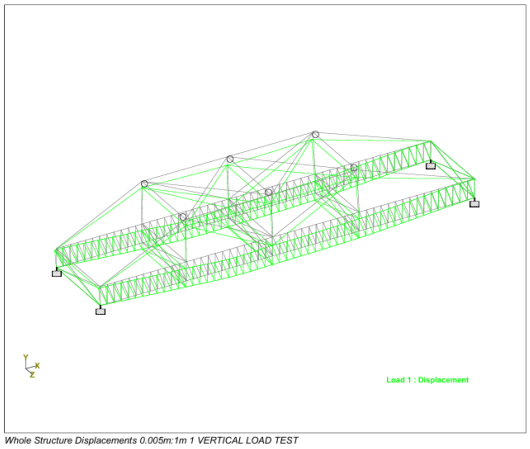
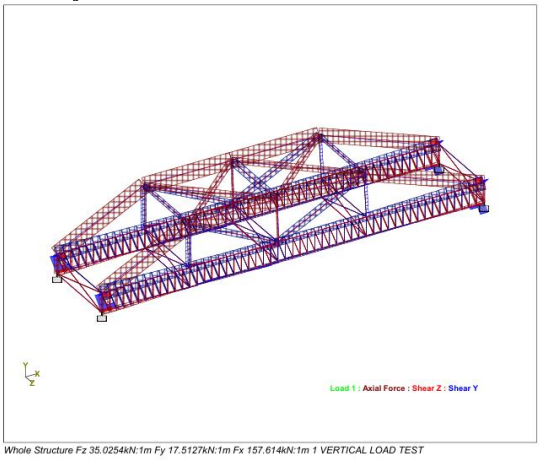


Whole Structure Displacements 0.005m:1m 1 VERTICAL LOAD TEST

Displacement

5.2 Shear Force

Shear force= Fx:157.614 KN, Fy:17.5127KN, Fz:35.0254KN,

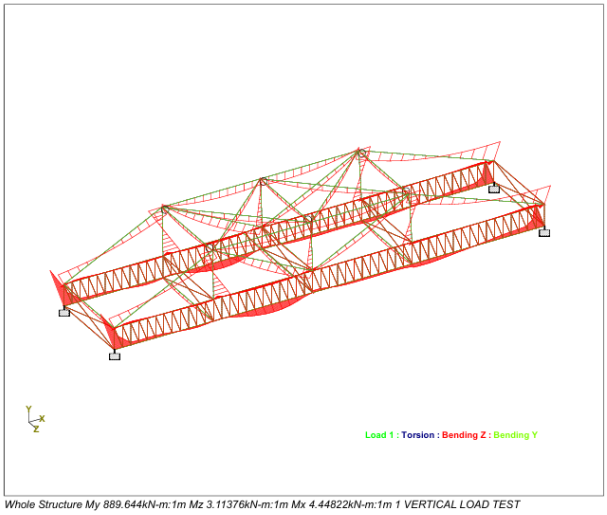


Whole Structure Fz 35.0254kN:1m Fy 17.5127kN:1m Fx 157.614kN:1m 1 VERTICAL LOAD TEST

Shear Force

5.3 Bending Moment

Bending Moment = Mx:4.448KN-m, My:889.644KN-m, Mz:3.11376 KN-m



Whole Structure My 889.644kN-m:1m Mz 3.11376kN-m:1m Mx 4.44822kN-m:1m 1 VERTICAL LOAD TEST

Bending Moment

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CONCLUSION

- The software are very helpful for constructing the economically bridge structure.
- Shear force =Fx:157.614 KN, Fy:17.5127KN, Fz:35.0254KN, Bending moment =Mx:4.448KN-m, My:889.644KN-m, Mz:3.11376 KN-m, Vertical load = 0.459316 KN-m, displacement = 0.005 m, Lateral load = 0.459316 KN-m.
- Analysis and design of the Deck Slab Bridge as per IS456 can be easily done by STAAD. Pro. In connection with STAAD.v22 Mechanism is well understood.
- In this study Analysis tool STAAD has been adopted whereas in future any other tool can be considered.
- Bending behavior and Shear behavior of different type of slab can be done by using STAAD Pro V22

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