International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 04 Issue: 09 | Sept-2020 ISSN: 2582-3930

Analysis And Design Of Cable Suspended Bridge Along With Identify Behaviour Cables During Moving Loads

Prashant Patil[1], Prof. N. P. Phadtare[2],

[1]*P.V.P.I.T Budhgaon, Sangli.*
[2]*P.V.P.I.T Budhgaon, Sangli.*

Abstract -Cable-stayed bridges have emerged as the dominant structural system for long span bridge crossings during the past thirty years. That success is due to a combination of technical advancements and pleasing aesthetics attributes. The interaction of the various structural components results in an efficient structure which is continuously evolving and providing new methods to increase span lengths. The objective of this thesis is to describe in detail the basic structural behaviour of cables under moving loads cable-stayed bridges, and to present thelack of fit forces of cables during construction stage and under moving load situation.

Key Words:cable-stayed bridge, truss model, increment loads, geometric stiffness

1.INTRODUCTION

Bridges are indispensable components of the infrastructure of modern society. Cable stayed bridges are constructed along a structural system which comprises of a deck and continuous girders which are supported by stays in the form of cables attached to tower located at the main piers. Stiffness of the overall structure can be provided by stiff towers or can be stiffened by taking backstays to individual or by employing intermediate tension piers or combination of the stiffness of the main span, the tower and the back span, credited to several advantages over suspension bridges,pre dominantly being associated with the relaxed foundation requirements, with the introduction of high- strength steel, development of welding technology and progress in structural analysis and new construction technique which is very much in vogue.

2. Methodology

Theinitialcablepre-stress,which is balanced with dead loads,is introduced to improve section forces in the main girders and towers, and cable tensions and support reactions in the bridge.,

`Step 1	Cable-Stayed Bridge Modeling
Step 2	Generate Load Conditions for Dead Loads for Main Girders and Unit Pretension Loads for Cables
Step 3	Input Dead Loads and Unit Loads
Step 4	Load Combinations for Dead Loads and Unit Loads
Step 5	Calculate unknown load factors using the Unknown Load Factor function
Step 6	Review Analysis Results and Calculate Initial Prestresses

Table -1: Analysisstages

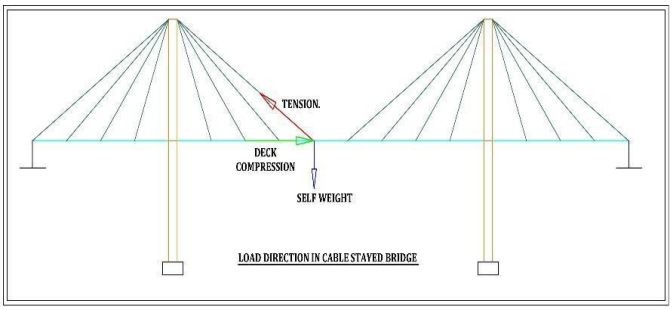

Fig -1: Load Direction

Cable Elements

The axial stiffness of cables depends on two factors, namely the sag of the cable and the deformation of the cable steel.Thes a ghasas of tening effect on the cable Stiffness so that this resultsinan on-linear force-displacement relationship.For large values of sag,the cable hasa relatively low stiffness.As the sag decreases,the cable stiffness increases and the behavior of the cable comes close to a truss bar tension element.The basic formulation of the static behavior of

cables is formulated by Peterson. An extensive study on cables and cable systems is also provided by Gimsing. Further details of the behaviour of cable elements in cable-stay bridges may be also found in the recommendations on cable stays

Maximum Shearing Moving (Beam Force)

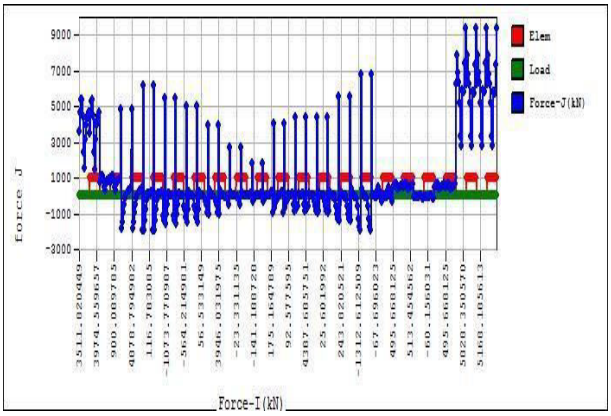

Fig -2: Beam Force

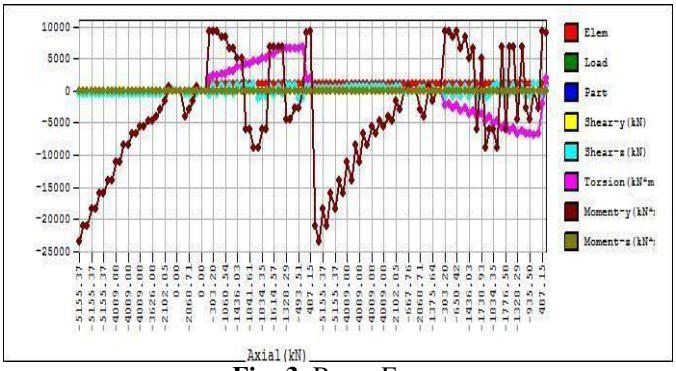

Fig -3: Beam Force

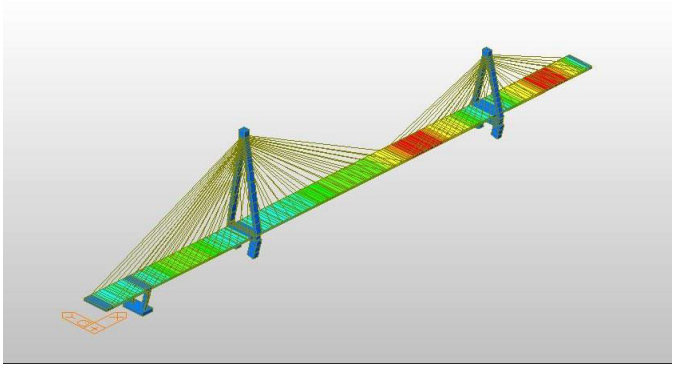

Fig -4: Deformation MVL

3. CONCLUSIONS

1. In cable stayed bridges as a unit pretension load applied in cables we get unknown load factors through influence matrix and then apply unknown load factors to find cable tuning forces.
2. In construction stage analysis as construction stage move on we consider time duration and load effects.
3. As in construction forward and backward stage analysis cable forces are initially controlled
4. cable behavior are reliable and safe during moving load as we analysed previous calculations.

REFERENCES

[1] Midas Civil Guide, 2019

[2] Elizabeth Davalos (2000) "Structural Behaviour of cable-stayed bridges", Massachusetts Institute Technology.

[3] Gurajapu Naga Raju, J. Sudha Mani (2017) analysis and design of cable- stayed bridge", International Research Journal of Engineering and Technology (IRJET), Volume 5, Issue 4,December-2017.

[4] pedro delgado, aníbal costa, rui pinho , and Raimundo delgado (2004) "different strategies for seismic assessment of bridges –comparative studies" , World Conference on Earthquake Engineering 2004.

[5] J J Alvarez (2016) "Seismic Response of cable-stayed Bridge for different layout condition", World Conference on Computational Structural Mechanics2012.

[6] Mrs. Mir Sana Fatema, Prof. A.A. Hamane (2016) "Self weight analysis of Cable stayed Bridge", International Journal of Emerging Trends in Science and Technology, 2019.

[7] h.otsuka1 and h. tanaka (2014) "a study on seismic behavior and displacement control of a continuous girder bridge with low friction sliding bearing support ", World Conference on Earthquake Engineering, March2008.