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Structural Analysis of Segmental Bridge using Software

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***Abstract:** A bridge is a structure providing passage over an obstacle without closing the way beneath. The required passage may be for a road, a railway, pedestrians, a canal or a pipeline. The obstacle to be crossed may be a river, a road, railway or a valley. In other words, bridge is a structure for carrying the road traffic or other moving loads over a depression or obstruction such as channel, road or railway. The structural analysis is carried out using BRIDGELINK software. Total 5 models are modeled in the Bridgelink software which is open source software. The moment, shear, rotation, deflection, reaction and stresses are computed for all the models.*
***Keywords:** Transmission*

I. INTRODUCTION

Bridge construction nowadays has achieved a worldwide level of importance. With rapid technology growth the conventional bridge has been replaced by innovative cost effective structural system. The efficient dispersal of congested traffic, economic considerations, and aesthetic desirability has increased the popularity of box type bridges these days in modern highway systems, including urban interchanges.

They are prominently used in freeway and bridge systems due to its structural efficiency, serviceability, better stability, pleasing aesthetics and economy of construction. They are efficient form of construction for bridges because it minimizes weight, while maximizing flexural stiffness and capacity.

II. REVIEW OF LITERATURE

A. Yuan et al [1] studied segmental box girder bridges with external prestressing is possible now due technique facilities and advantages. This paper constructed to highlights researches conducted to study behavior of segmental beams with dry and shear keyed joints. codes limitations, Structural modeling and analytical formulas are also illustrated. From the review, the investigations on segmental beams were still limited.

B. G. Rabbat [2] conducted to determine the effect of using external tendons, discretely bonded at intermediate diaphragms, and supplemental, grouted internal tendons on the strength and ductility of post-tensioned segmental box-girder bridges. Results of the tests and computer model indicated that both discrete bonding of external tendons and use of supplemental, grouted internal tendons improved the strength and ductility of segmental box girder construction.

Garg, C. et al [5] studied one is the unavoidable gap between two adjacent elements caused by the heat of hydration during segment production (‘bowing effect’).

This imperfection may significantly influence the bearing capacity of the structure and its serviceability. Thereafter, two real segmental bridges with perfect and imperfect segments have been modelled.

III. MODELING

The modeling is carried out in the BRIDGELINK software, mentioned as follows.

1) *Model-I:* HL-93 load
2) *Model-II:* AASHTHO legal loads
3) *Model-III:* Notional Rating Load
4) *Model-IV:* HL-93 load (Girder with square corner Haunch shape)
5) *Model-V:* AASHTHO legal loads (Girder with square corner Haunch shape)

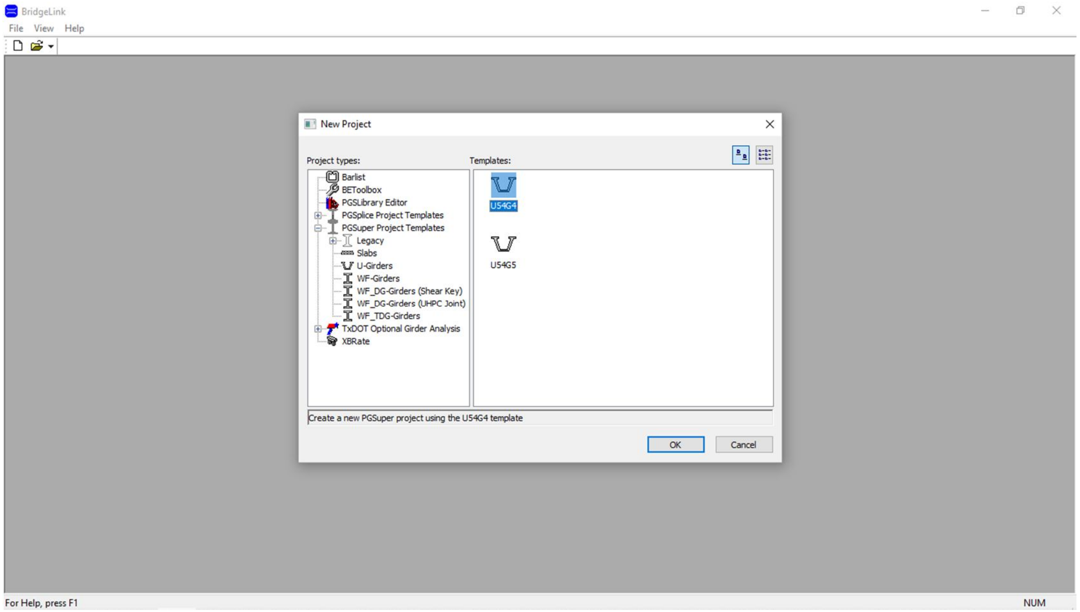

Fig. No.1: Modeling of U girder

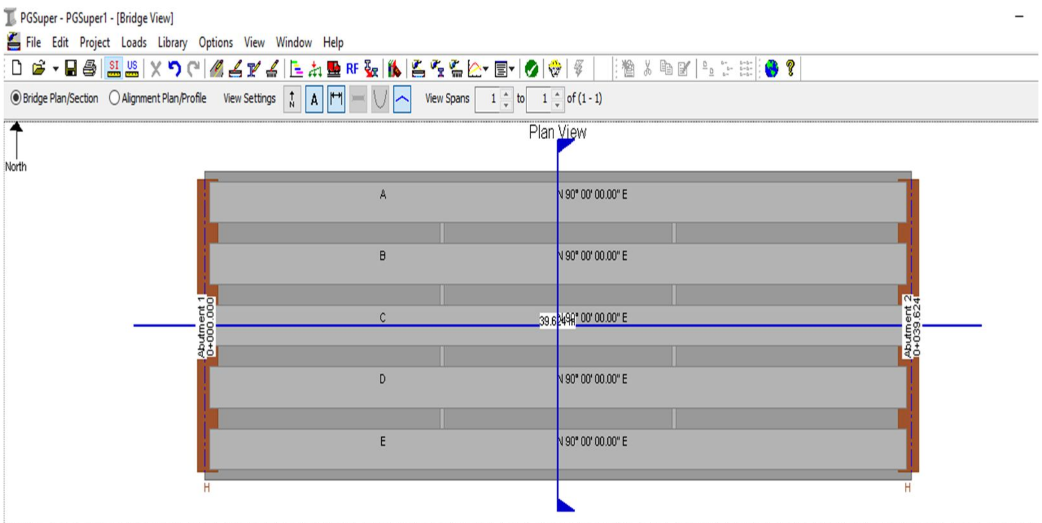

Fig. No.2: Plan view of the Bridge

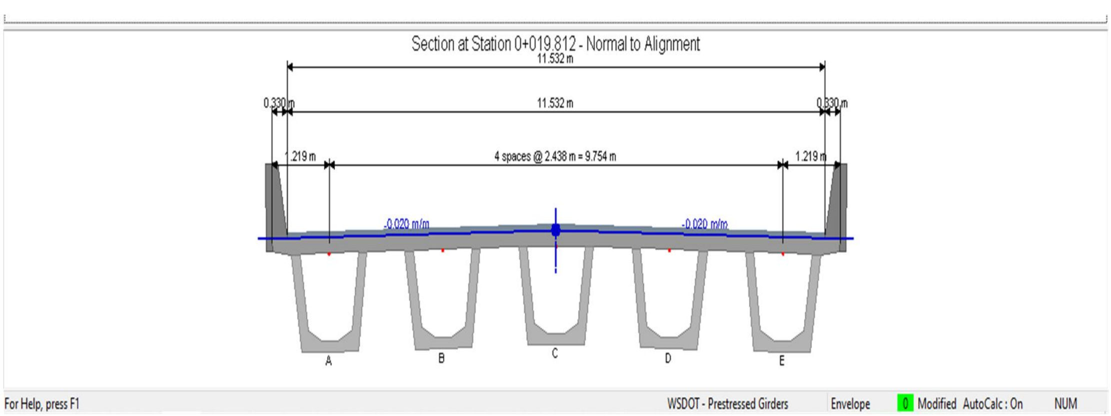

Fig. No.3: Cross section of the Bridge

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IV. RESULTS

The analysis is carried out in BRIDGELINK software and the results in terms of shear force, bending moment and other parameter is obtained as follows.

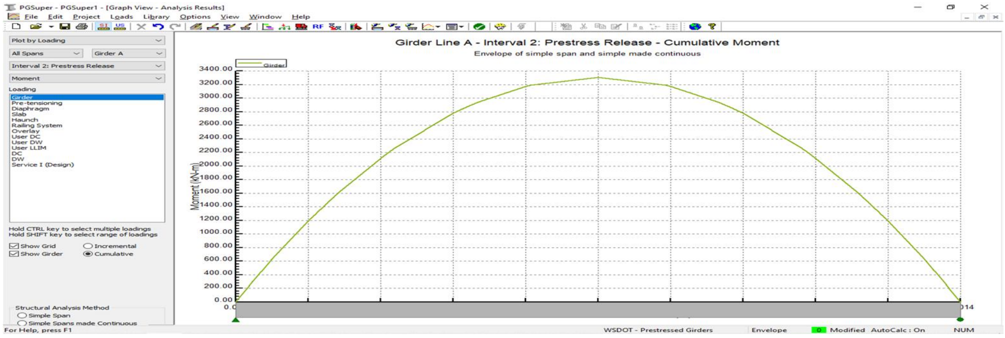

Fig. No. 6.1: Prestress release cumulative moment for Girder

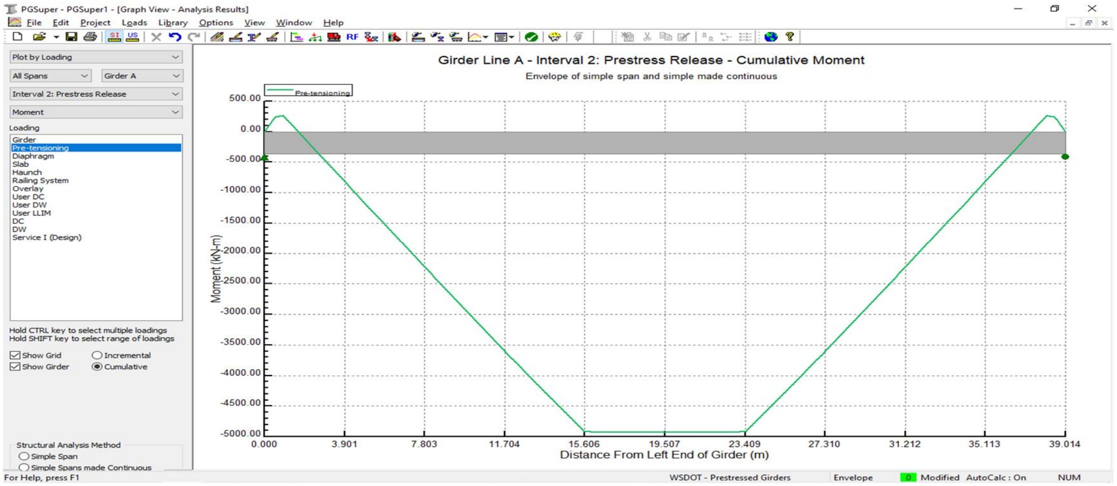

Fig. No. 6.2: Prestress release cumulative moment for Pretension

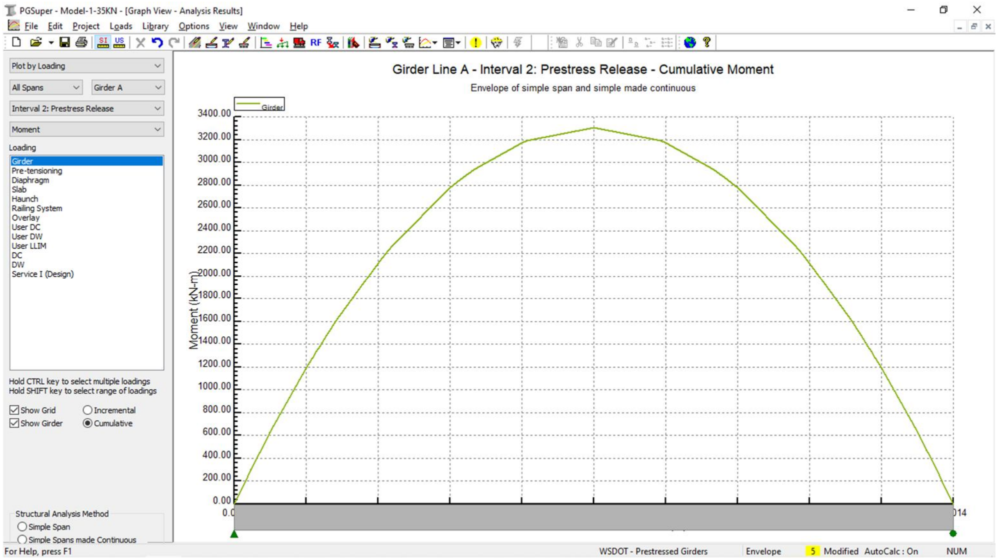

Fig.6.10: Prestress release cumulative moment pf girder for model-II

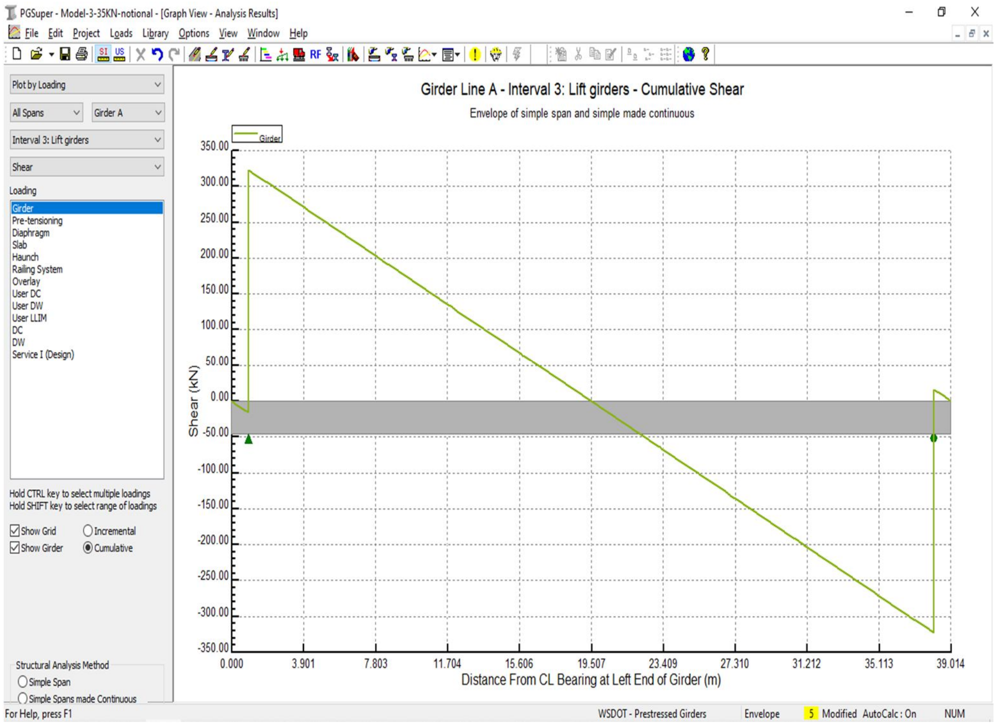

Fig. No. 6.20: Lift girder case of cumulative shear for model-III

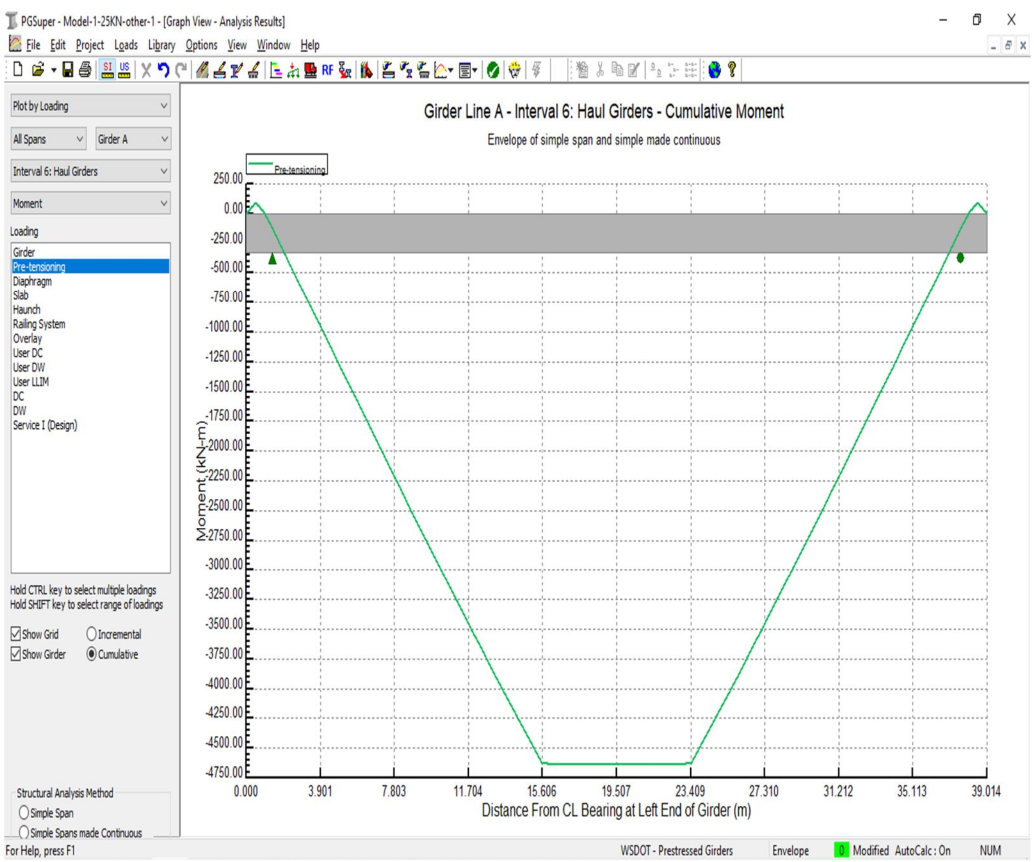

Fig. No. 6.25: Haul girders cumulative moment of pre-tensioning for model-IV

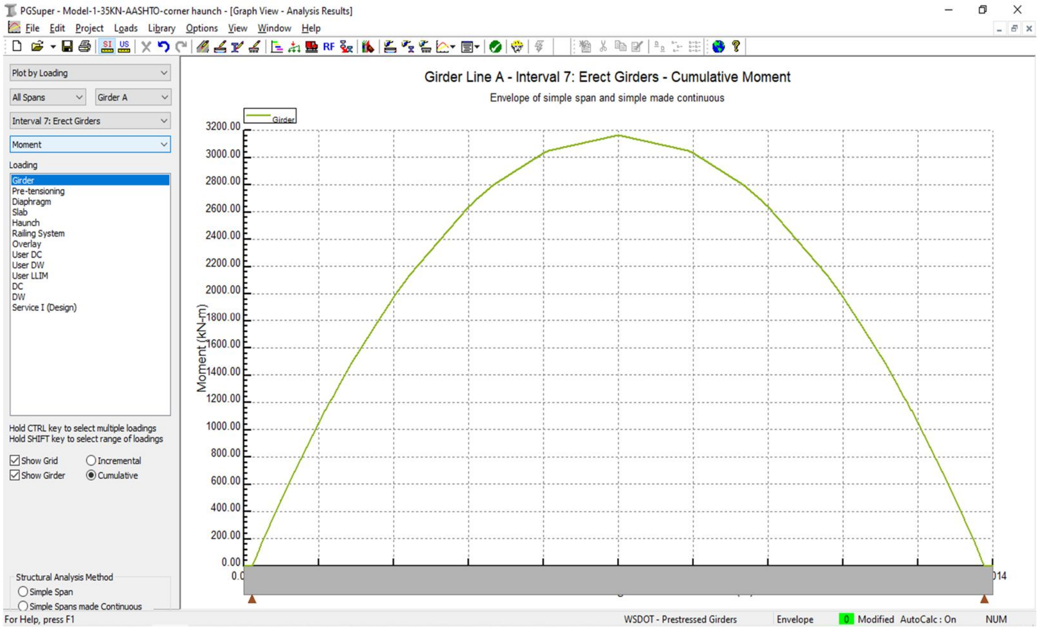

Fig. No. 6.32: Erect girder case of cumulative moment for Model-V

V. CONCLUSION

The conclusions from the above study are as follows:

A. Total 5 models are modeled in the Bridgelink software which is open source software
B. The moment, shear, rotation, deflection, reaction and stresses are computed for all the models.
C. It was observed that the model-V gives the maximum result in case of stress and moment
D. As the load patterns get changed the analysis is affected for the case of models
E. Maximum deflection is obtained in the model-V and minimum deflection is in model-I

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