

A REVIEW PAPER ON STRENGTHENING AND WIDENING OF FLEXIBLE PAVEMENT: A CASE STUDY OF KAITHAL-RAJASTHAN BORDER (NH-152/65)

¹Deepu Razak, ²Dr. Devinder Sharma, ³Er. Munish Kumar

¹M.Tech Scholar, ²Assistant Professor
Civil Engineering Department
SRMIET, Bhurewala, Ambala, Haryana, India.

Abstract – Grossly, In India different types of pavement design have been observed, Most of the highways are having the flexible pavement. All types of pavements are designed to support the wheel load imposed on it from traffic moving over it. Additional stresses are also imposed by change in the climate. Pavement should be strong enough to resist the stresses and to distribute the external load. The study highlights the need of pavement evaluation and pavement evaluation measures for the road pavements of Kaithal – Rajasthan Border NH-152/65 for the stretch of 7.5 km. For structural evaluation the existing pavement condition has carried out by BBD technique and overlay design has carried out as per IRC: 81-1997 guidelines on Kaithal – Rajasthan Border NH-152/65 for the selected stretch of 7.5 km.

Keywords: Strengthening and widening of flexible pavement

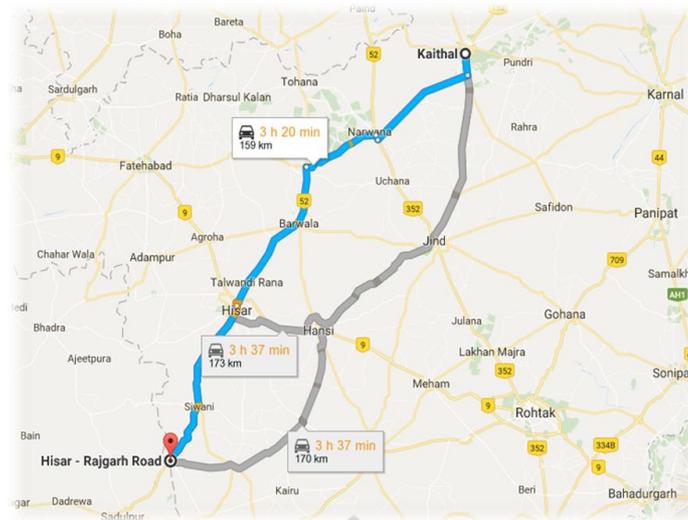
1. INTRODUCTION

Government of India through Ministry of Road Transport and Highways has launched National Highway Development Program for improvement of National Highways network in the Country. In this program such roads are proposed for development which needs immediate capacity augmentation for safe and efficient movement of vehicles. This program is to be carried out in phases. The Project Corridor Four Laning of Kaithal-Rajasthan Border section of NH-152/65 from part of Phase IV B of NHDP program. This project highway is proposed for up graduation as per the traffic requirements through Public Private Partnership (PPP) basis. The project road starts at Km 33+250 (Design Km 0.520) in Kaithal and ends at Km 241+580 (Design Km 165.759) of NH-152/65 in Rajasthan Borders. The project corridor is located in the State of Haryana and passes through four districts namely Kaithal, Jind, Hisar and Bhiwani. The nodal town on the stretches is Kalayat, Narwana, Barwala, Hisar, Barwa and Siwani. There is no major river crossed by the project road. The project road is not passing through any sensitive area live wildlife sanctuary, national park etc.

The project road being situated on the Yamuna-Ghagger plain, the terrain for the entire street is plain with the soil composition being alluvial type. The land use pattern in the project section is generally agriculture, with scattered stretches of urban/semi urban/ rural development. The percentage distribution of land use is 15.6%, 21.9% and 62.6% for semi Built up, Built up and agriculture respectively. The climate of Haryana is similar to other states of India lying in the northern plains is continental with extremes of heat in summer. The temperature falls in the minimum of 3°C in January and reaches up to 50°C during the months of May and June.

The existing highway geometry is very good and no major realignment to improve the horizontal geometry is envisaged. The terrain is absolutely plain and hence the vertical profile also needs very minimum improvement to achieve the required sight distance with respect to the design speed.

NHAI has appointed M/s Consulting Engineers Group Limited in association with SHRI KUSHALSURI Engineering Service Private Limited Jaipur to act independent engineer for this project.



2. LITERATURE REVIEW

Kunal P. Bhagat, Chetan P. Hadial, Ujjval J. Solanki (2015), “Mechanistic design of overlay based on Benkelman beam deflection technique,” in this literature flexible pavement overlay design was carried out as per IRC: 81- 1997 -Guidelines for Flexible Road Pavement Strengthening using Benkelman beam deflection (BBD) technique. The design thickness as per evaluated of Benkelman beam deflection is 85 mm bituminous layer. They have done overlay design as per IRC 37 2012 base on fatigue and rutting failure criteria. The various inputs required for the design is computed through deflection & existing pavement layer thickness as per IRC guidelines. The computed fatigue & rutting strain is 0.0837 micron and 169 micron due to material which is lower than strain due to traffic so the overlay design found safe in both criteria

Mahendrakar Kiran Kumar, D. Gouse Peea, Konge Praveen Kumar (2015), “A study on overlay designs of repeatedly deteriorating flexible pavement,” in this research they have studied on a factor, in India there is very high and very low pavement temperature in some parts of the country. Under this condition, flexible pavement tends to become soft in summer and brittle in winter. Further increase in road traffic during the last one decade with an unduly low level of maintenance has contributed to accelerated deterioration of road surfacing. To prevent this deterioration process, several types of measures may be adopted effectively such as improved design use of high performance material and effective construction technology.

A.A. Patel, Dhaval V. Lad (2015), “Pavement evaluation by Benkelman beam of state highway section (Waghodiya crossing to Limda)” In this structural evaluation of flexible pavement deflection by the Benkelman Beam is measured. Rebound deflection is used for overlay design. A detailed pavement condition survey is done on State Highway 158 (Waghodiya crossing to Limda) and the road condition is evaluated structurally. Their present study is evaluates the overlay thickness for State Highway 158 Waghodiya crossing to Limda.

3. OBJECTIVES OF THE PROPOSED WORK

The objectives of the work would be:

- (i) To study the existing traffic situation for the selected road stretch. Highway infrastructure projects would also require substantial up-scaling if the sector is to be developed for broader objective of achieving socio-economic development of the country and maintain the targeted growth trajectory.
- (ii) To carry out traffic volume survey of stretch.
- (iii) To study on need of road widening and justify the activities such as Road Safety, pilot schemes to test the efficacy of new / emerging technologies and materials, etc.

7. FUTURE SCOPE

Land prices along the highway have shot up, as farmers who see little future in farming have cashed out, and entrepreneurs who see gold in asphalt have bought in. It is of paramount importance to regulate and control the development activities in land abutting the Right of Way (ROW) of Highways so as to ensure availability of adequate clearances, enhance safety of traffic, obviate possible encroachments of ROW in future, etc. it is a long stretch and the development around the highway was stuck because of heavily clogged roads. The widening of the road would not only ease the traffic and reduce travel time but would also result in development of residential housing, Industrial Area along the road.

REFERENCES

- [1] Kazunori Munehiro et al, “Analysis on rural highway design using traffic micro-simulation in cold regions”, *Procedia Social and Behavioral Sciences*, 2011, 16, 388– 399.
- [2] Ghosh Indrajit et al, “Operational performance measures for two-lane roads: an assessment of methodological alternatives”, *Procedia Social and Behavioral Sciences*, 2013, 104, 440-448.
- [3] Dr. Rajashekar M. R. and Konthoujam Breeten Singh, “Prediction of level of service (los) based on volume speed relationship for an urban road widening project”, *International Journal for Innovative Research in Science & Technology*, 2015, 282-288.
- [4] Dr. Rajashekar M. R. and Konthoujam Breeten Singh, “A study on urban road widening project based on prediction of level of service (los)- a case study in Banetghatta road Benagalore”, *International Journal of Engineering Research & Technology*, 2015, 1176-1179.
- [5] Bhagat K.P. et al., “Mechanistic design of overlay based on Benkelman beam deflection technique”, *National conference on transportation and water resources engineering, NCTWE*, 2015.
- [6] Mahendrakar Kiran Kumar et al, “A study on overlay design of repeatedly deteriorating flexible pavement”, *American journal of engineering research*, 2015, 46-51.
- [7] Umersalam et al, “Evaluation and strengthening of reconstructed roads excavated for utilities using Benkelman beam deflection (bbd) technique (a case study),” *International journal of civil engineering and technology*, 2015, 27-38.
- [8] S.K. Khanna, C.E.G. Justo, A. Veeraragavan *In Highway Engineering; 10th Edn; Nem Chand & Bros, Roorkee 247 667, India*, 2014, pp650.

