International Research Journal of Engineering and Technology (IRJET) e-ISSN: 2395-0056
Volume: 06 Issue: 06 | June 2019 www.irjet.net p-ISSN: 2395-0072

Performance Analysis of Retrofitted Structure

Mahesh B. Tapkir[1], Ratnkant R. Piche[2], Onkar S. Panchal[3], Jitesh K. Soundarmal[4], Ms. Rohini Khandelwal[5]

[1,2,3,4]Students, Dept. of Civil Engineering, D Y Patil College of Engineering, Maharashtra, India
[5]Professor, Dept. of Civil Engineering, D Y Patil College of Engineering, Maharashtra, India

---

Abstract - *There are many old stone masonry Pier Bridge in Gulbarga for river crossing which are more than 70 years old, still under service. Need for capacity enhancement of railway transportation in recent years. Indian railway authority decides to enhance the axle load of train. Condition survey for one of the most remarkable of this stone masonry pier showed stone damage. Hence provide strength to the masonry pier is necessary. At the following pages we will present the performance analysis of retrofit design that was selected as the most economical for the existing bridge. Detailed study was carried out in order to find the most economical and advanced solution for the river crossing.*

Key Words: Stone masonry Pier, Railway Transportation, Axle load, Performance Analysis of Retrofit Design.

1. INTRODUCTION

Retrofitting is the process of modifying existing structure with additional or new components or members.

The existing bridge was constructed in the early 50's and is 100.45m long with five spans (Figure 1). It consists of one track and lies on a straight line in plan and elevation. The total width of the deck is 11.725 m. Thus a new cross section of the railway track was decided which accommodates two track. Following the above restrictions a detailed study was carried out in order to find the most economical and advanced solution for the river crossing. At the following pages we will present the performance analysis of retrofit design that was selected as the most economical for the existing bridge. Also we should mention that although the river has medium to high flow with a river bed of approximately 102 m.

1.1 Problem Statement

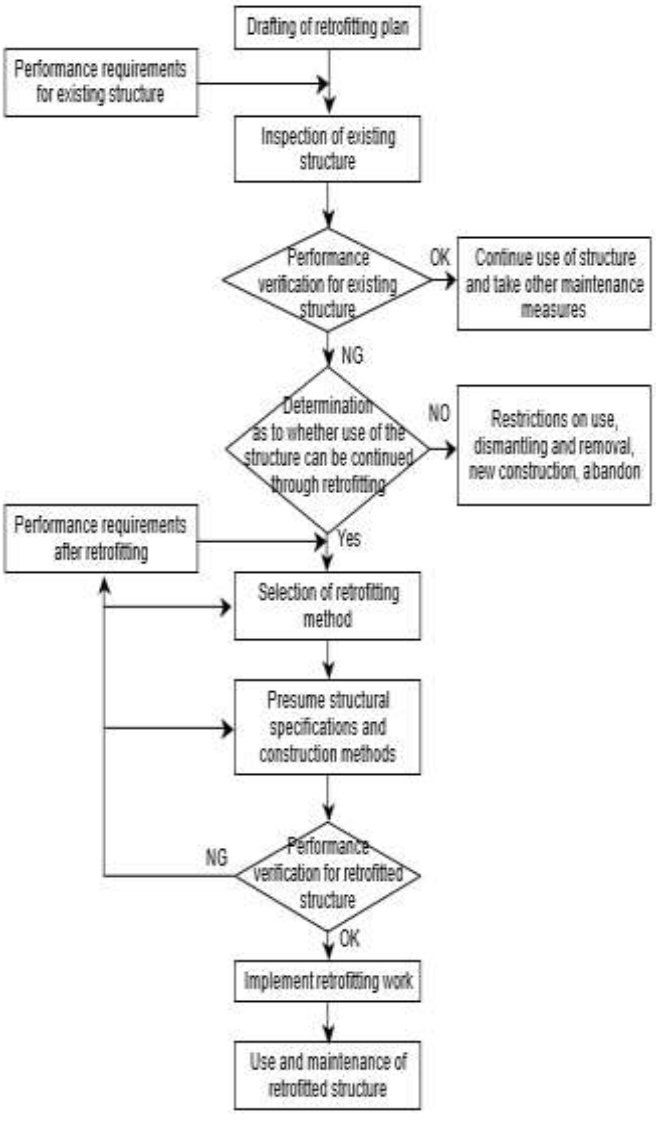
There are many old stone masonry Pier Bridge in Gulbarga for river crossing which are more than 70 years old, still under service. Need for capacity enhancement of railway transportation in recent years. Indian railway authority decide to enhance the axle load of train from 350 KN to 400 KN. Condition survey for one of the most remarkable of these stone masonry pier showed stone damage. Hence provide strength to the masonry pier is necessary.

1.2 Aims and Objectives

i. To indicate appropriate methods of repair and retrofitting.
ii. To indicate percentage increased strength due to use of jacketing method for retrofitting.

2. METHODS

2.1 Study of Retrofitting Process



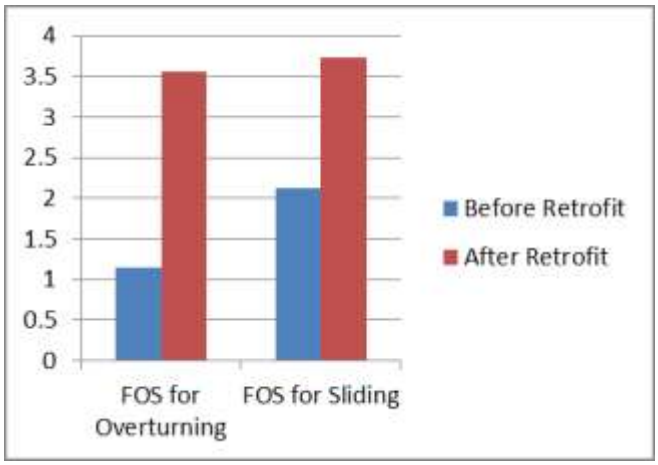


Chart -1: Graph for Comparison of FOS between Without and With Retrofitting

3. RESULT

3.1. Factor of Safety without Retrofitting

Check	FOS	Remark
Overturning	1.15 < 2	Unsafe
Sliding	2.13 > 2	Safe

3.2. Factor of Safety with Retrofitting

Check	FOS	% increased	Remark
Overturning	3.56 > 2	32.30	Safe
Sliding	3.73 > 2	57.10	Safe

4. CONCLUSION

There are many old stone masonry Pier Bridge in Gulbarga for river crossing which are more than 70 years old, still under service. Need for capacity enhancement of railway transportation in recent years. Indian railway authority decides to enhance the axle load of train from 350 KN to 400 KN. Therefore they increase strength by retrofitting. In our project we conclude that before retrofitting, structure will fail against overturning. After retrofitting, structure is safe against overturning and it increase 32.30% strength of structure. Hence, retrofitting is very good technology to increase strength instead of demolishing and constructing new structure.

REFERENCES

1. Akihiro Kunisue, Norihide Koshika, Yasushi Kurokawa, Norio Suzuki, Jun Agami And Mitsuo Sakamoto - "Retrofitting Method of Existing Reinforced Concrete Building Using Elasto-Plastic Steel Dampers".
2. N. Lakshmanan, K. Muthumani, and T.S. Krishnamoorthy -"Retrofitting of Reinforced Concrete Structures Using Wrapping Tehniques".
3. Sameh Elbetar and Mohamed S Issa -"SEISMIC RETROFIT OF EXISTING REINFORCED CONCRETE FRAMED BUILDINGS".
4. A. Figueiredo, H. Varum, A. Costa, D. Silveira, C. Oliveira -"Seismic retrofitting solution of an adobe masonry wall".
5. Ilya Zasukhin, Sergey Bokarev Siberian Transport University, 630049 Novosibirsk, Russia –"Determining strength of rubble masonry of bridges' supports being in operation".
6. Shri. Pravin B. Waghmare, Acharya Shrimannarayan Polytechnic, Pipri(M), Wardha –Maharashtra –" MATERIALS AND JACKETING TECHNIQUE FOR RETROFITTING OF STRUCTURES".
7. T. R. Jagadeesh & M. A. Jayaram "*Design of Bridge Structure*" Eastern Economy Edition, Published by Asoke K. Ghosh, Prentice- Hall of India Private Limited, New Delhi-110001,pg no. 216 to 223.
8. IRC 40-2002 Standard Specifications and Code of Practice for Road Bridges, Published by The Indian Road Congress, New Delhi-110011, 2002.
9. RDSO-B 1024

BIOGRAPHIES

Mahesh B. Tapkir, Student of D Y Patil College of Engineering, Akurdi, Pune-411044.

Ratnkant R. Piche, Student of D Y Patil College of Engineering, Akurdi, Pune-411044.

Onkar S. Panchal, Student of D Y Patil College of Engineering, Akurdi, Pune-411044.

Jitesh K. Soundarmal, Student of D Y Patil College of Engineering, Akurdi, Pune-411044.