

**Zeitschrift:** IABSE congress report = Rapport du congrès AIPC = IVBH  
Kongressbericht

**Band:** 14 (1992)

**Artikel:** Use of prestressed steel flexural members for bridge construction

**Autor:** Gupta, Laximkant M.

**DOI:** <https://doi.org/10.5169/seals-13852>

### **Nutzungsbedingungen**

Die ETH-Bibliothek ist die Anbieterin der digitalisierten Zeitschriften auf E-Periodica. Sie besitzt keine Urheberrechte an den Zeitschriften und ist nicht verantwortlich für deren Inhalte. Die Rechte liegen in der Regel bei den Herausgebern beziehungsweise den externen Rechteinhabern. Das Veröffentlichen von Bildern in Print- und Online-Publikationen sowie auf Social Media-Kanälen oder Webseiten ist nur mit vorheriger Genehmigung der Rechteinhaber erlaubt. [Mehr erfahren](#)

### **Conditions d'utilisation**

L'ETH Library est le fournisseur des revues numérisées. Elle ne détient aucun droit d'auteur sur les revues et n'est pas responsable de leur contenu. En règle générale, les droits sont détenus par les éditeurs ou les détenteurs de droits externes. La reproduction d'images dans des publications imprimées ou en ligne ainsi que sur des canaux de médias sociaux ou des sites web n'est autorisée qu'avec l'accord préalable des détenteurs des droits. [En savoir plus](#)

### **Terms of use**

The ETH Library is the provider of the digitised journals. It does not own any copyrights to the journals and is not responsible for their content. The rights usually lie with the publishers or the external rights holders. Publishing images in print and online publications, as well as on social media channels or websites, is only permitted with the prior consent of the rights holders. [Find out more](#)

**Download PDF:** 04.04.2026

**ETH-Bibliothek Zürich, E-Periodica, <https://www.e-periodica.ch>**



**Use of Prestressed Steel Flexural Members for Bridge Construction**

Éléments métalliques précontraints dans la construction de ponts

Vorspannung von Stahlbiegeträgern bei Brücken

**Laximkant M. GUPTA**

Assist. Prof.

V.R.C.E.

Nagpur, India

**SUMMARY**

In past several decades there is increase in use of new forms and shape for buildings, bridges, dams, power station in which technological competence and economic awareness play an important role. One of most important method for reducing the cost of steel bridges is use of prestressing in steel structure. Use of open web section of high tensile steel with prestressing gives a considerable saving in overall cost of bridges.



## 1. INTRODUCTION

1.0.1 Design example presented here is of flexural member of a deck type bridge for class A loading. An effective span of 30.0m and thickness of R.C.C. slab inclusive of wearing coat is 250 mm have been considered. Conventional structure is compared with open web section of mild steel and high tensile steel without and with prestressing.

## 2. ANALYSIS

2.0.1 As four plate girder are provided at 3 m c/c. The intermediate plate girder of bridge is subjected maximum load. Therefore maximum bending moment and shear force due to deadload, liveload including impact are

- a) Maximum Bending Moment = 5686.74 KNm
- b) Maximum Shear force = 786.00 KN

## 3. DESIGN

3.0.1 Bridge girder is designed for maximum bending moment and shear force due to deadload, liveload, including impact by using different type of section such as

- 1. Using solid web section of M.S.
- 2. Using open web section of M.S.
- 3. Using open web section of H.T. steel
- 4. Using open web section of M.S. with prestressing
- 5. Using open web section of H.T. steel with prestressing.

3.0.2 Open web section used for construction of bridge girder is made up of standard rolled angles with cover plate. Theory of open web section is very simple, it is ideally suitable section where bending action is predominant. For prestressing of girder tendon is placed externally below the girder section on tension side. It increases the efficiency of structure.

## 4. COST CALCULATION AND COMPARISON

4.0.1 Based on the design prepared for bridge girder the cost of construction is calculated and compared. It is seen that open web section of H.T. steel with prestressing helps in reducing the cost of bridge girder.

## 5. METHOD OF CONSTRUCTION

5.0.1 Prestressing of steel structure can be carried out by two ways. (1) Pretensioning the Structure (2) Posttensioning the Structure.

In the first method girder is prestressed before the concreting of slab. Thus opposite stresses are developed in girder only. In the second method girder is prestressed after complete construction of bridge but before its actual use.

## ACKNOWLEDGEMENT

Author acknowledges with thanks, encouragement given by authorities of V.R.C.E., Nagpur, in completing this work.