

भारत सरकार / GOVERNMENT OF INDIA
रेल मंत्रालय / MINISTRY OF RAILWAYS
(रेलवे बोर्ड / RAILWAY BOARD)

No. 2025/W-I/Genl./Bridges (E-File No.3489910)

New Delhi, Dated: 10.01.2025

**The General Managers,
All Indian Railways.**

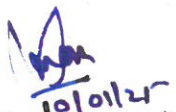
Sub.: Improving the planning and construction of major/ Important bridges and opening thereof.

**Ref.: (i) Rules for Opening for Public Carriage of Passengers-2000
(ii) Railway Board's L. No. 2022/19/CE-III/BR/Girder Inspection,
E-3322338 dt. 18.10.2024.
(iii) Railway Board's letter No. 2023/19/CE-III/BR/RDSO/1,
E-Office No. 3423738 dt. 06.08.2024.**

In order to improve planning & construction of major & important bridges and to facilitate the process of opening, following measures need to be taken:

1. For important and special type of bridges, separate guidelines issued for formation of Technical Advisory Group (TAG) and getting the approval of DBR should be followed. Commissioner of Railway Safety (CRS) should be kept apprised about the special features/ innovative aspects of the Design Basis Report and the decisions taken by TAG thereon.
2. Planning & Design Cells should be strengthened at construction HQ level. Instructions issued, vide Ref (iii) above in this regard, shall be referred. Short training sessions should be organized at Zonal Railway Headquarter level to improve the skills & knowledge of officials with the assistance of CBE. Zonal Railways should engage 3rd party inspection wherever feasible for quality checks. For erection of girders also, third party inspections as per approved method statements/Safety precautions, can be carried out.
3. Instructions regarding supply of opening documents to Commissioner of Railway Safety (CRS) are given in Rule 4.1 of Chapter-II of the Opening Rules. In order to facilitate process of inspection and opening of major and important bridges, necessary application for minor sanction shall be submitted before start of construction. The application shall be submitted to the Commission of Railway safety in advance with details such as general arrangement drawings (GADs), calculations on adequacy of waterways, maximum anticipated scour depth, river training works and various other compliances to technical instructions.

This is issued with the approval of Board(MI).


(Vivek Kumar)
Executive Director/Gati Shakti (Civil)II
Railway Board

Copy to:

1. Chief Commissioner of Railway Safety.
2. Commissioner of Railway Safety - All Circles.

Chapter II

Preparation for Opening of Railways

3. Reference to the Commissioner.

- (1) Every railway administration shall ensure that the railway line or a portion thereof to carriage of passengers is complete in all respects as per the Indian Railways Standard (Practice and for such opening all the administrative formalities are complete and the railway is regulated by the Indian Railways (Open Lines) General Rules, 1976.
- (2) The Chief Executive of the railway administration of a non-Government railway, before to the Commissioner under sub-rule(3) for inspection of any railway, shall obtain Central Government that the railway which is sought to be opened has been constructed that administration in accordance with the Indian Railways Standard Codes and Manual working of the railway is governed by the Indian Railways (Open Lines) General Rules
- (3) Where the General Manager of a Zonal Railway, or the Chief Executive of a non-Government railway, has the opinion that any railway or part thereof is required to be opened for public carriage, he shall refer the matter to the Commissioner for inspection and report on the safety of the

4. Supply of certain documents to Commissioner.

- (1) The General Manager of a Zonal Railway or the Chief Executive of the non-Government railway shall furnish all the relevant documents to the Commissioner while making reference to inspection under rule 3 from the following list of documents, namely :-
 - (a) Tabulated details;
 - (b) Index Plan and Section of railway;
 - (c) Drawings of works;
 - (d) List of questions and answers.

Issued by bmccl
on 28.10.2024

2020/17/CE-III/BR/GirderInspection

I/3108447/2024

भारतसरकार GOVERNMENT OF INDIA
रेलमंत्रालय MINISTRY OF RAILWAYS
(रेलवेबोर्ड RAILWAY BOARD)

No. 2022/19/CE-III/BR/Girder Inspection (E-3322338)

New Delhi Dated 18-10-2024

General Manager/Const (NFR)
All CAO/C & PCEs,
Zonal Railways

Sub: Planning of non-standard spans of Open Web Girders for New line, Doubling and Multi tracking Works of Railways

Ref: (i) 2013/CE-III/BR/RDSO/Misc. dated 04-6-2014 and 11-08-2014
(ii) RDSO letter No. CBS/DOW dated 18.10.2024

A case of rejection of Non-standard Open Web Girder has come to the notice of Railway Board wherein besides issue of insufficient camber, one of the bottom chords was found having been repaired for the damage caused during erection. It needs to be understood that the railway bridges are subject to heavy dynamic loads and stress concentration generated at such repaired locations will cause early fatigue failures. One of the IITs has approved the repairs without any technical examination of the likely adverse implications of the repairs done.

2.0 Several cases are reported where the Non-standard designs are being proposed with a small variation with respect to standard span. Design of Open Web Girders is a specialized job where camber & pre-stressing are provided in truss members and strict quality control is maintained at fabrication workshops to ensure that notches in fabricated parts are avoided and there are no locations of stress concentration except those provided in design.

3.0 In view of above, it has been hereby decided that the non-standard Open Web Girders shall only be planned when these are totally unavoidable. Prior approval of Railway Board shall be taken through PCE with complete justification. Detailed instructions in this regard are contained in the **Annexure-I** attached.

This is issued with the approval of Member Infra, Railway Board.

DA: As above

Signed by

Ravindra Kumar Goel

Date: 26-10-2024 12:41:18

(Ravindra Kumar Goel)

Principal Executive Director/Bridge
Railway Board

Copy to : (i) DG/IRICEN, Pune for information

(ii) PED/Infra-II, RDSO, Manak Nagar, Lucknow for information & necessary action.

(iii) MD/CMD, RITES, IRICON, RVNL, KRCL, MRVC & DFCCIL etc. for information

(Ref : Rly Bd L No. 2022/19/CE-III/BR/Girder Inspection (E-3322338) New Delhi Dated 18-10-24)

Use of Non-standard spans of Open Web Girders (OWG)

1. Railway Bridges are vital links over rivers & roads etc. They are not only to be constructed but have to be maintained well for longer service life. The designs of standard spans are validated over a period of time and maintenance issues are understood well and methods for remedial attention are also standardized. Besides this quick replacement of standard girders is possible during emergency restoration as fabricated girders of similar type can be easily diverted from other ongoing works.
2. In view of above, it has been advised time to time that only standard span shall be adopted in all new line/doubling /multi tracking projects of railways. To overcome site constraints, pier caps may be suitably projected to meet the actual requirements of standard spans. In case new bridge is to be located close to existing bridge, staggering of pier arrangement with respect to existing piers may be considered. The scour control measures during the design of new foundations or protection of existing foundations from anticipated scour may be considered with requisite hydraulic studies.
3. Non-standard spans for OWG shall be adopted only in un-avoidable situations with prior approval of Railway Board. The proposal shall be submitted by PCE after examining the justification and professional capacity of the executing unit to get a good design and quality execution done.
4. If non-standard spans are adopted care shall be taken, while designing, to follow available RDSO standard drawings of nearest OWG span with minimum required changes made to meet the essential design requirements. Complete procedure of detailed design, however shall be followed as per DBN approved by RDSO. As per extant instructions, design of all non-standard spans of OWG shall be approved by Zonal Railways.
5. **Design Basis Notes (DBN)** of Non-standard spans of OWG in all bridges shall be approved by RDSO. Critical values of various design parameters such as loading, fatigue category, partial factor of safety, type and specifications of HSFG bolts etc. shall be specified in DBR/DBN. Connection design at every node shall be examined carefully with respect to member capacity and number of rivets/HSFG bolts required/ provided. RDSO shall also specify the check points of vital design stages so as to ensure that design process is followed correctly by DDC & PC. The stages of fabrication process to be inspected by DDC & PC and QAP shall be part of DBN.
6. Designs may either be done by in-house Design Cell of CAO/C or through outsourcing the work to competent Detail Design Consultants (DDC) duly proof checked by Proof Consultants (PC). In the later case also, the design cell shall be involved to verify that the design is being done as per the approved DBN and all vital design stages are completely satisfactorily.
7. The engagement of DDC and PC and quality of fabrication shall be regulated and monitored as under :
 - a. Only competent DDC and PC of repute, having professionally trained designers, shall be awarded the consultancy works. DDC and PC shall be engaged from the very beginning of the project and they shall remain associated with the construction

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of bridge till commissioning/defect liability period. During construction stage, same DDC and PC will provide necessary advice/ design modification as and when warranted.

- b. While engaging Proof Consultants, any conflict of interest with DDC or Contractor shall be avoided. IIT/NIT may be associated for technical guidance & opinion only in exceptional cases.
 - c. Same DDC and PC shall be involved in the design of foundation, substructure, super structure, launching & erection schemes, temporary works, formwork etc. to safeguard against any mismatch in designs, proper estimation of various loads or damage during the final erection on sub-structure.
 - d. Professional Liability clause of sufficient duration shall be added in the contract of DDC and PC. The responsibility of these Consultants in case of any failure shall be clearly laid down in tender conditions. Necessary certificates from DDC & PC shall be taken on design documents and drawings before release of drawings for fabrication & construction.
 - e. Based on design drawings and approved DBN submitted, the PC shall check the adequacy of design based on **independent analysis** performed on separate software (*other than that used by Design Consultant*) as per load parameters & codal provisions given in **DBN**. PC will also check detailing of all the load bearing connections and bearings in his independent report.
 - f. Fabrication workshop shall be selected carefully after ensuring its past experience & capacity to deliver the span of girder. During fabrication of steel girders, the DDC & PC shall associate with Field engineers/PMC and inspect the work of fabrication at different stages to ensure that the quality of work is achieved as per specifications, design assumptions made and precautions required from fatigue consideration etc. All the requirement of RDSO specification (B-1: 2000) and approved QAP shall be met with to the full satisfaction of DDC & PC. The fabrication stages shall be mentioned in the DBN and approved by RDSO. Based upon their certified technical report, project executing authority shall raise the inspection call to RDSO/TPI.
 - g. Erection methodology given by the construction agency duly approved by Field engineers /PMC, shall be scrutinized by the DDC and PC to check for any unwanted erection stresses coming up at different stages. Sufficient factor of safety at every stage shall be ensured. Structural adequacy of members and joints to withstand the erection and launching forces, wind forces etc. shall be certified by these consultants. Deficiencies, if any, shall be pointed out clearly in the technical report and the certificate of satisfactory completion shall be given for that stage of erection and launching. Detailed technical report from DDC & PC must be ensured before undertaking next stage of erection/ launching.
8. These are minimum instructions for guidance and do not restrict project execution authority or CAO(C) to implement other necessary instructions for better quality control on the design activities and related fabrication & erection work as per actual requirements.

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**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)**

No.2023/19/CE-III/BR/RDSO/1(E-3423738)

New Delhi, Dated: 06.08.2024

Principal Chief Engineers,
All Zonal Railways

- Sub:** Strengthening of Design cells & Bridge Line units
Ref: (i) Review meeting on 19.07.2024 at Mumbai.
(ii) Rly Bd. L. No. 2016/52/CE-III/BR/Safety dated 05-08-2024.
(iv) Rly Bd L. No. 2017/50/CE-III/BR/FOB dated 26.04.2024
(v) Rly Bd L. No. 2017/Trans/01/policy dated 27-11-2017.
(vi) 2024/10/CE-III/BR/Prof of Practice(E-3454464) dated 05-03-2024

Bridges are important structures related to public safety. Design and maintenance of these structures require careful consideration of actual needs of the user, material strength and it's deterioration with age & fatigue effects on structure under sustained dynamic loads etc. The FOB/ROBs are generally constructed in steel and adequate safety margins are to be kept in design for material degradation and future increase in loading. With faster pace of development, the population of bridges is constantly on increase. New types of designs are being adopted increasingly.

2.0 In order to maintain the bridges, the professional capabilities of maintenance units and design cells are to be improved. Some of steps which can be taken early are as under :-

(A) PLANNING & UP GRADATION OF FACILITIES:

- (i) Strengthening of **Design cells & Bridge line units** by filling up vacant posts of SSE/JEs.
- (ii) Creating **additional posts of Dy. CE/Br-Line, SSEs/JEs** in bridge line units & design cells to deal with the work of planning & design of bridges effectively. The posts rendered surplus in other categories may be got re-designated for the purpose.
- (iii) **New Software for RSI analysis and design of bridge structures** etc. shall be procured.

(B) KNOWLEDGE SHARING & TRAINING:

- (i) The **training facilities** for supervisors and artisans at **ZBTIs** shall be reviewed and deficiencies shall be made good. Additional works shall be got sanctioned for procurement of **computers, teaching aids, up-gradation of hostels** & other civil amenities.
- (ii) Training needs of **Design & Drawing cadre** to be identified & special courses to be get conducted at ZBTI or IRICEN.
- (iii) Nominating Bridge Engineers & SSEs in **technical seminars** organised by various bridge forums.
- (iv) **In-house training/seminars** on issues of correct preparation of GADs, maintenance of ROB/FOBs, inspection of bridge, case studies on failures etc. should be organised periodically in Divisions/ HQs. for knowledge sharing.

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(C) QUALITY CONTROL :

- (i) **Bridge Work Shop & ZBTI** shall be under the administrative control of **CBEs**.
- (ii) **List of working consultants** shall be maintained with their core competence in specific fields of design such as Steel FOBs, RCC Structures & ROB, preparation of General arrangement Drawings and TADs, waterway calculation for bridges, RSI studies, third party auditing etc.
- (iii) **All new construction** should be maintenance friendly with control on quality of work. CBE shall have **check list** to scrutinise the GADs & quality of fabrication should be ensured through **third party inspection**.
- (iv) The **professional competence** of the engineers involved in the fabrication inspection to be reviewed & got certified.

(D) REVIEW & MONITORING:

- (i) One Sr. DEN/ DEN shall be made in-charge of bridge matters in divisions.
- (ii) Adequate no. of SSE/JEs shall be posted in **Divisional Bridge Cell**. There should be centralised control of various correction slips issued to codes & manual and technical instructions issued by RDSO, railway Board etc. for effective implementation and regular updation on **Bridge Management System**. Adequate number of Data Entry Operator should be made available to Divisional Bridge Cell for updation of above.
- (iii) Sr. DEN/Co shall have **weekly meeting** to review the position of Bridge rehabilitation works and matters pertaining to inspection of bridges. Concept of predictive maintenance shall be followed.

(E) OTHERS:

- (i) **Third party audits** shall be got conducted for **old & vulnerable ROB/FOBs** and other bridges as per Railway Board instruction already issued.
- (ii) Assistance of **RITES/IRCON/DMRC/IITs /NIITs/ VJTI, Mumbai /CRRI/ SERC /IISc, Bangalore /CWPRS, Pune/ NIH, Roorkee /CSIR labs/PSUs** and other institutions of repute shall be taken in specific cases of planning, design, peer review of Designs & DPRs and structural audits etc. as per Rly. board instructions issued vide **ref- (iv)** above.
- (iii) **DPR for works** related with **improving the mobility** may be got sanctioned under **PH-32** to improve speed potential or to relax existing speed restrictions on bridges.

DA : As Above

(Ravindra Kumar Goel)
Principal Executive Director (Bridge)
Railway Board

Copy to:**GMs All zonal railways** - for information.**DG/IRICEN** – for information pl.

Signed by

Ravindra Kumar Goel

Date: 08-08-2024 14:39:14