

राजेश कुमार श्रीवास्तव
Rajesh Kumar Srivastava
कार्यकारी निदेशक/पु0एवंस0
Executive Director/B&S



भारतसरकार-रेलमंत्रालय
अनुसन्धानअभिकल्पऔरमानकसंगठन
लखनऊ- 226011
Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow- 226011
Phone / Fax : 0522-2450398
Email : edbsrdso@gmail.com

सं.: CBS/PBR

दिनांक: 06.12.2022

Principal Chief Engineers:

- | | |
|---|---|
| 1. Central Railway, Mumbai CST - 400001 | 9. North Western Railway, Jaipur - 302 001 |
| 2. Eastern Railway, Fairlie Place, Kolkata - 700 001 | 10. Southern Railway, Park Town, Chennai - 600 003 |
| 3. East Central Railway, Hazipur - 844 101 | 11. South Central Railway, Rail Nilayam, Secunderabad - 500 371 |
| 4. East Coast Railway, Bhubaneshwar - 751 016 | 12. South East Central Railway, Bilaspur - 495004 |
| 5. Northern Railway, Baroda House, New Delhi - 110 001 | 13. South Eastern Railway, Garden Reach, Kolkata - 700 043 |
| 6. North Central Railway, Allahabad - 211001 | 14. South West Railway, Hubli - 580 023 |
| 7. North Eastern Railway, Gorakhpur - 273001 | 15. Western Railway, Mumbai - 400 020 |
| 8. Northeast Frontier Railway, Maligaon, Guwahati - 781 061 | 16. West Central Railway, Jabalpur - 482 001 |
| | 17. Metro Railway, Jawaharlal Nehru Road, Kolkata - 700 071 |

विषय: RDSO's Addendum & Corrigendum Slip (A&C Slip) No. 50 to IRS-Bridge Rules.

संदर्भ: Railway Board's letter No. 2016/4/CE-III/BR/BSC/84/Seminar/Pt. Dated 01.12.2022

In reference to above, Addendum and Corrigendum slip No.- 50 dated 06.12.2022 to IRS Bridge Rules is being sent for your information & necessary action please.

सलग्नक: Copy of A&C Slip No.50 to Bridge Rules.

(राजेश कुमार श्रीवास्तव)

(Rajesh Kumar Srivastava)

कार्यकारी निदेशक/पुल एवं संरचना
Executive Director/B&S

प्रतिलिपि :

- (A) 1. Additional Member (Civil Engg.) Railway Board, Rail Bhawan, New Delhi- 110001
2. Additional Member (Works) Railway Board, Rail Bhawan, New Delhi- 110001

3. Principal Executive Director/Bridges, Railway Board, Rail Bhawan, NewDelhi-110001
4. Director General, Indian Railway Institute of Civil Engg., Pune-411001
5. Executive Director Civil Engg./B&S, Railway Board, Rail Bhawan, Room No.140A, New Delhi-110001
6. General Manager(C),N.F.Railway, Maligaon, Guwahati- 781001
7. The Director General, National Academy of Indian Railways, Vadodara-390004

(B) The Chief Administrative Officer (Construction):

1. Central Railway, Mumbai CST-400001
2. Eastern Railway, Fairlie Place, Kolkata -700001
3. East Central Railway, Mahendrughat, Patna(Bihar) -800004
4. East Coast Railway, Bhubaneswar, (Orissa) -751016
5. Northern Railway, Kashmere Gate, Delhi -110006
6. USBRL Project, Northern Railway,Satyam Complex,Trikuta Nagar Extn.,Jammu-180 020
7. North Central Railway, Allahabad, (U.P.) -211001
8. North Eastern Railway, Gorakhpur- 273001
9. North Western Railway, Jaipur (Rajasthan)-302001
10. Southern Railway, Egmore ,Chennai -600008
11. South Central Railway, DRM/Secunderabad Office Compound,Secunderabad-500371
12. South Eastern Railway, Garden Reach, Kolkata-700043
13. South East Central Railway, Bilaspur-495004
14. South Western Railway,No.18 Miller Road, Bangalore, (Karnataka) -560046
15. Western Railway, Mumbai - 400020
16. West Central Railway, Jabalpur (M.P.) -482001
17. North Frontier Railway,Maligaon,Guwahati-781011
18. CAO/ERS, Southern Railway, Ernakulam, Kerala-682506
19. CAO/North Frontier Railway-I,II,III, Maligaon, Guwahati-781011
20. CAO/ERS, Southern Railway, Ernakulam, Kerala-682506

(C) Chief Bridge Engineers:

1. Central Railway, Mumbai CST-400001
2. Eastern Railway, Fairlie Place, Kolkata -700001
3. East Central Railway, Hazipur- 844101
4. East Coast Railway, Bhubaneshwar- 751016
5. Northern Railway, Baroda House, NewDelhi-110001
6. North Central Railway, Allahabad - 211001
7. North Eastern Railway, Gorakhpur- 273001
8. Northeast Frontier Railway, Maligaon,Guwahati-781061
9. North Western Railway, Jaipur- 302 001
10. Southern Railway, Park Town, Chennai -600003
11. South Central Railway, Rail Nilayam, Secunderabad-500371
12. South East Central Railway, Bilaspur-495004
13. South Eastern Railway, Garden Reach,Kolkata-700043
14. South West Railway,Hubli-580023
15. Western Railway, Mumbai - 400020
16. West Central Railway,Jabalpur-482001
17. Metro Railway, Kolkata -700071

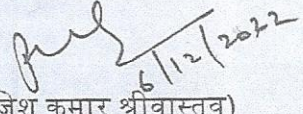
(D) Commissioner of Railway Safety:

1. Chief Commissioner of Railway Safety, N.E. Railway Office Compound, Ashok Marg, Lucknow- 226002
2. Central Circle, 2nd Floor, Churchgate Station Building Mumbai-400020
3. Eastern Circle, Multistoreyed Building of Eastern Railway, 12th Floor, Strand Road, Kolkata-700001
4. Northern Circle, near Centre for Railway Information System, Safdarjung Railway Station, New Delhi -110021
5. North Eastern Circle, DRM Compound, Northern Railway, Hazratganj, Lucknow-226001
6. Northeast Frontier Circle, 12 Strand Road, Multistoreyed Building of Eastern Railway, Kolkata-700001
7. Southern Circle, 7 Seshadri Road, Gandhi Nagar, Bangalore-560009
8. South Central Circle, Opp. Rail Nilayam, Sarojini Devi Road, Secunderabad-500071
9. South Eastern Circle, 14 Strand Road, Multistoreyed Building of Eastern Railway, Kolkata-700001
10. Western Circle, 2nd Floor, Churchgate Station Building Annexe, Maharishi Karve Road, Mumbai-400020.

(E) Railway PSUs & Others:

1. The Managing Director, RITES LTD, RITES Bhawan, Plot No.1, Sect.29, Gurgaon (Haryana)-122001
2. The Managing Director, IRCON, Palika Bhawan, Sector-XIII, R.K. Puram, New Delhi -110066
3. The Chairman & Managing Director, Konkan Railway Corporation Ltd., Bhawan, Plot No.6, Sector-II CBD Belapur, Navi Mumbai-400614
4. The Managing Director, Rail Vikas Nigam Ltd., 1st floor, August Kranti Bhawan, Bhikaji Cama Place, Africa Road, R.K. Puram, New Delhi-110016
5. The Managing Director, DFCCIL, 5th Floor, Pragati Maidan, Metro Station Building Complex New Delhi-110001
6. The Managing Director, Delhi Metro Rail Corporation Ltd., Metro Bhawan, Fire Brigade Lane, Barakhamba Road, New Delhi-110001

सलसूतक: Copy of A&C Slip No.50 to Bridge Rules.


(राजेश कुडार श्रीवास्तव)
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Executive Director/B&S

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

BRIDGE RULES

(IN SI UNITS)

RULES SPECIFYING THE LOADS FOR DESIGN OF SUPER-STRUCTURE AND SUB-STRUCTURE OF BRIDGES AND FOR ASSESSEMENT OF THE STRENGTH OF EXISTING BRIDGES

Adopted – 1941

Revised – 1964

Reprinted in 2014

(Incorporating Correction Slips 1 to 46)

Addendum and Corrigendum Slip No. 50 dated: 06.12.2022

Add new clauses as follows:

- 1.1.1 All structures near railway track shall be checked for accidental impact from derailed trains as per clause 2.16.4 of these rules.
- 2.1(o) Forces due to accidental impact from any vehicles such as road vehicles, ships or derailed train vehicles etc. using the bridge.
- 2.16 Forces due to accidental impact from any vehicles such as road vehicles, ships or derailed train vehicles etc. using the bridge.
- 2.16.1 The forces due to accidental impact from any vehicles shall be taken either by the bridge structure or any separate arrangement suitably designed to withstand these forces. The impact forces to be considered shall be reasonably expected forces and the bridge design/arrangement shall ensure that the bridge span does not collapse under these forces.
- 2.16.2 The forces due to accidental impact from road vehicles shall be as per provisions of relevant road authorities.
- 2.16.3 In bridges nominated/regularly used for navigation purposes, the forces due to accidental impact from ships or other water borne vehicles shall be as per provisions of relevant maritime authorities.
- 2.16.4 The design of structures for accidental impact from derailed trains shall be done as follows:
 - 2.16.4.1 Structures to be checked for accidental impact from derailed trains.
 - 2.16.4.1.1 Structures which need special measures to be taken regarding derailed vehicles:
 - i. Buildings with regular occupancy offices/residences including amenities at Railway Stations (occupancy more than 10).
 - ii. Buildings likely to be crowded usually or occasionally such as shopping areas, theatres, Auditorium etc.
 - iii. Structures supporting tracks, railway etc. carrying passengers.
 - iv. Structures carrying hazardous chemicals like oil, gas etc.
 - v. Road Over Bridges.
 - vi. Any other structure where risk analysis indicates a need for taking measures to protect the structures against derailment loads.

2.16.4.1.2 The structures which usually don't need any special measures to be taken regarding derailed vehicles:

- i. Fencing/ boundary walls etc.
- ii. Masts, poles etc. for railway use such as indicators, OHE/signal structures etc.
- iii. Platform cover shelters and other structures which do not normally have people on them.
- iv. Warehouses and parking lots which are thinly occupied (occupancy less than or equal to 10).

2.16.4.2 **Distance upto which the Structures shall be considered vulnerable:** The structures shall be considered vulnerable for a distance specified below:

Maximum Speed of Trains	Perpendicular distance of structure from center line of nearest track (including duly protected ends of tracks) upto which structures shall be considered vulnerable
≤ 100 KMPH	$4.1\text{m} + (\text{Maximum height of vehicle}/3)$
> 100 KMPH, ≤ 160 KMPH	$5.1\text{m} + (\text{Maximum height of vehicle}/3)$
For track curvature exceeding 0.5 deg, an additional clearance of 1m shall be provided.	

- Note: 1. For vehicles travelling at different speeds, the distance of vulnerability shall be worked out separately for different vehicles.
2. The height upto which the distance of structure is to be measured shall be upto the top of vertical part of the Maximum Moving Dimension diagram for the route.

2.16.4.3 Design Measures for structures which are within distance specified in para 2.16.4.2: All structures within the distance specified in para 2.16.4.2 are vulnerable to damage due to being hit by derailed vehicles. These structures shall be suitably designed as specified below:

2.16.4.3.1 The structures considered vulnerable as per clause 2.16.4.3 but located near tracks having maximum speed 100 kmph shall be considered adequately protected if the structure is supported on a platform (can be an extension of foundation) with minimum height 0.76m above rail level, minimum length 3.6m and minimum thickness 0.8m, which extends minimum 1.2m below the surrounding ground and if the columns/piers of the structure are minimum 0.5m (measured from all possible directions of train impact) behind edge of the platform. One possible way of achieving this is by extending pile cap up to 1.2m below ground level and up to 0.76m above ground level; and by locating the structure (pier or abutment) on pile cap in such a way that its face is minimum 0.5m away from edge of the pile cap for all possible directions of probable train impact. It is desirable that the end of platform so provided is having proper shape (such as shape of cut water of piers) to guide and deflect the derailed vehicle away from the structure.

2.16.4.3.2 For locations where train speeds are expected to be less than 50 kmph during life of the structures and considered vulnerable as per clause 2.16.4.3 shall be considered adequately protected if guard rail as per para 228 (1) of IRPWM is provided under the structure starting from a distance 30 m ahead of the structure (to be measured from the start of guard rail to the start of structure) in the direction of travel of trains.

2.16.4.3.3 The substructures not considered protected as per clauses 2.16.4.3.1 and 2.16.4.3.2 shall be designed as follows:

- i. The substructures shall preferably be wall type as such structures provide maximum stiffness and energy absorption capacity against impact. Wall type substructures should preferably be proportioned as below:

- a) $L \text{ (length)} / B \text{ (width)} \geq 4$
b) $H \text{ (height)} / L \text{ (length)} \leq 2$
c) Minimum width of 0.8m

Note: The length and width should be measured at 2m above rail level and height should be measured from top of foundation to top of bed block.

- ii. If wall type substructures are not possible/provided and instead multiple columns are provided, the column/columns which are subjected to direct impact of derailed vehicles should be individually designed for loads given in (iii) below.

- iii. The substructure (either wall type or column type) shall be designed for the following impact loads (considered as ultimate load case with a load factor of 1.0), applied at 2m above rail level:

- a) Along the direction of travel : maximum load of 50m train length $\times K$; or
b) Perpendicular to the direction of travel: maximum load of 15m train length $\times K$.


Note:

1. The train load may be taken from EUDL for shear force.
2. Both the loads shall be applied separately.
3. K shall be as given in the table below:

Speed (kmph)	Curvature	K
≤ 50	< 0.5	0.5
≤ 50	> 0.5	0.6
$> 50 \leq 100$	< 0.5	1.0
$> 50 \leq 100$	> 0.5	1.2
$> 100 \leq 160$	< 0.5	1.2
$> 100 \leq 160$	> 0.5	1.5

Note: Principal Chief Engineer may allow deviations, by recording reasons, from the requirement of designing the structures for accidental impact loads as per para 2.16.4 depending upon practical considerations as per site conditions.

By Order,


6/12/2021

(राजेश कुमार श्रीवास्तव)

(Rajesh Kumar Srivastava)

कार्यकारी निदेशक /पुल एवं संरचना

Executive Director/B&S

अ.अ.मा.सं./RDSO

लखनऊ/Lucknow
