Issued by Email on 22.11.22

भारत सरकार GOVERNMENT OF INDIA
रेल मंत्रालय MINISTRY OF RAILWAYS
(रेलवे बोर्ड RAILWAY BOARD)
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No. 2021/3/CE-III/BR/1/CBEs Seminar New Delhi, dated 22.11.2022

Director General,
IRICEN, Pune.

Sub:-CBEs Seminar held on 02nd & 03rd December, 2021 at IRICEN/Pune.

Ref:-IRICEN's letter no. 2021/IRICEN/21308 dated 10.01.2022.

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Vide letter dated 10.01.2022 under reference above on the captioned subject IRICEN/Pune has sent the Minutes and recommendations of the CBEs Seminar held at IRICEN/Pune on 02nd & 03rd December, 2021 to the Board's office for communicating the Board's approval on the recommendations of the CBEs Seminar.

Accordingly, Board's orders/approval on the recommendations of the CBEs Seminar held at IRICEN/Pune on 02nd & 03rd December, 2021 is hereby communicated as enclosed.

This has the approval of PED/Bridge/Railway Board.

22/11/22

DA: As above.

(L. L. Meena)
Director Civil Engg./B&S,
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Copy to:- (i) Principal Executive Director/Infra-II/RDSO for kind information please.
(ii) PCEs & CBEs/All Zonal Railways for information and necessary action please.

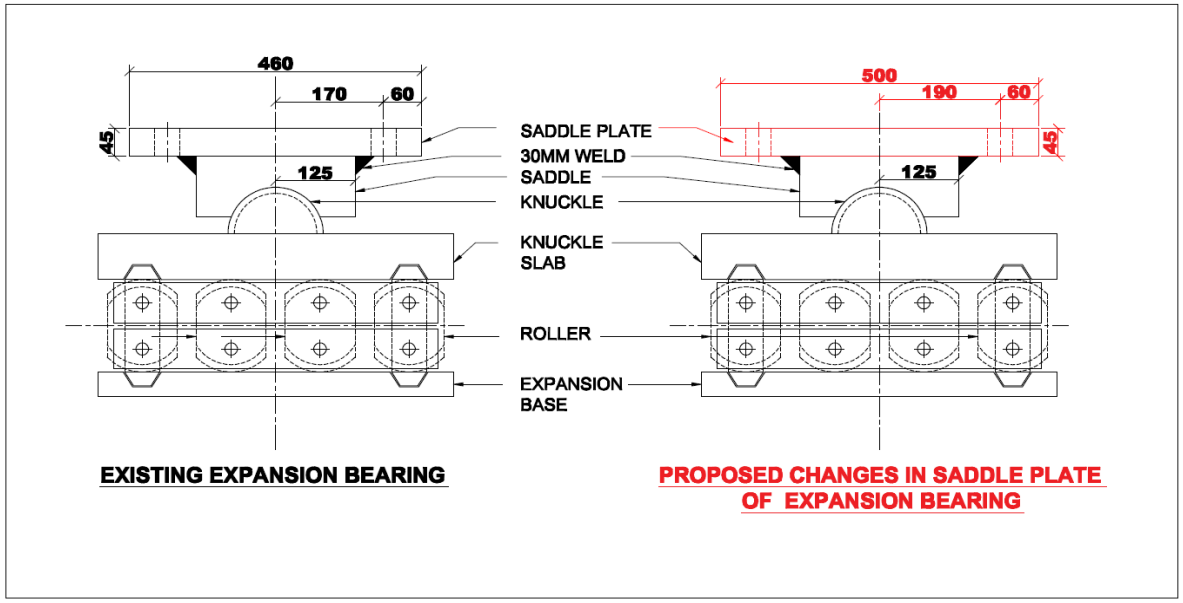
Annexure-'A'

DISCUSSION ON AGENDA ITEMS FOR CHIEF BRIDGE ENGINEERS SEMINAR HELD AT IRICEN/PUNE ON 02nd & 03rd DECEMBER, 2021

Sr. No.	Zone	Items	Discussion/Approval
	RB	**Items raised by Railway Board** 1. Works sanctioned based on new technological inputs shall be started early. RDSO to monitor such works. 2. Expenditure and progress of Bridge rehabilitation works to be monitored. 3. More incidence of flooding has been reported this year. This may be due erratic rainfall pattern. Locations where extra waterway is required or protection works are required should be identified and new works may be processed under umbrella work for PH 30, 32. Already sanctioned works may be executed early. 4. Third party audit of some of bridges is pending. The same may be completed early. 5. BMS data including related to physical features may be updated early. 6. Meeting related to RSW works with NHAI and State Authorities must be continued without fail. 7. Estimates regarding deposit works should be realistic as MORTH has commented adversely. 8. Repository of drawings with RDSO must be expedited early.	
1.	CR	**Technical scrutiny, approval and sanction for pipeline crossing under railway track-** Deliberations are required to decide for the procedure of technical scrutiny A reference has been made by Central Railway to Railway Board vide letter No.W.131.Br.D.Pipe Crossing. Correspondence-ll dated 15.03.2021 (copy enclosed).	Definition of bridges and track crossing is given in Sub Structure Code. Bridges/ Track crossing may be classified accordingly. Discussed and dropped. **Approved**.

2.	CR	**Use of NP-4 pipeline crossing micro-tunneling-** RDSO vide letter No. CBS/DCP dated 25/26-02-2010 (copy enclosed) have authorized use of NP-4 RCC pipes as Railway Bridge in accordance with stipulations of Type A bedding as per Appendix B(B-10) of IS 783 (relevant extract enclosed). The RCC NP-4 pipe is required to be supported on concrete cradle all along the Length. Same is, however, not possible in Micro-Tunnelling method of execution. Deliberations on the issue are required since the work executed by Micro-Tunnelling is very fast and with least affect to traffic.	Micro tunnelling is a different technology.NP-4 pipes are used for minor bridges with open excavation and placement of pipes at site. Two processes are different and as such forces will be different. RCC pipes for such use shall be designed separately. Discussed and dropped. **Approved.**
3.	ER	**Anomaly in construction of Bow String Girder:** **I. RDSO has issued standard drawings. The salient features of standard drawings are as under.** a. Members are made of closed box section by welding. b. Individual members are connected by welding only. c. Splicing of members are done at centre by in-situ welding. d. Bolted connection (HSFG bolts) is not permitted. The reason may be to avoid ingress of moisture which may cause corrosion of members due to closed section. e. Grade of steel used is E350. **II. Before issuance of RDSO standard drawing for bow string girder for ROBs, non-standard drawings were permitted with following salient features.** a. Members are made of open section by welding. b. Individual members are **connected by HSFG bolts** c. Sections of members are made open so that painting of all faces of the members (top chord,	In principle RDSO agreed with remarks. Non standard BSG girders are supposed to be developed following the same practices/ general arrangements as adopted in RDSO standard spans. Discussed and dropped. **Approved.**

		bottom chords, verticals) is possible. d. Splicing are done by HSFG bolts e. Grade of steel used is E250, B0 **III. Recently construction department of Eastern railway has designed one non-standard Bow-string girder of 67.880m span with following salient features.** a. Members are made of closed box section by welding b. Individual members are **connected by HSFG bolts** c. Splicing are done by HSFG bolts d. Grade of steel used is E410 **IV. Remarks of CBE/ER** a. If closed box section is used, it should be 100% welded as per RDSO Drawing. b. If HSFG bolts are use for some connection, then only open section should be used. c. Till date, in all non-standard design approved by ER, open section sections are used. d. The grade of steel should preferably be used E350 or E250	
4.	ER	**Level difference in bearings of girder.** Till date all the approved drawings of Eastern Railway, both the bearings of the girder are at the same level. Recently in one drawing, construction department of Eastern railway has proposed to place the bearings at level difference of 180mm. As result of that the girder has become inclined to the horizontal. In case of a girder being laid in inclined position the following difficulties may arise **a.** The connections in the girder will be subjected to additional torsion. **b.** The bearings will be subjected to additional moment. **c.** The splicing will be subjected to torsion. **d.** This may affect the stability.	This GAD is already approved by CBE/ER. However preferably bearings are to be on same level. Discussed and dropped. **Approved.**

		As such for new construction, placement of girder in inclined position should not be permitted except in extraordinary situation.	
5.	ER	**Increase in length of Saddle plate of bearing of bottom flange of 45.7m RDSO Standard girder (Drg. No. B-17181/R):** a. As per RDSO Drg. No. B-17181/3 for bearing of 45.7m girder, the saddle & saddle plate are connected with 30mm fillet welding. b. As shown in the drawing, the clearance between the edge of the 40mm dia bolt hole and the saddle plate is 25mm. whereas the size of welding is mentioned as 30mm. c. Also some additional space is required to room the bolt head. d. Hence, the length of saddle plate across the direction of track may be increased to 500 mm instead of 460mm to have proper room for welding and bolting. 	RDSO has checked the design and found that design is safe if welding length near the bolts area is not accounted. Alteration in drawing will be issued by RDSO. **Approved.**
6.	ECR	**<u>Standardized Location of Seismic restraint</u>** Seismic restraint is to be provided in zone IV & V. However, suitable guidelines to be given regarding placement of lateral/longitudinal seismic restrainer as it obstructs O & G of bearings, if placed in the position shown in photo. CCRS during recent inspection in ECR has advised, those seismic blocks to	RDSO will examine the drawing. **Approved.**

		be removed from such locations. Standardized locations and provision in drawings may be done by RDSO. 	
7.	ECR	**<u>Elastomeric Bearings</u>**: Poor-quality elastomeric bearings/ (or requiring design modification are being provided) in newly constructed bridges which are tested and passed at manufacturers labs. During commissioning stage only, bulging to different extent is generally seen in elastomeric bearing of composite girder due to self-weight & super imposed dead load (Ballast, Sleeper & track). Guideline/parameter not mentioned about limiting case of bulging of elastomeric bearing. Criteria for rejection of bearing due to bulging should be clearly defined. **<u>A case in point</u>**- Br. No 313 is newly constructed bridge under SANKI- TATISILWAI section of Dhanbad division of E C Railway. In this bridge, there are 32 nos. elastomeric bearing. But due to dead load only, bulging and crack in 22 nos. elastomeric bearings occurred bulge and crack as shown	IRC 83 pt II Clause 3.4.4 will be examined by RDSO.

		in fig. below. 	
8.	ECR	**<u>Bow String Girder</u> –** Guidelines required in Indian Railway Bridge Manual for inspection and maintenance of Bow String Girders as ROB with BOW string girder is increasing day by day. Inspection/maintenance of top chord is not possible due to curved profile, hence arrangement for inspection/maintenance should also be included in RDSO drawing. Arrangement for inspection of bottom cross beam & its connection with bottom long beam is also required in RDSO drawing. Further fabrication/erection tolerance for various members of Bow String Girder may also be spelt out in IRS-B1-2001(Specification for fabrication and erection of steel girder bridges & Locomotive Turn Table).	The item of inspection was deliberated in 86th BSC and Inspection arrangement was finalized. Feedback from various railways was required so as to finalize scheme by RDSO. **Feedback from Railways shall be provided by 31.01.2022.**

9.	ECR	**<u>Cable Stayed Bridge</u>** - Guidelines required for inspection & maintenance of Cable Stayed Bridges.	This is a special kind of structure. Designer to give methodology and maintenance guidelines. **Approved.**
10.	ECR	**<u>Side Pathway</u>** – (i) As per RDSO drawing (CBS-0046) for side pathway in composite girders, bracket for pathway shall be provided with new stiffener of minimum size 160mm x 16mm, but process of fixing of extra stiffener (i.e. welding/bolting) is not mentioned. RDSO drawing of 25T loading composite girder for span 30.5m is having outer stiffener of size 160mm x 16mm, 12.2m span have outside stiffener of size 140mm x 12mm, 18.3m span have outside stiffener of 120mm x 16mm and 24.4m span have outside stiffener of 120mm x 12mm. Hence, in RDSO drawing CBS – 0046, process of fixing extra stiffener of size 160mm x 16mm should be mentioned or in drawing of 12.2m, 18.3m & 24.4m of 25T composite girder, size & location of stiffener should be changed and adequate no. of stiffeners may be provided accordingly to ensure max required spacing of 7 m for side pathway brackets. (ii)Further, as per RDSO drawing, (CBS-0042-0042/3) for side pathway in plate girder, bracket channel of side pathway should be provided in outer stiffener where cross frame is provided. Guidelines are required for process of fixing outside stiffener where it is not provided at cross bracing locations in case of welded plate girder at required max spacing of 5.2m for side pathway brackets. Adequate no of outside stiffeners at cross bracing locations may be provided so that erection of side pathway in field becomes convenient without requiring hole drilling in web for provision of stiffeners. (iii) Different drawing for side pathway should be developed which may be independent from girder such as runner beam supported on column provided at Pier/Abutment as weight of existing assembly becomes considerable, which may cause overturning moment during service or maintenance in field while oiling greasing etc. Also during erection of side pathway activities being carried out in main girder may be avoided.	Drawings have been revised by RDSO and updated drawings have been uploaded on Railnet website. **Approved.**

11.	ECoR	**Items No:- 1** During the inspections of roller & rocker bearing in recently constructed new girder bridge in doubling projects, gaps were noticed between roller and knuckle slab and also between roller & base slab in some of the bearings. As per item No. – 12 in footnotes of RDSO drg. No.- RDSO/B-I /17183/3, it is mentioned that "Method of assembly and welding should be so as to ensure **perfect contact** between machined surfaces of the finished bearings". One of the RDSO approved vendor of Roller. Rocker bearings has indicated that tolerances in roller rocker bearing components should be acceptable as per IRC 83 part-I (2015). The Tolerance are: (a) On Flatness of rollers as per clause 10.4.4. (b) On surface profile as per clause 10.4.5. (c) On surface roughness as per clause 10.5 (d) On multiple roller as per clause 10.6 of IRC 83 Part-I (2015). If the above tolerances are accepted that is resulting into gaps between rollers and roller base plate/knuckle plate. If these gaps can be permitted or not. If permitted to what length the gap can be permitted.	Tolerances given in IRS B1 to be followed. In the given case defects are on very high side. Discussed and dropped. **Approved.**
12.	ECoR	**Item No:-2** RDSO approves the QAP, WPSS and WPQR for the fabrication of all types of steel girders for Railway Bridges. As per approved QAP there are different stages of inspection right from inspection of Raw materials to the final assembly. RDSO specifies in the QAP about the inspecting officials who will be inspecting at different stages of fabrication. RDSO inspects Fabrication of components, trial assembly of one span and individual components of the remaining spans. Zonal Rlys also conducts inspection at some stages such as inspection of raw materials etc as specified in approved QAP. Zonal Railways also approves QAP for ROBs with composite girder and also fabrication of different types of bridge bearings. Zonal Rly. FIU team also inspects the fabrication of girders at different stages including fabrication of component, trial assembly etc. and bridge bearings. RDSO charges 1% of the fabrication cost of the girder as the inspection charges. As the onal Rly. also inspects the fabrication work of girder for ROBs and bridge bearings. Some of the Zonal Rlys are charging inspection charges and some are not. A guideline in this regard may be issued.	Inspection charges are part of fabrication work. Discussed and dropped. **Approved.**

13.	ECoR	**<u>Item No.-3</u>** Standard drawings for side pathway should be developed by RDSO for all PSC girder bridges of span12.2m, 18.3m & 24.4m.	Item Discussed and closed. **Approved.**
14.	ECoR	**<u>Item No.-4</u>** Composite plate girder drawings for the ROBs are available for carriageway width of 9.5m, 11m, & 12m and in Bowstring Girders, the carriageway width is 7.5m, 9.5m, 10.5m, and 14m. The differences in carriageway width creates problem in providing combination of composite and Bowstring Girders. Hence carriageway width configuration may be kept same for both types of girder to have uniformity in the Carriageway as per standard of MORTH.	RDSO will discuss with NHAI and will develop standard drawings. Discussed and dropped. **Approved.**
15.	NR	**Allowing higher axle loads on old bridges with adhocism – Is it an avoidable safety risk?** 1. Of over 20,000 bridges on Northern Railway, more than 9000 (45%) were built in pre-BGML loading era and more than 15,000 (75%) with pre-MBG loading standards. Within the constraint of resources, approx 100 to 125 (0.5%) bridges are rehabilitated annually primarily on condition basis, out of which number of bridges rebuilt to higher loading standards is further low. 2. Since construction of fixed infrastructure on a Railway system especially bridges, needs huge cost and prolonged time, it is built for longest possible life spans viz., 100-125 years. The design and manufacture time cycle as well as life span of the moving infrastructure i.e., rolling stock on the other hand is relatively much shorter. It is therefore logical that instead of demanding change in fixed infrastructure every now and then, moving infrastructure follows the boundary conditions of fixed infrastructure. 3. Loading and design standards of bridges not only prescribe loads for which new bridges should be designed and built, but also put a legal limit to which these structures should be loaded. Since 1926, these standards on Indian Railways have been revised 4 times i.e., almost once in 25 years. However due to design life of bridges being over 100 years and resources for their rebuilding being scarce, bridges built to the older standards still outnumber the bridges built to new standards. 4. In violation of above philosophy, rolling stocks, breaching the legal limit of bridge loading	Discussed and dropped. **RDSO to take up the matter in wagon design criteria committee of RDSO.**

standards are however being introduced frequently. Comparison of bridge loading standards introduced over the years and a few CC+8+2T wagons introduced recently brought out as under:

Loading Std.	**Year**	**Max. Axle Load (t)**	**Trailing Load (t/m)**
BGML*	1926	22.9	7.67
RBG*	1975	22.9 (LOCO 22.5)	7.67
MBG	1987	25	8.25
25 T	2008	25	9.33
BOXNS and BOXNEL Wagons	2016	25	11.67/9.34
BCFCM wagon	2016	22.9	10.69/8.55
*Load density of CC+8+2T loading wagons is higher than RBG and BGML.			

5. It may be appreciated that latest loading bridge loading standards introduced in 2008, did not survive even five years, before being breached. The need for hauling high axle load wagons has further generated demand for high tractive effort loco and led to spurt in introduction of these locos, whereas 45% of pre-BGML bridges designed for NIL longitudinal force still exist. The reasons of permissiveness in accepting violations routinely could be lack of vision in planning rolling stock or just scant regard being paid to loading standards by rolling stock designers.

With above approach, upgradation of fixed infrastructure will always remain out of sync with that of moving infrastructure, maintaining a perpetual safety concern.

6. To accommodate the rolling stock built in breach of bridge loading standards, the only way left with Engg deptt is to dip into the reserve strength of bridges, i.e. factor of safety, which was provided to cater to probable events of imposition of heavier than designed loads, actual material strengths being lower than designed, limitations in understanding of structural behavior, unexpected events etc, so that the consequences of failure are minimized and thus now leaving reduced margin for safety.

7. It would have been still better, if reserve strength of bridges was utilized and FOS eaten up in a

deterministic and objective way. However in our system where even loading standards of bridges built in pre BGML era is not known firmly and completion drawings of a significant number of bridges are unavailable, ad hoc approach is being adopted which does not behove the scientific subject of bridge design. If a bridge seems in good physical condition, heavier loads are being allowed.

8. Flow Chart prepared to illustrate chronology of provisions incorporated in Codes for certification of Rolling Stock with Higher loads is annexed in Annexure A. It can be seen that, relaxation has been gradually extended for clearance of new rolling stocks by introducing revision and correction slip in code of practice for the design of substructure and foundation. And when no objective / scientific method could be devised, we have not shied away to even rely upon physical condition of existing bridge, which is a highly subjective approach and difficult to be considered as a proper engineering approach.

9. A few arbitrary relaxations permitted by other codes / guidelines are listed in Annexure B. As can be seen from codal provisions, our present methodology for authorizing higher loadings on bridges, primarily relies on the following:

- Physical condition of bridge
- Keeping substructure of bridge under observation
- Permitting overstress in masonry
- Installing TELS in high tractive force locos and putting entire burden of compliance on loco-pilot which is not a failsafe arrangement and is highly subject to human error.

10. The pitfalls in above methodology are as under:

- The physical condition of bridge is being assessed under present loading standards. Our prognosis of considering good physical condition of bridge under lower loads, as indicator of its fitness for higher loads, is unparalleled and without any technical basis.
- Again, prognosis of assuming that considering that bridges will be able to support 20% more longitudinal force than imposed by already running locomotive for the past one year, is ad hoc and without technical basis.

		• Keeping substructures of numerous bridges under observation is practically impossible and subjective approach. Further, in case of deterioration, it would be difficult to say with conviction, whether the same was due to higher axle loads or on account of some other reason. • Permitting overstressing in masonry naturally reduces the FOS and thus increases risk against factors for which it was provided. • Discretion given to CE/ CBE for allowing higher axle loads over distressed arches and wherever checking of substructure is not possible, puts them in awkward position. A technical problem should be addressed by technical solution. 11. Thus indiscipline / permissiveness in adopting rolling stocks breaching bridge loading standards is being addressed by permitting overstressing, extrapolating physical condition of bridge as basis to permit higher loads, utilize reserve strength and finally imposing speed restrictions. The entire approach is arbitrary, unscientific and against Indian Railways ethos of SAFETY FIRST. 12. In view of above it is recommended that, any new design of rolling stock on IR should conform to bridge loading standard and violations not permitted under any circumstances. Further, extant codal provisions based on extrapolations, subjective assessment of physical condition of bridge and keeping bridges under observations etc should be reviewed to make them objective and based on sound engineering principles.	
16.	NR	**Item No.2 Speed certificate for operation of diesel locomotives WDG4G, WDG4D & WDG5 over Indian Railway.** RDSO issued a speed certificate no.SD/WDG4G/II dated 18.10.2018 for operation of WDG4G class of locomotive up to a max. speed of 100 KMPH with certain speed restriction on bridges such as 95 KMPH on 78.8m BGML spans, 90 KMPH on 47.3m RBG span, 70 KMPH on 63.0 m RBG span & 50 KMPH on 78.8m RBG spans for single handed operation. Accordingly, Northern Railway issued the bridge certificate with some other speed restrictions for non-standards spans such as 35 KMPH for 94.00 m span, 25 KMPH on 109.90 m span & 15 KMPH on 125.50 m span.	Speed certificates are issued on the basis of design parameters. Even though axle load and tractive efforts are similar, speed potential may be different for different locomotives based on axle distances and other design

Earlier, RDSO also issued speed certificate for operation of WDG4D class of locomotive (SD/WDG4D/II dated 23.08.13) for a max. speed of 105 KMPH and WDG5 class of locomotive (SD/WDG5/II dated 27.12.2013) for a max. Speed of 90 KMPH with no speed restriction on any bridge for single headed operation. In addition to it, maximum tractive effort for the single headed WDG5 class locomotives has been limited to 30T while running on bridges of BGML Span 19.4m, whereas there is no such limitation of tractive effort mentioned in speed certificate for WDG4G & WD4D locomotives.

It is noted that axle load and TE of these three locomotives (WDG4G, WDG4D & WDG5) are almost similar, but the condition of speed restriction & limitation of TE over bridge are different. For ready reference, the comparison table is as under:-

SN	Locomotive (Speed)	Axle load	Tractive Effort	Speed restriction on span			Speed Certificate cl. Ref:
				BGML	RBG	MBG	
1.	WDG4G (100KMPH)	22.0t	55.45t	78.8m (95kmph)	47.3m (90kmph) 63.0m (70kmph) 78.8m (50kmph)	-	Clause 2.2.3.1 dated 18.10.18
2.	WDG4D (105KMPH)	21.7t	54.00t	-	-	-	Clause 3.2 dated 23.08.13
3.	WDG5 (90KMPH)	22.3t	56.00t	19.4m (With TELS)	-	-	Clause 2.2.3.2 dated 27.12.13

The issue has been further studied & examined. It is observed that speed restriction on bridges is also

features. Item discussed and dropped.
Approved.

		required for operation of WDG4D & WDG5 locomotive similar to WDG4G locomotive. The concerned departments of Northern Railway have also raised a question that why the bridge speed certificate of WDG4G locomotive comprises speed restriction on many bridges whereas other locomotives (WDG5 & WDG4D) of similar axle load & TE were cleared with no such speed restrictions. As it is a bridge safety related item, therefore there is need for reviewing certificate issued for locomotive WDG5 & WDG4D. There may be other locomotives groups (load wise) with similar situation i.e. one speed certificate provides for speed restriction on certain bridges, whereas speed certificate of other locomotive does not provided for speed restriction/different speed restriction for those bridges. Reference has already been sent to RDSO vide letter no.DOB/MISC./BC/Pt-1 dated 11.04.19, 18.11.19 & 28.01.20. This may be decided early. This has implication on structural safety of bridges and thus needs to be discussed in CBE seminar.	
17.	NCR	**<u>Rebuilding/replacement of minor bridges under running track</u>** Railway Board vide letter no. 2015/CE-III/Br/Substructure Code dated 03.11.2021 has restricted the use of segmental RCC Boxes for construction of railway bridge (carrying waterway) except use of segmental RCC Boxes upto 1.2m size in railway bridges on major yards. In case of minor bridges without earth cushion where raising of formation is not possible, placement of RH girder will reduce the vertical clearance in bridges. In view of above, segmental RCC box construction may be permitted for maximum size of RCC box up to 4.0M.X3.0M for rebuilding / replacement of minor bridges/ additional opening under running track. However the barrel length of the segment directly placed under track should not be less than 3.0m. Therefore, it is requested that Railway Board may issue necessary direction for use of segmental boxes for maximum size of RCC box up to 4.0M.X3.0M in case of rebuilding / replacement of minor bridges/ additional opening under running track.	Normally length of a bridge shall be constructed for one track. However site specific issue for Segmental construction of RCC Box may be processed separately. Discussed and closed. **Revised instructions on use of RCC boxes issued from Board.**
18.	NCR	**<u>Provision of bearing layout in composite girder drawings for NHAI loading</u>** RDSO has issued Standard structural drawings of composite girder for construction of ROBs for NHAI loading including SV loading upto 36m span. Metallic guided bearing drawing for Seismic	Since there are elastomeric bearing, bearing layout is not

		zone IV and V have been issued without Pin bearing. RDSO is requested to issue bearing layout drawings for all girder configurations given in RDSO standard drawings as given in standard drawing issued for composite girder without SV loading.	required. **Approved.**
19.	NCR	**Issue of open web drawing for standard span and DFC loading with new fatigue provision** RDSO has issued open web girder drawings of standard span for 25T loading with new fatigue provisions and HSFG bolts. However, open web girder drawings of standard span for DFC loadings are still as per old fatigue provisions and Rivets. It is therefore requested that revised open web girder drawings of standard span for DFC loading with new fatigue provisions and HSFG bolts should be issued by RDSO.	RDSO will examine the issue.
20.	NCR	**Standard drawing for multiple box** RDSO has issued standard drawing of single box and twin boxes with different span/heights for railway bridges. During doubling/new line/ gauge conversion difficulty is being faced in provision of box in case of lesser height slab/girder/Arch bridges and linear waterway less than 12.0 m (i.e. minor bridges) due to aspect ratio to maintain same rail level. Further, there will be advantage in smooth flow of water for existing bridges of 3 spans with provision of triple cell RCC boxes. Therefore, it is requested that Standard Drawing for triple cell RCC boxes for different span/height RCC boxes of extant loading standard for minor bridges (for span less than 12.0m) may be issued by RDSO.	Issue discussed and dropped. **Approved.**
21.	NCR	**Standard drawing of FOB for more than 4 tracks** RDSO has issued Standard structural drawings for construction of FOBs up to 4 track crossing (with maximum 30.23m clear span). Presently due to provision of III/IV line urgent need is faced for Standard drawings of FOB for 5/6 track crossings. Therefore, it is requested that Standard Drawing of FOB for 5/6 track crossings may be issued by RDSO.	Drawing issued in various railways may be shared to RDSO for dissemination to other railways. **Approved.**
22.	NER	**Irrigation drains - Classification, maintenance & their extension.** There are large number of irrigation drains consisting of small diameter pipes ranging from 0.15m to 1.20m being classified differently by different units. Some units are treating them as minor Bridge & included in Bridge list. Other units are treating them as pipe line crossing and separate list is being maintained .There is no clarity regarding classification of such Irrigation drains. If very small size pipes (say upto 0.30m) are treated as minor Bridge, then as per IRBM,	Definition of bridge is given in sub structure code. Hence discussed and closed.

		new minor Bridge (necessitated due to extension of existing pipes for doubling/multi tracking) shall be of min1.0m span & 1.2m headroom. This will have issue of different waterway for same bridge for different tracks leading to problems in inspection and maintenance. Further, closure of such Irrigation drains, whenever required will be a lengthy process due to bridge. Discussions with different Railways revealed that different practices are being followed. NER has issued comprehensive guidelines enclosed as Annexure. Other railways may share their practice. It is prudent that uniform guidelines are issued by RDSO/Rly Board for adoption across ZR.	**Approved.**
23.	NER	**Construction of skew LHS –** (i) LHS are constructed using RCC box as per drawing issued by RDSO. These RDSO drawings of RCC boxes are for normal track only (i.e. track is along the span). Skew track (track not along the span) is not permitted. There are number of cases in NER where LHS is not at right angle to track. As the RDSO drawing of RCC boxes for skew angle is not available, LHS has to be constructed normal to the track by introducing curve on the approaches, restricting the visibility and other traffic movement hurdles. By provision of skew angle upto certain degree to LHS in such cases, the sharp approach radius can be avoided/ smoothened and visibility can be improved. (ii) In the case of composite girder ROB, drawings issued by RDSO, there is provision of skew span. It is mentioned in the drawings that the drawings of ROB composite girder may be adopted for skew angle upto 20 degree. It is recommended that similar to ROB composite girder, RDSO may incorporate the range of skew angle in the drawing of RCC boxes also for which design of RCC boxes is safe.	Zonal Railways may share drawings of skew bridges for dissemination and information for other railways. **Approved.**
24.	NER	**A&C slip No. 48 dated 22.06.2017 of IR Bridge Rules –** (i) The A&C Slip No. 48 to IRS Bridge Rules was issued by RDSO on 22.06.2017. However, due to difficulties in its implementation, it has been kept in abeyance vide Railway Board's letter No. 2016/04/CE-III/BR/BSC/84/Seminar/Pt. Dated; 12.10.2018. (ii) To review the above A&C Slip No. 48, a committee was constituted by Railway Board consisting of Director/ IRICEN, ED/Structure/RDSO, CBE/WR and Shri Manoj Arora, CE/C/WR. However, the status of this A&C Slip is not clear. (iii) CRS/NEC, Lucknow is insisting implementation of the provisions of A&C Slip No. 48 for	Item discussed in BSC. Report submitted to Railway Board, approval may be expedited. **Approved.**

		construction of ROB stating that the codal provisions cannot be kept in abeyance indefinitely. Accordingly he has written letter to Railway Board also. (iv) The status of A&C Slip No. 48 may be clarified.	
25.	NER	**Boulder filling behind RCC segmental Box -** (i) As per para 7.5 of IRS Bridge Substructure and Foundation code, behind abutments and wing walls, boulder filling and back fill materials shall be provided. The boulder filling shall consist of well hand packed boulder/cobbles to thickness not less than 600mm with smaller size towards the back. Behind the boulder filling, backfill materials shall consist of granular materials of GW, GP and SW groups as per IS:1498-1970. (ii) The above materials and boulder filling are also provided behind RCC box bridges including Limited Height Subways (LHS) constructed with segmental construction. (iii) The boulder filling facilitates the rainwater coming out from backfill granular materials to drain out from the weep holes of abutment's weep holes. However, in the case of RCC box bridge where weep holes are not provided in the walls of RCC box, the rainwater come along the walls of RCC box and oozes out through weep holes of wing walls. (iv) In case of LHS constructed with segmental construction, there are number of joints between the box segments. When these joints are not properly sealed, water through boulder filling percolate inside the LHS causing the water logging problem. (v) It is suggested that boulder filling may be omitted from the LHS being constructed by segmental construction.	RDSO may examine the issue. **Approved.**
26.	NER	**Aspect Ratio for RCC Box** (i) RDSO has issued drawings of RCC box of various spans and earth fill. However, all these RCC boxes are of aspect ratio (span/height ratio) less than or equal to 2. (ii) Sometimes, RCC box of aspect ratio more than 2 is required to suit the site condition. In such situation, depth of RCC box is increased below the bed level of bridge to keep aspect ratio 2 and the additional depth below the bed level of RCC box is filled with concrete. However, this practice can not be adopted for large number of bridges. (iii) It is suggested that RDSO may issue drawings of RCC boxes up to aspect ratio 3.	Nonstandard design and drawings may be developed by the zonal railways. **Approved.**
27.	NER	**Creation of Fabrication Inspection Unit (FIU) on Zonal Railway.**	RDSO will review the guidelines and advise

A- Railway Board vide letter 2017/16/CE-III/BR/Girder Inspection dated 09-09-2021 has issued the eligibility criteria for SSE/JEs to be utilized in FIU on Zonal Railway as under:

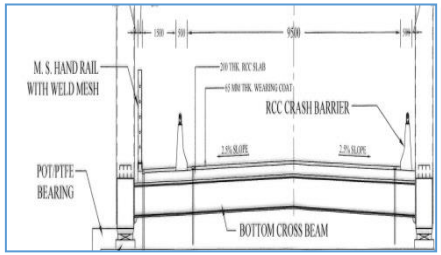
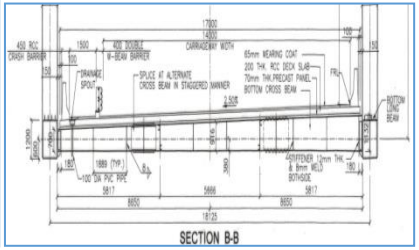
Eligibility Criteria for SSEs/JEs to inspect fabrication related works other than M&C	**Eligibility Criteria for SSEs/JEs to inspect M&C related matters**
Eligibility Criteria-	**Eligibility Criteria-**
i. The supervisor must have been continuously and directly involved in girder fabrication inspection (either through trade or Railway Bridge Workshop) for a period of at least 3 years in the last 7 years. This means involvement in the process of girder fabrication inspection consisting QAP, WPSS, trail Assembly, Jigs & Masters approval, Layout inspection, Component Inspection under his signature. Girder fabrication inspection means fabrication inspection of ROB/Railway/Rail cum Road Bridges only and not to include FOB/ PP Shelter / any other type of Steel Fabrication other than those mentioned above. **or** ii. The supervisor has successfully done Steel Fabrication inspection of ROB/ Railway / Rail cum Road Bridge Girders to the tune of equal to or more than 1000 MT **and** iii. The supervisor must have successfully obtained completion certificate of at least one course on "Fabrication Inspection of Steel Girders" organized by IRICEN or jointly organized by	i. The supervisor must have been continuously and directly involved in girder fabrication inspection (either through trade or Railway Bridge Workshop) for a period of at least 3 years in the last 7 years. This means involvement in the process of girder fabrication inspection consisting of WPQR, WPSS, QAP under his signature. Girder fabrication inspection means fabrication inspection of ROB/ Railway/ Rail cum Road Bridges only and not to include FOB/ PP Shelter / any other type of Steel Fabrication other than those mentioned above. **or** ii. The supervisor has successfully done Steel Fabrication inspection of ROB/ Railway / Rail cum Road Bridge Girders to the tune of equal to or more than 1000 MT **and** iii. The supervisor must have successfully obtained completion certificate of at least one course on "Fabrication Inspection of Steel Girders" organized by IRICEN or jointly organized by IRICEN and RDSO.

Railway Board accordingly.

Approved.

		IRICEN and RDSO.	
		B- These are no SSE/JE on NER who are fulfilling the criteria indicated in (i) & (ii) of above table. As such, setting up to FIU has not been possible. Considering the fact that earlier all Bridge Girder inspection were done by RDSO, the similar problem may be faced by another Railway also. As such, there is need to review the criteria in such a way that quality of inspection does not suffer. **Suggestion**: - The SSE/JE considered for nomination in FIU shall be identified and obtain completion certificate of at least one course indicated in Sr.No. (iii) of above table. They shall associate in the inspection to be done by RDSO till they attain the eligibility criteria indicate in Sr. No. (i) &(ii) of above table except inspection under his own signature. During intervening period, the inspection shall continue with RDSO. Once the SSE/JE has gained experience; the inspection under his own signature can be allowed by CBE and he shall be permitted independent inspection under FIU of Zonal Railway.	
28.	NFR	As per appendix XX(a) for MBG Loading and appendix XXIII(a) for 25T Loading of IRS Bridge Rules – provisions for Equivalent Uniformly Distributed Load (EUDL) for Bending Moment & Shear force in Kilo-Newton (tonnes) for cushions of various depths and spans upto and including 8m are available. Provision of EUDL (BM & SF) or Ballasted Deck for spans beyond 8m should be incorporated in IRS Bridge Rules for different loading.	No action required. **Approved.**
29.	NFR	Presently there is no provision of pathway in PSC slab Bridges. CRS is insisting to provide pathway in PSC Slab bridges. Suitable drawing may be developed.	Item Discussed and closed. **Approved.**
30.	NWR	**RDSO Standard Drawings of composite steel girders for ROBs on NH configuration:** Note No. 6 of the sheet of "Note for loading" states that : 'For earth quack zone II & III, pin & metallic guide bearings are not to be provided. Accordingly, pedestal for the same should not be provided in the sub-structure. Pin & metallic guide bearings are	For SV loading, design is based on elastomeric bearing so no pin is required. In drawings for

		designed to function as seismic restrainers for zone IV & V.' However, structural drawing of metallic guide bearings only is given in RDSO Standard Drawings. No drawing of pin bearing is given. Hence, structural drawing of pin bearing should also be given in the above RDSO standard drawings along with their fixing location on the pier cap for various configurations.	other loadings it is given.
31.	NWR	**Carriageway width of RDSO Standard Drawings of ROBs:** ROB standard drawings for certain carriage way & deck width (carriage way: 8.15m, 10.5m & 11.0m & Deck slab width: 12.30m, 15.3m& 15.60m),have been issued by RDSO. However, cases of higher carriage way width are also coming from sponsoring agencies (i.e. NHAI/ PWD(NH) etc.). In this regard, it is suggested that: A note should also be incorporated in the ROB standard drawings that for deck width & carriage way configuration other than RDSO standard drawings of ROBs, number of girders should be increased @ 2.5m c/c with minimum & maximum value of cantilever width of deck slabs beyond the outmost girder. In the recent project of ROBs of Central Government Scheme "Bharat mala", the most popular clear carriage way width being proposed by road authorities is 13.50m. No standard drawing is available for clear carriage way width of 13.50m. Therefore, standard drawings of ROBs for clear carriage way widths of 13.50m should also be issued by RDSO.	Any new requirement of design may be met by Zonal Railways under the instructions issued vide Railway Board letter no. 2016/54/CE-III/BR/RDSO/Misc dated 12.02.2021. However such finalized designs and drawings shall be shared with RDSO for making it a part of repository. Item is dropped. **Approved.**
32.	NWR	**POT-PTFE bearings have been provided in the old RDSO standard drawings for ROBs for E250 Grade steel not suitable for Spl. vehicle loadings. However in latest RDSO standard drawings of ROBs for NH configuration, elastomeric bearing have been adopted.** NHAI & MORTH are generally proposing POT-PTFE bearings for higher carriage way & deck width for ROBs in comparison to those given in the standard RDSO drawings. POT-PTFE bearings have more service life and require less maintenance efforts. Therefore, possibility to use POT-PTFE bearings in the RDSO standard drawings of composite steel girders for NH configuration should also be explored by RDSO & to issue standard drawings	POT-PTFE Bearings are also allowed. Those are to be designed based on loads which are given in table. Design to be checked by Zonal Railways. Approved drawings may be sent to RDSO depository for

		accordingly.	dissemination to various railways. **Approved.**
33.	NWR	**RDSO Standard Bow string steel girder for ROBs:-** Configuration of both sided cross drainage slope arrangement on each carriage way has been given in the above drawing. Such configuration is merely proposed by road authorities. The most popular arrangement being proposed by road authorities is one sided slope drainage arrangement for uni-direction traffic movement through each carriage way matching with configuration on approaches. However, three lane carriageway width (14.0m) RDSO standard drawings of bow string steel girders for clear span 60m & 72m have recently been uploaded by RDSO with one side cross drainage arrangement through each side carriage way. In the similar pattern, drawings for one side cross drainage slope arrangement for other span configurations should also be issued by RDSO.   	Any new requirement of design may be met by Zonal Railways under the instructions issued vide Railway Board letter no. 2016/54/CE-III/BR/RDSO/Misc dated 12.02.2021. However such finalized designs and drawings are to be shared with RDSO for making it. a part of repository. Item is dropped. **Approved.**
34.	NWR	i). Recently, Railway Board letter No .2015/CE-III/BR/Sub-structure code dated 03.11.2021 has issued guidelines and item No. (vi) of the same says that in existing lines, efforts should be made to provide girder/ slab bridges as far as possible and RCC boxes shall be provided only as last resort with approval of CBE on case to case basis after recording the reasons. Also item No. (iv) says that use of segmental RCC boxes for construction of railway bridges (carrying waterway) shall not be permitted. However, for railway bridges in major yards, segmental boxes may be permitted for opening upto 1.2 m with approval of CBE on case to case basis.	**Revised instructions have been issued from Railway Board.**

		ii). In NWR, lot of old GC loading bridges exist specially on Madar- Palanpur (UP Line) section having spans 1.0m, 1.2m with multiple spans. These bridges are small & merely balancing culvert used in monsoon period & there is no regular water flow & are having very less vertical clearance up to 1.0m or so. So strengthening of such bridge is technically not feasible having less vertical clearance & span. Further in-situ casting of RCC box is also not feasible with relieving girder due to less vertical clearance. Launching of single unit barrel length is also not feasible as existing line is sand witched between Down line and DFCCIL line and having space constraint of heavy cranes. Only viable solution is use of segmental RCC boxes (single & multi-cell) to match with the already provided RCC Box bridge during doubling of the section. Such segmental RCC box shall be provided with Pre-cast RCC base slabs (size of base slab to be kept such that to avoid uneven settlements i.e. Pre-cast slabs overlapping two or more RCC Box segments) along with proper hydraulic protection arrangement in terms of curtain wall/ drop wall with flooring to ensure hydraulic safety of the Bridge. iii). Hence use of segmental RCC Box type construction similar to LHS should also be allowed in such balancing type culvert Railway Bridges with use of precast base slab and proper protection arrangement in terms of curtain wall/ drop wall with flooring to ensure hydraulic safety.	
35.	SCR	**<u>Item No (1) : Para No.227 (2) of IRPWM JUNE 2020 – maximum Sleeper spacing is shown as 600 mm</u>** ➢ Para No 3, Chapter I, Schedule –I, of IRSOD-2004 under sub heading 'Bridges' reads as following **3.** Bridges must conform to the requirements of chapter IV of the Railways opening for the Public carriage of Passengers, Rule 2000, Directly on longitudinal girders should not be less than 150mm deep exclusive of any notching which may be required to allow for cover plates, camber, etc. and not less than 305mm greater in length than the distance. **On existing bridges where there is nothing solid between sleepers to prevent a derailed wheel dropping**, **the clear distance between two consecutive sleepers shall not exceed 510mm. The clear distance between the joint sleepers shall not, however, exceed 200mm and that between the two consecutive sleepers 450mm in all new constructions and in existing bridges when regirdering or carrying out through sleeper renewal.**	Steel channel sleeper spacing reduced to 600 mm vide correction slip no. dated 2012. The issue may be examined in RDSO for continuation of existing sleeper spacing within permissible limit as per SOD provisions. **Approved.**

		➢ Para 227 (2) of IRPWM June 2020, reads as below : **227 Steel sleepers on Bridges** **(2) Sleeper spacing – Maximum centre-to-centre sleeper spacing should be 600mm at all locations on the bridge except at the cross girder in open web girders, where the spacing may be suitably increased depending upon the top flange width of the cross girder. However, in case of width of top flange of cross girder exceeds 450mm, then special channel sleeper to be provided as per applicable RDSO drawing for such situations. The clear distance between joint sleepers should not be more than 200mm.** As per RDSO standard drawings, for Steel channel sleepers (RDSO drg no.RDSO/BA-1636/R2, RDSO/BA-1636/2, RDSO/B-1636/7) the top width is 230mm with maximum centre to centre spacing of sleepers as 680mm (Except for RDSO/B-1745 for MG-BG conversion which is 740 mm). For H-beam sleepers (RDSO drg no. RDSO/B-1636/8 & RDSO/B-1636/9) the top width is 200mm with maximum centre to centre spacing of sleepers as 650mm. These spacings are based on the maximum clear distance of 450mm between two consecutive sleepers prescribed in IRSOD. **Since Para 272 (2) of IRPWM prescribes Maximum Centre to Centre spacing of sleepers as 600 mm which translates to a maximum clear spacing of 370 mm for Steel channel sleepers & 400 mm for H-beam sleepers, clarity is required on the actual sleeper spacing to be adopted for these two types of sleepers on bridges.**	
36.	SCR	**<u>Issue of Generalized standard drawing for 44.5m span Composite Girders for NH construction</u>** There are several ROBs of NHAI/MORTH where 44.5m span (Centre to Centre bearing) Composite Girder was adopted to suit site requirements and the design/drawing of this span was approved by RDSO. The Composite girder drawing may be issued as a Standard drawing by RDSO for adoption in other locations where 44.5m span requirement is there.	In bow string type bridges requirement of approach length is less. However available approved drawings may be sent to RDSO repository for sharing it with various zonal railways. **Approved.**

37.	SCR	**<u>Item No (3) : Issue of wider deck width ROBs for multi lane Bridges for larger spans exceeding 36.0m</u>** For spans beyond 36m, Standard Bowstring girder ROB drawings issued by RDSO are as follows: (i) Deck width of 12m with carriage way of 7.5m for 70 R / class A loading with two sides footpath (ii) Deck width of 12.5m with carriage way of 9.5m for Special Vehicle loading of 385T (for spans 42,48,54,60 & 72m) with one side footpath for NH (iii) Deck width of 15.0m with carriage way of 10.5m for Special Vehicle loading of 385T (for span 60 m) with two sides footpath for NH NH authorities are proposing 13.0m carriageway each for 2 lane/3 lane considering present and future expansion. For express ways, NHAI is proposing 14.0m carriage way taking approach paved shoulders into account. According to the requirement of NHAI/MORTH, Standard Bow string girder spans (>36.0m span) for 12.0m, 13.0m and 14.0m width of carriage way may be issued by RDSO.	Any new requirement of design may be met by Zonal Railways under the instructions issued vide Railway Board letter no. 2016/54/CE-III/BR/RDSO/Misc dated 12.02.2021. However such finalized designs and drawings are to be shared with RDSO for making it a part of repository. Item is dropped. **Approved.**
38.	SCR	**<u>Item No (4) : Issue regarding Consideration of length of bridge 110m for continuation of LWR on Ballasted Deck Bridges</u>** As per Annexure-1 Para no.1.1 of Policy letter no. CT/IM/LWR(Part) dated 19/25.03.2014 issued by ED/Track-1/RDSO, LWR/CWR can be continued with approval of Principal Chief Engineer, as trial on Ballasted deck bridges up to total bridge length of 110m on Tangent track subject to following condition: **1.1:Individual Span:** 1.1.1 Individual span does not exceed 24.4m, if bearings are of fixed and free type (such as roller/rocker or POT-POTEE type) 1.1.2. Individual span does not exceed 45.7m, if elastomeric bearings without restraint in longitudinal direction are used. 1.1.3. Total length of bridge from abutment to abutment does not exceed 110m. in the recent edition of IRPWM, June 2020 para no.330, guidelines for continuation of LWR on Bridges with Ballasted Deck (with bearing) are as follows:	The issue may be examined by RDSO and clarification be issued. **Approved.**

		Detailed calculations shall be done by the Design Office of Chief Bridge Engineer/CAO(C) to ascertain the effect of LWR of such bridges and its effect on the Sub-structure of the bridge as per Para 2.8.1.2 of "Bridge Rules". The LWR/CWR, may be permitted on a case-to-case basis based on the above calculations. In case detailed calculations are not done, LWR may be permitted as per Para 331 of IRPWM for bridges with un-ballasted deck. As per the latest IRPWM provisions, LWR can be permitted on Ballasted deck bridges irrespective of the length, if the bridge is found suitable as per the RSI analysis. Clarity is required as to whether LWR can be permitted on ballasted deck bridges if they are found suitable as per RSI analysis.	
39.	SER	**A. Provision of Steel H-Beam Sleepers over Girder Bridges** RDSO issued Provisional Drawing No. B-1636/4/R & B-1636/ 5 for Provision of Steel H-Beam Sleepers over Girder Bridges. While planning for provision of Steel H-Beam Sleepers over girder bridges of South Eastern Railway, it is observed that as per site measurement width of top flange plate (**F**) is varying from 320 mm to 450 mm. But as per the RDSO's Provisional Drawing No. B-1636/5, width of the elastomeric pad shall be 300 mm. In this context it is to mention that width of the elastomeric pad as well as bottom packing plate, etc if any, was earlier referred as (**F-20**) mm. in the same drawing which has been altered later on as **300** mm. However, there may be a possibility of gap between hook bolt face and face of elastomeric pad if 300 mm dimension is adopted in all cases.	Earlier this issues was taken in BSC and instructions were revised. The position may be checked by SER from the other railways. May be again taken up in BSC if required. **Approved.**
40.	SER	**B. Construction of bridges during doubling :** There is no clear provision available in Bridge Sub Structure and Foundation code regarding the distance between new and existing Bridge Foundation. Guide lines issued by RDSO vide letter no. CBS/Imp./Br. 427 /NCR Dated 14/03/2017 for the same. However vide letter no. CBS/Imp./Br. 427 /NCR Dated 16/08/2017,the letter has been withdrawn. As per Railway Board's letter no. 2017/29/CE/III/BR/Br588/ECoR Dated 03.08.2017 , to avoid excessive scour , 1. The piers of new bridge are in alignment of piers of existing bridge , The span	Guidelines have been issued by Railway Board. July'2019. **Approved.**

		arrangement should be decided in such a way that there is free flow of water through spans of old bridge and there is no staggering of piers in water flow area . 2. There should be adequate distance between new bridge and old bridge. 3. Hence necessary guidelines are required for the above.	
41.	SER	**C. Construction of RCC Boxes for Railway Bridges :** Use of segments in RCC box for water way bridges prohibited by Railway Board in main line vide letter no. 2015/CE-III/BR/Substructure code dated 03.11.2021. In South Eastern Railway, a no. of bridge works already sanctioned for stone slab bridges , to be rebuilt by RCC Box Bridges (with Cut & cover method).However it is not possible to complete all these bridges within targeted time period , by cast-in –site construction using relieving girders. Also traffic block is an important issue for safe completion of the bridge works in a running line. Hence necessary guidelines may be issued for Use of small segmental RCC boxes for water way bridges in main line also on case to case basis .	Site specific issue may be referred to Railway Board separately. **Revised instructions have been issued from Railway Board.**
42.	SECR	**Reduction in frequency of greasing of bearings of steel girder bridges from once in 3 years to once in 2 years is proposed on following grounds.** 1. Increase in traffic density – Number & frequency of passenger trains and goods trains have increased enormously in comparison to early days of Indian Railways. 2. Increase in load. 3. Increased air pollution – It is observed that applied grease in bearings dries early in more polluted areas than less polluted areas. 4. Increase in coal transportation – Due to increase in transportation of coal, coal dust accumulates on grease which results in deterioration of performance of grease. 5. Reduction in frequency of greasing of bearings of steel girder bridges would also result in more frequent and closer inspection of bearings.	Discussed & dropped. **Approved.**
43.	SECR	**Adoption of open web girder in lieu of Bow string girder in ROBs.** Bow string girder is being used in ROBs having longer spans like 48m,54m, 60m & 72m. But	RDSO is developing two such standard drawings

		assembly of bow string girder is more complicated & cumbersome in comparison to open web girder. The main difficulties with bow string girder are as below:- i. Fabricated components of bow string girders require more space in comparison with open web girder components. In forest area /densely populated area/narrow roads, such type of problems have been faced. ii. Huge site welding is required in joints of bow string girder. For such welding, regular power supply with good voltage is required which is difficult if the site is situated in remote location. iii. Quality control of site welding is difficult due to voltage problem in remote locations. iv. If bolted connection is adopted as in case of open web girder, assembling of girders will take less time with good quality control. On the above ground, open web girders for ROB should be standardized by RDSO in addition to Bow string girders.	in consultation with NHAI. **Approved.**
44.	WR	**Item 1 – IRS Seismic Code Revision:** The Seismic Zone map of India shown in IRS Seismic code 2020 at Page 15 has been taken from IS 1893-2002. The said code has since been updated to IS 1893- 2016 with revision in the seismic zones. As per IS 1893-2016 the area of Seismic Zone IV and V has been reduced, which is not updated in IRS Seismic code. Necessary correction to code need to carried out.	Necessary corrections will be issued by RDSO. **Approved.**
45.	WR	**Item 2 – Size of RCC Pipe Bridges (NP4 Type):** RDSO vide letter no. CBS/DCP Dated 26.02.2010 provides for use of RCC Pipe of internal diameter 300mm to 1800mm for railway Bridges (Pipe Culverts). Para 311(3) of IRBM states that Minimum clear Span of 1m and minimum headroom of 1.2m should be provided in New Bridges for proper inspection and maintenance. Many proposals for providing pipe Bridges with diameter less than 1200mm are received stating RDSO's letter mentioned above. RDSO may review and bring the contents of instructions in consonance with IRBM.	RDSO letter is for structural suitability of RCC pipes, however for minimum span and minimum headroom provision of IRBM is to be followed. **Approved.**
46.	WR	**Item 3 – Delegation of Powers to CBE to engage consultants for checking Non standard designs:** As many Non-Standard designs are being received, Zonal Railways be given powers at CBEs level to engage design consultants/ IITs on the lines of DFCCIL and other PSUs for assisting Railways	Board is requested to examine and issue delegation of powers

		to check the design of Non Standard ROB/RFO/RUB for expeditious disposal of Design Drawings.	suitably. **Suitable proposal may be sent by Zonal Railways to Board.**
47.	WR	**Item 4 – BMS Module – Provision of marking Inspection records of Major and Minor bridges received at HQ to nominated/ mentor HODs:** There is no provision of send the Bridge registers to nominated/mentor HOD/CBE in BMS. As per Para 1104(5) of IRBM, the bridge registers forwarded by division to HQ are to be scrutinized by nominated HOD/CBE, but BMS Module does of have facility of marking/forwarding registers to mentor HODs. BMS Module may be modified to bring it in consonance with the instructions contained in ACS 24 of IRBM Para 1104(5) so that scrutiny of inspection records can be undertaken by mentor HOD/CBE.	BMS may be updated. **Matter should be taken up with CRIS.**
48.	WR	**Item 5 – Provision for checking tightening of HSFG bolts** HSFG Bolts are tightened at stresses nearer to yield stress by applying torque with the help of calibrated torque wrench. The tension imparted to the bolt is then checked with the help of filler gauges. In BS 111 revision 6 (para 9 –viii) the check with 0.1mm filler gauge has been removed. There is only one check with 0.4/0.25 filler gauge (NO GO Type) to ensure that the bolts have been tightened to have not less than required tension. The over tightening of bolt and thereby material reaching yield stress and beyond cannot be detected as there is no provision for minimum Gap checking. Before the said revision, two types of Filler Gauges were used as a check after tightening with torque wrench as per BS-111 revision 5 (Para 10.II.b.iv). One gauge was "NO GO TYPE" and another was "GO TYPE". To check that bolt has been tightened with not less than required tension, the 0.40 mm/0.25 mm (as the case may be) thick Filler Gauge were used. This gauge was "NO GO TYPE'. Another Filler Gauge of 0.1 mm (GO TYPE) was used to check that gap Between DTI washer and Nut/Bolt head should be more than 0.1 mm (at minimum 90% Bolts). In the present Guidelines deletion of Filler gauge of 0.1mm (GO Type) may be reviewed and necessary instructions may be issued for checking of over stressed condition of bolts.	RDSO will study the matter. **Approved.**
49.	WCR	**I.** RDSO have developed the drawings of man refuge provided on open web girder. Now RDSO may also develop the drawing for trolley refuge in open web girder (OWG) in similar pattern.	Drawing has been issued by RDSO.

			Approved.
50.	WCR	**II.** It is difficult to inspect top chord member/joints & other top bracing of open web girder / Bow string girder. Therefore RDSO may develop the inspection Pathway connected with top boom.	The item of inspection was deliberated in 86th BSC and Inspection arrangement was finalized. Feedback from various railways was required so as to finalize scheme by RDSO. **Approved.**
51.	WCR	**III.** RDSO have developed drawing of Pedestrian Pathway outside of open web girder connected with bottom boom. Pedestrian path way may be provided between track & bottom boom to facilitate inspection of train by loco pilot /Guard in emergency.	The matter may be taken up in BSC.