

No.2019/M(C)/137/5Pt.-3

New Delhi, Date: 09.06.2023

ED/Carriage
RDSO, Lucknow

Sub: Strengthening of ICF bogie Frame.

Ref: i.RDSO letter No. SV. Bogie Crack Dated 27.11.2017.

ii. RDSO letter No. SV. Bogie Crack Dated 03.01.2018.

iii. RDSO letter No. SV. Bogie Crack Dated 09.09.2022.

iv. WCR letter No. WCR/M/C/02/404 Dated 16.12.2022.

v. CWM/JU/NWR's L. No. WS/423/BG Coach Policy/2022-23 Dated: 20.02.23

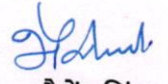
IR has experienced total 05 cases of Bogie frame crack in ICF coaches in 2022-23 and 02 cases in 2023-24, till date. The brief details are as below:

2023-24					
S.No.	Date	Train No.	PM Depot	Coach	Type
1.	04.06.2023	16102	MS	111134	GSCN
2.	08.06.2023	15014	KGM	44648	GSLRD
2022-23					
1.	01.04.2022	16788	TEN	03246	WGSCN
2.	17.08.2022	22531	CPR	161010	GSLRD
3.	25.08.2022	12191	JBP	094076	WGSCN
4.	24.11.2022	18233	BSP	124451	GS
5.	19.03.2023	13301	DHN	44235	GS

It is learnt that RDSO had issued instructions regarding strengthening of ICF bogie frame in 2017 and has further issued revisions for the same. The latest drawing has been issued vide letter under reference iii above. While discussions with various workshops, it has also been revealed that modifications issued by RDSO, are inadequate to address the issue.

In this regard, RDSO is advised to depute concerned official to JUDW/NR, JU/NWR, GOC/SR and BPL/WCR to examine the modifications carried out in ICF trolley and to review the same accordingly. In this matter it is also advised to convene a short Video conference meeting with CWMs. Cracks in Bogie frame is serious concern accordingly a detailed report with action taken to avert such cases may further be submitted by 30 June 2023 in the matter. The matter may further be treated as Most Urgent.

DA: As above


(शैलेंद्र सिंह)
कार्य. निदेशक यांत्रिक इंजी./ई.एन. एच. एम.& प्रोजेक्ट
रेलवे बोर्ड

C/- All PCMEs/Zonal Railways for kind information and necessary action please.



भारत सरकार - वि. वि. वि.
संस्कृत विभाग और वि. वि. वि.
११११३ - २२६ ०११
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Government of India Ministry of Railways
Research Design & Standards Organisation
Lucknow - 226 011
DHO (0522) 2458115
DHO (0522) 2458310



Date: 27.11.2017

No. 5V. Bogie Crack

Chief Mechanical Engineer,

1. Northern Railway, Baroda House, New Delhi-110 001
2. Western Railway, Churchgate, Mumbai-400020
3. Central Railway, CSTM, Mumbai - 400 001
4. Eastern Railway, Fairly Place, Kolkata- 700 001
5. Southern Railway, Park Town, Chennai - 600 003
6. North East Frontier Railway, Maligaon, Guwahati- 781 011
7. North Eastern Railway, Gorakhpur-273 001
8. South Eastern Railway, Garden Reach, Kolkata-700 043
9. South Central Railway, Secunderabad-500 071
10. West Central Railway, Jabalpur- 482 001
11. South East Central Railway, Bilaspur- 495 004
12. South Western Railway, Hubli- 580023
13. East Coast Railway, Railway Complex, Bhubaneswar- 751 023
14. East Central Railway, Hazipur-844 101
15. North Western Railway, Jaipur-302 006
16. North Central Railway, Allahabad-211 001
17. Konkan Railway Corporation Ltd., Corporate office, Belapur Bhawan, Navi Mumbai - 400 614.
18. Integral Coach Factory, Chennai, 600 038.
19. Rail Coach Factory, Kapurthala, 144 6802.

Sub: Bogie Alteration Instructions for BG mainline and self-propelled ICF design coaches.

Ref: i. CRSE/WCR letter No. WCR/M/C/02/404 Vol- V dated 02.11.2017.

ii. ICF/Chennai's letter No. ICF/OMS/MDM/File/F015 dated 17.02.2017.

iii. This office letter of even no. dated 27.02.2017.

iv. This office letter of even no. dated 15.02.2016.

With reference to above, a few bogie frame crack cases have been reported by Zonal Railways in ICF all coil bogies on mainline coaches in the recent past. West Central Railway vide reference (i) above, has reported the failure of the GS coach due to crack found near dashpot in bogie frame. Further, similar incidents of cracks on bogie side frame bottom flange and web has also been reported in other BG mainline ICF type coaches, both in AC & Non-AC at the same location i.e. near safety strap.

In this connection, vide this office letter under reference (iv), Bogie Alteration Instruction for Non-AC Hybrid Coaches were already circulated to Zonal Railways & PUs for necessary action. In the hybrid coaches, shell structure is of LHB type and bogies are of conventional type (ICF type) fitted with air suspension arrangement in secondary suspension with BMBC arrangement. There is no change in the basic design of bogies of hybrid and conventional type coaches except air suspension.

The failure reports of Zonal Railways have revealed that the recent failure/crack cases of bogie frames near dashpot in bogie frames are due to poor maintenance, particularly poor quality, repeated welding operations. M&C analysis was also carried out at RDSO. The findings of investigations on the examined bogie were as follows:

1. Fatigue crack initiation from weld junction between axle guide and side frame bottom plate.
2. A wide gap (4 mm) between welded plates (guide plate and side frame bottom plate) had been found which had adversely affected the performance. These are inherent welding execution deficiency.
3. Lack of fusion was observed in the fatigue initiation region during micro examination.
4. Lack of fusion and lack of penetration were observed during the macro examination.
5. Chemical composition of guide plate was not satisfactory in terms of Carbon content which was found higher than the specified limit (0.25% against 0.22% max.).

6. The wider gap between plates may be due to shifting of plates while executing the welding, caused by loose fixture or inappropriate placement of plates before commencement of welding. Such wider gap may always lead to lack of fusion and lack of penetration with the existing welding parameters followed, which are set for closure gaps. Such wider gap will also lead to higher stress concentration at the weld joint and will aggravate easy crack initiation due to in service impacts.
7. M&C Directorate of RDSO had concluded that while executing the welding, recommended parameters may be followed to avoid cracking due to welding. The NDT techniques may also be followed to arrest welding defects.

Besides above, the axle box suspension strap should not be welded from inside (towards Axle Guide) and edge preparation of suspension strap should be ensured for proper penetration of welding. Excessive and poor welding on axle box suspension strap towards axle guide makes the structure soften/annealed and promotes cracks. ICF, Chennai vide reference (ii) (copy enclosed) has issued CAI No. B-2017/01 for welding of suspension strap during POH.

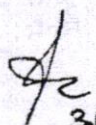
As an additional safeguard, it is suggested that strengthening of bogie frame may be done by providing a channel from inside and a rib from outside (at the centre of inner channel) in the area of inner Axle Guide as per RDSO drawing no. CG - 17066.(copy enclosed). General welding guidelines may be followed as prescribed in RDSO CMI No. RDSO/2012/CG/CMI-02, Amendment 1 issued vide letter No. MC/CRN/REH dated 17.07.2015.

Manufacturers of Bogie are requested to follow the RDSO instructions mentioned in latest revision of RDSO Specification No. C-9202 for manufacturing of bogie. It is pertinent to mention here that the heat treatment is one of the important parameters to manufacture the good quality of product. Therefore, special attention on this may be given during production process. The heat treatment and stress relieving process should be strictly followed as per RDSO guidelines issued vide letter reference (iii).

Further, it is advised that all brake gear bushes, pins and cotters with standard size should be properly fitted otherwise due to excess lateral and longitudinal play in bogie frame, components fitted in dashpot get broken and complete brake rigging may be shifted. This will cause additional forces on bogie frame and may cause development of cracks in weak spots like welded joints and heat affected zones.

Necessary action may be taken to implement these instructions at the earliest.

DA: As above.

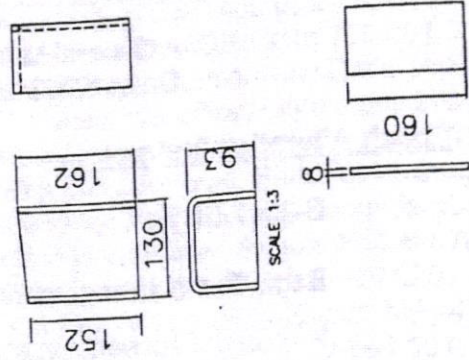
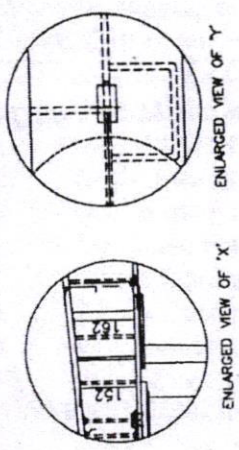
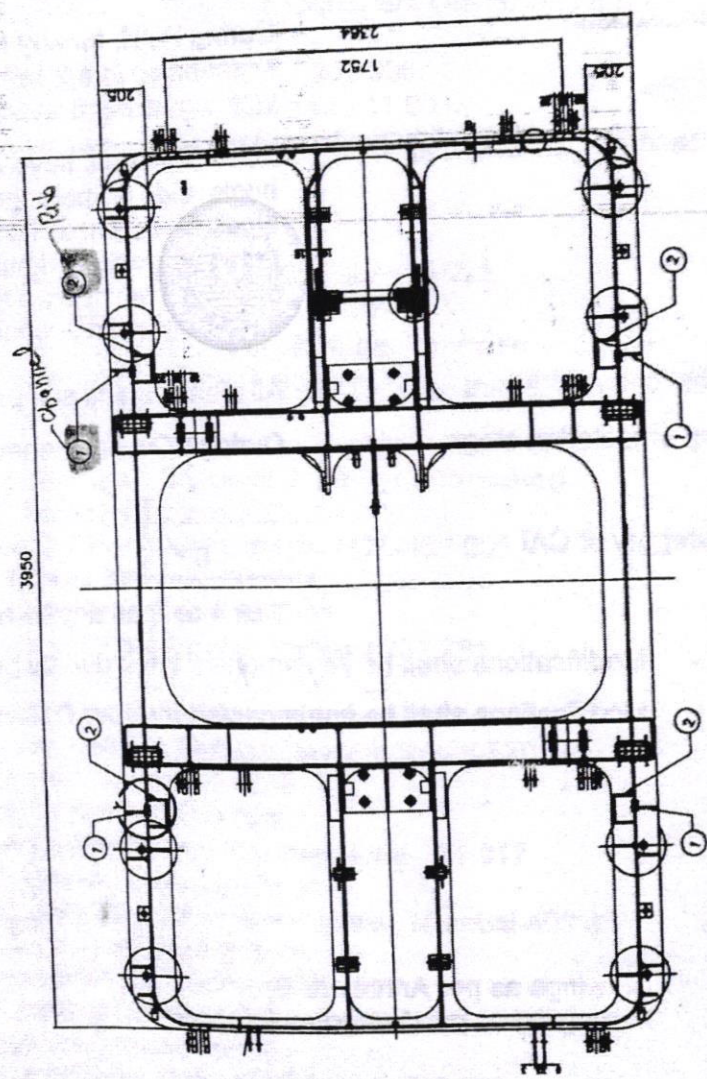
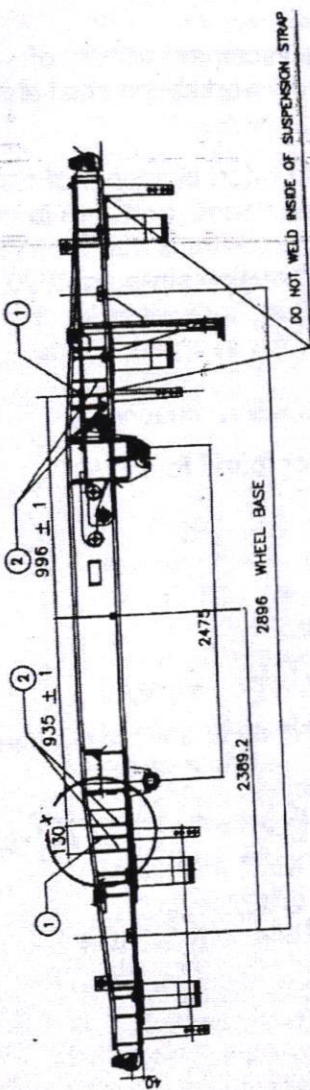

30.11.2017
(Indrajit Singh)
Executive Director/Carriage

Copy to:

EDME (Coaching),
Railway Board, Rail Bhawan,
New Delhi- 110 001.

} For kind information please.

2/25
This sig. altered to
set of



NOTE:
 1. ALL DIMENSIONS ARE
 IN MM.

DESIGNED BY		CHECKED BY		DATE	
SUPERSEDED BY		REVISION		REVISION	
INDIAN RAILWAY STANDARDS		MAIN LINE COACHES		MODIFIED BOGIE FRAME	
ARRANGEMENT FOR SG-AC COACHES		B.G.		CG-17066	

MODIFIED LOCATIONS IN BOGIE FRAME INDICATED WITH 1 & 2



30
9/01/18

Research Design & Standards Organisation
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Lok Sabha Building
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DND: (0522) 2451116



Date: 03.01.2018

No. SV. Bogle Crack

Principal Chief Mechanical Engineer,

- 1 Northern Railway, Baroda House, New Delhi-110 001
- 2 Western Railway, Churchgate, Mumbai-400020
- 3 Central Railway, CSTM, Mumbai - 400 001
- 4 Eastern Railway, Fairly Place, Kolkata-700 001
- 5 Southern Railway, Park Town, Chennai - 600 003
- 6 North East Frontier Railway, Maligaon, Guwahati-781 011
- 7 North Eastern Railway, Gorakhpur-273 001
- 8 South Eastern Railway, Garden Reach, Kolkata-700 043
- 9 South Central Railway, Secunderabad-500 071
- 10 West Central Railway, Jabalpur-482 001
- 11 South East Central Railway, Bilaspur-495 004
- 12 South Western Railway, Hubli-580023
- 13 East Coast Railway, Railway Complex, Bhubaneswar-751 023
- 14 East Central Railway, Hazipur-844 101
- 15 North Western Railway, Jaipur-302 006
- 16 North Central Railway, Allahabad-211 001
- 17 Konkan Railway Corporation Ltd. Corporate office, Belapur Bhawan, Navi Mumbai - 400 614
- 18 Integral Coach Factory, Chennai-600 038
- 19 Rail Coach Factory, Kapurthala, 144 6602

Sub: Bogie Alteration Instructions for BG mainline and Hybrid type ICF design coaches.

- Ref:
- 1) Para 5 of Minutes of Meeting held in Railway Board on 27.12.2017.
 - 2) This office letter of even no. dated 27.11.2017 (copy enclosed)
 - 3) ICF/Chennai's letter No. ICF/QMS/MDM/File/F015 dated 17.02.2017 (copy enclosed)
 - 4) This office letter of even no. dated 27.02.2017.
 - 5) This office letter of even no. dated 15.02.2016.

Vide letter under reference (2) instructions were issued on preventive measures to be taken by Zonal railways to overcome the problem of cracks reported in ICF type bogies for mainline coaches. CAIs were issued in this connection vide reference (2) for mainline coaches and reference (5) for hybrid coaches. The instructions are being reiterated here, as per the directives of Railway Board vide reference (1).

The investigations into the failed bogies had revealed deficient process during manufacture as well as poor maintenance in the field. The following deficiencies were noticed which need to be overcome to prevent the crack cases being reported:

- a) Heat treatment of bogies during manufacture should be scrupulously followed as given in the specification for ICF bogies (RDSO spec. No. C-9202)
- b) Improper surface finish of edges during profile cutting of plates for manufacture of bogie side frames, transoms and head stocks
- c) Improper setting of plates to be welded resulting in large gaps which finally leads to lack of fusion of the materials being welded.

Annexure 2 to C.O.F. DYHQ (CWO)

CWE ✓	CMPE/DSL
CRSE/Chg.	CESE

(169)

d) Improper setting of welding equipments leading to lack of fusion, lack of penetration etc

e) Inadequate surface preparation particularly in Coaching depots and workshops for the welding work resulting in introduction of impurities, improper fusion at weld points etc.

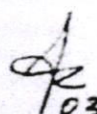
f) Welding of Axle box safety strap on all the four sides resulting in overlapping of heat affected zones with Axle guide. It may be noted that most of the bogie crack cases reported, have taken place from this region and utmost care needs to be taken while welding the safety strap and axle guides. The side of the safety strap towards Axle guide should not be welded in any case. ICF, Chennai has also issued the CAI B-2017/01 for welding of suspension strap assembly. This may be followed for guidance.

Action may be taken to overcome the deficiencies found during investigation as listed above. Additionally it has been advised vide ref (2) and (5) that as an additional safeguard strengthening of bogie frames may be done by providing the channel from inside and a rib from outside in the area of inner Axle guide as per RDSO drawing no CG - 17066 (copy enclosed). General welding guidelines as prescribed in RDSO CMI No. RDSO/2012/CG/CMI-02 Amendment 1 may be followed.

Further, it is advised that all brake gear bushes, pins and cotters with standard size should be properly fitted otherwise due to excess lateral and longitudinal play in bogie frame, components fitted in dashpot get broken and complete brake rigging may be shifted. This will cause additional forces on bogie frame and may cause development of cracks in weak spots like welded joints and heat affected zones.

Necessary action may be taken to implement these instructions at the earliest.

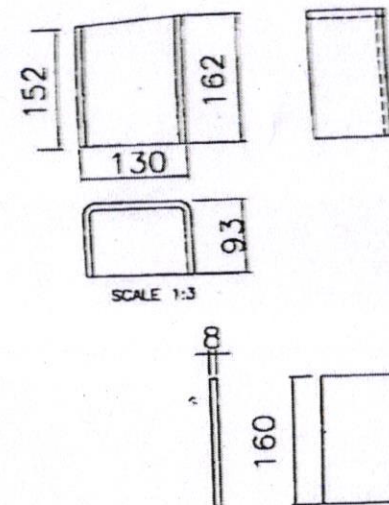
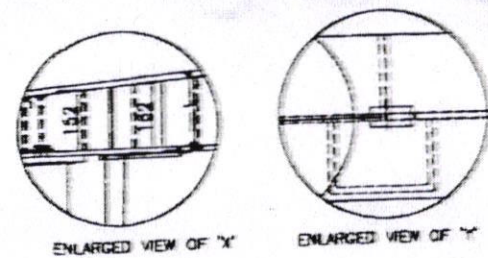
DA. As above.


03-01-2018
(Indrajit Singh)
Executive Director/Carriage

Copy to:

EDME (Coaching),
Railway Board, Rail Bhawan,
New Delhi- 110 001.

} For kind information please



NOTE -
1. ALL DIMENSIONS ARE
IN MM.

1		NO	3		REVISION - 2011
1		CHANGEL	3		REVISION - 2011
FORM		DESCRIPTION & DIMENSIONS	MANUFACT. DATE		WEIGHT & SPEED
RDS		INDIAN RAILWAY STANDARDS			
SUPERSEDED BY:		MAIN LINE COACHES			
SUPERSEDES:		MODIFIED BOGIE FRAME			
ASSEMBLY DGS		ARRANGEMENT FOR SG-AC COACHES			
REFERENCE:-		CG-17066			
SCALE		R.D.S.O. [CG]			
C		U.S. 100/10/10			
D		U.S. 100/10/10			
1/2		R.D.S.O. [CG]			
CHECK SHEET NO.		CG-17066			
ALY ITEM	AUTHY.	DESCRIPTION	DATE		

1000
101
490cl8i
07



भारत सरकार - रेल मंत्रालय
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Research Designs & Standards Organisation
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DID (0522) 2450115
DID (0522) 2455310



No. SV.Bogie Crack

Date: 09.09.2022

Principal Chief Mechanical Engineer:

1- Southern Railway, Park Town, Chennai - 600003	10- East Coast Railway, Chandrasekharpur, Bhubaneswar - 751 016 (Orissa)
2- South East Central Railway, Bilaspur - 495004	11- North Central Railway, Allahabad - 211 001
3- Northern Railway, Baroda House, New Delhi - 110 001	12- West Central Railway, Jabalpur - 482 008
4- Central Railway, Chhatrapati Shivaji Terminus, Mumbai-400 001	13- South Western Railway, Hubli - 580 023
5- North Western Railway, Jaipur - 302 006	14- South Central Railway, Rail Nilayam, Secunderabad - 500 071
6- Western Railway, Churchgate, Mumbai - 400020	15- East Central Railway, Hajipur - 844 101
7- North Eastern Railway, Gorakhpur - 273 001	16- Eastern Railway, Fairlie Place, Kolkata-700 001
8-Northeast Frontier Railway, Maligaon, Guwahati -781 011	17- Konkan Railway Corporation Ltd., Corporate office, Navi Mumbai-400 614
9- South Eastern Railway, Garden Reach, Kolkata - 700 043	

Sub: Bogie frame strengthening in connection with Bogie frame crack.

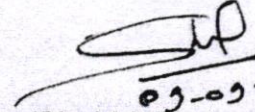
Ref: (i) This office letter of even no. dated 29.06.2020 (copy enclosed).
(ii) This office letter of even no. dated 03.01.2018 (copy enclosed).
(iii) This office letter of even no. dated 27.11.2017 (copy enclosed).
(iv) This office letter of even no. dated 15.02.2016 (copy enclosed).
(v) WCR's Letter no. CRWS/BPL/Drg/External Doc. Dated 05.09.2022 & WCR/M/C/02/404 Vol-V dated 02.09.2022 (copy enclosed).

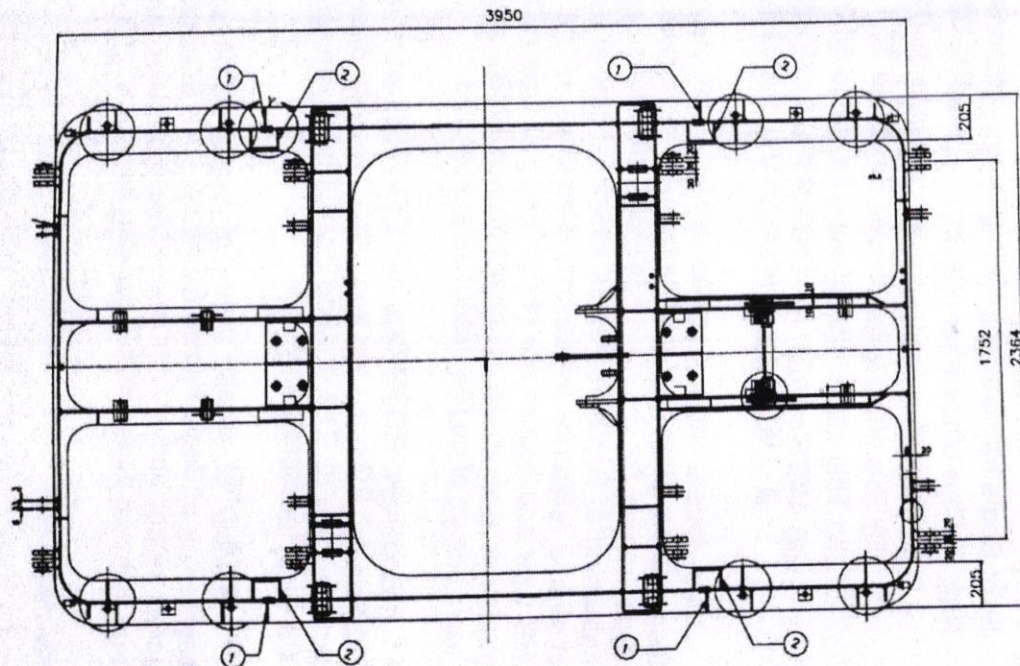
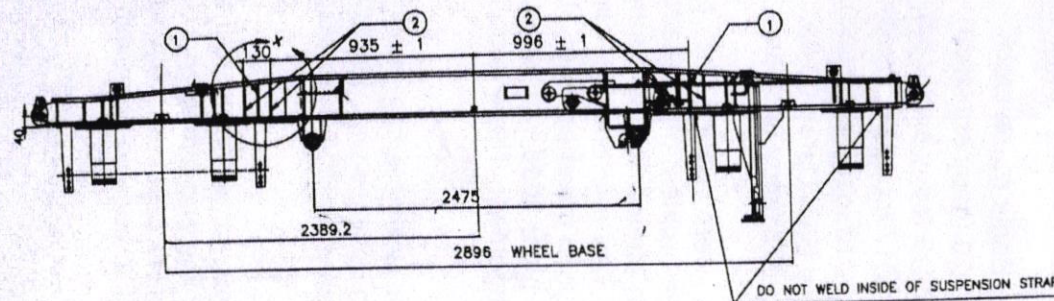
Vide letters under reference (ii), instructions were issued for preventive measures to be taken by Zonal Railways to overcome the problem of cracks reported in ICF type bogies for mainline coaches. CAIs had been issued in this connection for strengthening of Bogie frames as additional safeguard, vide reference (iii) for mainline coaches and reference (iv) for hybrid coaches. In the hybrid coaches, shell structure is of LHB type and bogies are of conventional type (ICF type) fitted with air suspension arrangement in secondary suspension with BMBC arrangement. There is no change in the basic design of bogies except air suspension.

Accordingly, RDSO Drg. No. CG-17066 alt '1' for strengthening of bogie frames for AC/Non-AC BG main line and hybrid type ICF design coaches was issued vide letter under reference (i). The drawing has further been updated as RDSO drawing no. CG-17066 Alt '2' for more clarity.

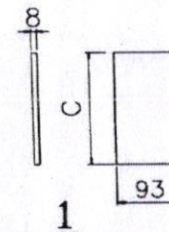
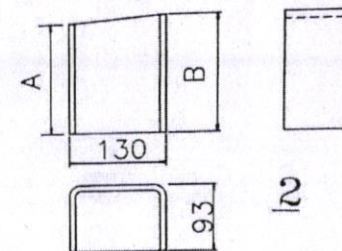
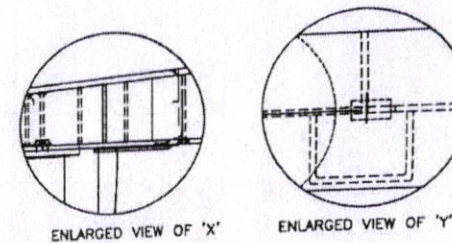
In view of recent cases of bogie frame crack, it is requested to ensure strengthening of Bogie frames for AC/Non-AC BG main line and hybrid type ICF design coaches as per above mentioned CAIs issued for mainline coaches & hybrid type ICF design coaches as per RDSO drawing no. CG-17066 Alt '2' enclosed herewith.

Encl.: As above


(Shobhit Pratap Singh)
Jt. Director (VDG)/Carriage
For Director General /Carriage



MODIFIED LOCATIONS IN BOGIE FRAME INDICATED WITH 1 & 2



	13T	16T
A	160	152
B	169	161
C	165	157

- NOTE -
- ALL DIMENSIONS ARE IN MM.
 - APPLICABLE FOR:-
AC, Non AC & HYBRID COACHES

2	1&2	VSC/	TITLE CHANGED NOTE 2	
		02/22	ADDED NO. OF CHANGED	
			TABLE ADDED	
1	1&2	VSC/	Description of Item 1 & 2	
		04/12	changed in table	
ALT	TECH	ALPHA	DESCRIPTION	DATE

ROSD	ASSEMBLY DRAWS	SUPERSEDED BY:	INDIAN RAILWAY STANDARDS
REFERENCE:-	SCALE: D	1:1	MAIN LINE COACHES
	1:2	1:2	STRENGTHENING ARRANGEMENT
			OF ICF COACHES
			U.S. 100/20/17
			B.G. [CG]
			CG-17066