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SV. Bogie Crack

Date: 19. 04.2017

**Chief Design Engineer (Mech.),
Integral Coach Factory,
Chennai - 600 038.**

Fax No: 044-26261872

Sub: FEA of the bogie with modification in ICF Bogie for lowering of brake cylinder mounting in ICF type Bogie for fitment of Crashworthy Centre Buffer Coupler.

Ref: Item no. 1 of para B of visit report of Executive Director/Carriage/RDSO to W.R. & C.R. on 5th & 6th April, 2017.

With reference to above, Coach No. WGSCN 01212 (SCR) fitted with crashworthy type of CBC head stock as per drawing released by RDSO in lieu of screw coupling head stock was inspected and also deliberated with officers and supervisors on shop floor and was noted that there was no problem observed while carrying out the this modification as per RDSO drawing. However, Parel Workshop is unable to lower the coach on bogie as there are infringements with brake cylinder necessitating modification in bogie also. Accordingly, draft Carriage Maintenance Instructions (CMI) for Modification of ICF Bogie for lowering of brake cylinder mounting in ICF type Bogie for fitment of Crashworthy Centre Buffer Coupler has been prepared at RDSO.

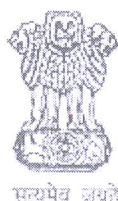
Please find enclosed herewith a copy of draft Carriage Maintenance Instructions (CMI) No. RDSO/2017/CG/CMI-02 'Procedure for Modification of ICF Bogie for lowering of brake cylinder mounting in ICF type Bogie for fitment of Crashworthy Centre Buffer Coupler'.

ICF is requested to carry out FEA of the bogie with proposed modification and advice to this office for suitability of the subject modification in bogie so that CMI may be issued to Railways for implementation.

DA: As above.


Mohammad Saquib)
Director/VDG (Carriage)

INDIAN RAILWAYS



PROCEDURE FOR MODIFICATION OF ICF BOGIE FOR LOWERING OF BRAKE CYLINDER MOUNTING IN ICF TYPE BOGIE FOR FITMENT OF CRASHWORTHY CENTRE BUFFER COUPLER.

Issued By:

Research Designs and Standards Organization

Manak Nagar, Lucknow - 226011.

S. No.	Month/Year of issue	Revision / Amendment	Page No.	Reason for Amendment
1.	April, 2017	-	-	First issue

Signature			
Name & designation	JE/E&S and Brakes/Carriage Prepared by:	SSE/E&S and Brakes/Carriage Checked by:	Director/E&S and Brakes./Carriage Approved by:

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PROCEDURE FOR MODIFICATION OF ICF BOGIE FOR LOWERING OF BRAKE CYLINDER MOUNTING IN ICF TYPE BOGIE FOR FITMENT OF CRASHWORTHY CENTRE BUFFER COUPLER.

1. INTRODUCTION:

In the wake of Kanpur accident, Railway Board has decided that now all the ICF coaches that are having more than 5 years residual life will be retro-fitted with CBC head stock for provision of CBC.

However, to further improve the crashworthy features of the proposed coaches to be retro-fitted, study for provision of CBC with crashworthy features has also been done by RDSO and in this regard, it has been found that CBC with crashworthy features can be provided but this will require some minor modification in the bogies for lowering the position of brake cylinder which is infringing with the crashworthy CBC pocket.

2. SCOPE OF COACH MAINTENANCE INSTRUCTION:

For fitment of crashworthy Centre Buffer Coupler, it is also noted that there is already a design of bogie where brake cylinder is mounted at lower level and these bogies are already running in the coaches having crashworthy features. Accordingly, necessary modification in existing bogies have been considered in this CMI to make modified arrangement of brake cylinder and its linkage mounting same as existing crashworthy bogie.

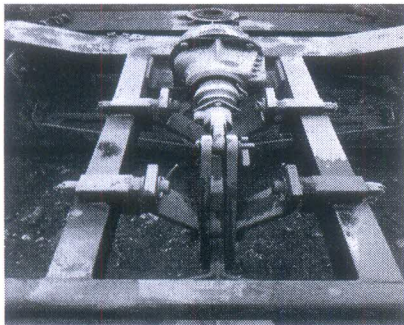
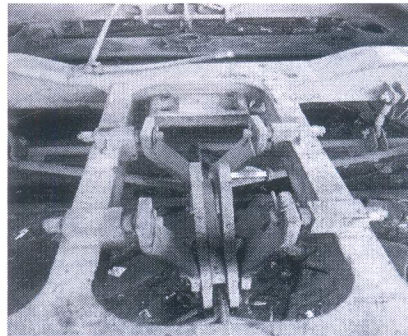
3. MODIFICATION PROCEDURE:

Modification Procedure have been elaborated in following steps:

3.1 Removal of existing equipment (brake cylinder & linkages):

- i. Loosen the brake cylinder mounting nut, remove connection between brake cylinder head and floating lever and dis-mount the brake cylinder.

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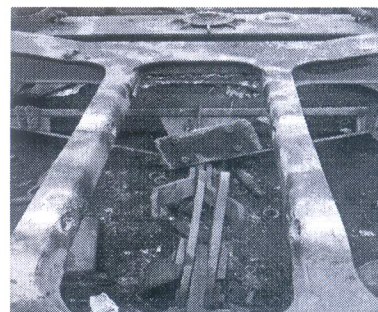
**Before****After**

ii. Remove the connection between various linkages such as

- a. Z-Lever
- b. Floating lever
- c. Lever Hanger
- d. Pull Rod



iii. Remove the 4 nos. of mounting block of Z-Lever from transom top with the help of angle cutter / oxy-acetylene gas cutting and properly ground the cut surface and level with adjacent transom top surface.



iv. Similarly cut the mounting plate of brake cylinder bottom with the help of angle grinder / gas cutting and ground the cut surface matching with adjacent faces.

3.2 Marking & Drilling of locations:

- i. Mark the 4 locations of Z-lever mounting bush as per drawing number WC03106 (Alt. Nil). Note that 470mm side from hole indicated in the drawing is inner side of transom where brake cylinder is mounted.
- ii. Make hole of dia 50 (+.5, -0) at marked location with the help of suitable drill machine. In case of non-availability of proper drilling machine hole can

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be done with hand plasma cutting machine (undersize) and finished to final dimension with the help of grinding machine.

- iii. Similarly mark the location for welding of bottom support plate of brake cylinder. Maintain vertical and horizontal dimensions between Z-lever mounting bush hole and brake cylinder support mounting. Please refer drawing No.WGSCWAC11-0-3-101.

3.3 Fitment of components:

- i. Arrange the following components as per drawings:

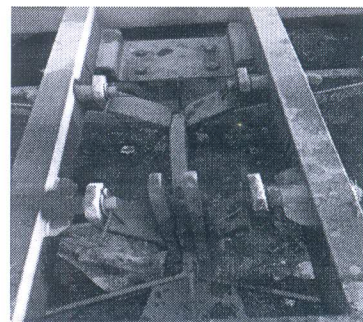
- a. Z-Lever (GS7-3-2-702)
- b. Floating lever (GS7-3-2-703)
- c. Lever Hanger (GS7-3-2-705)
- d. Pull Rod (GS7-3-2-704)
- e. Ribs & Bracket (WC03107)
- f. Z-lever mounting bush (Refer Drg.no.WC03107)
- g. Bottom support Bkt for brake cylinder (Refer Drg.no. WGSCWAC11- 0-3-101.)
- h. Pins & Bushes are identical with as used in ICF Bogies.

- ii. Position the bottom support plate of brake cylinder at marked location and make the tack welding.

- iii. Similarly fit the bush in the transom hole and maintain the relative dimensions (horizontal & vertical) between bush and brake cylinder mounting holes on support plate and make the tack welding.

- iv. After verifying correctness of dimensions make the full welding of bush and bottom support plate with tansem as per drawing No. WC03107 & Drg.no. WGSCWAC11- 0-3-101.

- v. Fit the various ribs and brackets on different bushes and weld them properly as per drawing No. WC03107.



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4. QUALITY CHECK OF WELD JOINTS AND PAINTING:

- 4.1 Inspection after welding shall be carried out to assess the quality of the weld joints. Carry out visual inspection at welded portion, measurement of weld size, Dye Penetrant Test (DPT) of weldments on all critical areas so as to ensure crack free joint in service, detection of weld flaws and discontinuities open to surface. IS: 3658 (Code of Practice for Liquid Penetrant Flaw Detection) may be used for guidance for DPT of weldments.
- 4.2 All the weld joints shall be free from welding defects such as blow holes, porosities, cracks, excessive undercuts and overlaps.
- 4.3 Weld joints shall be uniform, weld slag shall be thoroughly removed and cleaned after each pass. Overlaps if any shall be grounded.
- 4.4 Welding shall not be intermittent and incomplete finish.
- 4.5 Misalignment shall not be acceptable. To avoid any misalignment, component shall be tack weld properly before fabrication.
- 4.6 To minimize distortion, component shall be tack weld properly before fabrication, weld size shall be uniform and intermittent weld shall be avoided.
- 4.7 The welds shall be ground to eliminate stress raisers and to improve fatigue life of weld joints.
- 4.8 All linear discontinuities shall be removed and repaired by chipping or grinding and subsequent welding.
- 4.9 Proper welding sequence shall be followed to minimize distortion of members during fabrication. Members distorted, if any due to welding shall be straightened by application of heat by flame heating and/or by cold straightening carefully. The temperature of the heating areas shall not exceed 650°C.
- 4.10 If any defect or crack is detected during DPT on critical locations of weld joints, the defect shall be removed by gouging and repaired by welding.
- 4.11 The repaired portion shall be re-checked for free from welding defect by the methods of visual inspection and DPT.
- 4.12 After DPT, all the dye must be washed out.

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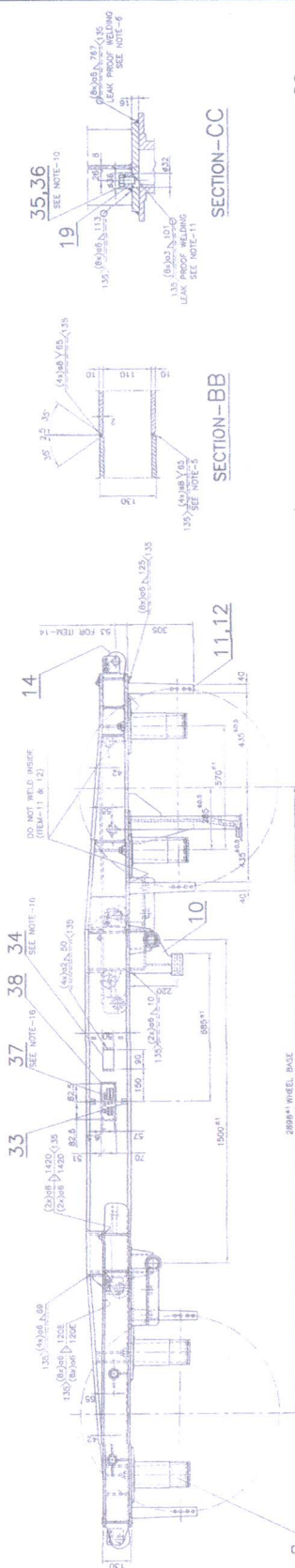
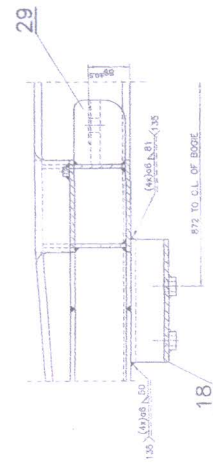
Ref:CG-WI-4.2.1 Ver.1.0	Page 7 of 7	Date of issue: April, 2017	RDSO/2017/CG/CMI-02
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- 4.13 The weld area should be ground finish. All the loose crust, heat strained loose layers etc. should be removed with the help of wire brush and suitable coating of primer and finish paint to be provided similar to corrosion protection scheme of bogie frame as per latest RDSO specification.

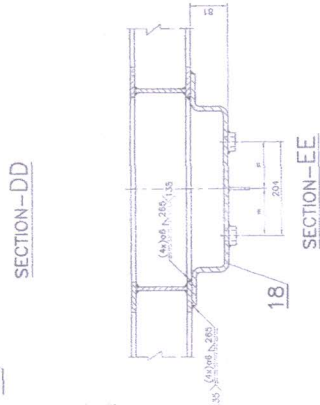
5. ASSEMBLY & TESTING:

Mount the brake cylinder and connect the various linkages as per drawings indicated In para 3.3 similar to existing system. The performance testing of bogie with modified brake cylinder to be done as per standard testing scheme.

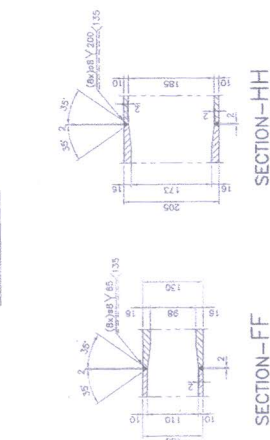
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2596⁴¹ WHEEL BASE

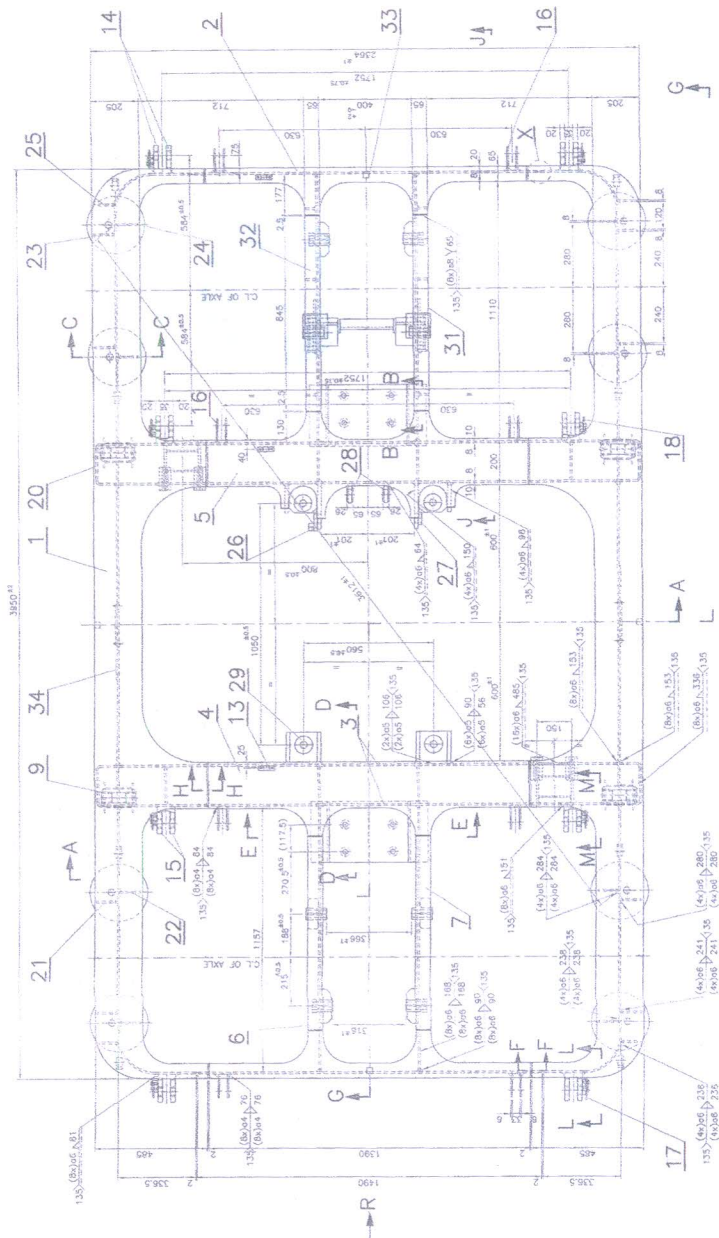
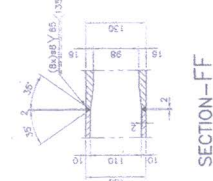
SECTION-DD



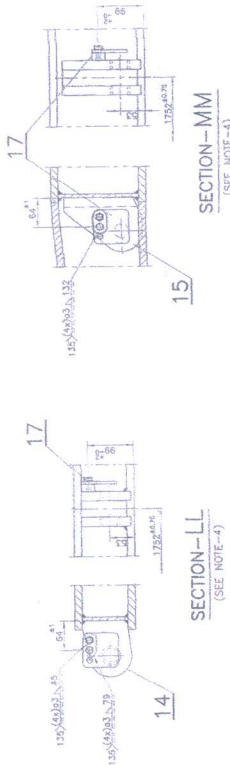
SECTION-EE



SECTION-HH

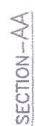
[illegible]

DATE OF LATEST AT	18-08-2014	18-06-2007	ASSEMBLY DRAWINGS
DATE OF FIRST ISSUE			
AME /SOME			



SECTION—MM
(SEE NOTE—4)

SECTION-LL
(SEE NOTE-4)



DETAIL AT--X

No OF ASSY RECD. PER COACH	
TYPE OF COACHES	COLS.
ALL AC SG COACHES WITH CRASH WORTHY FEATURES	2
ALL AC EGG COACHES WITH CRASH WORTHY FEATURES	2

1. TRIAxIAL WELDS SHALL BE AVOIDED.
2. IN CASE OF BOX SECTIONS, GAPS SHALL BE FILLED WITH SEALING COMPOUND CONFORMING TO IS:1380 TO AVOID MOISTURE CREEP.
3. FOR OPEN TOLERANCES REFER DRG NO. ICF/STD--9--0-001.

4. ITEM-17 SHALL BE WELDED TO ITEMS-14 & 15 AT DETAIL STAGE AND THEN THE WHOLE ASSY. BE WELDED TO HEAD STOCK & TRANSOM RESPECTIVELY AS SHOWN IN THIS DRAWING.
5. BEFORE PLACING ITEM-18, WELDING OF LONGITUDINAL-TRANSOM BOTTOM FLANGE SHALL BE GROUND FLAT AND SMOOTH.

6. CURING WELDING OF ITEM--B WITH SIDE FRAME, THE MANUFACTURER'S INITIAL SHOULD BE PLACED OUTSIDE OF THE FRAME, TO FACILITATE EASY IDENTIFICATION.
7. ALTERNATIVELY STEEL TO IS2082--E, 250 CU C M MAY BE USED IN LIEU OF STEEL, TO IRS WHOEVER SPECIFIED FOR THE ITEMS PERTAINING TO THIS DRAWING.

8. PAINTING PROCEDURE:

8.1) ALL SHARP EDGES TO BE ROUNDED OFF.

8.2) AGGRESSIVE BLAST CLEANING TO GRADE Sa2.5 OF ISO 8501-1-1988.

B.3) HOLES AND MACHINED SURFACES SHALL BE MASKED.

B.4) TWO COATS OF HIGH PERFORMANCE ANTI-CORROSION EPOXY COATING RED BROWN FINISHING TO RDSO SPECN.M&C/PCN/123/2008 TO GET

8.5) MACHINED SURFACES SHALL BE APPLIED WITH RUST PREVENTION OIL.

9. GALVANISED TO IS:1573 TO SERVICE GRADE NO.2 OF TAB.2.

10. ITEM-35 SHALL BE HAND TIGHTENED.

11. CARE SHOULD BE TAKEN WHILE WELDING UNDERNEATH TO AVOID DAMAGE TO THE THREADS IN THE BOSS, ITEM...19.

13. ROSS SPECN C-9202(LATEST REVISION) SHALL BE FOLLOWED FOR MANUFACTURING OF BOGIE FRAME.

14. ALUMINUM RIVETS AND THE HOLES IN THE BOGIE FRAME COMING IN CONTACT SHALL BE ADEQUATELY TREATED FOR BI-METALLIC ACTION WITH AN ANTI-BI-METALLIC COMPOUND OR A FLUORIDE COMPOUND BEFORE BRITING.

15. ITEMS 37 & 38 ARE APPLICABLE FOR PURCHASED BOGIE FRAMES ONLY.

16. a) PUNCHING OR ITEM-34 SHALL BE DONE BY THE SUPPLY OFFICE.
b) PUNCHING ON ITEM-37 SHALL BE DONE BY ICF/PURCHASER.
17. APPROVAL OF QAP BY DESIGN OFFICE/ICF BEFORE MANUFACTURE OF PROTOTYPE IS ESSENTIAL.

ITEM NO.	DESCRIPTION	QTY	UNIT	WEIGHT	REMARKS
1	WIP END MET 648 IS 20T (LUMIN)	38	kg	0.3407	SEE SPEC-14412
2	NUMBER PLATE	37	EA/STD	0.0000	SEE SPEC-14412
3	SEALING WASHER	36	EA/STD	0.0000	SEE SPEC-14412
4	SEALING WASHER	35	EA/STD	0.0000	SEE SPEC-14412
5	SEALING WASHER	34	EA/STD	0.0000	SEE SPEC-14412
6	SEALING WASHER	33	EA/STD	0.0000	SEE SPEC-14412
7	SEALING WASHER	32	EA/STD	0.0000	SEE SPEC-14412
8	SEALING WASHER	31	EA/STD	0.0000	SEE SPEC-14412
9	SEALING WASHER	30	EA/STD	0.0000	SEE SPEC-14412
10	SEALING WASHER	29	EA/STD	0.0000	SEE SPEC-14412
11	SEALING WASHER	28	EA/STD	0.0000	SEE SPEC-14412
12	SEALING WASHER	27	EA/STD	0.0000	SEE SPEC-14412
13	SEALING WASHER	26	EA/STD	0.0000	SEE SPEC-14412
14	SEALING WASHER	25	EA/STD	0.0000	SEE SPEC-14412
15	SEALING WASHER	24	EA/STD	0.0000	SEE SPEC-14412
16	SEALING WASHER	23	EA/STD	0.0000	SEE SPEC-14412
17	SEALING WASHER	22	EA/STD	0.0000	SEE SPEC-14412
18	SEALING WASHER	21	EA/STD	0.0000	SEE SPEC-14412
19	SEALING WASHER	20	EA/STD	0.0000	SEE SPEC-14412
20	SEALING WASHER	19	EA/STD	0.0000	SEE SPEC-14412
21	SEALING WASHER	18	EA/STD	0.0000	SEE SPEC-14412
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24	SEALING WASHER	15	EA/STD	0.0000	SEE SPEC-14412
25	SEALING WASHER	14	EA/STD	0.0000	SEE SPEC-14412
26	SEALING WASHER	13	EA/STD	0.0000	SEE SPEC-14412
27	SEALING WASHER	12	EA/STD	0.0000	SEE SPEC-14412
28	SEALING WASHER	11	EA/STD	0.0000	SEE SPEC-14412
29	SEALING WASHER	10	EA/STD	0.0000	SEE SPEC-14412
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31	SEALING WASHER	8	EA/STD	0.0000	SEE SPEC-14412
32	SEALING WASHER	7	EA/STD	0.0000	SEE SPEC-14412
33	SEALING WASHER	6	EA/STD	0.0000	SEE SPEC-14412
34	SEALING WASHER	5	EA/STD	0.0000	SEE SPEC-14412
35	SEALING WASHER	4	EA/STD	0.0000	SEE SPEC-14412
36	SEALING WASHER	3	EA/STD	0.0000	SEE SPEC-14412
37	SEALING WASHER	2	EA/STD	0.0000	SEE SPEC-14412
38	SEALING WASHER	1	EA/STD	0.0000	SEE SPEC-14412

WSSWAC11-0-3-3

INDIAN RAILWAY

STANDARDS

DATA

NO

431

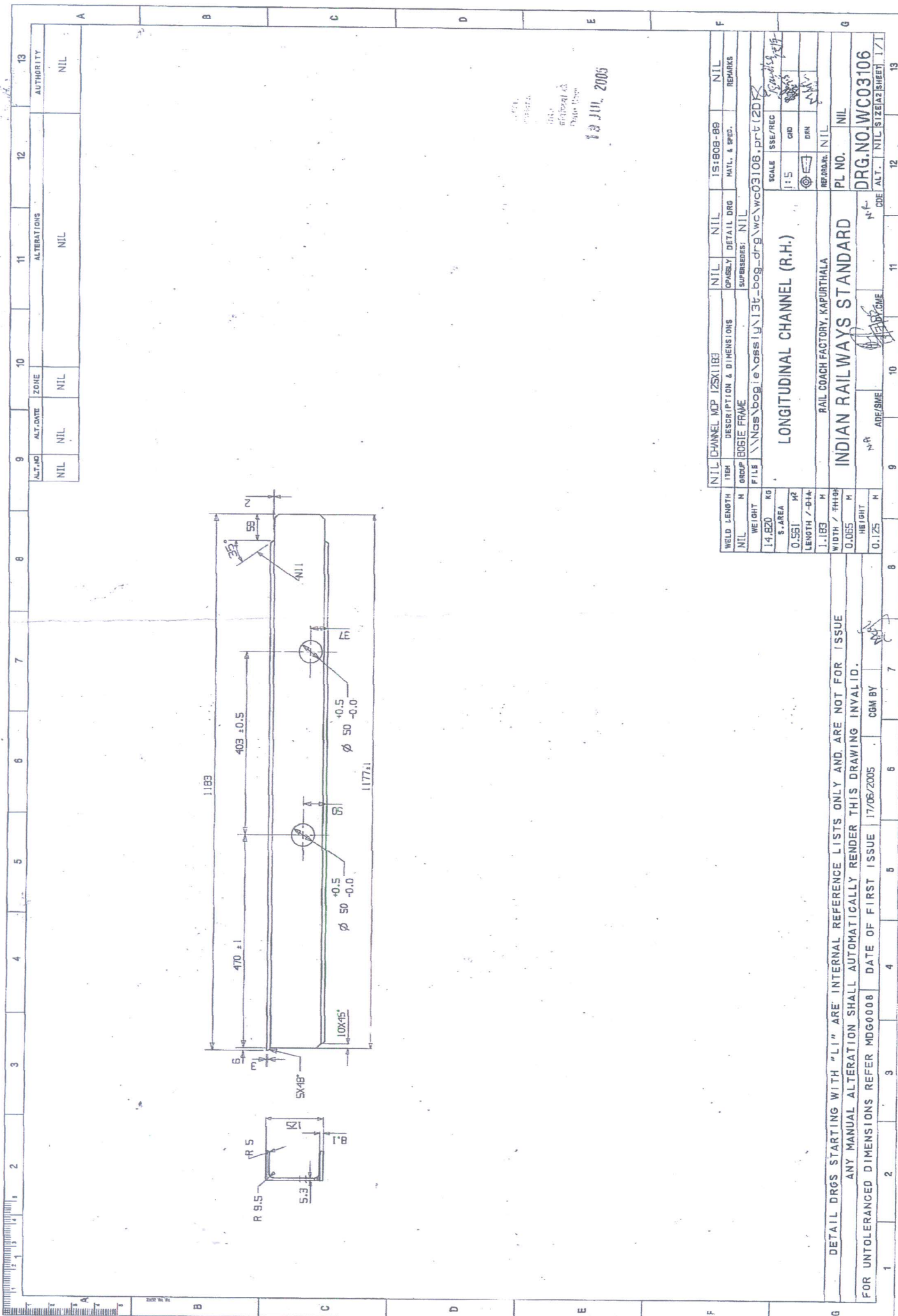
INDIAN RAILWAY

STANDARDS

WSSWAC11-0-3-3

**BOGIE FRAME ARRGT.
FOR AC CRASHWORTHY COACHES**

DATA CODE NO.	INDIAN RAILWAY STANDARDS	SHEET 2 OF 2	WGSOWAC11-0-3-101
431			



ALT. NO.	ALT. DATE	ZONE	ALTERATIONS	AUTHORITY
NIL	NIL	NIL	NIL	NIL

NIT CHANNEL MCP 125X1183		NIL	NIL	151808-89	NIL
DESCRIPTION & DIMENSIONS		OPASBLY		DETAIL DRG	REMARKS
GROUP BOSTIE FRAME		SUPERSEDES: NIL			
FILE		\\NCS\bosie\1183-bog-drg\wc\wc03106.prn (2D)			
WELD LENGTH		SCALE			
NIT		1:5			
WEIGHT		CHD			
14.520 KG		DRN			
S. AREA		REG. DRG. NIL			
0.551 M ²		PL NO. NIL			
LENGTH / Ø14		DRG. NO. WC03106			
1.183 M		DATE OF FIRST ISSUE 17/05/2005			
WIDTH / TH40		FOR UNTOLERANCED DIMENSIONS REFER MDG0008			
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HEIGHT		DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE			
0.125 M		N/A			
ADE/SME		N/A			
N/A		N/A			
INDIAN RAILWAYS STANDARD		RAIL COACH FACTORY, KAPURTHALA			
LONGITUDINAL CHANNEL (R.H.)		LONGITUDINAL CHANNEL (R.H.)			
RAIL COACH FACTORY, KAPURTHALA		RAIL COACH FACTORY, KAPURTHALA			
INDIAN RAILWAYS STANDARD		INDIAN RAILWAYS STANDARD			
DRG. NO. WC03106		DRG. NO. WC03106			
DATE OF FIRST ISSUE 17/05/2005		DATE OF FIRST ISSUE 17/05/2005			
FOR UNTOLERANCED DIMENSIONS REFER MDG0008		FOR UNTOLERANCED DIMENSIONS REFER MDG0008			
ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.		ANY MANUAL ALTERATION SHALL AUTOMATICALLY RENDER THIS DRAWING INVALID.			
DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE		DETAIL DRGS STARTING WITH "LI" ARE INTERNAL REFERENCE LISTS ONLY AND ARE NOT FOR ISSUE			

