



(Govt. of India)
(Ministry of Railways)

camtech

MAINTENANCE INSTRUCTIONS
FOR
UIC TYPE RUBBER VESTIBULE
OF B.G. MAIN LINE COACHES
(For official use only)



July , 2001

*Centre
for
Advanced
Maintenance
TECHnology*



Excellence in Maintenance

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PREFACE

In the Sixth CMG meeting CAMTECH was assigned the task of preparation of maintenance instruction for UIC rubber vestibule with reference to RDSO specification C-8812 revision 1 which is already adopted by Indian Railways for a considerable period of time and railways have gained service experience.

The field studies were conducted in open line and workshops. Coaches were running with torn rubber flanges. Different sizes of foot plates are in use. There was no proper procedure for patching of torn flanges. Railways and UIC vestibule manufacturers were contacted to send their Maintenance and handling methods in use.

In the preparation of this report contribution has been given by S/shri S.M.H.Tandur, Sr.CTA/CAMTECH and A.D.Sawant, Sr.CTA/CAMTECH.

CAMTECH has prepared this report for maintenance of UIC vestibule both at shops and depots. This is aimed at assisting the field maintenance staff and does not supersede any existing instructions issued by Railway Board and RDSO

CAMTECH, Gwalior
Date: 27.7.2001

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Director (Mech)

SUMMARY OF RECOMMENDATIONS

S. No.	RECOMMENDATIONS	ACTION TO BE TAKEN BY
1.	Revised RDSO drawing no. 99056 with part drawings to be included in the RDSO specification no. 8812 Rev.I (Refer para. 102)	RDSO
2	Railways should procure UIC vestibule to new drawing (refer para 102)	Railways
3	Marking particulars on rubber flanges should be modified to last till the service life of vestibule (Refer para no. 104)	RDSO
4	During POH in ICF coaches the support brackets should be replaced in correct position. (Refer para 106)	Railways, ICF
5	ICF should stop using drawing no. ICF/SK-2-5-066 alt.f to manufacture foot plates to maintain interchangeability Refer para 107)	ICF
6	Fixing/joining method drainage channel on rubber flanges (refer item (iii) of para - 203) should be revised.	RDSO
7.	Inspection and Maintenance in POH Chapter 2	Railways
8	Repair of damaged rubber flange (para 203) by Use of Rubber patch on torn rubber flanges (ref. Figure - 2.8a & b) para 203 item iv	Railways and coaching depots
9	Examination and repair practice at carriage maintenance depots (chapter 3)	Coaching depots

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CHAPTER 1

CONSTRUCTION DETAILS OF UIC TYPE RUBBER VESTIBULE OF B.G. MAIN LINE COACHES

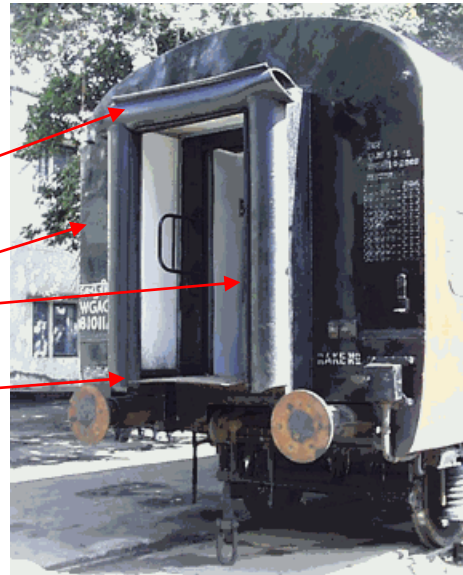
101 INTRODUCTION (Ref. Figure 1.1)

A vestibule is designed to provide a safe and through passage between adjoining coaches of a rake/train.

Figure 1.1

UIC type rubber vestibule arrangement on coach end wall.

- a) Upper flange
- b) Lateral side flange
- c) Foot plate arrangement



UIC type rubber vestibule consists of three elliptical rubber flanges bolted on to a steel frame. The steel frame is welded to the end stanchion of the coach. The rubber flanges are projected beyond the buffing line of the coach to achieve sufficient pre compression.

A hinged foot plate is provided with support brackets (Angles). A rubber pad is provided over support bracket (Angle) to prevent metal to metal contact.

When two coaches are coupled the flanges get compressed against each other thus forming a sealed enclosure all around.

102 SPECIFICATION AND DRAWING NO.

UIC type rubber vestibule should be to RDSO specification C-8812 (Rev.-I) . As per this specification the drawing number indicated is RDSO sketch - 88058 for BG mainline coaches. The drawing number should be modified in the specification to the latest RDSO sketch no. 99056 for B.G main line coaches. So it should be ensured that new procurement should be only to revised drawing.

103 PART LIST WITH RELEVANT DRAWING

UIC vestibule should be as per drawing no. RDSO sketch - 99056. The Part list with relevant drawing numbers is given below:

Table - 1.1

Sr. No	Description of item/component	No. off / assly.	Drawing No.
1	Steel frame complete	1	RDSO SK-99057
2	Upper flange	1	RDSO SK-85248
3	Lateral side flange LH. & RH	2	
4	Rubber packing 6X75X1900	2	RDSO SK-99060
5	Rubber packing 6X75X1500	1	
6	Locking plate item 1	2	RDSO SK-99058
7	Locking plate item 2	2	
8	Locking plate item 3	1	
9	Locking plate item 4	1	
10	Special screw	17	RDSO SK-99059
11	Spring washer M10	53	IS:3068-65 tab-1 type B
12	Hex nuts M10	70	IS:1365-84, Tab-1
13	CSK head screw M10X25	36	IS:1365-84, 4-6Tab, 28-3
14	Snap head rivet dia. 5X10	10	IS:2998-82, Gr.1, Tab-1
15	Foot plate arrangement	1	RDSO SK-99057
16	Support bracket for foot plate	2	
17	Vestibule door sill arrangement	1	
18	Holding device for foot plate	2	T-2-5-699
19	Pin	2	RDSO SK-99059
20	Washer M20	2	
21	Split pin dia. 4X36	2	IS:549
22	Connecting component	2	ICF/SK-2-5-078
23	Foot holding bracket	2	RDSO SK-99057
24	LP sheet	2	RDSO specs. C-9602
25	Spring plate	2	RDSO SK-99058

104 STAMPING ON THE VESTIBULE

Firm's stamps are to be embossed in 5 mm type as per note no. 1 of RDSO Sketch - 85248 alt.3 on rubber flanges. Even in RCF's Drg .Nos. CC25181 for upper flange and Drg. No. CC25185 for lateral side flange similar instructions are incorporated for embossed markings on these flanges (however the marking is shown at bottom end of side flange and for upper flange it is shown at one end). Often the marking give way due to wear and rubbing of flanges during service of the UIC vestibule and become illegible (see figure 1.2 and 1.3). Due to this it is not possible to lodge a warranty claim on a particular firm and also know the life of the vestibule.

IDENTIFICATION MARKINGS ON VESTIBULE FLANGES

Figure 1.2



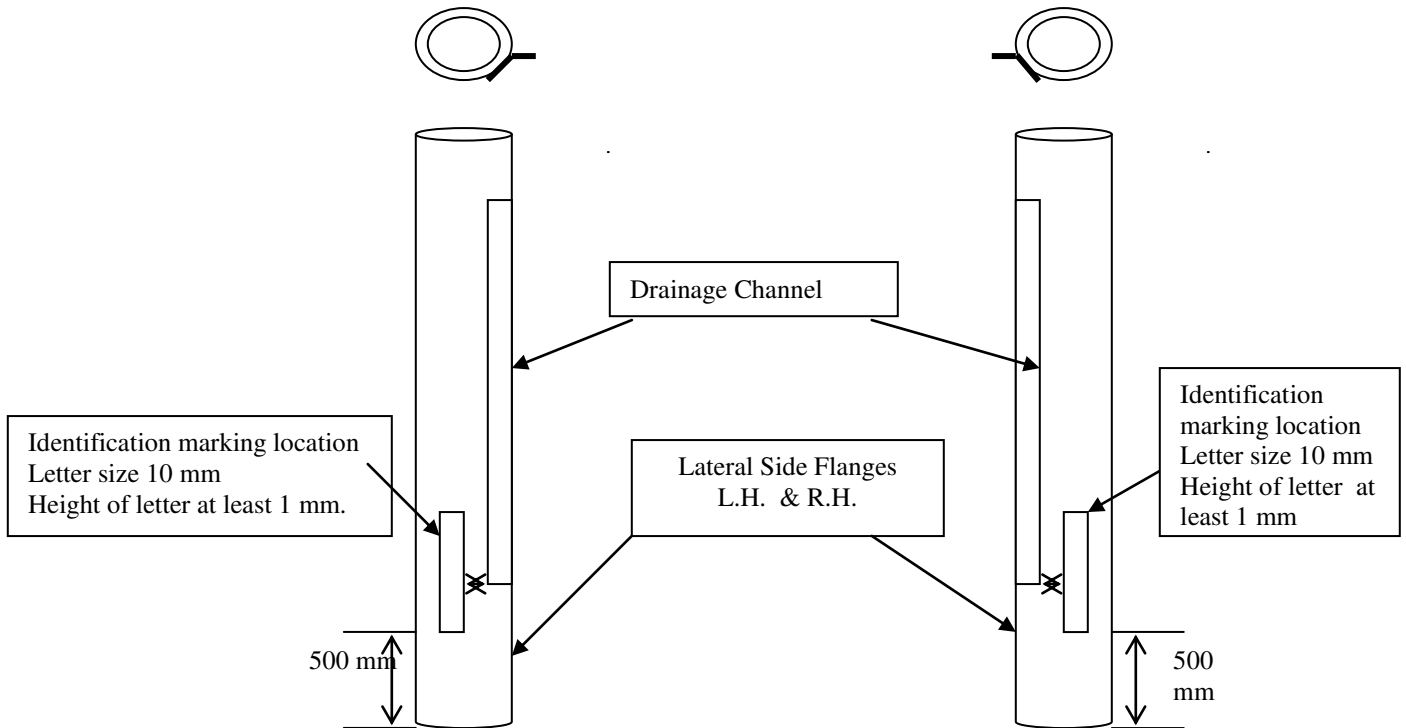
Embossed markings on rubber flange of one manufacturer
(not legible and on the rubbing surface)

Figure 1.3



Embossed markings on rubber flange of another manufacturer
(more legible and away from rubbing surface)

Firm's stamps on rubber flanges should be located in such a way that the Firm's stamp should remain till the service life of the vestibule for which marking particulars will have to be suitably modified to last till the service life of vestibule. A sketch showing ideal location for the markings on side as well as upper flange is shown at figure 1.4.



Identification marking should be made with raised letters of 10 mm size and height of 1 mm embossed. The markings should not be on the rubbing area and it should be at least 500 mm from bottom end of the lateral side flanges.

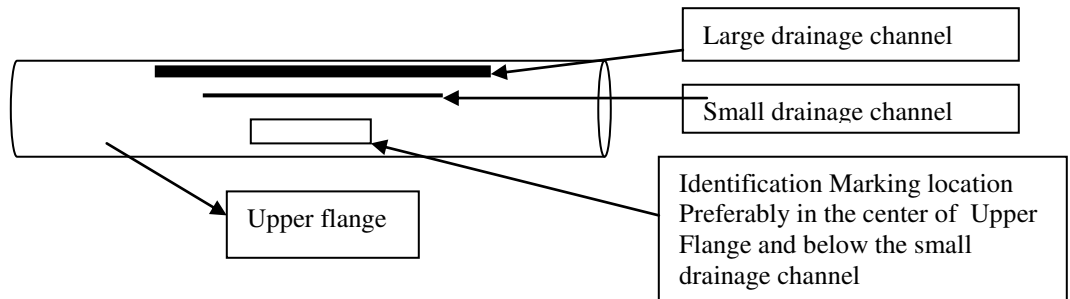


Figure 1.4 Proposed location and size of identification marking

105 MODIFICATIONS IN RUBBER FLANGE

It is observed that the rubber flanges (see **Figure - 1.5**) to old drawings were cut or torn at bottom by buffer plungers and foot plate, whereas the rubber flanges of latest drawings RDSO sketch 99056 (see **Figure - 1.6**) are not cut by buffer plungers or foot plates.



Figure - 1.5 Rubber flange torn by foot plate. and buffer to Drg. no. RDSO SKETCH -88050.

At encircled area, it is seen clearly that the flange is fixed below the height of foot plate level.

Steel frame

Torn Lateral side flange with missing drainage channel

Foot plate

Drainage flange is detached and missing on the lateral flange

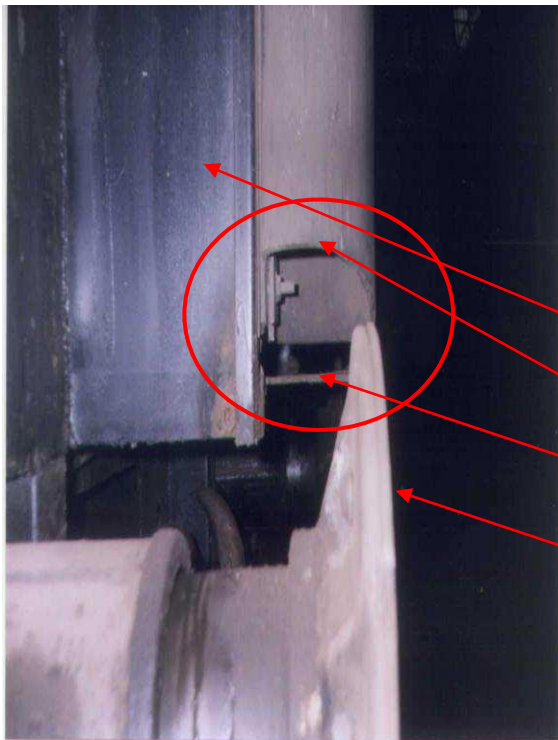


Figure - 1.6 Rubber flange clear of buffer and foot plate as per drg. no. RDSO SKETCH - 99056.

At encircled area, the lateral side flange is fixed above the buffer plunger and foot plate.

Steel frame

Lateral side flange

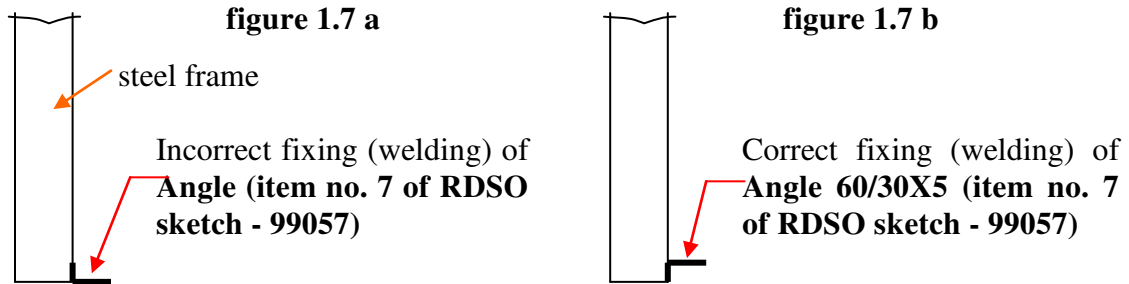
Foot plate

Buffer plunger

Old stock of rubber flanges can be modified as per the latest drawing.

106 FITMENT OF SUPPORT BRACKET FOR FOOT PLATE

It is observed that in some of ICF coaches the Support bracket (angle) for foot plate are not fitted as per drawing. Due to this when a ICF coach is coupled with RCF coach in the rake /train, there is a gap of about 40 mm between the foot plates. During POH in such ICF coaches the support brackets should be replaced in correct position. (Ref. **Figure - 1.7a & b**)



107 FOOT PLATE

Foot plate to RDSO sketch-88059 alt. 5 (item No.9) should only be fitted by ICF and RCF. ICF should stop using drawing no. ICF/SK-2-5-066 alt.f to manufacture foot plates to maintain interchangeability. This will save relocation of holding device by 35 mm in vertical direction and 70 mm in horizontal direction on either side which is to be done at present for changing footplates manufactured to ICF/Sk-2-5-066 alt.f (kindly see figure 1.8 and figure 1.9)

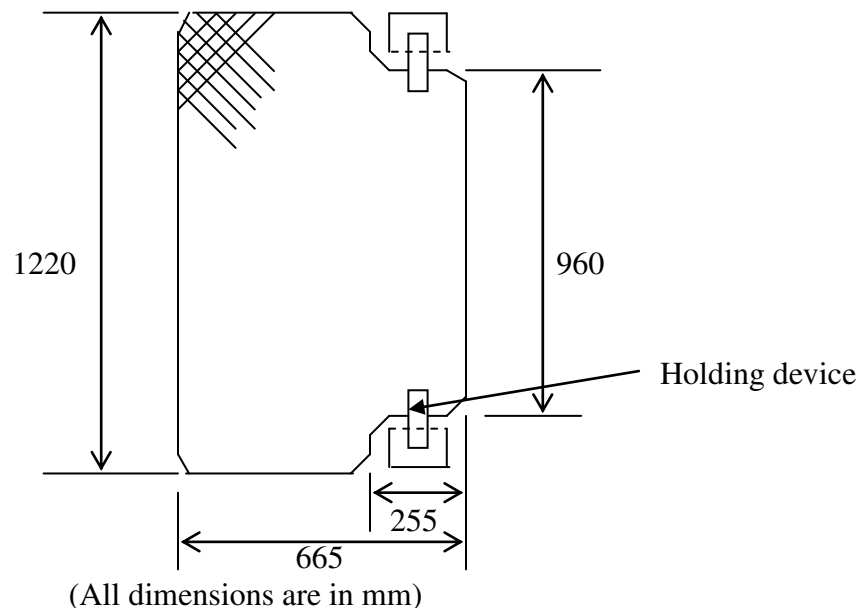


Figure - (1.8) Sketch of foot plate (item 9) to drawing no. RDSO sketch - 88059 alt. 5 and RDSO sketch - 99057 showing the overall dimensions. This foot plate is manufactured and fitted in the shop during POH to replace the damaged foot plates.

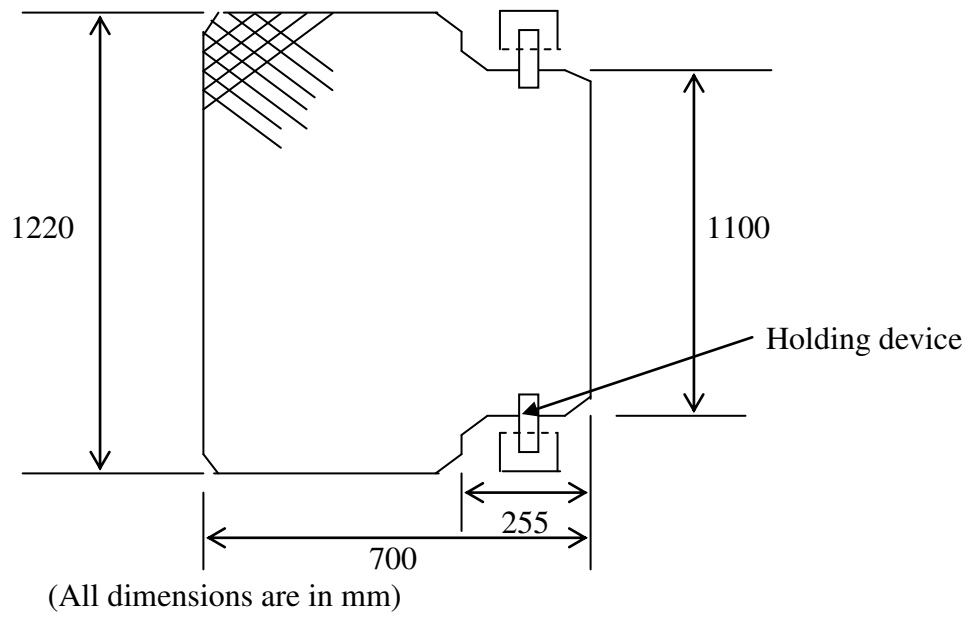


Figure - (1.9) Sketch of foot plate drawing no. ICF/SK-2-5-066 alt. f, showing the overall dimensions. This foot plate has larger overall dimensions.

CHAPTER 2

INSPECTION AND MAINTENANCE IN POH

201 PRE INSPECTION

When the coaches are received for POH, UIC vestibule should be thoroughly inspected visually for dimensional deformation and surface defects such as damages, bent, welding cracks, cuts/torn, wear, broken/missing, etc.

The detailed instructions for inspection and maintenance of individual assembly and component are given in following paragraphs.

202 STEEL FRAME COMPLETE (Ref. Drg. NO. RDSO Sketch - 99056 & 99057)

- i) Check the steel frame for deformation and welding crack or corrosion. Deformed frame should be straightened by heating. (Ref. Figure - 2.1)

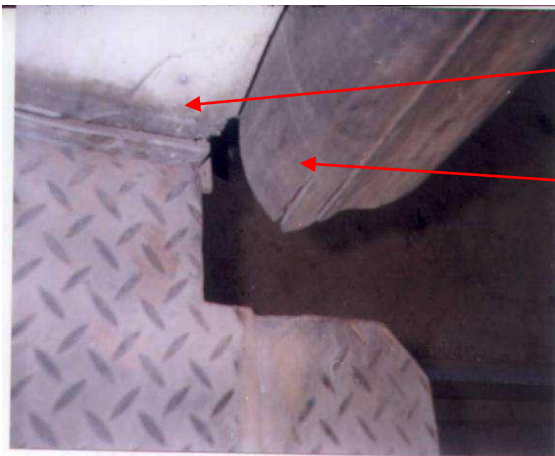


Figure - 2.1

- a) Steel frame bent out side
(Foot plate is not resting completely on support bracket)
- b) Torn flange at bottom.

- ii) Check visually the mounting screws and hexagonal nuts, locking plates and rubber packing for fixing the rubber flanges. Tighten the hexagonal nuts if found loose or missing.
- iii) Visually check the LP sheet if provided on the frame. Wash and clean the LP sheet. Replace if found broken or cracked.
- iv) Examine the support bracket (Angle) for foot plate. Remove scale or rust. Straighten the deformed support bracket. See that the foot plate is resting evenly on both the brackets. (Ref. Figure - 2.2)

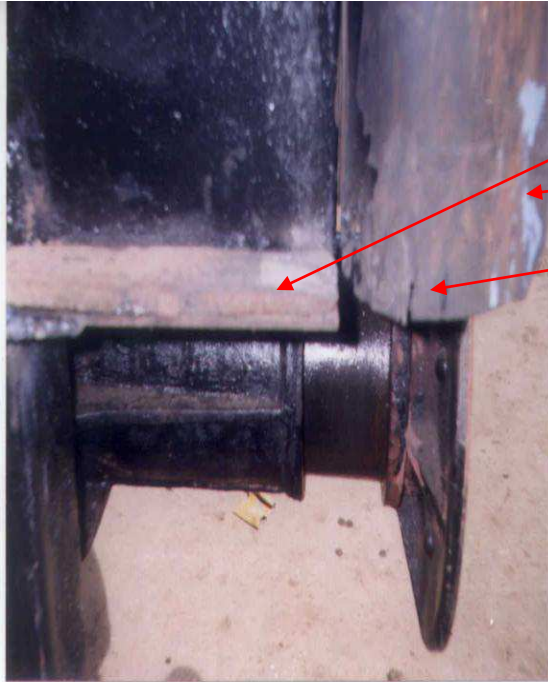


Figure - 2.2

- a) Support bracket (Angle) without rubber sheet.
- b) Worn out drainage channel
- c) Damaged rubber flange at bottom

- v) Refix the loose rubber seat 10X60X460 with neoprene adhesive Dunlop S 758 or Fevicol SR-998 on the support brackets. If the rubber seat is missing or perished, prepare new rubber seat 10X60X460 from condemned rubber vestibule and fix on support brackets with neoprene adhesive Dunlop S 758 or Fevicol SR-998.
- vi) After attending all the repairs apply two coats of anti-corrosive paint.

203 UPPER FLANGE AND LATERAL SIDE FLANGES (Ref. Drg. RDSO Sketch - 85248)

- i) The rubber flanges should be checked in every POH for wear, torn. Replace the rubber flanges if found defective. **(Ref. Figure - 1.2, 2.1, 2.2, 2.3, 2.4, 2.5 and Table - 2.1 & 2.2)**
- ii) The drainage channels detach from rubber flanges. Refix the same with neoprene adhesive like Dunlop S-758 or Fevicol SR-998. It has been observed that the drainage channels are found either broken, worn out, detached or missing in almost all the coaches received for POH. **(Ref. Figure - 2.3, 2.4, 2.5)** It is not possible to refix or join drainage channel with lateral side flange and so its purpose is not served. Either the fixing or joining method or material quality has to be revised by RDSO.

Table 2.1

Percentage of defects noticed in Lateral side flange				
Coaches inspected	Rubber drainage channel disjointed, worn, missing (1)	Rubber cracked at bottom (2)	Rubber worn, pitting, cracked at other areas (3)	Rubber perished (4)
39	38	28	11	4
	97.40%	71.70%	28.20%	10.20%

Figure - 2.3

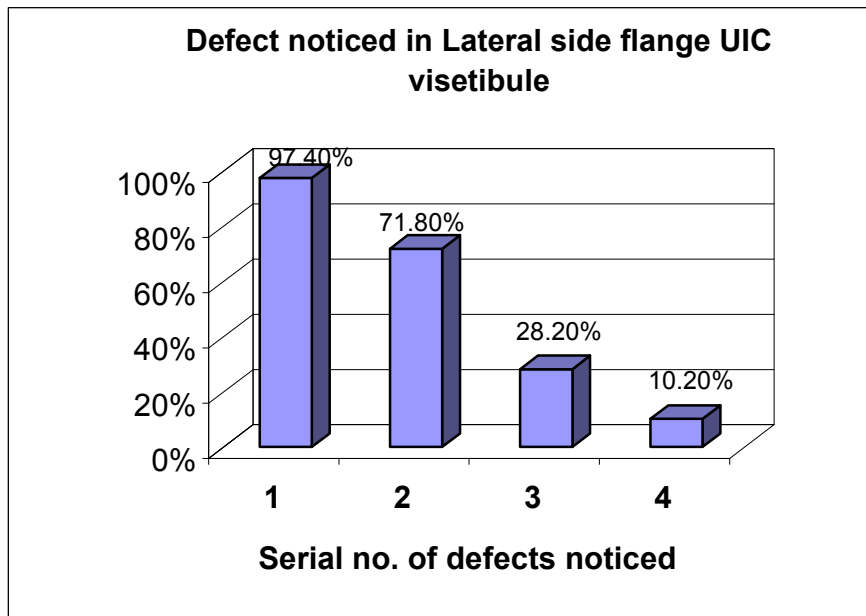


Table - 2.2

Percentage of defects noticed in Upper flange			
Coaches inspected	Rubber drainage channel disjointed, worn, missing (1)	Rubber worn, pitting, cracked at other areas (2)	Rubber perished (3)
39	35	15	3
	81.70%	38.50%	7.61%

Figure - 2.4

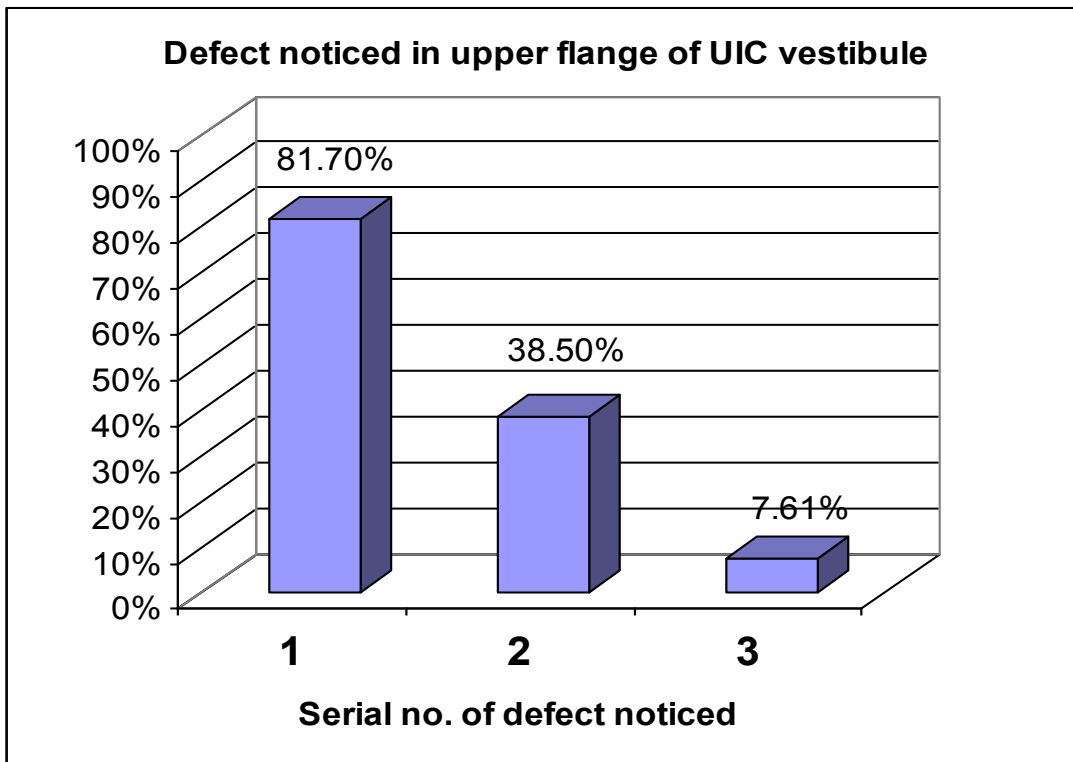
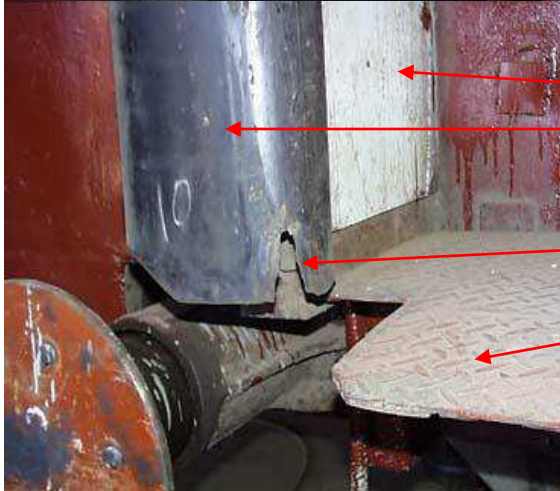




Figure - 2.5

- Worn lateral side flange
- Drainage channel is good condition
- Bent foot plate



- LP sheet to be cleaned
- Drainage flange is missing from lateral flange
- Lateral flange cut at bottom
- New Foot plate



- Torn lateral flange
- Drainage channel is also missing



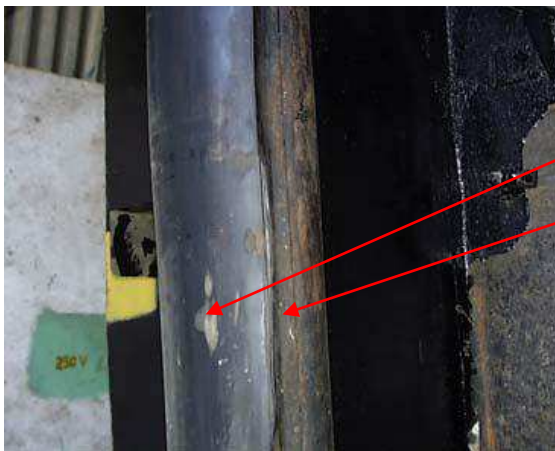
Figure - 2.6

a) Peeled rubber flange - defective rubber



Compressed lateral side flange

Drainage channel in good condition



Worn out lateral flange

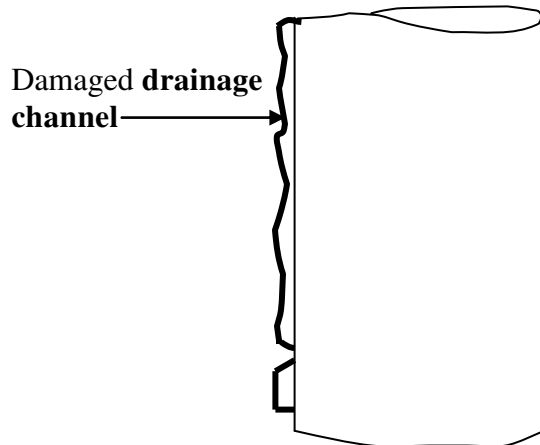
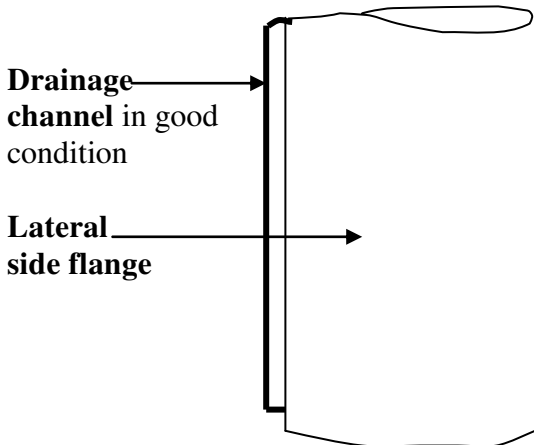
Worn out drainage channel



Figure - 2.7

- a) Peeled rubber flange - defective rubber
- b) Displaced drainage channel

Worn out drainage channel



- iii) If the rubber flanges are found torn or cracked up to 300 mm the following repair method should be employed to prevent further propagation of the cut.

Method : Use of Rubber patch (ref. Figure - 2.8a & b)

- Clean the torn or cracked spot/area on rubber flanges with an emery paper.
- Prepare a rubber patch from the condemned UIC vestibule according to size of the damage spot/area.
- Apply rubber solution ("Dunlop S-758 or Fevicol SR-998) on the cleaned surfaces. Do not allow the adhesive to form small deposits. These will trap solvent and cause pockets during adhesion.
- Allow the solution to become touch dry before fixing together.
- Fix the rubber patch on the damaged spot/area using back support and wooden mallet to prevent entrapment of air between mating surfaces. Allow complete dry before use.

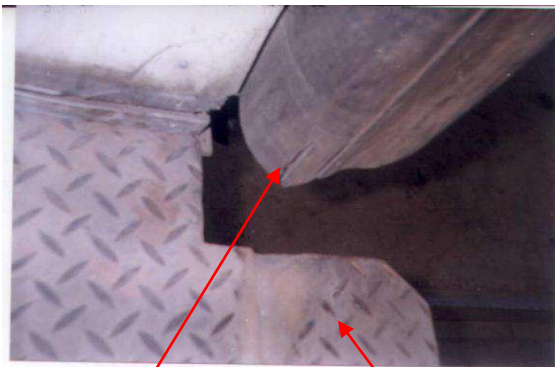


Figure - 2.8a
a) Torn flange

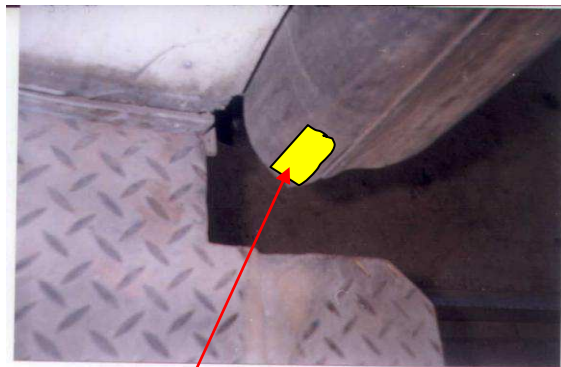


Figure - 2.8b
Rubber patch

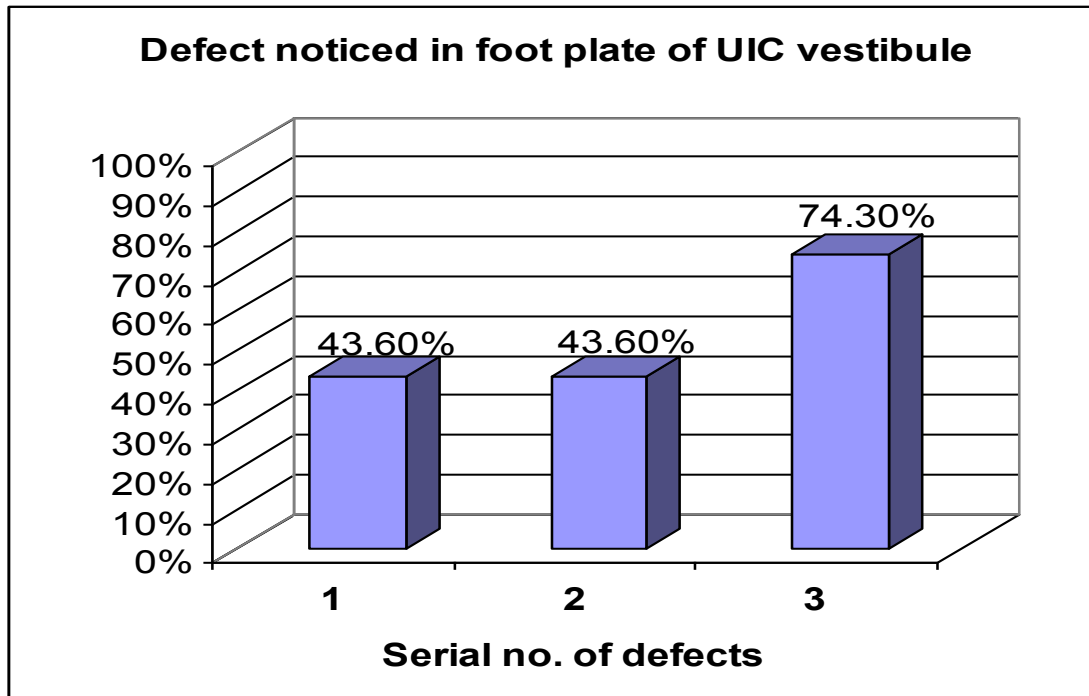
204 FOOT PLATE**(Ref. Drg. RDSO Sketch- 99057)**

- i) Check foot plate for wear, damaged, bent or crack. Replace the heavily damaged, worn out or missing foot plate. **(Ref. Table - 2.3)**
- ii) Clean the foot plate with wire brush to remove the mud, muck, etc. Smoothen sharp corners or edges from the foot plate by hand grinder.
- iii) Small cracks can be welded with electrode size 5mm in down hand welding. Grind the weld to smoothen the surface.
- iv) Bring back to shape the bent foot plate by heating and hammering. If not possible send the bent foot plates to smithy shop for shaping as per drawing
- v) Check the holding device for proper functioning. Replace if found defective.
- vi) Check visually the wearing piece on foot plate. Replace if found broken, worn out or missing.
- vii) Check the stiffeners on foot plate for worn out, broken welding crack, etc. Replace or repair the same.
- viii) Check the foot plate mounting pins for worn out. Replace if the pins are worn out more than 1 mm.
- ix) Replace the holding brackets if found worn out more than 1 mm at holes. Shop should relocate the holding brackets according to foot plates of different drawings (refer **fig. 1.8 & 1.9**)
- x) Replace the split pins invariably at every POH.
- xi) Tack weld the washer on pin as an APD.
- xii) After attending all the repairs, apply two coats of anti corrosive paint.

Table - 2.3

Percentage of defects noticed in Foot plate			
Coaches inspected	Foot plate bend (1)	Wearing piece worn, missing (2)	Rubber packing missing (3)
39	17 coaches	17 coaches	29 coaches
	43.60%	43.60%	74.30%

Figure - 2.9



205 CONNECTING COMPONENTS (Ref. drg. ICF/SK-2-5-078)

- i) Check the bracket assembly and connecting component (if provided) for coupling the UIC vestibule with conventional vestibule for damages or missing components.

206 VESTIBULE DOORS

It should be ensured that the locking arrangements for the sliding doors/ flap doors/ rolling shutters are provided and are in working order.

207 ROLLING SHUTTERS FOR UIC VESTIBULE

- i) Check the rolling shutters for easy rolling up and down.
- ii) Check the bottom lock plate and sliding bolt for proper fitment, if damaged attend the same.
- iii) Check guide channel and curtain for any damage, if any damage is noticed attend the same.
- iv) Check stoppers for proper condition, attend the same and repair/rectify if damaged or broken.
- v) Grease the guide channels and springs for ease of operation.
- vi) Clean the rolling shutters to remove dust, dirt, etc.

- vii) The arrangement for pad locking of shutters when not in use should be ensured.
- viii) After attending all repair, apply two coats of anti corrosive paint.
- ix) Give final coat of silver paint.

208 **SLIDING DOORS FOR UIC VESTIBULE**

- i) Check the sliding door for smooth operation.
- ii) Check the bottom rails if damaged and attend the same to rectify.
- iii) Check the top rail and wheels for any damage, attend the same if damaged.
- iv) Grease the top rail and wheels for smooth operation of the sliding doors.
- v) Ensure that the locking latches of the sliding door are in correct position. If damaged or broken replace the same.
- vi) While replacing the LP sheet in the toilet where the sliding door pocket is located. It should be ensured that the length of the screws for LP sheet do not obstruct the sliding movement of the door.
- x) Provide a pad lock arrangement to prevent the opening of sliding door when vestibule passage is not in use.

209 **TOOLS, PLANTS & CONASUMABLES**

i) **Fitting tools**

- Welding machine
- Oxy-acetylene gas plant
- Ball peen hammer
- Chisel
- 12" & 6" screw driver
- Metal cutting scissors
- Hand grinder

ii) **Rubber patching tools**

- 12"Knife
- Brush for applying rubber solution
- Spanner for M10 screws and hexagonal nut
- Wooden mallet
- Wooden support

iii) **Consumables**

- 5 mm welding electrode
- Neoprene adhesive of Dunlop S-758 or Fevicol SR-998.

CHAPTER 3

EXAMINATION AND REPAIR PRACTICE IN CARRIAGE MAINTENANCE DEPOT

301 PRIMARY/SECONDARY EXAMINATION, SCHEDULE A & B EXAMINATION'

- i) Check visually the UIC type rubber vestibule arrangement for proper condition and functioning of rubber flanges, foot plate arrangement and steel frame.
- ii) Check visually the foot plate holding brackets and pins, for worn out, broken or welding crack or missing.
- iii) Check holding device for proper working, damages, etc.
- iv) Always ensure that the unused vestibule foot plate is held at holding device.
- v) Examine visually rolling shutters/sliding doors of vestibule for smooth working.
- vi) It should be ensured that the locking arrangements for the sliding doors/ flap doors/ rolling shutters are provided and are in working order.
- vii) Provide pad locks on sliding doors/ flap doors/ rolling shutters when the vestibule is not in use.

302 SCHEDULE 'C' EXAMINATION

- i) Carry out all the examination as above para 301.
- ii) Grease all moving and sliding parts of UIC vestibule arrangement.
- iii) Do APD of vestibule foot plate mounting pins
- iv) Refix the detached rubber drainage channel with neoprene adhesive Dunlop S-758 or Fevicol SR-998.
- v) Fix rubber patch on small punctures of rubber flanges

**303 USABLE LIFE FOR DIFFERENT COMPONENTS UIC VESTIBULE
(Ref. annexure 1)**

S.No.	Description of items	Reasons for rejections
1.	All steel items like steel frame complete, locking plates for fitment of rubber flanges on frame, foot plate arrangement complete	Condition basis like heavily damaged, corroded, worn out or deformed beyond repairs.
2.	All fasteners like special screws, hex. nut M10, CSK head screws M10	Condition basis like threads worn out, damaged, or corroded.
3.	Rubber items like upper flange, lateral side flanges, rubber packings	Condition basis like Cuts, worn out, pitting, piercing, perishing.

Annexure - 1

**UIC VESTIBULE FAILURES IN COACHES CAME FOR POH IN LOWER
PAREL WORKSHOP
SAMPLE DATA RECORDED FROM 22.2.01 TO 24.2.01**

		Type of defects noticed		Type of defects noticed		
		1) Rubber drainage channel disjointed, worn, missing 2) rubber cracked at bottom 3) rubber worn, pitting, cracked at other areas 4) Rubber perished		Foot plate assembly 1) Foot plate bend 2) Wearing piece worn, missing 3) Rubber packing missing on foot plate		
		Locations		Locations		
S.No.	Coach no.	Lateral side rubber flange	Upper rubber flange	Foot plate	Wearing piece	rubber pad missing
1	2959	1,2	1,3	OK	2	4
2	6567	1,2	1	OK	OK	OK
3	7135 A	1,2,3	OK	OK	OK	4
4	7137	1,2,3,4	1,3	1	2	4
5	7162	1,2,	OK	OK	OK	4
6	7279	1,2	1,3	OK	2	4
7	7703	1,2	1,3	1	2	OK
8	7712	1,2,3	1	1	2	OK
9	7751	1	1	Removed for headstock corrosion repair		4
10	7804	1,2,3	1,3	1	2	OK
11	79013A	1	1	OK	2	4
12	87236	1	1	1	2	OK
13	88002A	1,2	1	1	OK	4
14	89220A	1,2,	1	OK	OK	4
15	89240A	1,2	1,3	1	2	4
16	89463A	1,2,3	1,3,4	OK	OK	4
17	90084A	1,2	1	1	2	OK
18	90206A	1,2	1,3	1	2	4
19	91178	1	1	1	OK	4
20	91248A	1,2	1,4	OK	2	4
21	91288A	1	1	OK	OK	4
22	92414	1,2	1,3	1	OK	4
23	93004A	1,	1	OK	2	4
24	93456A	1,2,3	1,3	1	2	4
25	94129A	1	1	OK	OK	4
26	94177A	1,2	1	1	OK	4
27	94178	1,2,3	1,3,4	1	2	4

		Type of defects noticed		Type of defects noticed		
		1) Rubber drainage channel disjointed, worn, missing 2) rubber cracked at bottom 3) rubber worn, pitting, cracked at other areas 4) Rubber perished		Foot plate assembly 1) Foot plate bend 2) Wearing piece worn, missing 3) Rubber packing missing on foot plate		
		Locations		Locations		
S.No.	Coach no.	Lateral side rubber flange	Upper rubber flange	Foot plate	Wearing piece	rubber pad missing
28	96060A	1	1	OK	OK	4
29	97108A	1,2,4	1,3	OK	OK	4
30	97113A	1	1	OK	OK	4
31	98151	1,2,3,4	1	OK	OK	OK
32	98153A	1,2	1	OK	OK	4
33	98618A	1,2,	OK	OK	OK	4
34	98623A	1,2,3	OK	OK	OK	OK
35	98624A	1,2	1,3	OK	OK	OK
36	98625A	1,3	1,3	1	2	OK
37	98629A	1,2,3	1,3	OK	OK	4
38	98801A	4	1	1	2	4
39	98852A	1,2,	1	1	OK	4
