

**GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
(RAILWAY BOARD)**

**INSTRUCTIONS FOR MAINTENANCE AND OPERATION
OF BOGIE PETROL TANK WAGON TYPE 'BTPN'**

Amendment No. 1 of January, 1993

Amendment No. 2 of August, 1998

Amendment No. 3 of December, 2007

Amendment No. 4 of July, 2012

Amendment No 5 of December, 2015

Amendment No 6 of October, 2016

**ISSUED BY
RESEARCH DESIGNS & STANDARDS ORGANISATION
MINISTRY OF RAILWAYS
LUCKNOW-226011**

November, 1991

Rs.-

Amendment No. 6 of October, 2016 applicable to RDSO technical Pamphlet No. G-90 of November, 1991 (Instruction for Maintenance and Operation of Bogie Petrol Tank Wagon Type BTPN).

1. Clause No 3.8 modified and shall be read as under-

“The leaky/unloadable wagons noticed by oil companies/refineries, during unloading/decanting at unloading points, shall be marked on to the wagon by paint by oil companies and also communicated to Railway Train examination staff at the nearest yard. The train examination staff of nearest yard will book the wagon at nominated workshop for proper repair of the wagon.”

Amendment No. 5 of December, 2015 applicable to RDSO technical Pamphlet No. G-90 of November, 1991 (Instruction for Maintenance and Operation of Bogie Petrol Tank Wagon Type BTPN).

1. Clause No 3.8 added and shall be read as-

“The leaky/unloadable wagons noticed by oil companies/refineries, during unloading/decanting at unloading points, shall be marked on to the wagon by paint by oil companies and also communicated to Railway Train examination staff at the nearest yard and the train examination staff will remove the stencil after proper repair of the wagon.”

Amendment No. 4 of July, 2012 applicable to RDSO technical Pamphlet No. G-90 of November, 1991 (Instruction for Maintenance and Operation of Bogie Petrol Tank Wagon Type BTPN).

To prevent possible fire risks due to electrical tracking through OHE, clauses 4.11.1, 4.11.2 and 5.12 added and be read as follows-

- 4.11.1 Oil companies/ loading parties shall switch over to non-metallic sealing wires for dome covers progressively. The cutoff date for 100% switchover shall be 30th October, 2012.
- 4.11.2 Till such time the switchover to non-metallic sealing wires does not materialize, the Oil companies/ loading parties shall ensure that the metallic sealing wires are wound taut and the loose/ uncut length of the sealing wires does not project more than 1 inch (25 mm) vertically from the centre of the hole provided in eye bolts for sealing. Loose winding of sealing wires all around the Dome Cover is strictly prohibited.
- 5.12 Used sealing wires shall be removed completely from the Dome Cover and shall not be left on the wagon Body/ Barrel.

Amendment No. 3 of December, 2007 applicable to RDSO Technical Pamphlet No. G-90 of November, 1991.

1. Clause No. 10.1.1. (iii) (b) deleted.

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**Amendment No. 1 of August 1998 to Technical Pamphlet No.G-90,
Nov.'91 (Instructions for Maintenance and Operation of Bogie Petrol Tank
Wagon Type BTPN)**

1. The following may be added to para 10.1.3 on page 17.

" Large no. of cases of crack have been noticed on the Anchoring Tee joint and these have been gradually progressing to the barrel. These should be attended as per the procedure given in Annexure-I"

Annexure-I as given in the enclosed 8 pages shall form page 22 to page 27 of G-90, Nov.'91.

2. Para 10.1.1 shall be modified as follows:

" After condensation of steam 0.2% to 0.3 % sodium Nitrate as per IS: 879-81 may be added to the condensate to act as corrosion inhibitor.

Condensed steam collected at the bottom shall be removed at the earliest and the barrel kept exposed to atmosphere for 24 hours."

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PROCEDURE FOR REPAIR OF BARREL/ANCHORING TEE CRACKS

The following are the guide lines for repair of cracks originating from the anchoring Tee web along the welded joint. The following five cases may arise.

Case No. 1 : If there is no crack.

Case No. 2 : If the crack is only in the web of the Anchoring Tee.

Case No. 3 : If the crack has propagated to the flange.

Case No. 4 : If the crack has propagated to the outer surface of the barrel plate.

Case No. 5 : If the crack has propagated to the full depth of barrel plate.

1. Case No. 1 If there is no crack (Fig.1).

- 1.1 Drill a 10mm dia arrester hole at the end of the welded joint of the web adjacent to the flange.
- 1.2 Remove 2nd and 3rd rivet and weld a patch plate all round as indicated in Fig.1 and secure it with nut and bolt.

2. Case No.2 If crack has appeared only in the web of Anchoring Tee (Fig.2).

- 2.1 Perform operation 1.1
- 2.2 Gouge the welded joint of the web to the full depth.
- 2.3 Grind the area and clean the adjacent flange portion also and perform D.P. Test to check that the crack has been fully gouged and it has not propagated beyond the arrester hole.

- 2.4 Fill the groove with specified electrode.

{Through out the procedure of repair, electrodes having RDSO approval in C2 & D1 type with low hydrogen (less than 5ml/100 gm or H3 type) shall be used.}

- 2.5 Perform DP test of the welded area after flush ground.

3 Case No. 3 If the crack has propagated to the flange (Fig.3).

- 3.1 Cut out a semi circular cavity in the web plate with the help of pneumatic chisel at the location of flange joint, just sufficient to make easy access of the gouging chisel & electrode.
- 3.2 Gouge the flange and web along the crack to the full depth.
- 3.3 Grind clean and perform DP Test to ascertain that the crack has not propagated to the barrel plate. If crack has propagated to the barrel also, proceed as in Case No.4.
- 3.4 Fill the groove in the flange with weld.
- 3.5 Fill the groove in the web with weld.
- 3.6 Perform DP Test after flush grinding.
- 3.7 Perform operation 1.1

4 Case No.4 If the crack has propagated to the outer surface of the barrel plate (Fig.4).

- 4.1 Perform steps 3.1 & 3.2.
- 4.2 Grind clean and perform the DP test, both from inside and outside the affected area to check the extent of propagation of crack.

- 4.3 If the crack has not propagated to the full depth of the barrel plate, gouge the crack in the barrel also from the outsides. Before gouging the barrel crack, make an arrester blind hole at the end of crack to arrest its further progression during gouging. Perform DP test and then weld (root run) the barrel plate with 3.15mm dia electrode. Perform DP test after root run. Weld the groove with 4mm. dia electrode.
- 4.4 Flush ground the welded portion of the barrel from the outside and perform DP test along the barrel & flange.
- 4.5 Perform radiography of barrel plate weld and hydraulic test.
- 4.6 Perform operation 3.4 & 3.7.

5 Case No. 5 : If the crack has propagated to the full depth of the barrel plate.(Fig.4.)

- 5.1 After performing steps 4.1 & 4.2 if the crack is found to have propagated inside the barrel proceed as under:
- 5.2 Once the crack is located, gouging should be carried out from inside along the crack. While gouging through and through, care should be taken to keep the gap as small as possible. Here, gouging should preferably be carried out with a Pneumatic chisel. Before gouging two arrester holes should be drilled at both ends of crack.
- 5.3 The gouged area shall be cleaned properly and welding root run with 2.5mm/3.15mm dia electrode should be given from inside. Back plate, if necessary should be provided from outside along the barrel.
- 5.4 After root run, the weld deposit should be ground and DP tested to ensure crack free deposit.
- 5.5 Fill up the weld with 4.00mm dia. electrode.
- 5.6 Conduct DP test from inside after flush grinding. If crack is found in any DP test regouge and refill. Remove back plate (if provided).

- 57 Gouge the root run from outside till sound metal appears.
- 58 Clean the area properly and fill up with 4.00mm dia. electrode.
- 59 Conduct DP test from outside and flush ground the welding along the barrel. Fill up the gouged area of flange with 4.00mm dia. electrode.
- 510 Flush grind along the flange and conduct DP.
- 511 Perform steps 4.5 & 4.6.
- 512 In case of multiple cracks suitable inserts may be used to facilitate easier welding. Patch plate of adequate size and contour to cover the entire welding crack from inside the barrel may be provided with inserts or otherwise as felt necessary.

GENERAL INSTRUCTIONS FOR WELDING

- 1 For repair by welding use electrode of any good manufacturer with RDSO approval in C2 & D1 class with low hydrogen (less than 5ml/100 gm or H3 class) shall be used.
- 2 Bake the electrode at 350 degree C - 400 degree C for one hour min. or as instructed by the manufacturer.
- 3 Use 2.5 mm/ 3.15mm dia. for root run and 4.00mm for filling.
- 4 As far as possible use flat down hand , horizontal and vertical up welding.
- 5 In case of long welding, use staggered welding to avoid warping.
- 6 The electrodes should not be too old. In any case electrodes manufactured more than 12 months before shall not be used.
7. For gouging , pneumatic chiseling should be used. Alternatively gouging electrodes of RDSO approved brand in class N2 can be used.

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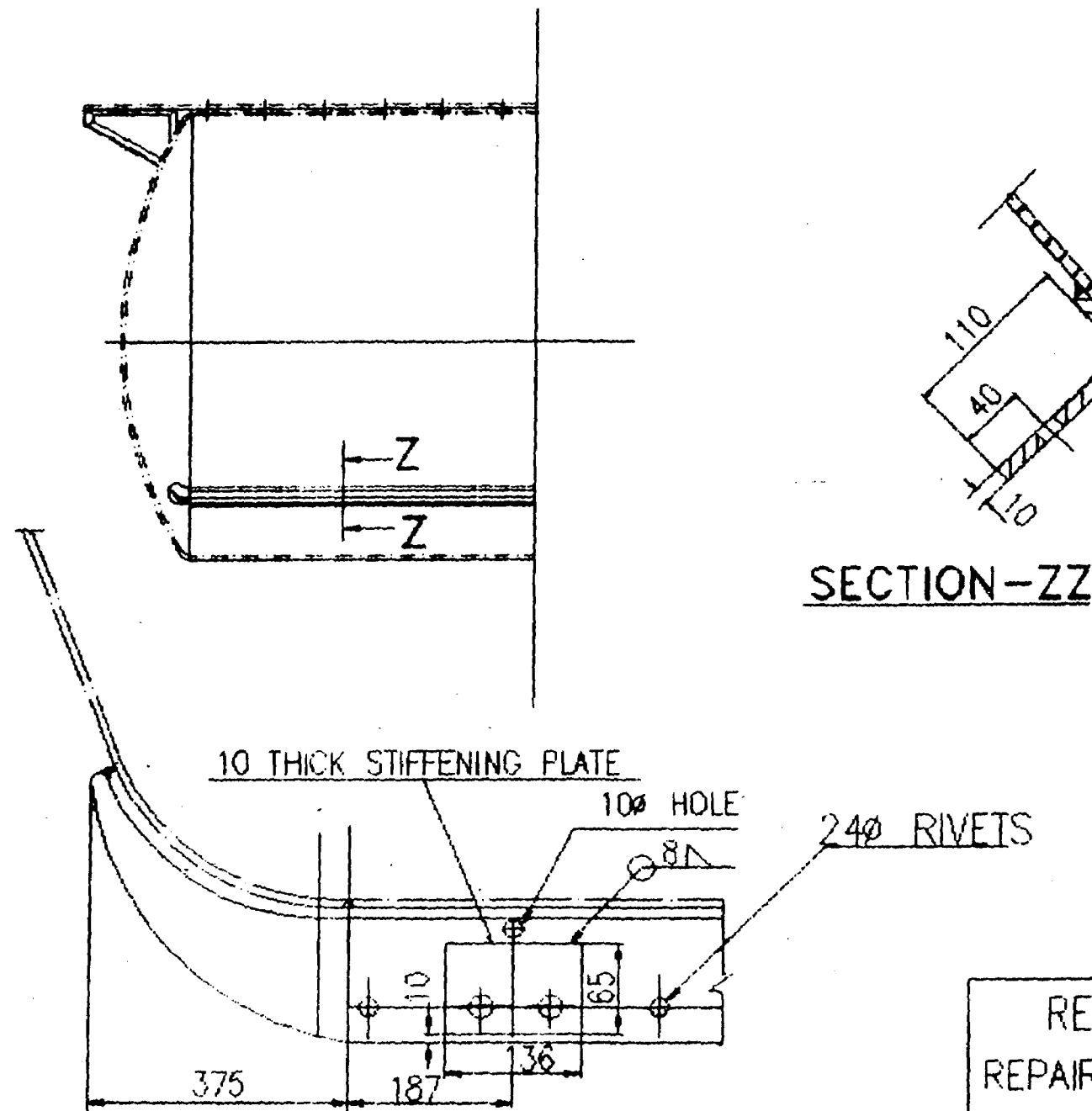
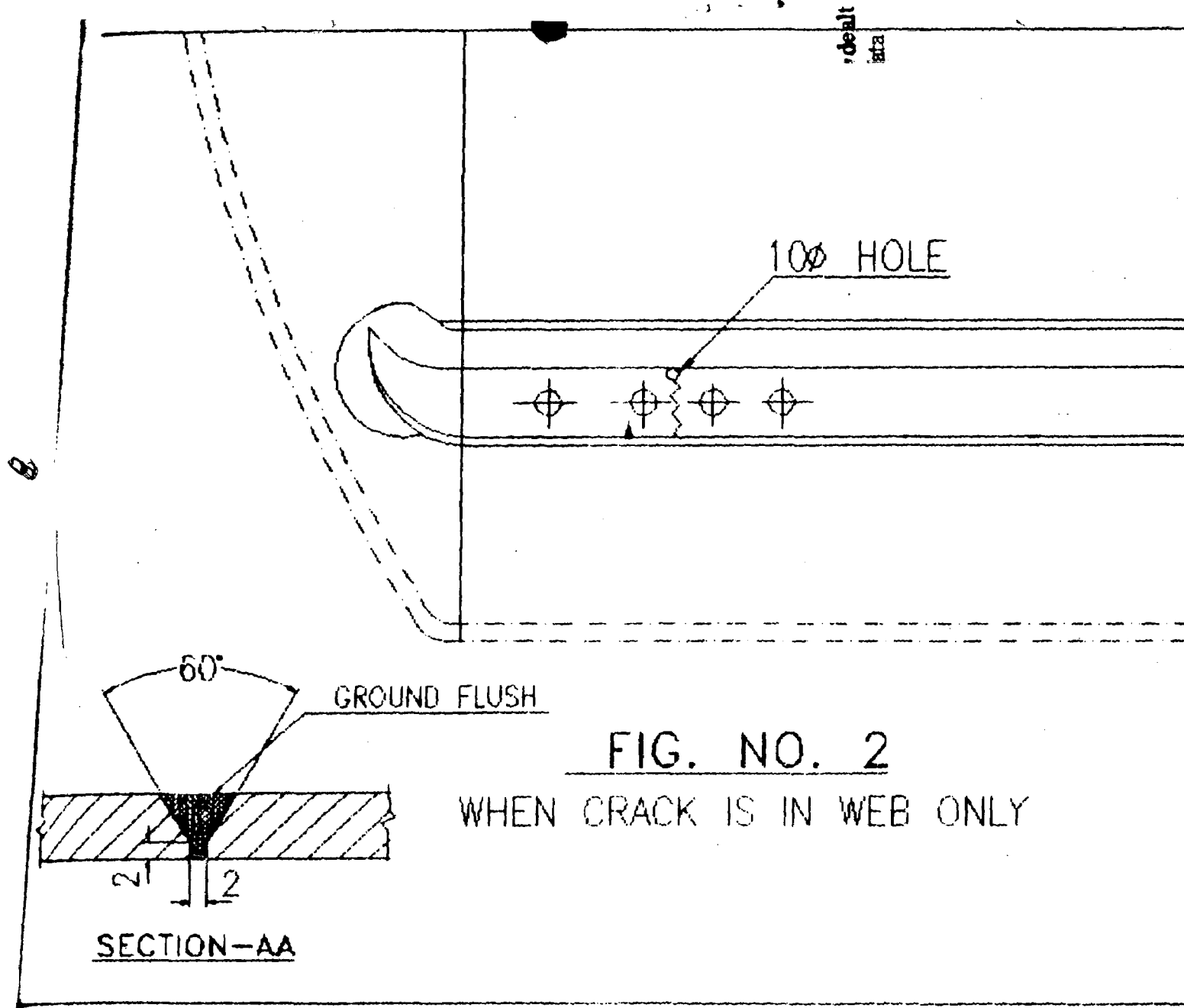


FIG. NO. 1
WHEN THERE IS NO CRACK.

REFERENCE
REPAIR PROCEDURE
FOR CRACK IN BARREL

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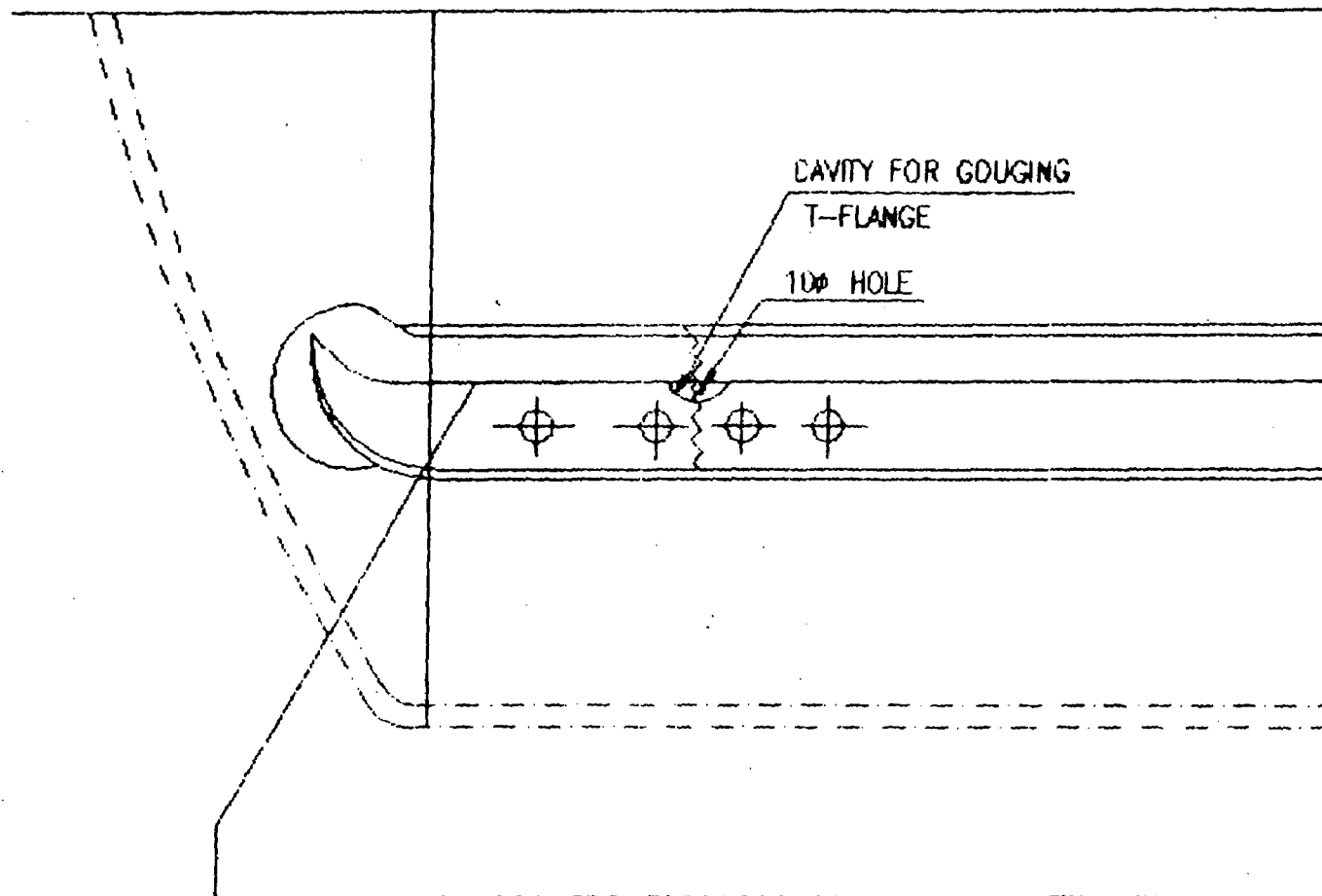


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REFERENCE
REPAIR PROCEDURE
FOR CRACK IN BARREL

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FIG. NO. 3

WHEN CRACK IS IN THE WEB AND FLANGE OF THE TEE.

REFERENCE
REPAIR PROCEDURE
FOR CRACK IN BARREL

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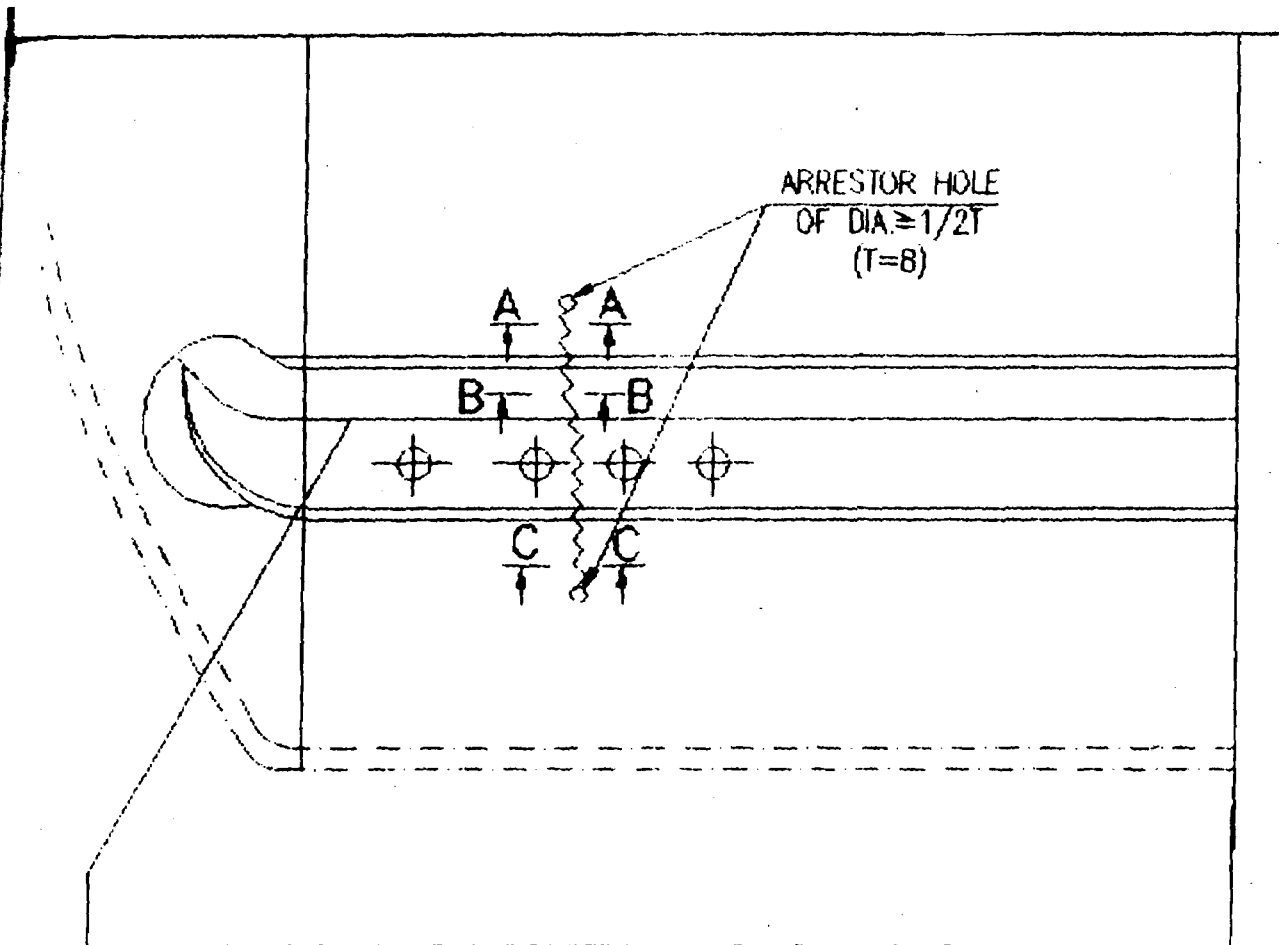
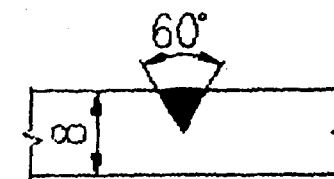


FIG. NO. 4

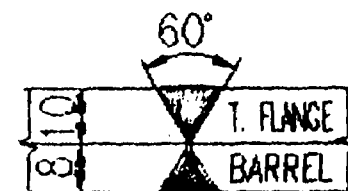
WHEN CRACK IS IN BARREL PLATE ALSO.



SECTION-CC
(CASE NO. 5)



SECTION-AA
(CASE NO. 4)



SECTION-BB
(CASE NO. 5)

REFERENCE
REPAIR PROCEDURE
FOR CRACK IN BARREL

WD-98026S01

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Corrigendum No.1 of January 1993 to the Technical Pamphlet No. G-90 Instructions for Maintenance and Operation of Bogie Petrol Tank Wagon Type 'BTPN'

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1. Sub Para-7(ii)

The Sub Para shall be revised as under:

- " The Routine Overhaul(ROH) at intervals of 18 months(3 ROH schedules between successive POHs)"**


(J. P. Singh)
for Director General/Wagon

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PREFACE

This manual contains instructions for operation and maintenance of Bogie Petrol Tank Wagon type "BTPN". The design of this wagon has been developed by RDSO and the wagons have been put into service over Indian Railways towards the end of 1989. This manual has been prepared based on the design considerations and other information available with this office. The manual is therefore, likely to be revised on the basis of the experience gained and data collected after the wagons have been in service.

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CONTENTS

Clause No	Description	Page
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GENERAL (SECTION-I)

1. Scope
2. Leading Particulars & Other details.

OPERATION-(SECTION-II)

3. Procedure for loading/unloading.
4. Precautions to be taken at loading points
5. Precautions to be taken at unloading points
6. Precautions to be observed during shunting & Marshalling.

MAINTENANCE-(SECTION-III)

7. Maintenance Schedules.
8. Trip Examination.
9. Routine Overhaul (ROH)
10. Periodic Overhaul (POH)

ANNEXURES

Diagram of wagon (Fig.1)

Diagram of Safety Valve WA/TF-87 (Fig-2)

Drg.of Vapour Extraction Cock-WA/TF-2116 (Fig.3)

List of design modifications notified so far

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GENERAL - (SECTION-1)

1. SCOPE

These instructions for operation and maintenance apply only to Bogie Tank Wagon type BTPN to RDSO Drawing No. WD-86081-S-51 (see Fig.1 for diagram) .

2. LEADING PARTICULARS

2.1 GENERAL

.1 Length over couplers	.. 12420mm
.2 Maximum width	.. 3126mm
.3 Overall height	.. 4265mm
.4 Tare weight	.. 27.0t
.5 Carrying capacity	.. 54.28t
.6 Gross load	.. 81.28t
.7 Axle load	.. 20.32t
.8 Gauge	.. 1676mm

2.2 UNDERFRAME

The design of underframe of the tank wagon consists of two longitudinals and two solebars which form the underframe with different cross members. The body bolster is a fabricated box section which support the saddle on the top of underframe and hold the bottom pivot underneath. While the Central longitudes and solebar take up the most longitudinal loads, the vertical load is borne by the underframe bolster which is supported over the pivots. The brake equipments like brake cylinder, distributor valve and other valves and cocks are mounted beneath the underframe. The underframe is manufactured from Structural Steel to IS:226 Fe 410Cus. The complete underframe has been fabricated by welding of these members to form a rigid structure. Dimensional details of underframe are as under:-

.1 Length over headstock	.. 11491mm
.2 Bogie Centres	.. 8391mm
.3 Coupling Arrangement	.. Standard CBC
.4 Method of anchoring barrel with underframe	.. rivetting.

2.3 Tank Barrel

The barrel is a cylindrical vessel fabricated out of Carbon structural steel to IS:2062 Fe 410 Cu WA by welding. The dished end has been pressed out of steel to IS:3747 (killed quality) and then

** .5 Dip rod pipe with flap or plug : 25mm dia pipe
.6 Bottom discharge valve : 100mm lubricated tapered plug valve.

**Initially manufactured wagons were provided with nut later on the nut type arrangement was changed to flap type arrangement. Some wagons are with this flap cover, however, latest arrangement is with a plug.

2.4.1 Safety Valve: It is a spring loaded valve which gets lifted when the pressure inside the barrel exceeds certain predetermined value. The valve is set at a release pressure of 1.4 kg/Sq.Cm. One safety valve has been provided on the barrel at top near the centre.

2.4.2 Filling pipe 100mm NB filling pipe has been provided in each dome for connecting the inlet hose required during gravity filling of product at loading point. The pipe is provided with flap or cap for closing the pipe after loading. All the BTPN wagons with cap type arrangements have to be modified to flap type arrangement as per the Drg.WD-86081-S-61. The filling pipe is extended to the bottom of the barrel to avoid any flashing. Perforations are provided in the pipe to enable the entrapped air, escape from the pipe. Two numbers of filling pipes one inside each dome have been provided on the wagon.

2.4.3 Vapour Extractor Cock: Function of this cock is to extract vapour from the tank during filling. One such cock inside each dome have been provided. Suitable cap has been provided to close the cock after loading.

2.4.4 Master Valve: The master valve, 100mm size, is fitted inside the barrel at the bottom and is operated by a hand wheel provided inside the dome. A long vertical spindle connects valve with hand wheel. The spindle is guided at three locations i.e. at bottom by bronze nut, at middle by a bracket and at the top by a gland at the diaphragm plate. The handwheel is operated to discharge the contents of the barrel by gravity. Two Master Valves, one inside each dome have been provided. The lift of the valve is 35mm.

2.4.5 Dip Rod Pipe With Flap or Plug: Dip rod pipe with a flap cover or a plug has been provided to gauge, by the Dip rod, height of the commodity during filling.

2.4.6 Bottom Discharge Valve: This valve is fitted below the barrel under each Master Valve. This is a tapered lubricated plug valve. The valve is provided with wire sealing arrangement for sealing it after loading. The main function of the valve is to control the flow of the content during unloading and also to serve as an additional safety stop in case the Master Valve fails or leaks.

2.5 COUPLER

The wagon is provided with straight CBC

2.6 BRAKE

The wagon is fitted with twin pipe graduated release compressed air brake system with manual empty load change over device.

2.7 BOGIE

The wagon is provided with cast steel, secondary suspension CASNUB-22W (M) bogie to Specification No.WD13-CASNUB-22W (M).

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OPERATION (SECTION-II)

3. Procedure for loading & unloading

3.1 Before starting loading/unloading operation, it should be ensured that all necessary safety precautions including those given in para 4 and 5 of this manual are clearly understood & followed.

3.2 Before loading, the wagon must be certified fit for loading by the TXR. Instructions issued by the Railway Board/Railways from time to time in this regard should be religiously followed.

3.3 The wagons to be loaded/unloaded are placed in position preferably under shed and hand brakes are applied to prevent any movement.

3.4 It should be ensured that points leading to loading/unloading line on which the wagons are to be loaded/unloaded are set and pad locked so as to isolate the line on which the loading/unloading are to be done.

3.5 Shunting of wagons are not permitted on the same line when loading/unloading is done.

3.6 Throughout the entire period of transfer operation, the wagon must be continuously attended to by the operator.

3.7 Spillage of contents inside the dome should be avoided

4. Precautions to be taken at loading points:

4.1 Ensure that all tank fittings are in good working condition.

4.2 Ensure that the safety valve is intact and properly sealed.

4.3 Ensure that the Master valve is fluid tight.

4.4 Ensure that the bottom discharge valve is fully closed and the outlet pipes at both sides of the wagons are closed with gasket and dummy flanges at four locations before commencement of loading.

4.5 Ensure that the vapour extractor cock is open before commencement of loading.

4.6 Ensure that loading is done through filling pipe only.

4.7 Ensure that recommended "air space" as specified for particular petroleum product is provided and that payload does not exceed the permissible limit.

4.8 Remember to close the vapour extractor cock and fit the cap on it after loading.

4.9 Ensure closure of dip rod pipe flap or plug after taking necessary measurements.

4.10 Ensure to close and tighten the flap covers of filling pipe after loading.

4.11 Ensure that dome cover is closed and provide proper sealing when dome cover eye bolt nuts are tightened.

5. Precautions to be taken at Unloading Points:

5.1 Open the dummy flange and connect the unloading hose to the dummy flange. Ensure that other end of the hose is inside the storage tank. Open slowly the bottom discharge valve. Open the dome at the top. Open the cap of the vapour extractor cock and open the vapour extractor cock and then rotate the handwheel slowly to lift the Master valve for discharge.

5.2 Ensure that master valve is not opened beyond its lift of 35mm to avoid uncoupling of master valve.

5.3 Ensure closing of the Master valve after unloading.

5.4 Close the bottom discharge valve after unloading

5.5 Fit the dummy flange with gasket with all its bolts back in position after unloading.

5.6 Do not allow unauthorised persons to operate the valves.

5.7 Close the dome cover after unloading and tighten the eye bolt nuts of dome cover.

5.8 Do not allow any person to enter the tank barrel for internal examination/repairs unless the barrel has been made free of gasses/inflamables by dry air circulation or steam cleaning.

5.9 Do not undertake repairs of tank barrel by welding unless it is free from all inflamables.

5.10 Do not start welding repairs on the wagon unless the barrel is properly earthed and roller bearings are short circuited.

5.11 Do not allow the wagons to move from loading/unloading points unless the tank fittings are properly refitted and dome cover closed

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6. Precautions to be observed during shunting and marshalling

6.1 Shunting

1 Shunting of wagons containing petroleum and inflammable liquids shall not be carried out except under the superintendence of a duly authorised officer who shall ensure that during shunting operations:

- a) Wagons containing petroleum and other inflammable liquids are separated from the locomotive by not less than three carriages not containing explosives or other dangerous goods or articles of inflammable nature provided that when an electric or diesel electric is used, only one such carriage need intervene between the wagons containing petroleum and other inflammable liquids and the locomotive.
- .2 The speed of all movements does not exceed 8 kmph.
- .3 No rough, hump, fly or loose shunting takes place.

6.2 Marshalling:

- .1 There is no restriction on the number of wagons containing petroleum and other inflammable liquids which may at any one time be attached to or be transported by any one train.
- .2 Wagons containing petroleum and other inflammable liquids, which may be grouped together, should be placed as far away as practicable from the train locomotive.
- .3 Wagons containing petroleum and other inflammable liquids, shall be separated by not less than three carriages not containing explosives or other dangerous goods or articles of inflammable nature from:-
 - a) The train locomotive, provided that when an electric (traction) or diesel (electric) locomotive is used, one such carriage need intervene between the wagons containing petroleum and other inflammable liquids and the locomotive.
 - b) The passenger carriages or the brake-van, provided that when an electric (traction) or diesel (electric) locomotive is used, instead of three such carriages, only one carriage not containing explosives or other dangerous goods or article of inflammable nature may be attached between the brake-van and the last tank wagon, containing petroleum or other inflammable liquids.
 - c) Any other carriage containing explosives or other dangerous goods or articles of inflammable nature.

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- .4 Wagons containing petroleum and other inflammable liquids shall be close coupled to the adjoining carriages and to each other.

Note:- The provision relating to precautions to be observed during marshalling shall also apply to empty tank wagons.

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MAINTENANCE (SECTION-III)

7. Maintenance Schedules:-

In order to keep the wagon in good fettle, the following schedules of maintenance are recommended.

- i) Trip Examination
- ii) Routine Overhaul (ROH) at intervals of 3 years (Two ROH). Schedules between successive (POHs)
- iii) Periodic Overhaul (POH) at an interval of 6 years. The periodicity of the subsequent POH will be decided after gaining experience on the running of BTPN wagon.

While ROH can be carried out in Maintenance Depots, the POH shall be carried out in a Mechanical Workshop fully equipped for the purpose.

8. Trip Examination

The following items shall be especially checked/attended to during trip examination:

- .1 Hand Brake to be released.
- .2 Empty load box operating handle to be in correct position i.e. in "Empty" position when wagon is empty and in "Loaded" position when wagon is loaded.
- .3 Worn out brake blocks to be changed.
- .4 All brake rigging pins to be intact and in position.
- .5 Ensure that the hose coupling for brake pipe (B.P.) on consecutive wagons are coupled to one another to form a continuous air passage from the locomotive to the rear end of the train. For proper identification, of 'BP' coupling heads are marked with 'BP' and painted in green.
- .6 Ensure that hose coupling for feed pipe (F.P.) on consecutive wagons are coupled to one another to form a continuous air passage from the locomotive to the rear end of the train. For proper identification, 'FP' coupling are marked with 'FP' and painted in white.
- .7 All the cut-off angle cocks of brake pipe and feed pipe except those at the rear end of the train shall be open. Handle shall be parallel to the pipe when cock is in open position and will be right angle on closed position.
- .8 Ensure that a cut-off angle cock of brake pipe and feed pipe at the rear of the train are kept closed.

- 9 The B.P. and F.P. hose couplings at the rear end of the train should be placed on their respective hose coupling supports.
- 10 Ensure that the isolating cock on the distributor valve of all the wagons are in open position.
- 11 Ensure that the isolating cock on the feed pipe of all the wagons are in open position.
- 12 Ensure that the gauges in Guard's compartment show the prescribed pressures.
- 13 If the leakage is found to be in excess of prescribed limit, the leakage shall be rectified.
- 14 If there is visible damages to the hose pipe then change then with new ones.
- 15 Release the brake and ensure the following:-
 - a) Position of the brake cylinder is in fully retracted position.
 - b) Brakes shoes are away from the wheel.
 - c) Driver, Guard & TXR should check the details given in the brake certificate and ensure its compliance.
- 16 In addition to the above, the following items shall be ensured in the originating station.
 - a) Caps/flaps for filling pipe, vapour extractor cock and dip pipe hole should be tightly closed.
 - b) Dome cover should be tightly closed. The dome cover should be sealed on loaded wagon.
 - c) Bottom discharge valve is properly closed and there is no leakage. It should be sealed in loaded wagon.
 - d) Dummy flange covers over the discharge pipes are tightly closed and there is no leakage.

9. Routine Overhaul (ROH)

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9.1 Barrel Fittings

The following work shall be done during ROH.

1. Safety Valve:-

- a) The safety valve shall be subjected to pneumatic test after wagon repairs. The valve adjustment should not be interfered with unless repairs to the valve become

necessary. In such cases, it must be repaired correctly adjusted and re-tested at pressure, 1.12kg/Sq.CM for vapour tightness and 1.4kg/cm2 for set pressure.

b) All gaskets/packings shall be changed.

2 Master Valve

a) The master valve shall be checked for smooth operation and leakage.

b) All damaged/worn out parts, particularly valve seat shall be changed.

c) All packings/gaskets shall be changed.

d) Whenever repairs to the master valve and its seating are undertaken, the valve should be tested in position under air pressure of 0.35 to 0.56 kg/cm2 (5 to 8 Psi), the tank barrel being filled with water to a minimum height of 150 cm. The hydraulic test should be carried out keeping the bottom discharge valve and dummy flanges over discharge pipe open.

3 Bottom Discharge Valve:-

Maintenance of this valve should be done as per recommendation of the manufacturer.

4 Blank Flanges

a) The gasket below the cover should be changed.

b) The blank flange should be tested in the same manner as the Master Valve, ensuring that gasket of specified material has been fitted.

5 Locking Devices

Ensure that all the locking devices like provision of spring washers under the nut, tack welding of nut and welding of split pin has been provided every where recommended

9.2 Underframe, Coupler & Bogies:-

For ROH of underframe, couplers and bogies, instructions given in para 2.11 of the Indian Railway Maintenance Manual for wagons issued by the Railway Board should be followed in so far as they apply to the equipments provided on this wagon.

9.3 BRAKES

The air brake equipment and its components shall be attended as provided in G-78.

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9.4 Examination of Tank Craddles:-

The barrel is anchored to the underframe by means of 24 dia rivets. These rivots shall be tapped to check that they are not loose. In case of loose rivets, they shall be removed and new rivets shall be provided.

9.5 Any design modification notified for incorporation should be carried out.

10. Periodic Overhaul (POH)

10.1 Barrel

The following work shall be done on the barrel during POH as per details given in subsequent paragraphs:-

- .1 Cleaning of barrel for inspection.
- .2 Internal and external examination of barrel.
- .3 Repairs of barrel.
- .4 Hydrostatic test of barrel.
- .5 Maintenance of barrel fittings.
- .6 Examination of craddles
- .7 Any design modifications notified for incorporation.
- .7 Test report & record of Inspection.

10.1.1 Cleaning of Barrel for Inspection

- i) Open all fittings and manhole cover and wash them clean of commodity.
- ii) Despatch all fittings for maintenance.
- iii) Clean the empty barrel free of products before internal inspection. The following procedure shall be followed for internal cleaning of barrel:
 - a) The barrel requiring steam cleaning should be placed as near to the steam supply line as possible and protected against any movement.
 - b) After removal of manhole cover and other fittings, the barrel shall be left exposed to atmosphere for 24 hrs.
 - c) Entry of staff in tank barrel should be strictly

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vii) Mark the defective area with chalk for repairs.

10.1.3 Repairs of Barrel

The barrel has been fabricated from mild steel to IS Specification No. IS 2062 Fe 410 Cu WA. Depending upon the defects indicated below, the repairs shall be carried out:

- i) Pitting
- ii) Cracks.

In case of pitting, where pits are not deep enough i.e. upto 1.5mm the defective area may be chipped off to sound metal and then chipped off portion shall be filled up by welding. The welded location should then be ground flush to the original thickness of plate. When pits are closely grouped and are deep enough to affect the strength of the metal, the affected area must be removed and an insert applied and joined by welding.

In case of cracks, cracks should be fully explored to ascertain their extent. A 12mm dia hole should be drilled at the end of the crack and metals shall be chipped off along the crack on one side of the barrel to form a groove for welding. Then the grooves shall be welded. The opposite side of the weld shall be gauged to sound metal and then welding shall be completed penetrating into the weld of first side. Finished weld shall be ground flush on both sides. Inserts whenever applied must have a double butt joint, with 25mm minimum corner radius. Entire length of the butt weld should be radiographed to ascertain the soundness of the butt joint. It must be ensured that insert is of same material and thickness as the parent metal.

In repairs of Barrel involving welding, an approved welding procedure and an approved grade of electrodes should be used. A qualified welder shall be employed for welding. Welding should, as far as possible, be done in down hand position. Welding current and other details like polarity etc. should be set as recommended by electrode manufacturer. After repairs the barrel should be sent for hydrostatic tests.

10.1.4 Hydrostatic test of Barrel

a) Hydrostatic test of barrel shall be carried out after its repair. In case no repairs have been carried out on the barrel, the hydrostatic test is not required.

b) Following procedures shall be followed during hydrostatic test.

- i) Ensure removal of all low pressure lines which should not be subjected to test pressure.

prohibited before cleaning and signs with suitable legends displayed at a reasonable distance away from the barrel to be steam cleaned.

d) In order to clean the barrel thoroughly, steam/dry air pipe should be inserted through manhole and steam/dry air be injected for 12 hrs. The steam/air pipe shall be provided with a 'T' connection at its lower end and so directed as to blow steam/dry air towards ends.

e) Condensed steam collected at the bottom shall be removed and the barrel be kept exposed to atmosphere for 24 hrs.

f) The outer surface of the barrel shall be cleaned free of dirt and paint markings.

g) The barrel is now ready for internal and external examination.

10.1.2 Internal and External Examination of Barrel

Generally barrel defects will be indicated by hydraulic test, but it is necessary to inspect the barrel before hydraulic test so as to avoid accidental rupture of corroded barrel plate at the time of hydraulic tests.

Following procedures shall be followed during examination:

- i) No one shall be allowed to enter into the barrel for internal examination until a work permit has been signed by an authorised supervisor indicating that the barrel has been washed and found to be safe.
- ii) The barrel should be examined by a competent inspector nominated by CME, who must examine the interior of the barrel and the internal fittings for their general condition and damage.
- iii) Make arrangement to illuminate the internal surface of the barrel.
- iv) Examine the internal surface of the barrel for any sign of pitting or injury. Lower part of the barrel, weld seams and pipe junction should be paid special attention.
- v) Mark the defective area with chalk for repairs.
- vi) Examine the outer surface for any damage or crack. The portion of the barrel in contact with cradle as also the junctions of anchoring 'Tee' with dished ends and barrel should be paid special attention.

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- ii) Close off nozzles/opening for fittings by means of dummy flange except that of vapour extractor cock.
- iii) Connect a water pump to the dummy flange of filling pipe.
- iv) Fill the barrel with water at ambient temperature till water comes out through nozzles of vapour extractor cock.
- v) Stop the water pump and close the nozzles of the vapour extractor cock with dummy flange which has a provision for a pressure gauge connection.
- vi) Pump in more water in the barrel till the pressure is increased gradually to 2.8kg/cm² (40 PSI).
- vii) The pressure shall be maintained for a period of 5 minutes so that thorough examination of repaired zones and weld seams can be carried out to see if there is any leakage or drop of pressure indicated in the pressure gauge. The weld seams of the barrel should be examined thoroughly by applying soap solution which will show up the crack and other source of leakage.
- viii) Test shall be carried out in presence of Inspecting Agency who will issue a clear fit certificate.
- ix) Drain out the water from the barrel and expose the barrel to atmosphere till it is dried.

10.1.5 Maintenance of barrel fittings:-

- a) All the barrel fittings mentioned in para 9 of this manual shall be subjected to pneumatic test during POH. Details of such test are same as indicated in ROH
- b) All gaskets/packings of different fittings shall be changed.
- c) All damaged/worn out parts shall be changed.

10.1.6 Examination of Craddles and Anchoring Rivets

- a) Craddles and Anchoring rivets shall be examined in position for any corrosion or any visible defect. In case rivets are loose or rivet heads are badly pitted, they should be replaced by new ones.

10.1.7 Test Report and Records of Inspection:

- a) Test of tank barrel and safety valves must be certified by official conducting the test and their records be

maintained in the office of Chief Mechanical Engineer. The certification must show the Railway initials, number of tank wagons, pressure to which tested, date and place of test etc.

b) Testing authority must maintain detailed record of test carried out on each individual tank wagon.

c) A special report must be submitted to the Chief Mechanical Engineer concerned in every case where maximum permissible working pressure cannot be maintained unless certain repairs are carried out. Such tank wagon must not be commissioned in service till it is certified fit for use after repair by retesting it under specified pressure by the testing authority.

10.2 Under frame, Coupler and Bogie:

A large number of underframes, couplers and bogies similar to one used in BTPN are already in use and are being maintained regularly by Indian Railways. POH of these special assemblies shall, therefore, be carried out as per procedure laid down in the Indian Railways Maintenance Manual for wagon issued by Railway Board.

10.3 Brakes:

Maintenance of brake equipment shall be carried out as per maintenance procedure laid down in maintenance manual G-72 as revised from time to time.

10.4 Bogies

Maintenance of bogies shall be carried out as per maintenance instructions laid down in maintenance manual G-64 with latest revision.

10.5 Painting & Lettering

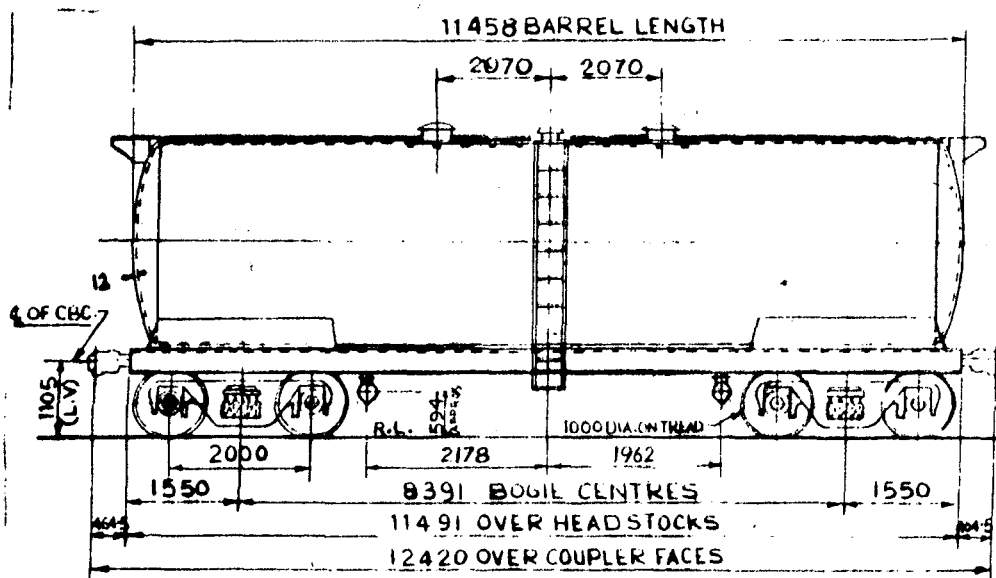
Painting and Lettering shall be carried out in accordance with the instructions contained in "Indian Railways Maintenance Manual for Wagons" issued by Railway Board, Ministry of Railways in the Chapter of Tank Wagon and the Marking Diagram of 'BTPN' Wagon.

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R.D.S.O.
[W]

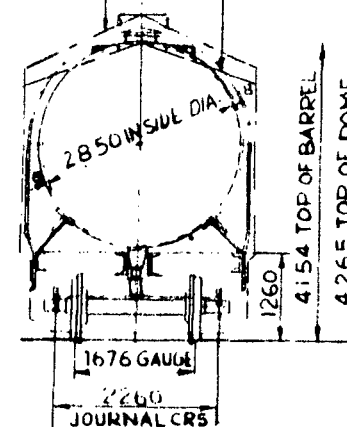
B.G. BOGIE TANK WAGON TYPE 'BTPN'

DRG. NO.
WD-86081-S-51



MAX MOVING
DIMENSIONS
X CLASS ENGINE

MAX MOVING
DIMENSIONS
OF 1929



THE WAGON SHALL BE FITTED WITH :

1. CASNUB 22 W(M) BOGIES.
2. TWIN PIPE GRADUABLE RELEASE AIR BRAKE SYSTEM FITTED WITH SLACK ADJUSTER AND EMPTY LOAD CHANGE OVER DEVICE.
3. STANDARD AUTOMATIC CENTRE BUFFER COUPLER OF KNUCKLE TYPE(NON-TRANSITION)
4. TWO DUMPS ACCOMODATING- FILLING PIPE, VENT PLUG, VAPOUR EXTRACTOR CAP CHAIN, VAPOUR EXTRACTOR COCK AND HAND WHEEL FOR OPERATING MASTER VALVE.
5. ONE SAFETY VALVE.
6. TWO BOTTOM DISCHARGE VALVES CONTROLLED BY MASTER VALVES WITHIN THE BARREL.

LOADING PARTICULARS

1. AXLE LOAD .. 20.32 t
2. GROSS LOAD .. 81.28 t
3. ESTIMATED TARE WEIGHT .. 27.00 t
4. CARRYING CAPACITY .. 54.28 t
5. CARRYING CAPACITY TO TARE WEIGHT RATIO .. 2.01
6. TRACK LOADING DENSITY WHEN LOADED TO FULL AXLE LOAD .. 6.54 t/m
7. CARRYING CAPACITY PER METRE WHEN LOADED TO FULL AXLE LOAD. .. 4.37 t/m
8. NO.OF WAGONS IN A LENGTH OF 585 METRES .. 47
9. TOTAL VOLUME OF BARREL .. 70.40 m³
10. LOADABLE VOLUME AFTER LEAVING 2.5% AIR SPACE .. 68.64 m³
11. LOADABLE VOLUME AFTER LEAVING 4% AIR SPACE .. 67.58 m³

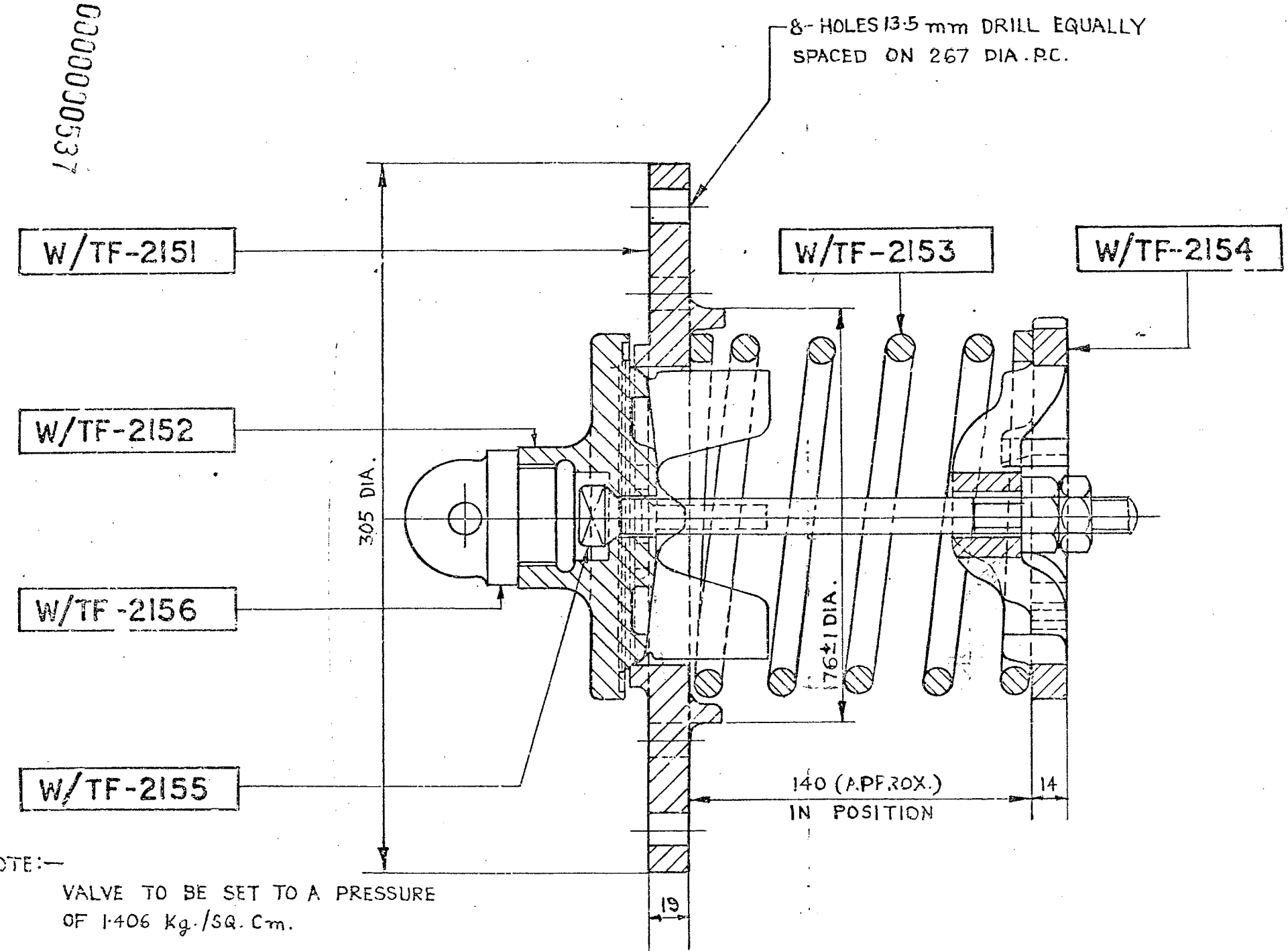
12. QUANTITIES OF VARIOUS COMMODITIES THAT CAN BE LOADED PER WAGON.

S. No.	PRODUCT	DENSITY (t/m ³)	MAX.PRODUCT WEIGHT WHICH CAN BE LOADED PER WAGON (t)
1.	MOTOR SPIRIT	0.7074	47.80
2.	NAPHTHA (ASSAM CRUDE)	0.7300	49.33
3.	NAPHTHA (OTHERS)	0.6957	47.01
4.	SUPERIOR KEROSENE	0.7922	54.28
5.	A.T.F.	0.7840	53.81
6.	H.S.D.	0.8349	54.28
7.	L.D.O.	0.8604	54.28
8.	F.O.	0.9254	54.28

FIG-1

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FREELY INTERCHANGEABLE
WITH WA 87



NOTE:—
VALVE TO BE SET TO A PRESSURE
OF 1.406 Kg./SQ. Cm.

COMPARED
S. K. K.

W/TF-2156	PLUG.	1
W/TF-2155	STEM.	1
W/TF-2154	FOLLOWER	1
W/TF-2153	SPRING	1
W/TF-2152	VALVE	1
W/TF-2151	SEATING	1
I. R. PART NO.	DESCRIPTION	NO. PER ASSY.

MANUFACTURE OF THIS ASSLY. SHOULD BE TO PART DRGS.
OF COMPONENTS BEARING THE LATEST ALTERATION
NUMBER OBTAINED FROM THE IDENTING AUTHORITY.

MTL.									
SPEC. NO.	I. R. S. R6								
TREAT									
WEIGHT	16,55 Kg.	DATE		I. R. ALT. NO.		AUTHY.		DESCRIPTION	CKR.
SCALE	DO NOT SCALE								
REF. DRG.									

SAFETY VALVE

FOR PETROL TANK WAGON
I. R. S.
WA/TF-87
I. R. PART NO. 32

FIG-2

6-98
 14/9/79

DATE	RLY. NO.	AUTH.	DESCRIPTION	CKR

TR DM CR SD CRF 1-2-62 R. Singh D. Singh D2 FILED OR. ROUGH GROUND G2 GROUND HARDENED G3 HARDENED & GROUND M1 ROUGH MACHD M2 MEDIUM MACHD M3 FINE MACHD RLY. NO. WA/TF-2116	4 HOLES 17.5mm. DRILL.		PIN RIVETED OVER		W/TF-1877		FREELY INTERCHANGEABLE WITH WA-2116.	
					W/TF-1872			
					W/TF-2034			
					W/TF-2142			
					W/TF-2143			
					W/TF-2117			
					W/TF-1873			
							D 5X83 PIN C 3X32 SPLIT PIN B M12 CASTLE NUT A 12X41 SQ SHANK STUD W/TF-2143 CAP " 2142 UNION COUPLING " 2117 BODY " 2034 SEATING " 1877 HANDLE " 1873 CAP W/TF-1872 PLUG	
							PART DESCRIPTION NO. FOR PETROL TANK WAGONS.	
							I. R. S.	
						WA/TF-2116		
						I. R. PART NO.		

MTL: SPEC. NO. R. G.
 TREAT WEIGHT 8.62 KGS.
 SCALE 1:2 DO NOT SCALE
 DATE 14/9/79 I.R. ALT. NO. AUTHY. DESCRIPTION CKR
 MICRO FILMED 4/84
 VAPOUR EXTRACTOR COCK

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