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सत्यमेव
जयते

भारत सरकार - रेल मंत्रालय
अनुसंधान अभिकल्प और मानक संगठन
लखनऊ - 226011
Government of India - Ministry of Railways
Research, Designs & Standards Organization, LUCKNOW - 226011

EL/3.2.13/6 Date:17.03.05

SPECIAL MAINTENANCE INSTRUCTION NO RDSO/SMI/ 0233/2005 REV.0

1. TITLE:

Ultrasonic testing procedure for Compensating beams, Equalizer beam and Link for WAG-7, WCAM3 & WCAG1 locomotive.

2. BRIEF HISTORY

RDSO has issued SMI/0227/2002 date 1-8-2002 to strengthen the maintenance practice related to compensating beam, equalizing beam and link with view to eliminate any chance of failure of link assembly on WAG7 and WCAM3 locomotive. The problem of cracks in compensating beam was discussed during 30th MSG Meeting held at W. Railway/Mumbai. It was decided that RDSO will issue the procedure for ultrasonic testing of compensating beams. Accordingly, this SMI is being issued.

3. OBJECT:

To detect the internal longitudinal discontinuities parallel to the rolling surfaces i.e lamination etc. in Compensating beam, Equalizer beam and Link.

4. INSTRUCTION:

Railway should follow M&C Directorate's code of procedure for ultrasonic testing MC-87 Feb (2005) attached as annexure to this SMI.

5. APPLICATION:

WAG7,WCAM3 & WCAG1 loco fitted with high adhesion bogie.

6. AGENCIES OF IMPLEMENTAATION

All electric loco shed & workshop.

7. PERIODICITY:

AOH, IOH and POH. One cycle of ultrasonic testing should be carried out on all compensating beams, equalizer beam and link. The tested compensating beam, equalizer beam and link should be given a separate number to identify the tested beam.

6. REFERENCE:

Metallurgical and Chemical directorate code of procedure no MC-87.(FEB-2005)

DA: 1. MC-87

--Sd--

(Ram Prakash)

For Director General Std/Elect

Distribution: As per standard mailing list no. EL/M/0019

GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS
RESEARCH DESIGNS AND STANDARDS ORGANISATION
LUCKNOW

CODE OF PROCEDURE FOR ULTRASONIC TESTING OF EQUALISER BEAMS , COMPENSATING BEAMS AND LINKS OF LOCOMOTIVES IN SERVICE.

METALLURGICAL AND CHEMICAL DIRECTORATE
CODE OF PROCEDURE NO.
MC-87

FEBRUARY-2005

CONTENTS

This report is based on ultrasonic tests conducted by the Metallurgical and Chemical Directorate of RDSO. Every care has been taken in recording data accurately and in analysing it subsequently. The views expressed in this report are subject to modification from time to time in the light of fresh data.

(A.K. MANDAL)
Director (M&C)

(K.P.S. VERMA)
Executive Director (M&C)

CODE OF PROCEDURE FOR ULTRASONIC TESTING OF EQUALISER BEAMS, COMPENSATING BEAMS AND LINKS OF LOCOMOTIVES IN SERVICE.

1. SCOPE: This code of procedure outlines the manual ultrasonic testing methodology for detection of internal longitudinal discontinuities parallel to the rolling surfaces i.e. laminations etc. This procedure is applicable for equaliser beams, compensating beams & links used in various locomotives.

2. EQUIPMENT & ACCESSORIES:

2.1 **Flaw Detector**: Any pulse echo type (A-Scan) Ultrasonic flaw detector approved by RDSO & meeting RDSO specn.No.M&C/NDT/104/2000 & M&C/NDT/125/2004.

2.2 **Probe:** 2.5 MHz double crystal probe of dia. 20/25 mm .

2.3 **Co-axial cable**: 2 Meter Co-axial cable fitted with BNC connector for fitment to double crystal probe.

2.4 **Battery:** Battery shall be re-chargeable plug-in type 6V/12V suitable for working approx. 8hrs. continuous operation per charge.

2.5 **Battery charger**: A suitable battery charger shall be provided with UFD

2.6 **Couplant**: Soft grease or machine oil .

2.7 **Calibration Block:** 50x50x50mm block of steel to grades 45C8 of IS:1875-1992. Rolled/forged and normalised to achieve grain size no.5 or finer to ASTM E-112.

3. **PROCEDURE *FOR CALIBRATION* AND SENSITIVITY SETTING.**

3.1 **Calibration:**

3.1.1 Time Base: Set the time base of ultrasonic flaw detector for 100 mm using 0° normal probe with the help of calibration block as mentioned in Para 2.7.Two multiple echoes will be observed.

3.2 **Sensitivity setting**: Sensitivity shall be done with the help of sound area of the plate and gain level shall be adjusted to produce an echo of 80 % of FSH from the bottom of the plate. This gain level shall be reference gain for acceptance or otherwise.

4. **Scanning.**

4.1 **Probing from the Plate surface**

4.1.1 The plate surfaces shall be sufficiently clean & smooth and if required grind the rough surfaces by fine grinding to achieve proper acoustic coupling.

4.1.2 Apply couplant on the plate surface, place the probe on this face and back echo will appear on the CRT screen.

4.3 Place the probe near to edge of the component and cover 100 % perimetric path as shown in Annexures. Similarly scanning shall be done circumferentially around the holes. Remaining part of the component shall be scanned parallel to above path and it should be ensured that 100% of the plate surface area is scanned.

5 **Rejection Criteria.**

5.1 Any defect showing flaw signal near to edge or hole, is unacceptable.

5.2 Any discontinuity causing complete loss of back reflection that cannot be encompassed within 50 mm diameter circle, is unacceptable.

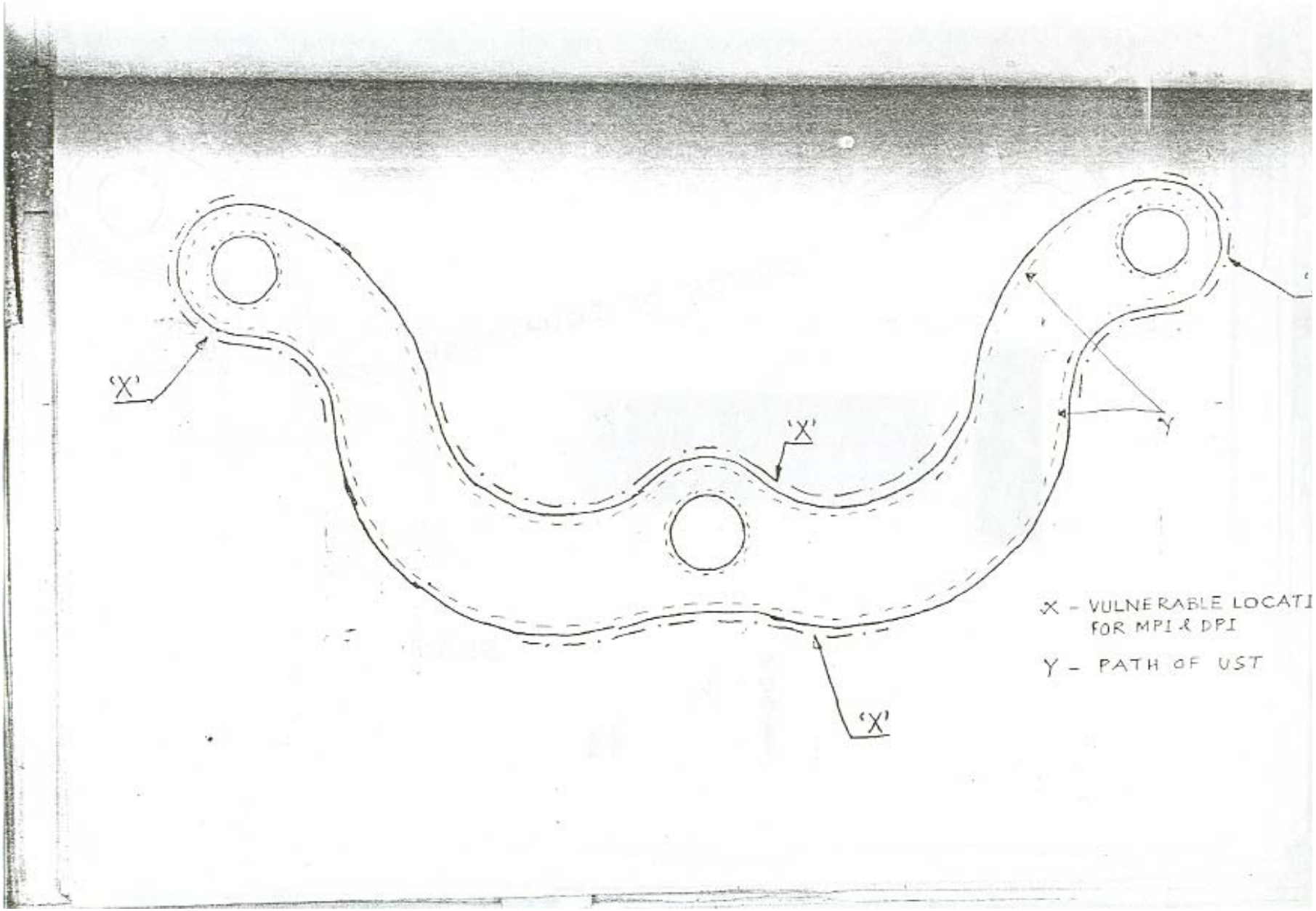
5.3 Any defect showing flaw signal with amplitude equal to or greater than 50% of the initial back reflection and accompanied by 50% loss of back reflection that cannot be encompassed within 50 mm diameter circle, is unacceptable.

6. **Dye Penetrant or Magnetic Particle Testing:**

Dye Penetrant or Magnetic Particle Testing of Equaliser beams, Compensating beams and links shall be carried out if found satisfactory during ultrasonic examination described above to detect transverse cracks at vulnerable locations as shown in Annexures I,II & III. Presence of any crack shall be the cause of rejection. Record of dye penetrate or magnetic particle examination and observations made may be maintained in the register.

7. **Recording of test details:**

Ultrasonic personnel conducting the test shall maintain a register indicating the technique employed , observation made , code of procedure followed and his remarks .He should also record the visual observations.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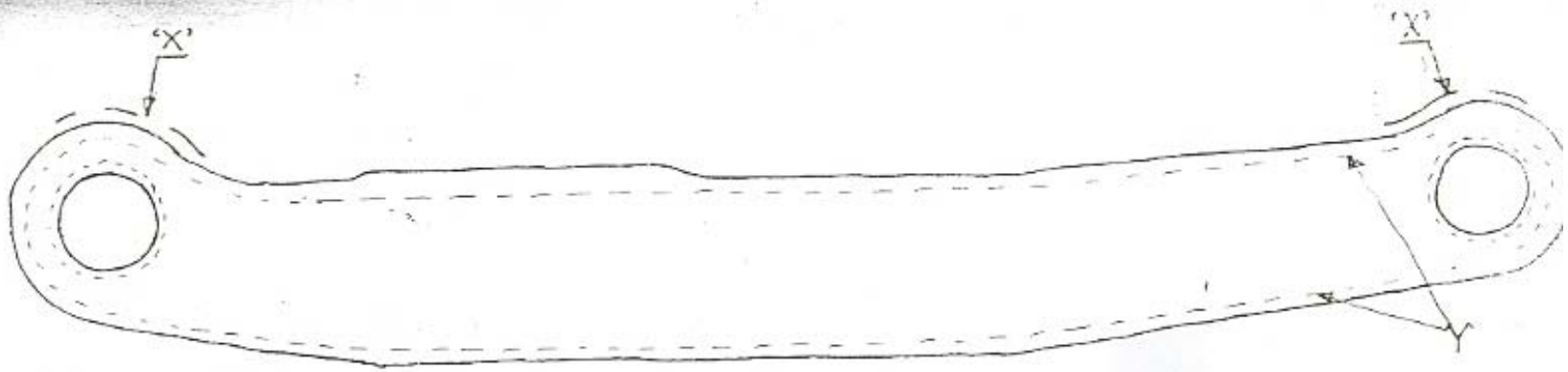

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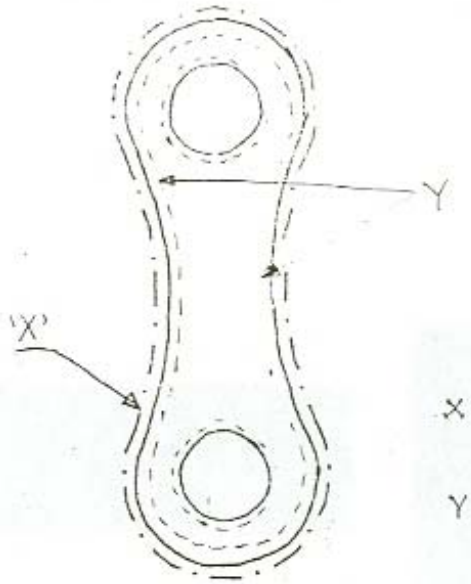

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