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Letter No.: CT/USFD/ACS 2

Date: 07.11.2025

Principal Chief Engineer
Chief Administrative Officer (Cons) & all concerned
(As per mailing list enclosed)

Sub: Manual for Ultrasonic Testing of Rails and Welds (Revised 2022) - Addendum and Corrigendum slip no.4 of November, 2025

Ref: This office letter no. CT/USFD dated 29.04.2022

The “Manual for Ultrasonic Testing of Rails and Welds (Revised - 2022)” was circulated to all Zonal Railways vide this office letter under reference. Railway Board vide letter no. 2020/Track-I(P)/USFD Manual dated 07.11.2025 has approved the A&C Slip No. 4 of the “Manual for Ultrasonic Testing of Rails and Welds (Revised - 2022).

The A&C Slip No. 4 of November, 2025 to USFD Manual is being issued in view of 91st TSC Committee’s recommendation on item no. 1441 ‘Ultrasonic Testing of flange of stock and tongue rail of SEJ/ISEJ’.

Please find enclosed herewith A&C Slip No. 4 of November, 2025 for information and further necessary action.

Please acknowledge the receipt.

Enclosure: As above

VINAY
TAK
Executive Director/Track-I

Digitally signed
by VINAY TAK
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Mailing list

I. Principal Chief Engineer

1. Central Railway, Mumbai CST – 400001
2. Eastern Railway, Fairlie Place, Kolkata – 700001
3. Northern Railway, Baroda House, New Delhi – 110001
4. N.E. Railway, Gorakhpur – 273012
5. Southern Railway, Park Town, Chennai – 600003
6. S.C. Railway, Rail Nilayam, Secunderabad – 500371
7. Western Railway, Churchgate, Mumbai – 400020
8. South Eastern Railway, Garden Reach, Kolkata – 700043
9. N.F. Railway, Maligaon, Guwahati – 781011
10. East Central Railway, Hajipur – 844101
11. East Coast Railway, Bhubaneshwar – 364001
12. North Central Railway, HQ Office, Subedarganj, Block – Bhagirathi, Prayagraj – 211015
13. North Western Railway, Jaipur – 755001
14. South East Central Railway, Bilaspur – 495004
15. South Western Railway, Hubli – 580023
16. West Central Railway, Jabalpur – 482001

II. Chief Administrative Officer (Cons)

1. Central Railway, New Administrative Office Building, 6th Floor, D.N. Road, Mumbai CST – 400001
2. CAO (I), Eastern Railway, 4th Floor, New Koilaghat Building, Strand Road, Kolkata – 700001
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4. Northern Railway, Kashmere Gate, Delhi – 110001
5. USBRL Project, Opp. R.R.B. Jammu Tawi – 180013
6. North Eastern Railway, Gorakhpur – 273012
7. Southern Railway, Egmore, Chennai – 600003
8. West Central Railway, Jabalpur – 482001
9. South Western Railway, 18, Millar Road, Bangalore – 560046
10. South Central Railway, Rail Nilayam, Secunderabad – 500371
11. South Eastern Railway, Garden Reach, Kolkata – 700043
12. East Coast Railway, Chandrashekhpur, Bhubaneshwar – 751023
13. Western Railway, Churchgate – 400020
14. CAO (North), East Central Railway, Mahendrughat, Patna - 800004
15. CAO (South), East Central Railway, Mahendrughat, Patna - 800004
16. North Western Railway, Near Railway Station, Jaipur – 302001
17. South East Central Railway, Bilaspur – 495004 (Chhattisgarh)
18. North Central Railway, HQ Office, Subedarganj, Block – Bhagirathi, Prayagraj – 211015
19. CAO (I), N.F. Railway, Guwahati – 781001
20. CAO (II), N.F. Railway, Guwahati – 781001
21. CAO (III), N.F. Railway, Guwahati – 781001

III. Public Sector Units (PSUs) & Rail Manufacturing Plants:

1. Chairman and Managing Director, Rail Vikas Nigam Ltd., Plot No. 25, First Floor, August Kranti Bhawan, Bhikaji Cama Place, R.K. Puram, New Delhi- 110066
2. Managing Director, DFCCIL, 5th Floor, Pragati Maidan, Metro Station Building Complex, New Delhi- 110001
3. MD, RITES Ltd., RITES BHAWAN. No. 1, Sector-29, Gurgaon-122001 (Haryana)
4. MD, IRCON International Ltd., C-4, District Centre, Saket, New Delhi-110017
5. CMD/ Konkan Railway Corporation Ltd., Belapur Bhawan, Plot No. 6, Sector 11, CBD, Belapur, New Mumbai-400614
6. Chief General Manger (Quality), Bhilai Steel Plant, Bhilai-490001
7. Managing Director, M/s Jindal Steel & Power Limited, Raigarh-496001

IV. PEDs/EDs of Railway Board and RDSO

1. Principal Executive Director/CE (P), Railway Board, Rail Bhawan, New Delhi – 110001
2. Executive Director, Track (P&P), Railway Board, Rail Bhawan, New Delhi – 110001
3. Executive Director, Track (M & MC), Railway Board, Rail Bhawan, New Delhi – 110001
4. Executive Director/Track-II, RDSO, Lucknow
5. Executive Director/M&C, RDSO, Lucknow

V. Chairman-cum-Managing Directors

1. The General Manager (Cons.), N.F. Railway, Maligaon, Guwahati-781 011
2. The Chief Commissioner of Railway Safety, 3rd Floor, Traffic Accounts Office, State Entry Road New Delhi- 110055
3. Metro Railways, Metro Bhawan, 33/1 Chowringhee Road, Kolkata-700071
4. The CMD, Managing Director, KRCL, Belapur Bhawan, Plot No.6, CBD, Belapur, New Bombay-400 614
5. The Director General, Railway Staff College, Vadodara-390 004
6. The Director, IRICEN, Pune- 411 001
7. The Executive Director, IRCAMTECH, Maharajpur Gwalior-474 020

11.9 Procedure for ultrasonic Testing of flange of stock and tongue rail of SEJ/ISEJ

11.9.1 Scope:

An ultrasonic test procedure has been prepared for detecting defects in tongue/stock rail at location where sharp change in one of the flange portion has been designed. Study reveals that even a small fatigue of 4-5 mm width in this location caused failure of tongue/stock rail. USFD procedure has been designed to detect defects smaller than above mentioned width. Physical verification at site of track reveals that ultrasonic testing of vulnerable location of tongue rail of SEJ/ISEJs is not feasible under in situ condition as this portion remains inside the bracket over it. For conducting ultrasonic testing bracket over the sharp curvature in the flange portion of SEJ/ISEJs are required to be removed for getting access to scanning area.

11.9.2 Apparatus required:

- a. **Equipment:** Any RDSO approved model of ultrasonic equipment Alumino-thermic welded rail joints as per RDSO specification No. M&C/NDT/129/2005, Rev-II, Aug. 2014 or its latest version.
- b. **Probes:** $70^0/2$ MHz, 20 mm dia. or 20 x 20 mm square crystal size Single Crystal probe.
- c. **Couplant:** Soft grease or thick oil shall be used as couplant.

11.9.3 General Condition: Prior to conducting testing, the bracket over the sharp curvature in the flange portion of SEJ/ISEJs shall be removed. Cleaning of flange with kerosene shall be done to remove dirt oil or grease over it. Flange shall be smooth and free from pitting otherwise paper grinding shall be carried out for smoothening the surface

11.9.4 Sensitivity setting procedure and test procedure:

11.9.4.1 Standard test piece: The sensitivity of the ultrasonic equipment shall be set with the help of Standard Tongue rail of SEJ/ISEJs test piece containing a 5 mm saw cut at sharp curved location of flange as shown in **Fig. 26(d)**

11.9.4.2 Range Calibration: The equipment shall be set for a depth range of 165 mm S-Wave. Connect the $70^0/2$ MHz probe with ultrasonic equipment and select T+R (Single Crystal) mode by selector switch.

11.9.4.3 Sensitivity Setting: Place the $70^0/2$ MHz probe at a distance of approx. 110 mm far from saw cut on the upper zone of flange of tongue rail with beam directing towards the saw cut. Move the probe in slight zigzag manner towards cut direction. The

reflection from 5 mm cut shall be maximized and shall be set to 60% full screen height by suitable adjustment of gain control.

11.9.4.4 Test Procedure: For conducting ultrasonic testing bracket over the sharp curvature in the flange portion of SEJ/ISEJs are required to be removed for getting access to scanning area. The 70^0 /2MHz/Single Crystal probe shall be placed on the upper zone of flange at a distance of approx. 110 mm far from sharp curve portion with beam directing towards curve portion and also in backward direction of the curved portion. Move the probe in zig-zag manner up to curve portion, scanning shall be carried out 2-3 times.

11.9.5 Defect Classification: Any flaw signal obtained by 70^0 probe of 20% vertical height of screen or more shall be treated as IMR. The defective SEJ/ISEJ should be adequately protected as per Para 11.10 below till it is replaced.

11.9.6 Testing frequency: Testing frequency of stock and tongue rail of SEJ/ISEJs for flange testing by 70^0 probe shall be once in six months under traffic block after opening the bracket.

11.10 Action to be taken after detection of defect: On detection of defect in stock and tongue rail of SEJ/ISEJ and gap avoiding rail of ISEJ, SSE/JE (P.Way) USFD shall impose speed restriction of 20 KMPH of stricter immediately and communicate in sectional SSE/JE (P.Way) about the flaw in SEJ/ISEJ with its location, who shall ensure the protection of defective SEJ/ISEJs by deputing a permanent watchman till the SEJ/ISEJ replaced. The defective SEJ/ISEJ shall be replaced within 3 days of detection.

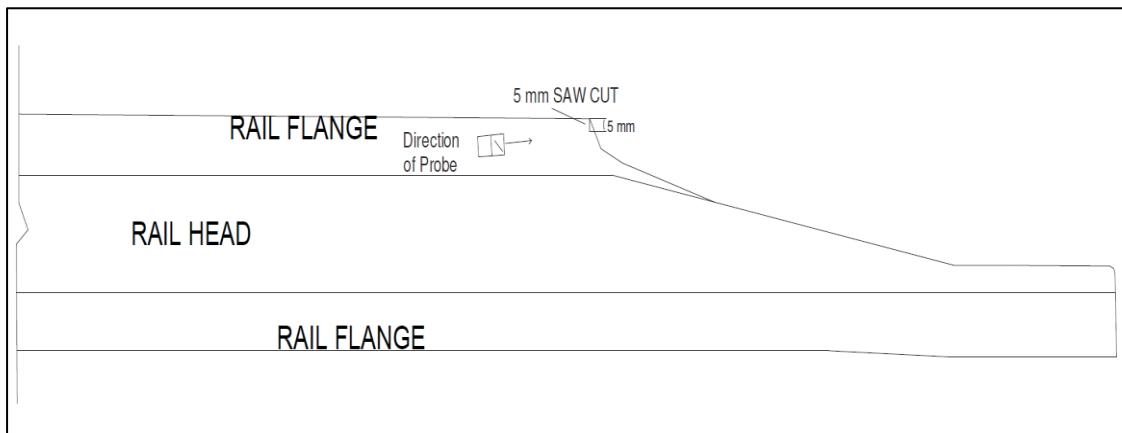


Fig. 26(d): Sensitivity setting block & Ultrasonic scanning of Tongue/Stock rail of SEJ/ISEJ (Rail in Plan)