भारत सरकार - रेल मंत्रालय
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Government of India-Ministry of Railways
Research Designs & Standards Organisation
Lucknow - 226 011
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No. CT/USFD/ACS

Dated: 14.09.2018

**I. The General Manager (Engg./Works)**

1. Central Railway, CST, Mumbai – 400 001.
2. Eastern Railway, Fairlie Place, Calcutta – 700 001.
3. East Central Railway, Hajipur – 844 101.
4. East Coast Railway, Chandrasekharpur, Bhubaneshwar – 751 016.
5. Northern Railway, Baroda House, New Delhi – 110 001.
6. North Central Railway, Allahabad - 211 001.
7. N.E.Railway, Gorakhpur - 273 001.
8. N.F.Railway, Maligaon, Guwahati – 781 011.
9. North Western Railway, Jaipur – 302 001.
10. Southern Railway, Park Town, Chennai – 600 003.
11. S.C.Railway, Rail Nilayam, Secunderabad – 500 371.
12. S.E.Railway, Garden Reach, Calcutta – 700 043.
13. South East Central Railway, Bilaspur 495 004
14. South Western Railway, Hubli– 580 023.
15. Western Railway, Churchgate, Mumbai – 400 020
16. West Central Railway, Jabalpur – 482 001

Sub: Manual for Ultrasonic testing of Rails and Welds (Revised 2012) - A & C Slip No. 04 of September, 2018

Ref: (i) This office letter of even no.dt: 10.08.2016
(ii) Railway Board's letter no. Track/21/2007/0903/7 dt: 20.08.2018

1. The Revised A&C Slip No. 3 of August, 2016 to 'Manual for Ultrasonic testing of Rails and Welds, (Revised 2012)' was circulated to all Zonal Railways vide this office letter at reference (i) above.
   Please find enclosed herewith A&C Slip No. 04 of September, 2018 to the above Manual duly approved by Railway Board for information and further necessary action.
2. The Correction Slip to USFD Manual is being issued in view of Railway Board's orders on following items of 86th TSC meeting and 9th extraordinary TSC meeting.

| S No. | Item no. | Description of Item |
|---|---|---|
| 1 | 1303 | Test free period of USFD testing of rails |

3. Apart from the above as a trial preventive measure to reduce the number of rail failures during reduced testing frequency period and weld failure in initial period, additional Policy Instructions on Ultrasonic testing of rails & welds to be read in conjunction with Manual for Ultrasonic testing of rails & welds (Revised-2012) are also enclosed, which are valid for two years i.e. up to 31.08.2020.

   Zonal Railways are also requested to send the feedback to RDSO alongwith data analysis for the impact of additional policy instruction on reduction of early rail and weld failures and impact on work load.
4. Please acknowledge the receipt.

संलग्न–उपरोक्त।

रेल मंत्रालय (रेलवे बोर्ड)
Ministry of Railways (Railway Board)
24 SEP 2018

(नीलमणि)
कार्यकारी निदेशक/रेलपथ–1
कृते महानिदेशक/रेलपथ

II Copy along with a copy of the A & C Slip No. 04 of September, 2018 for information and record to:

1. The General Manager(Cons.),N.F. Railway, Maligaon, Guwahati-781 011.
2. The Chief Commissioner of Railway Safety, Ministry of Tourism & Civil Aviation, NE Rly. Compound, 16-A, Ashok Marg, Lucknow260 001.
3. The CMD, Managing Director, KRCL, Belapur Bhawan, Plot No.6,CBD, Belapur, New Bombay-400 614.
4. The Director General, Railway Staff College , Vadodara-390 004.
5. The Director, IRICEN, Pune- 411 001.
6. The Executive Director, IRCAMTECH, Maharajpur Gwalior-474 020
7. ED/M&C/RDSO/Lucknow.
8. ED/QA(Civil), RDSO, Lucknow.

III Copy along with a copy of A&C Slip No. 04 of September, 2018 to Executive Director/Track (Procurement), Railway Board, Rail Bhavan, New Delhi 110 001 for kind information in reference to Railway Board's letter no Track/21/2007/0903/7 dtd 20.08.2018.

संलग्न–उपरोक्त।

(नीलमणि )
कार्यकारी निदेशक/रेलपथ–1
कृते महानिदेशक/रेलपथ

IV Copy along with a copy of the A & C Slip No. 04 of September, 2018 for information and record to:

**The Chief Safety Officer:**

1. Central Railway, CST, Mumbai – 400 001.
2. Eastern Railway, Fairlie Place, Calcutta – 700 001.
3. East Central Railway, Hajipur – 844 101.
4. East Coast Railway, Chandrasekharpur, Bhubaneshwar – 751 016.
5. Northern Railway, Baroda House, New Delhi – 110 001.
6. North Central Railway, Allahabad - 211 001.
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8. N.F. Railway, Maligaon, Guwahati – 781 011.
9. North Western Railway, Jaipur – 302 001.
10. Southern Railway, Park Town, Chennai – 600 003.
11. S.C.Railway, Rail Nilayam, Secunderabad – 500 371.
12. S.E. Railway, Garden Reach, Calcutta – 700 043.
13. South East Central Railway, Bilaspur 495 004
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संलग्न–उपरोक्त।

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कृते महानिदेशक/रेलपथ

1. Para 6.6 is modified as under:

6.6 **Frequency of testing of rails and welds**: In view of the revised criteria of defect mentioned in Para 6.2, the testing frequency of 8 GMT has been prescribed. Based on the same, testing schedule of rails/welds as laid down in Para 6.6.1.1 shall be followed.

6.6.1 After the initial USFD testing of rails in rail manufacturing plant, the subsequent USFD testing needs to be carried out at reduced frequency until the rail have undergone 15% of the service life in GMT as given below (**para 302(i) (d)** of IRPWM):

For rails rolled in April 1999 and later, the reduced frequency testing period shall be 25% instead of 15%.

| Gauge | Rail Section | Assessed GMT service life for T-12 72 UTS rails | Assessed GMT service life for T-12 90 UTS rails |
|---|---|---|---|
| B.G. | 60Kg | 550 | 800 |
| | 52Kg | 350 | 525 |
| | 90 R | 250 | 375 |
| M.G. | 75 R | 150 | - |
| | 60 R | 125 | - |

Rail testing during reduced frequency testing period is to be done using all probes (as given in para 4.1) as is being done during normal testing frequency period on passage of every 40 GMT traffic or Eight (08) years, whichever is earlier.

Whenever, rails are not tested in rail manufacturing plant, the reduced frequency testing period shall not be applicable and the rail testing shall be done immediately after its laying in field and thereafter at the periodicity given in table under para 6.6.1.1 .

2. Para 8.14 is modified as follows:

8.14 **Action to be taken after detection of defects in AT welds**: Action to be taken for defects in AT welds shall be same as at **para 6.4**. In addition, following shall also be applicable for welds classified as defective (DFWO/DFWR) in Initial acceptance test & periodic testing of AT welds using hand probing:

| Classification | Painting on both faces of weld (In Head) | Action to be taken |
|---|---|---|
| Defective weld **'DFWO/DFWR'** with $0^0$ / 2MHz, $70^0$/ 2MHz, $45^0$/ 2 MHz or $70^0$ 2MHz SL probe, $45^0$/2 MHz Tandem Rig | In case of DFWO, one circle with red paint. In case of DFWR, two cross with red paint. | (i)In case of DFWO weld, following action will be taken:<br>a) SSE/JE (P.Way)/USFD shall impose speed restriction of 30 kmph or stricter immediately and communicate to sectional SSE/JE about the flaw location, who shall ensure the following :<br>b) Protection of defective weld by joggled fish plates using minimum two tight clamps immediately with a speed restriction of 30 kmph. Speed restriction can be relaxed to normal after protection of DFWO weld by joggled fish plates with 2 far end tight bolts (one on each side) with champhering of holes, within 3 days. The joint is to be kept under observation.<br>(ii) In case of DFWR following action will be taken:<br>a) SSE/JE (P.Way) USFD shall impose speed restriction of 30kmph or stricter immediately and communicate to sectional SSE/JE about the flaw location who shall ensure the following:<br>b) Protection of DFWR weld by joggled fish plates using minimum two tight clamps immediately. SR of 30 Kmph can be relaxed to normal after providing joggled fish plates with two far end tight bolts one on each side with champhering of holes. The DFWR weld shall be replaced within three months of detection.<br>Adequate traffic block should be granted for removal of DFWR welds. In case of non removal within three months, a speed restriction of 75 kmph for loaded goods train and 100 kmph for |

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| | | |
|---|---|---|
| | | passenger train should be imposed.<br>(iii) In case of defective weld (DFWO/DFWR) on major bridges & bridge approaches (100m either side) and in tunnels & on tunnel approaches (100m either side), following action will be taken :<br>a) SE/JE(P.Way)/USFD shall impose speed restriction of 30 Kmph or stricter immediately and to be continued till defective weld is replaced. He should communicate to sectional SE/JE (P.Way) about the flaw location who shall ensure the following :<br>b) Protection of defective weld using clamped joggled fish plate within 24 hrs.<br>c) The defective weld shall bereplaced within 3 days of detection. |

Note: DFWR and DFWO found in "Initial Acceptance Test" shall be removed from track as per para 8.10.1.

**3.** Para 8.15, 8.15.1 and 8.15.2 has been modified as under:

**8.15** Frequency of testing of welded joints

**8.15.1** Frequency of testing of welded joints for through periodic rail testing by SRT/DRT using $0^0$ & $70^0$ probes shall be as per 6.6.1.1.

8.15.2 Testing of AT welded joints by hand probing shall comprise of testing by probes with sensitivity setting and calibration as per references indicated against them in the table below:

| S.No | Probes | Calibration as per | Sensitivity Setting as per | Scanned area | Acceptance Criteria |
|---|---|---|---|---|---|
| 1. | $0^0$ 2 MHz | Para 8.5.1 | Para 8.5.2, Fig 20(a) | Head, web | As per Para 8.5.4 |
| 2. | $70^0$ 2MHz | Para 8.6.1, 8.9.1 | Para 8.6.2, 8.9.2, Fig 20(a) | Head, weld foot | As per Para 8.6.4 & 8.9.4 |
| 3. | $70^0$ 2MHz SL | Para 8.8.1 | Para 8.8.2, Fig 22 (a) | Weld foot ( Half Moon Defect) | As per Para 8.8.4 |
| 4. | $45^0$ 2 MHz | Para 8.7.1 | Para 8.7.1.2 , Fig 22 (a) & 23 | Weld foot (Half Moon Defect/clustered defect & micro porosity) | As per Para 8.7.1.4 |
| 5. | $45^0$ 2 MHz single crystal probe | As per Para 8.7.2.1 | As per Para 8.7.2.2 | Lack of fusion in the web and foot region below web | As per Para 8.7.2.4 |

The frequency of testing of AT welds with above listed probes by hand probing shall be as under:

| S No | Type of Welds | Type of Testing | Testing Schedule | |
|---|---|---|---|---|
| 1 | Conventional AT weld | Periodic Tests | Every 40 GMT or 5 years whichever is earlier | |
| 2 | SKV Weld | Acceptance Test | Immediately after welding | |
| 3 | | First Periodic Test | 1 year | |
| | | Further tests based on route GMT | Routes having GMT | Frequency |
| 4 | | | > 80 | 1 years |
| 5 | | | >60 ≤ 80 | 1½years |
| 6 | | | >45 ≤ 60 | 2 years |
| 7 | | | >30 ≤ 45 | 3 years |
| 8 | | | > 15 ≤30 | 4 years |
| 9 | | | 0-15 | 5 years |

In case of welds on major bridges & bridge approaches (100m either side) and in tunnels & on tunnel approaches (100m either side), the minimum frequency of testing shall be once in a year.

Due to unusually high weld failure or other abnormal development in some sections, Chief Engineer may order *testing of welds early, as per need.*

The testing interval of USFD testing of defective AT welds should be reduced by 50% of normal testing interval of AT welds as provided in para 8.15.1 to avoid fractures of defective welds.

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