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No. CT/FF/Misc

Date: 17.12.24

PCEs & CAOs to all Zonal Railways
(As per attached mailing list)

Sub: Usage of High Performance Rail Clamps with IR fishplate on Indian Railways

Ref: i) Functional Requirement Specification of HPRC clamps approved by Rly Bd vide letter dt 05.12.19 (*Copy attached*)

ii) Report No. CT-63 (Nov.-24) for Field trials of High Performance Rail Clamps compatible with IR fishplates (Phase-A: Speed potential up to 50kmph) (*Copy attached*)

iii) Rly Bd's letter No. 2024/Track-I/8(1)/HPRC dated 09.12.24 (*Copy attached*)

- Based on 'Functional Requirement Specification' (FRS) approved by Railway Board, nominated Zonal Railways (WR & SCR) procured two types of high performance rail clamps i.e. Robel & Codiun for conducting field trials. Use of these HPRC clamps will enable higher speed on clamped joints at worksites & track restoration sites.
- WR (Nodal Railway), NR & NCR conducted field trials of Robel clamps and SCR (Nodal Railway), SECR & ECR conducted field trials of Codiun clamps as per the approved "Trial scheme & Monitoring Proforma".
- Based on the received performance report of these field trials from above 06 Zonal Rlys, report 'CT-63 (Nov-2024)- Field trials of High Performance Rail Clamps compatible with IR fishplates (Phase-A: Speed potential up to 50kmph)' was submitted to Railway Board vide this office letter of even no. dated 02.12.24.
- Approval of Board on this report is granted vide ref. (iii) above, as under:
 - Both the clamps (Robel & Codiun) are compatible only for fishplates RT-5916 & RT-3714 for 60kg. So, trial report is approved for both the clamps (Robel & Codiun) for fishplates RT-5916 & Rt-3714 for 60kg.
 - For fishplates(52kg) & Joggled fishplates (52kg, 60kg), decision would be taken after successful trials of at least 2 vendors.
- Accordingly, as per above approval of Railway Board , Zonal Railways are advised to use HPRC clamps with the following instructions:
 - HPRC clamps shall be used with fishplates of drawing No. RT-5916 & RT-3714 for 60kg rails at track restoration sites & worksites @ 45kmph permissible speed, subject to daily monitoring by keymen during their daily patrol.
 - If creep is observed while using HPRC clamps on track, then safeguard of the joint to be done accordingly.
 - 02 HPRC clamps per joint shall be used. HPRC clamps to be tightened with a calibrated torque wrench of desired capacity provided by OEM, to ensure the stipulated torque value.
 - P.way staff/supervisors/officials/teams of Zonal Railways need to be well conversant with the HPRC clamps system for ensuring safety & effectiveness of HPRC during use. The user officials to be vigilant till enough experience & confidence is attained for HPRC systems.
 - For proper use of HPRC clamps, detailed instructions/Precautions are recommended in Para-8 of the attached report CT-63 (Nov-2024). Other relevant details/documents are also attached as Appendix with this letter. Functional Requirements Specification (FRS) approved by Railway Board vide ref (i) above, attached as Annexure-I.

6. HPRC clamps not recommended for use on following locations:

- i) On banks having height 5 m or more
- ii) On bridges (having length of waterway as 100 m or more) and on its approaches upto 100 m length
- iii) On curved track having curvature more than 2°

7. After accumulating experience on HPRC clamps, the matter shall be reviewed after 12 months for exploring the potential of further increase in permissible speed on HPRC clamped joints. Zonal Railways shall forward the 'Performance Report' to RDSO on quarterly basis, countersigned by JAG level officer as per the Proforma for performance report attached as Annexure-II.
8. Zonal Railways to procure required number of HPRC clamps, compatible with IR fishplates Drg No. RT- 5916 & RT-3714 for 60kg, along with torque wrenches of requisite capacity from HPRC clamp supplier firms. Inspection of supplied HPRC clamps shall be done by the consignee Zonal Railways.

This is issued with the approval of PED/Infra -I/RDSO.

- DA:** 1. Annex-I: FRS for HPRC + RB's FRS approved letter dated 05.12.19 (02 + 01 page)
 2. Report no. CT-63 (Nov-2024) & Appendices (35 & 61 pages)
 3. RB's approval for HPRC clamp report CT-63 vide letter dated 09.12.24 (01 page)
 4. Annexure-II: Proforma for Quarterly performance report by Zonal Rlys.(01 page)

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Annexure-I

FUNCTIONAL REQUIREMENT SPECIFICATION(FRS) FOR HIGH PERFORMANCE RAIL CLAMP WITH STANDARD/JOGGLED FISH PLATE ON INDIAN RAILWAYS.

1. EXISTING TRACK STRUCTURE ON INDIAN RAILWAYS:

60Kg/ 52 Kg Rail laid on Pre-stressed Concrete Sleepers at sleeper density 1540/1660 nos. per km with elastic fastenings and ballast cushion of 300/350 mm on important Broad Gauge routes.

2. OPERATING CONDITIONS OF IR:

(i) Axle load and Speed

| Traffic Type | Axle Load | Speed upto |
|--------------|-----------|------------|
| Goods | 25T | 100 kmph |
| Passenger | 20T | 160 Kmph |

(ii) Electric Traction (Minimum) : 25 KV AC.

(iii) Track Circuits : DC (2 – 6 volts) / AC 110V & AFTC

(iv) Gauge : Broad Gauge, Nominal (1676 mm)

(v) Ambient Temperature : (-) 5°C to 50°C.

(vi) Rail Temperature : (-) 15°C to (+) 76°C.

(vii) Humidity : Max. 100%

- The clamping system with standard fish plate/joggled fish plate should be compatible with the existing track structure and operating conditions as given in 1 and 2 above. It should enable passing of trains at a higher speed.
- The clamp should be made up of durable material so that the clamp is in usable condition for a minimum period of 8-10 years. The details of the material used in the manufacturing of the clamp shall be furnished. Reports of tests conducted on clamps relating to its quality, type of material, strength of material etc. shall be provided.
- Clamp should be of compact design, lightweight with less maintenance and should be mounted directly on standard or Joggled fish plate on rail /weld joint without drilling of a hole in the rail. The detailed installation procedure should be furnished along with dimensional drawings and pictures.
- The firm would specify the clamping force for the system. The minimum clamping force for the complete system (including all the clamps) should not be less than 30 KN.
- The jaw of the clamp may be connected by suitable arrangement to exert a requisite clamping force on fish /joggled fish plate such that the clamp is capable of fixing the rails to proper alignment.
- The screw or nut of the clamping arrangement should be secured by some locking arrangement to protect from the loosening of clamps due to the movement of traffic.

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Initial tightening torque and resulting clamping force for the arrangement shall be furnished.

9. The clamp should not loose the tightening torque by more than 20% of the initial tightening torque in 30 days, when put in service in running track. The frequency of inspection/maintenance of the system would be furnished. The corresponding nature of traffic and detailed items of inspection /maintenance would be furnished.
10. Minimum ballast excavation should be required in ballasted track and the system should also be usable on ballastless track. Mounting and dismounting of clamps should be easy. The clamp should also enable unhindered working of track machine.
11. Certificate for satisfactory performance in running track at a minimum speed of 50Kmph (100 Kmph desirable) from world railway networks, where it is in use, shall be provided along with track structure and operating conditions of that railway. The duration of use on that railway shall also be provided.

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2024/Track-I/8(1)/HPRC

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भारत सरकार/GOVERNMENT OF
रेल मंत्रालय/MINISTRY OF RAIL
(रेलवे बोर्ड)/(RAILWAY BOARD)

| | |
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| ADG | |
| ST. ED/ED | |
| DATE | |

सं/No. Track/21/2011/0700/7

दिनांक/Date: 8.12.2019

Executive Director/Track-I,
RDSO, Manak Nagar,
Lucknow.

विषय/Sub: Carrying out Laboratory test in regard to Rail clamp-
ROCLAMP 68.5 Short Ver.-5.

संदर्भ/Ref: 1. RDSO's letters No. CT/FF/Misc. dated 01/04.11.2019.
2. Board's letter No. 2013/Tk-II/22/7/4(Genl. Policy) dated
08.03.2016.

In regard to the above it is advised that, Board (ME) has approved the draft Functional Requirement Specification (FRS) for High Performance Rail Clamp with Standard/Joggled Fish Plate on Indian Railways, as forwarded by RDSO vide letter under Ref.-1.

Further, RDSO should include suitable fatigue test to be conducted by the bidder through a Government/Internationally recognised laboratory, report of which should be part of the submission for the product being offered.

The speed potential and fitness of the new product will be decided after provenness in field trials.

Further necessary action in this regard may be taken by RDSO under intimation to Board.

निदेशक/रेलवे-1
निदेशक/रेलवे-2
निदेशक/रेलवे-3
निदेशक/रेलवे-4
निदेशक/रेलवे-5
निदेशक/रेलवे-6

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GOVERNMENT OF INDIA
MINISTRY OF RAILWAYS

Report No. CT-63
(November-2024)

Report on Field Trials of High Performance Rail Clamps
(Robel Clamps & Codiun Clamps) with IR Fishplates
(Phase-A: Speed Potential upto 50kmph)

Track Design Directorate
Research Designs & Standards Organisation, Lucknow-226011

INDEX

| SN | PARTICULARS | PAGE No. |
|---------------------|--|---------------------|
| 1 | OBJECTIVE | 2 |
| 2 | BACKGROUND | 2 |
| 3 | DEFINITION OF HIGH PERFORMANCE RAIL CLAMPS (HPRC) | 2 |
| 4 | TRIAL SCHEME OVERVIEW | 3 |
| 5 | FIELD TRIALS & MONITORING OF HPRC CLAMPS WITH IR FISHPLATES | 4-5 |
| 6 | FEEDBACK FROM NOMINATED ZONAL RAILWAYS & PERFORMANCE REPORT OF HPRC CLAMPS | 6 |
| 7 | SUMMARY OF EVALUATION | 6 |
| 7.1 | SALIENT POINTS & OBSERVATIONS-ROBEL CLAMP | 7 |
| 7.2 | SALIENT POINTS & OBSERVATIONS-CODIUN CLAMP | 8 |
| 8 | PRECAUTION TO BE TAKEN WHILE USING HPRC CLAMPS | 8-9 |
| 9 | RECOMMENDATIONS | 9-10 |
| Annexure-I | SUMMARY OF PERFORMANCE REPORT OF FIELD TRIALS ON ZONAL RAILWAYS | 11-21 |
| Annexure-II | SUMMARIZED OBSERVATION OF ZONAL RAILWAYS | 22-29 |
| Annexure-III | FUNCTIONAL REQUIREMENT SPECIFICATION FOR HPRC CLAMPS | 30-31 |
| Appendix-A | TRIAL SCHEME AND MONITORING PROFORMA FOR HIGH PERFORMANCE RAIL CLAMPS(HPRC) | A-1 to A-12 |
| Appendix-B | PHYSICAL FEATURES OF HPRC CLAMPS | B-1 |
| Appendix-C | DRAWINGS OF ROBEL CLAMP 68.05 VER. 13 | C-1 |
| | DRAWINGS OF CODIUN MK8 & CODIUN MK 2 T-5848 | C-2 to C-11 |
| Appendix-D | PHOTOGRAPHS OF ROBEL & CODIUN CLAMPS IN FIELD TRIALS | D-1 to D-2 |
| Appendix-E | INSTALLATION MANUAL FOR ROBEL CLAMPS | E-1 to E-19 |
| | INSTALLATION MANUAL FOR CODIUN CLAMPS | E-20 to E-32 |
| Appendix-F | CONTACT DETAILS OF HPRC FIRMS AND OEM THAT HAVE PARTICIPATED IN THESE TRIALS | F-1 |
| Appendix-G | COST COMPARISON OF HPRC CLAMPS WITH CONVENTIONAL IR CLAMPS | G-1 |
| Appendix-H | LIST OF COMPATIBLE REQUIRED IR FISHPLATES | H-1 |

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EXECUTIVE SUMMARY

To overcome the limitation of speed restriction of 20/30 kmph on fishplated joints with IRS clamps, these trials with High Performance Rail Clamps (HPRC Clamps), as used in foreign Railways, were carried out in various zones/divisions of Indian Railways.

Against the Global Expression of Interest (EOI) for this product, 02 foreign (Original Equipment Manufacturers (OEMs) expressed willingness to participate in these trials of HPRC clamps, i.e., Robel Clamp (M/s Robel- Germany) & Codiun Clamp (M/s Codiun Ltd-UK). As per the technical literature of these clamps, these/similar high performance clamps are being used on foreign railways to permit speeds upto 100 kmph on fishplated joints.

The compatibility of the offered HPRC clamps for use with various fishplates of Indian Railways has been ensured both for 52 kg & 60 kg rails. Robel Clamps trials were done with 04 types of fishplates & Codiun Clamp trials done with 09 types of fishplates.

A detailed trial scheme for HPRC Field Trials & Monitoring developed & got approved by the Railway Board. For each trial location HPRC Clamp performance was monitored for total 17 days: for initial 07 days these HPRC clamps were fixed in loop lines and performance tested @ 30 kmph, then 03 days on main line @ 30 kmph & finally monitored for 07 days on main line @ 50 kmph speed, over fishplated joints secured with these HPRC clamps.

In these phase “A” trials, the highest speed at which performance of these HPRC clamps was monitored is 50 kmph. In near future, similar trials at speed upto 100 kmph is also envisaged in phase “B” trials.

These Field trials were carried out in different railways i.e., for Robel clamps in WR (Nodal), NR & NCR and for Codiun clamps SCR (Nodal), SECR & ECR between June-2024 to October-2024. Total 10 divisions of above 06 zonal railways were involved. Trials were carried out at 43 locations under different jurisdictions of ADENs/SSEs.

Trials completed at all nominated locations. Performance is recorded as satisfactory by respective divisions/railways.

Based on the feedback received on performance of these 02 HPRC clamps, this Report No. CT-63 (Nov. 2024) titled as “Report on Field Trials of High Performance Rail Clamps (Robel Clamps & Codiun Clamps) with IR Fishplates (Phase-A: Speed Potential upto 50kmph)” is prepared. The reports, remarks, and observations as received from the field are compiled and consolidated in annexure I & II of this report.

1. OBJECTIVE:

At present, IRS clamps being used for fixing of fishplates have the speed restriction of 20kmph/30kmph {as per the provision of Note no. 5 under [Fig. 3.9 to 3.12](#) of IRPWM-2024 (First Reprint)}. This is quite restrictive and leads to time loss, affecting punctuality & maintenance efforts. Hence, trials done to enable higher speed on clamped fishplated joints .

For attaining the above objective, field trials of High Performance Rail Clamps (HPRC) were planned as per functional requirement & compatibility with existing IR fishplates to assess their efficacy and suitability to allow higher speeds at clamped fishplated joints.

In these phase “A” trials, performance of these HPRC clamps has been assessed upto 50 kmph speed by fixing fishplated rail joints with these clamps.

2. BACKGROUND:

RDSO published open-ended ‘Global Request for Proposal (RFP) for HPRC’ vide notification no. CT/FF/Misc. dt 22.05.2020 to shortlist the HPRC clamps being used by World Railways, compatible with IR fishplates.

Functional requirements of these HPRC clamps were made as per the results obtained after doing lab trials for fatigue testing of HPRC (ROBEL) clamps in RDSO/TMM DTE. Results detailed in report TM-232 dt Oct 2019.

Against the published Global RFP, 02 Indian firms offered HPRC clamps of foreign OEMs i.e. Robel Clamp (M/s Robel- Germany) & Codiun Clamp (M/s Codiun Ltd-UK). After detailed evaluation and approval of the Railway Board, both systems have been found suitable for field trials.

Compatible HPRC Clamps were sought for the following fishplates for 52kg and 60kg rail sections-

Table-A

| Fishplate (Normal) | | Joggled Fishplate | |
|----------------------------|-------------|--------------------------|-------|
| RDSO/T-3714 | 52kg & 60kg | RDSO/T-5551 | 52 kg |
| RDSO/T-5850 to RDSO/T-5851 | | | |
| RDSO/T-5915 | 52kg | RDSO/T-5848 | 52 kg |
| RDSO/T-5916 | 60kg | RDSO/T-5849 | 60 kg |

3. Definition of High Performance Rail Clamps : Clamps complying following provisions shall be considered as HPRC clamps in IR. Functional requirement specifications for HPRC are attached at Annexure-III

- Compatible with IR fishplates.
- Minimum clamping force shall be 30kN (including all clamps on a joint) applied by the clamps.
- Specified torque (400 Nm, 580 Nm or as per design of the clamps) to be transferred to achieve minimum clamping force of 15 kN per clamp on fishplate or 30 kN for each rail joint.
- Capable for permitting minimum 50 kmph speed (Desirable 100 kmph speed) on a running track.