

Title: Fatigue Life Evaluation of R260 and 1080HH Alumino-Thermit Welded Rail Joints [SSP 40141]

Duration: July 2024 to January 2025

Deliverables: To study fatigue life evaluation of three numbers of 60 kg/60E1 rail profile of R260 grade and three numbers of 60 kg/60E1 rail profile of 1080HH grade alumino-thermit welded rail joints up to two million cycles of loading or failure whichever is earlier.

Significant Achievements:

Fatigue life evaluation of three numbers of R260 grade alumino-thermit and three numbers of 1080 HH grade welded rail joints were carried out as per Clause 13.0 and Annexure 4 of IRST-19-2021 of RDSO specification. The rail samples were supported over a span of 1500 mm and constant amplitude sinusoidal cyclic loading was applied by means of two point loads at a distance of 75 mm on each side from the centre of weld. The tests were carried out at a stress range of $+20.0 \text{ kg/mm}^2$ (tensile) to -4.0 kg/mm^2 (compression). The frequency of testing was 8.33 Hz. All the six alumino-thermit welded rail joints withstood two million cycles of loading as specified by RDSO specification. After completion of fatigue tests, dye penetrant technique was used to identify any defects/cracks on the tested welded rail joints. No visual crack was observed in the welded rail joints.



Set-up for fatigue test on alumino-thermit welded rail joint



Close-up view of fatigue test set-up

Team:

Dr. A. Ramachandra Murthy
Dr. S. Vishnuvardhan
Dr. M. Saravanan
Shri Abhishek Kumar
Shri Nitin Khandelwal (Project Leader)
Shri V. Thondamon

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