

## **Abrasive wear performance of repair welds on R260 rail using different welding electrodes**

### **Abstract**

This study compares the abrasion resistance of unrepaired base rail steel grade R260 to three different welds repaired using shielded metal arc welding (SMAW). Three different types of pearlitic covered electrodes were utilized in this study. Rail steel and repaired weld metals were examined for chemical composition, microstructure, hardness, wear test, and worn surface. The repaired weld metal using covered electrodes A, B, and C featured acicular ferrite and bainitic structure, while the original rail steel grade R260 possessed a pearlite matrix. The results showed that wear resistance did not correlate with hardness values. The wear resistance of the rail steel was highest, while its hardness was lowest. Covered electrode C, on the other hand, has the highest hardness but the lowest wear resistance. The worn surface of the repaired weld metal employing covered electrode A dominated micro-cutting mechanism. Micro ploughing and micro fracturing occurred in the weld metal of covered electrodes B and C during abrasion test. Therefore, covered electrode A performed best in this repair welding of R260 rail steel.

### **Keywords**

Abrasive wear; Hardness; Microstructure; Rail steel; Shielded metal arc welding