# RAILWELDING ON TRACK Itw welding products

**ITW Welding** 





Larger loads and the increased demand for rail travel will place heavier demand on the rail track. Local wear, cracks and renewal of parts or entire rail tracks will increase. Replacement of worn (embedded) rail is costly and time consuming and causes major disruption to the system operation as well as to road traffic and the general public. Therefore defects must be repaired quickly efficient and in the most effective way.

Due to environmental friendly travel most governments are giving high priority to improvement and development of railway networks and its infrastructure. This will include the development of low cost travel involving regional, light rail and trams as well as the upgrading of the existing mainline network.







### SOLUTIONS FOR EFFICIENT RAIL WELDING

Joining of rail (butt welding), using copper backings and self shielding wires (FCAW process). Modern technology allows to use specialized flux cored wires increasing deposition rate and quality. Compared to the "SMAW stick process", the Hobart Fabshield 4 wire increases productivity by over 30-40 %. The general procedure for butt welding is that 2 pieces of rail are placed on a copper backing plate. The distance between the work pieces is about 20mm. The root is first welded using a torch with special narrow gap nozzle. A good root weld profile maximizes fatigue strength.

After the root has been welded, copper backings are placed around the rail profile. Welding of the remaining profile, is carried out using a weaving movement. Care should be taken not to touch the copper backings. The welding is continuous while the gap is filled layer by layer. After welding, the copper backings are removed and the rail is ground to the right profile and ready for use.

### **REPAIR WELDING USING FCAW AND SAW PROCESS**

Tight curves that are subjected to hard flange contact, suffer from accelerated side wear. The replacement of worn rail is not only expensive but it also disrupts road traffic movement and inconvenience to tram users and local residents. Rail repair welding allows areas of worn rail to be rebuilt with hard wearing weld material. Effective restoration of worn areas of rail, back to the original profile can be achieved.

FCAW or SMAW can be used for local wear or repair welding of potholes, crossings and frogs using suitable sticks, self shielded or gas shielded tubular wires.

SAW repair welding (SUB ARC) is a welding technique that allows on site repair of (grooved) rail profile wear bringing significant cost savings to the system operator/ maintaining company.

### **KEY BENEFITS INCLUDE:**

- Minimal down time.
- Rail repair is normally done during night time, causing minimal disruption to traffic.
- The existing rail and surrounding polymer integrity is maintained.
- The deposited weld layer is more wear resistant than the parent steel.

# **TYPICAL RAIL DEFECTS / WEAR**



\*Clad-welded with FCAW or a chrome band electrode will reduce screeching by 80%.

### WIDELY USED FILLER METALS AND APPLICATIONS

JOINING					
Tubular wire	Application	Туре	Typical analysis		
HOBART Fabshield 4	Butt welding	Joining CMn / LA	0.27% C, 0.73% Mn, 0.3% Si, 1.42% AL		

REPAIR AND MAINTENANCE					
Stick Elect	trodes	Application	Туре	Typical analysis	
<b>McKAY</b> °	M-932	Crossovers / Frogs / Rail ends / Switch Points	Carbon / Low alloy	0.13% C, 0.8% Mn, 0.4% Si, 2.2% Cr, 1% Mo	
<b>McKAY</b> <sup>°</sup>	118	Crossovers / Frogs	Manganese	0.8% C, 16.5% Mn, 0.5% Si, 5% Cr, 0.3% Ni	
<b>McKAY</b> <sup>®</sup>	119	Crossovers / Frogs	Manganese	1% C, 19.5% Mn, 0.5% Si, 5% Cr	
<b>McKAY</b> <sup>®</sup>	121	Crossovers	Manganese	0.4% C, 4.1% Mn, 0.4% Si, 19.2% Cr, 9.2% Ni, 1.4% Mo	
Tubular wi	res	Application	Туре	Typical analysis	
<b>McKAY</b> <sup>®</sup>	Tube Alloy 242-0	Crossovers / Frogs / Rail ends / Switch Points	Carbon / Low alloy	0.25% C, 1.3% Mn, 0.7% Si, 4% Cr, 0.5% Mo	
<b>McKAY</b> <sup>®</sup>	Tube Alloy 218-0	Crossovers / Frogs	Manganese	1% C, 15% Mn, 0.4% Si, 3.1% Cr, 0.4% Ni	
<b>McKAY</b> <sup>®</sup>	Tube Alloy 219-0	Crossovers / Frogs	Manganese	1% C, 20% Mn, 0.6% Si, 4.5% Cr	
<b>McKAY</b> <sup>°</sup>	Tube Alloy AP-0	Crossovers / Frogs	Manganese	0.4% C, 16.5% Mn, 0.3% Si, 13% Cr	
SAW wire/	/Flux	Application	Туре	Typical analysis	
<b>McKAY</b> <sup>°</sup>	Tube Alloy 242-S MOD	Rail Rebuild / Crossovers / Frogs	Carbon / Low alloy	0.14% C, 2.0% Mn, 0.8% Si, 3.0% Cr, 0,75% Mo	
<b>McKAY</b> <sup>.</sup>	Tube Alloy AP-S	Crossovers / Frogs	Manganese	0.36% C, 13.3% Mn, 0.47% Si, 15,1% Cr	
McKAY <sup>®</sup>	HFN-N Flux		Sub Arc Flux		

## RAIL WELDING EQUIPMENT



AUTO-LINE 208-575V, 1- 3 Phase

Standard 36,3 kg, lightweight 31kg

SMAW/GMAW/FCAW/GTAW/CAC-A

5-425A, 10-38V

350A 60% at 40°C



#### XMT 350 CC/CV

Autoline power management technology.Input Power:<br/>Rated Output:Inverter Technology, suitable for generator.Rated Output:<br/>Wire feed speed:Wind tunnel technology, Adaptive Hot Start.Wire feed speed:<br/>Wire feed speed:Overheat protection, low OCV.Weight :<br/>Process:

### **SUITCASE EXTREME 12 VS**

Strong polypropylene case with build in slide rails.Totally enclosed, impact resistant, flame retardand case. Digital meters, trigger hold, wire jog and gas purge function. Potted and trayed PCB. Optional wire end switch (WS version). Input Power: Rated Output: Wire feed speed: Weight : Process:

14-48 VDC welding voltage/ 15-110 VDC OCV 425A 60% at 40°C 1.3 – 19.8 m/min 15.9 kg GMAW/FCAW



#### **BIG BLUE 400X CC/CV**

Tailored Arc Control (DIG). Low OCV. Auto remote sense. Robust design. Low RPM, fuel efficient engine. Quiet only 96 Lwa (77dB at 4m) at max output. Input Power: Rated Output: Wire feed speed: Weight : Process:

Engine driven (Diesel 1800 RPM) 20-420A/ 14-30,3V 400A at 30% / 300A at 60% at 40°C 499 kg SMAW/GMAW/FCAW/GTAW/CAC-A



### **IRONMATE 1260**

Special welding gun for FCAW-Self Shielded wires. Replaceable 50° and 90° gooseneck, aluminium jacketed, replaceable liner. 90 or 180mm narrow gap welding nozzles. Rated Output:

350A at 60% at 40°C

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**77 Miler** 

### SAW TRACTOR

OBADI

Sub Arc equipment and tractors for mechanised rail welding. Custom made systems and options Single wire/ twinarc/ strip cladding. Input Power: Rated Output: Wire feed speed: Process:

115 VAC 15 + 44 VDC/ 150 - 1000 A 0 - 10 m/min. SAW

VolkerRail's Miller BIG BLUE 400X for daily maintenance on the Dutch Railway tracks."Speed and Reliability"

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