In today’s world a reduction in carbon footprint requires a cost effective and sustainable transport system – weld restoration of worn Grooved Rails offers a cost effective approach for life extensions and a significant cost saving than replacing worn track. Using Welding Alloys and Tata Steel patented consumables, machinery and technology the cost savings can be fully maximized.

We have been working with Welding Alloys for many years. I am impressed with the dedicated approach of Welding Alloys people. They are on hand to assist with technical issues and innovative solutions tailored to our needs.

Dr. Jay Jaiswal, Director, Track Engineering & Technologies, Tata Rail.

Scott Wilson, Welding Operations Manager, VolkerRail

Customer references across 5 continents
### Features & benefits of refurbishing

- Quickly restore and repair the rail in-situ
- Recycle used rails by repairing in the workshop
- Improve the life and performance of the rails using customised welding consumables
- Reduce rail maintenance downtime and track closures
- Achieve cost savings up to 80% compared to replacement costs

### Flux cored wires and automated solutions for:

#### Railway
- Crossings
- Switchblades and stock rail
- Rail heads

#### Light rail
- Crossings
- Switchblades and stock rail
- Rail heads
- Curved gauge corner
Weld rebuilding vs. replacement

In today’s world, a reduction in carbon footprint requires cost effective and sustainable transport systems. Weld restoration of worn embedded grooved rails offers a cost-effective approach to extend the lifetime of the track and a significant cost saving compared to replacing worn track. Weld rebuilding can take place in-situ without the need to uproot the rails at major cost, disruption and environmental expense.

Features & benefits of cored wires vs. stick electrodes

- **Faster deposition rate** – saves time, leading to reduced rail maintenance downtime and required operator time.
- Minimisation of heat input and reduced heat affected zone (HAZ) – **homogeneous** weld deposit leading to safer rails.
- Higher level of **consistency** and **reproducibility** – using a fully automated process.
- Increased **integrity** and **quality** of repair.
- **Cost savings of more than 60%** per kg of metal deposited achievable.
Gauge Corners
The fastest high tech tram rail rebuilding

Why Welding Alloys?

- Consumables developed specifically for tramways and gauge corner restoration.
- Products approved worldwide.
- 50 years of experience in the manufacture of welding consumables.
- Able to customise solutions and offer technical expertise in developing welding procedures.
- Customer references across 5 continents.
- Manufacture of automated welding equipment to provide a complete on-site welding solution.
- Provide full training.
- Close work with OEM rail manufacturers to develop innovative and unique products.

Our products

<table>
<thead>
<tr>
<th>Product name</th>
<th>Description</th>
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<tbody>
<tr>
<td>HARDFACE 19.9 6-S</td>
<td>Cored wires for gauge corner restoration. Austenitic structure up to 46 HRC.</td>
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</table>

Available as open arc, sub merged arc and coated electrodes

Profile of refurbished rail before grinding

Open arc welding process in Toronto
Rail Crossings Refurbishment
The best welding solution for all rails

Weld rebuilding vs. replacement

Crossings or frogs are subjected to daily metal-to-metal wear, abrasion and impact, consequently they become extremely worn and subject to damage or potential breakages. Refurbishment by weld rebuilding allows you to: quickly restore and repair the crossing in-situ, recycle used crossings in the workshop, reduce maintenance downtime and track closures and achieve cost savings of 80% compared with replacement costs. Standard alloys used in rail crossings need to be welded by respecting low inter-pass temperature.

Features & benefits of cored wires vs. stick electrodes

• Faster deposition rate – saves time, leading to reduced rail maintenance downtime and required operator time.

• Minimisation of heat input and reduced heat affected zone (HAZ) – safer rails with reduced embrittlement and extended lifetime.

• Higher level of consistency and reproducibility – fully automated or semi automated process.

• Increased integrity and quality of repair.

• According to US Rail FCAW is the favoured process across the USA, for crossing rebuild or repair

Heat input (kJ/mm): SMAW vs. FCAW

Heat input based on electrode at 200A & 25V welding @ 130mm/min and wire at 300A & 28V welding @450mm/min on a manganese crossing
Rail Crossings Refurbishment
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for Manganese crossings

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<tr>
<td>HARDFACE AP-O</td>
<td>Cored wires for Mn-steel track components; high rate of work hardening 50 HRC. (for HARDFACE AP-G) Shielding gas is M21</td>
</tr>
<tr>
<td>HARDFACE AP-G</td>
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<td>EN ISO 14700: T Fe9</td>
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for Perlitic crossings

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<tr>
<td>HARDFACE TN-O</td>
<td>Flux cored wire containing Ni for the build-up for the build-up of rail heads, rail ends, switch points and carbon steel crossings. Hardness 300-350 HB. DB Approval.</td>
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<tr>
<td>HARD FACE TLN-O</td>
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<tr>
<td>EN ISO 14700: T Fe3</td>
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All product available in sizes 1.6mm and 2.0mm, as coupled with the travel speed puts less heat into a manganese crossing.

Applicable on all UIC/EN rail grades

*Available open arc and electrodes
Rail Heads and Ends
One product for fast weld maintenance

Maintenance vs. replacement

The rail heads can become damaged after a relatively short period of time due to the wheel spinning under load. The metal-to-metal wear leaves surface and sub-surface defects which, left untreated, can lead to further damage of the rail - resulting in premature failure. Refurbishment by weld rebuilding allows you: to restore the rail in-situ, recycle used rails in the workshop and reduce maintenance downtime. Using an automatic or semi-automatic process offers a cost effective solution compared to replacement of the rail. A joining solution for rails is also proposed.

Features & benefits of cored wires vs. stick electrodes

- **Faster deposition rate** – saves time, leading to reduced rail maintenance downtime and required operator time.

- **Minimisation of heat input** and reduced heat affected zone (HAZ) – safer rails with reduced embrittlement and extended lifetime.

- **Higher level of consistency and reproducibility** – fully automated or semi automated process .

- **Increased integrity** and **quality** of repair.

- **Cost savings** of more than 50% per kg of metal deposited achievable.

![Time Saving for 100kg of Weld Material](image)

Time savings of up to 50% using wire rather than electrode leading to significant cost savings
Rail Heads and Ends
One product for fast weld maintenance

Why Welding Alloys?

- Consumables developed specifically for tramways and gauge corner restoration.
- Products approved worldwide.
- 50 years of experience in the manufacture of welding consumables.
- Able to customise solutions and offer technical expertise in developing welding procedures.
- Customer references across 5 continents.
- Manufacture of automated welding equipment to provide a complete on-site welding solution.
- Provide full training.
- Close work with OEM rail manufacturers to develop innovative and unique products.

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<td>TRI S RW, EN ISO 14700: T Fe10</td>
<td>Flux cored wire developed for butt-welding of all rail types. May also be used for surfacing.</td>
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Applicable on all UIC/EN rail grades
Available open arc and coated electrodes

Butt joint of rails welded with TRI S RW-O

Fully automated D3 Touch Rail buggy

Open - arc welding of rails
Stock Rail and Switchblades
Efficient fast welding solution

Weld rebuilding vs. replacement

The demand for reliable and safe transport systems is increasing year on year. The stock rail and blade of a railway is subjected to daily metal-to-metal wear and impact conditions, this leads to a high requirement for maintenance or replacement. Refurbishment by weld rebuilding allows you to: quickly restore the switch blade and stock rail in-situ, carry out maintenance in the workshop if required, reduce rail maintenance downtime and achieve cost savings of around 60% compared to replacement costs.

Features & benefits of cored wires vs. stick electrodes

- **Faster deposition rate** – saves time, leading to reduced rail maintenance downtime and required operator time.
- **Minimisation of heat input** and reduced heat affected zone (HAZ) – leads to safer rails with reduced embrittlement and extended lifetime.
- **Higher level of consistency and reproducibility** – fully automated or semi automated process.
- Increased **integrity** and **quality** of repair.
- **Cost savings of** around 50% per kg of metal deposited achievable.

Time saving of up to 30 hours leads to significant cost savings
Stoked Rail and Switchblades
Efficient fast welding solution

Why Welding Alloys?

• Consumables developed specifically for tramways and gauge corner restoration.
• Products approved worldwide.
• 50 years of experience in the manufacture of welding consumables.
• Able to customise solutions and offer technical expertise in developing welding procedures.
• Customer references across 5 continents.
• Manufacture of automated welding equipment to provide a complete on-site welding solution.
• Provide full training.
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Applicable on all UIC/EN rail grades
*Avalable open arc, submerged and electrodes

Switchblade requiring refurbishment

After welding and grinding

Part refurbished in the workshop

Switchblade fully refurbished in the workshop using open arc welding
Weld rebuilding vs. replacement

Tamping is an essential part of track maintenance, used to pack the ballast under sleepers, to correct track alignment and ensure the track is parallel and level. The service life of the tamping tines/tools has a fundamental influence on the economic efficiency of this maintenance work; in general, tines are rejected after 15%-20% wear in their thickness/width. A long service life of the tines weld hardfaced with WA products ensures a consistent quality of tamping and reduced costs in the labour required for replacing the tines.

Features & benefits

- **Withstands extreme abrasion and impact forces**
- **Extremely hard, finely dispersed titanium carbides** lead to excellent results
- **Extension in service lifetime**
- **Economical and automated hardfacing solution**
- **Customised cored wires to suit individual working environments**
Why Welding Alloys?

- Consumables developed specifically for tramways and gauge corner restoration.
- Products approved worldwide.
- 45 years of experience in the manufacture of welding consumables.
- Able to customise solutions and offer technical expertise in developing welding procedures.
- Customer references across 5 continents.
- Manufacture of automated welding equipment to provide a complete on-site welding solution.
- Provide full training where required.
- Expertise in each application.

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<td>HARDFACE TIC-O</td>
<td>Open arc flux cored wire designed specifically for the build up weld and protection of tamping tines. Contains extremely hard finely dispersed titanium carbides. HRC 57.</td>
</tr>
<tr>
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<tr>
<td>HARDFACE HC-O</td>
<td>Open arc flux cored wire designed specifically for the build up weld and protection of tamping tines. Highly abrasion resistant primary and eutectic chromium carbides deposit. HRC 58</td>
</tr>
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Automated weld restoration of worn frogs and rails offers a more cost effective approach to extend track lifetime compared to replacing worn frogs or track. Welding Alloys FTR machine, with pendant machine control technology, allows fully automated control of the welding process with little operator intervention.

**Features**

- Multiple modular configurations
- Touch screen pendant control system
- Lightweight
- Conforms to UCI standards
- Approved by SNCF

**Benefits to You!**

- Rail surface welding
- Frog hardfacing, different welding shapes possible - triangular, trapezoidal, rectangular
- Portable
- Huge reduction in costs, up to 80% savings with repair solution compared to replacement
Specifications

- Two direction welding – no need to return the machine
- Automated welding with X, Y and Z axis - max. length 400 x width 200mm
- Track width - between 1420 – 1472 mm
- Conforms to Low Voltage Directive 2006/42 CE, norm NF EN 139777
- Motorised wheel with brake system – stops in case of emergency
- Weld up or down 1:10 gradients and 12 metre radius curves
- Manually operable clutch – minimises downtime by providing a fast return to the weld start position
- Automatic stick-out length adjustment

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www.welding-alloys.com

Welding Alloys Group
The go-to provider of automated equipment for wear protection