



## Perfectly connected on the move

Welding on the route  
Mobile welding factory  
Rail replacement

# As good as in the factory In-track welding



How the rails are connected is the most sensitive zone of every railway route. The technology of rail connections must be such that there are no use restrictions, the service life of the rail is not compromised, and the noise level is kept low. Clearly, rail connections must be of the highest quality in terms of technology, equipment, and the experts who execute them. In addition to its services in its own rail welding factories, Vossloh also offers the perfect solutions for **mobile welding**.



## Mobile welding – our method

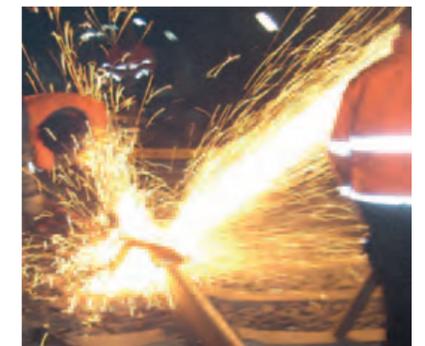
In order to be optimally equipped for every rail route, region, and customer requirement, Vossloh provides highly qualified personnel for all conventional welding technologies.

**Mobile flash butt welding** is the most modern and highest quality form of rail welding technology.

**Mobile flash butt welding factory:** For large-scale construction projects, Vossloh can set up what we call our "semi-stationary welding factory" directly on site. Here too, flash welding is employed.

**Aluminothermic cast welding** is used both for switches and on rail routes.

Of course, the Vossloh mobile welding team also performs all types of **weld cladding**.



Rail separation



Flash butt welding

# Excellent and economical Mobile flash butt welding



## TECHNICAL DATA

- Road speed (road-rail vehicle): 80 km/h
- Fast on-railing and off-railing
- Track speed: 20–30 km/h
- Compressive force: 600 kN
- Automatic cut-off of the welding burr
- Welding procedures per shift: 35–40

Mobile flash butt welding is the most modern and highest quality form of rail welding technology. It is a procedure that does not use any filler metal, thus guaranteeing **maximum quality**. Flash butt welding is used worldwide in all stationary rail welding factories to manufacture long rails. In order to provide this quality for welding joints manufactured on the track, Vossloh also uses **mobile flash butt welding**. Mounted on road-rail or rail-bound vehicles, these welding modules provide a maximum degree of quality, economic efficiency, and flexibility in the manufacturing of **continuous welded track**.

## Flash butt welding – completely continuous track

The **mobile flash butt welding** of Vossloh is in no way inferior to the stationary method. This is because we have developed special technologies and means of transport for this purpose, which we have continuously optimised over the years. Today, Vossloh is **one of the leading companies** in flash butt welding with more than 20 years of experience in mobile use. We have a large number of machines and can carry out numerous projects simultaneously, even on high-speed routes. Having obtained the necessary approvals in many countries, our mobile flash butt welding teams have already been deployed successfully on three continents.

- Flash butt welding machines on road-rail vehicles (welding module: AMS 60)
- Rail-bound flash welding machine
- Computer-controlled welding process monitoring and documentation

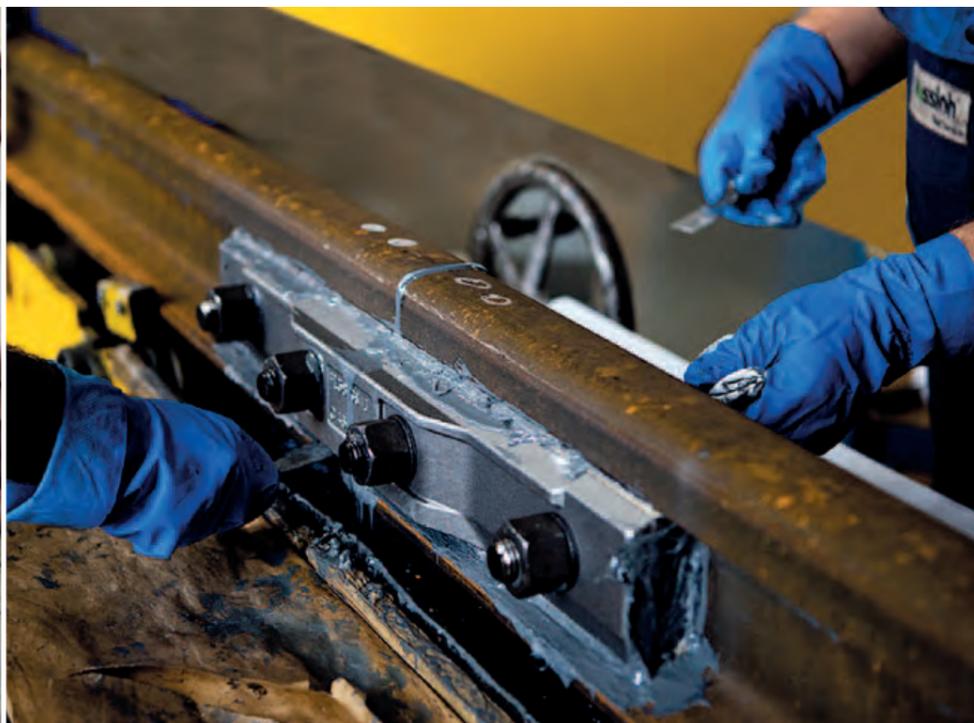
## BENEFITS

- High quality due to automatic weld monitoring and data recording
- Reliable welding procedure, proven for decades
- Flexibility thanks to road-rail technology



Fresh weld seam immediately prior to fine processing

Large photo: Road-rail vehicle with flash-mounting module



## Straight from the construction site: Insulated joints

Vossloh offers manufactured **insulated joints** using both stationary and mobile methods, either through the direct manufacturing of MT joints at the construction site or the delivery of IVB-30 and S joints from the factory. These joints can also be integrated and welded into the rail string to fit precisely.



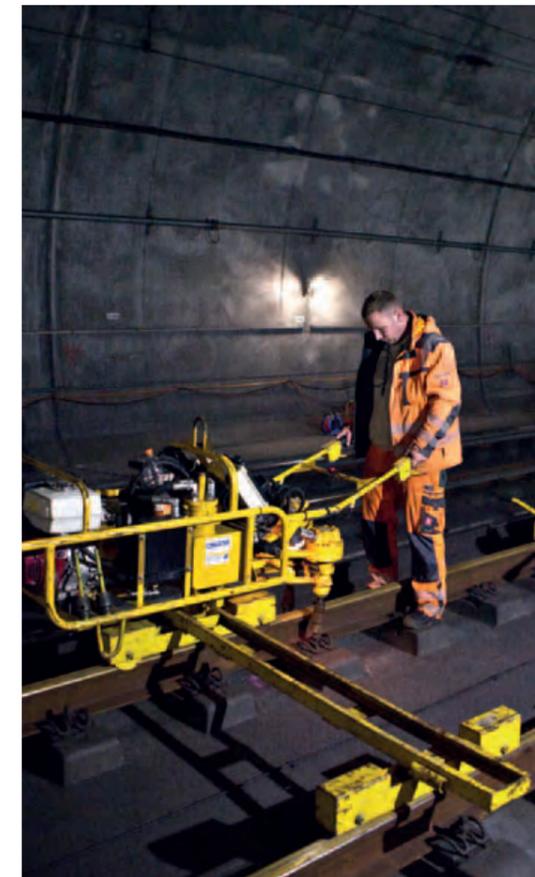
Glued insulated joint IVB-30

## Cast welding and weld cladding

With more than **25 years of maintenance work** for the German Railway, Vossloh also offers additional welding methods for the refurbishment or repair of rails and switches.

With **weld cladding**, a coating that is of the same or similar material that approximates the rail surface properties is welded onto the rail, thus realigning component properties with the rail's original condition. Weld cladding is particularly suited to repair welding on worn or corroded rail parts.

Vossloh uses the **aluminothermic cast welding method** on switches and on rail sections. Aluminium granulate and iron oxide, which has a high reaction heat after ignition, is used to generate liquid steel without employing external energy sources. This liquid steel can then be used to weld rail ends securely.



Track tensioning

### AT VOSSLÖH, ALL OUR WELDERS ARE EXPERTS

As a **full-service provider**, we, along with our experienced foremen, provide on-site welding services that integrate into the overall construction management plans:

- Performing and providing specialist supervision of stress equalisation procedures
- Hydraulic or thermal stress equalisation
- Tensioning included: using calibrated electric screwdrivers or double-head electric screwdrivers. Includes documentation
- Unloading and loading of rails
- Rail replacement using the production-line method

Vossloh employs the best-trained experts with experience in superstructure welding:

- Specialist welding engineers superstructure welding
- Experts in superstructure welding
- Specialist construction site manager for stress equalisation
- Category 1 superstructure welders



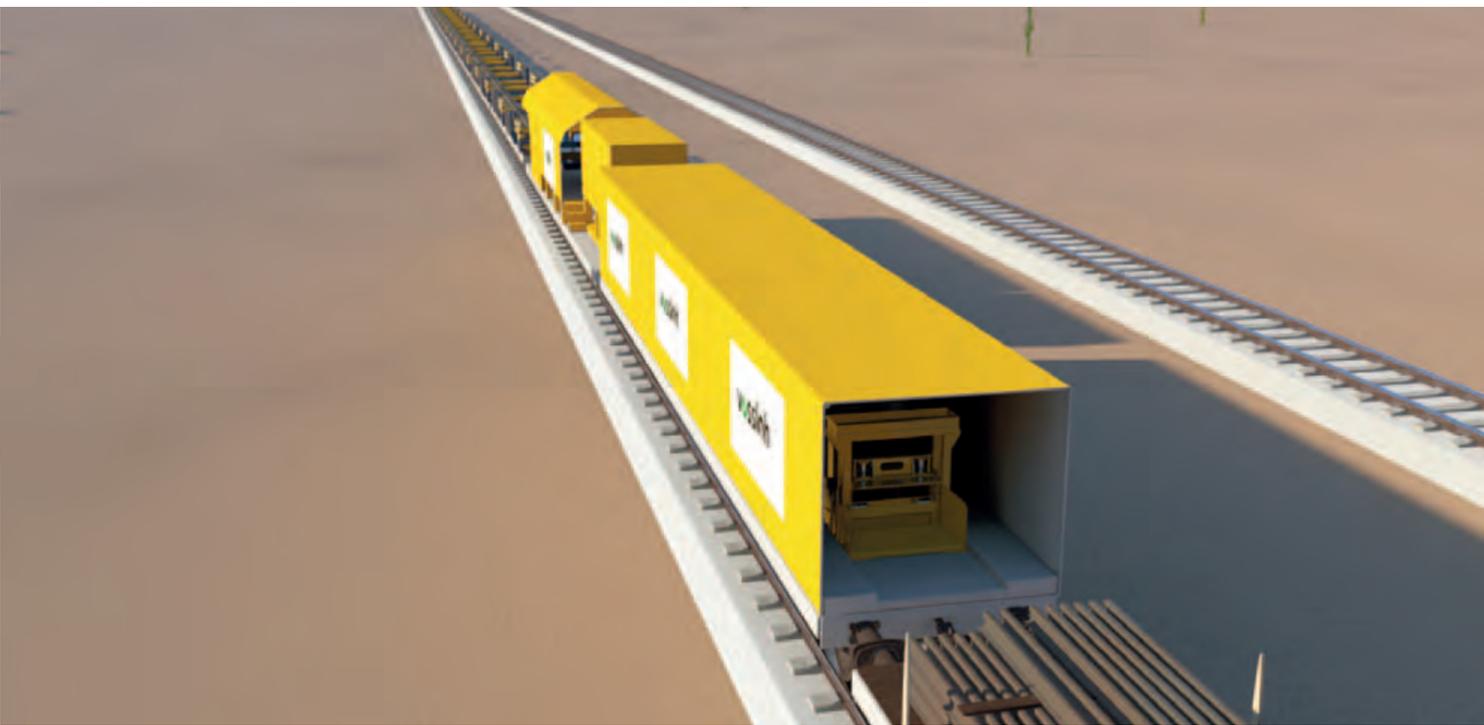
In the mobile welding factory  
**Semi-stationary welding**



**ADVANTAGES**

- Welding of short rails in close proximity to the construction site
- Manufacturing of long rails up to 400 m in length directly on special wagons
- Highest welding geometry standards due to stationary straightening and welding technologies
- Cost savings by minimising transport distances for long rails
- Simplified logistics due to needs-based production „on site“
- Fast construction through the use of long rails
- Independent power supply
- Suited for all common rail profiles and qualities

In a mobile welding factory, the base rails from the rolling mills are welded into long rails in the immediate vicinity of the construction site. Flash welding technology, comparable to the high quality standard of stationary welding factories, is used. This concept also combines **stationary quality standards** with the **logistical advantages of mobile flash butt welding technology**.



**Like a factory – but much easier**

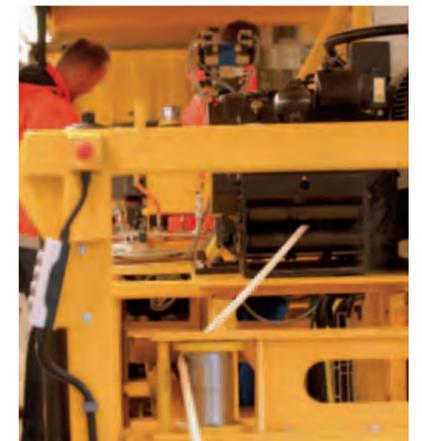
In order to offer the quality of a welding factory on site, Vossloh developed the **mobile welding factory**. It is mounted on the track, but also has a mobile and modular design. Special wagons are combined in order to perform mobile welding, whereby the heart of operations is the **flash butt welding module**. As a result, many construction sites can be supplied with rails much faster, more easily and more affordably.

**AREAS OF APPLICATION**

- The mobile flash butt welding factory is used when:
- The projects are particularly long term or large-scale
  - No long rails can be delivered
  - The delivery takes too much time and effort
  - The route requires the rails and welds to be of particularly high quality



Welding head



The rail is pulled into the processing module using the retrieval unit

## Manufacturing of long rails up to 400 m



Short rails welded into long rails are pushed onto the transport unit, where the fine grinding takes place after cooling.

Connection of short rails with a fishplate

## Mobile welding factory – Modular structure

### THE THREE MODULES OF THE MOBILE WELDING FACTORY

#### Short rail storage

The rails are delivered on railway wagons. The rails can be between 15 m and 120 m long.

#### Processing unit

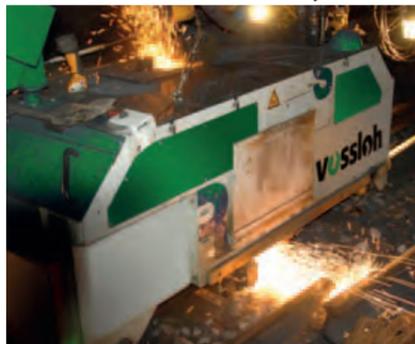
This is where everything takes place: the welding preparation, the exact positioning of the rails to be connected by a transport crawler, and the welding itself.

#### End processing of the welding procedures

Grinding and straightening take place here, and rails can be up to 400 m long.



Construction site in southern Germany



#### Short rail wagon

Short rails are generally fed into the rolling mills using wagons from public railway traffic. Using a retrieval unit, the rails are pulled onto the processing module.



The transport crawler moves the rail back and forth to the precise millimetre



#### Long rail transport unit (LSE)

The completed, welded long rails are stored on the long rail transport unit and brought directly to the construction site.

# One-step rail replacement It's what we do



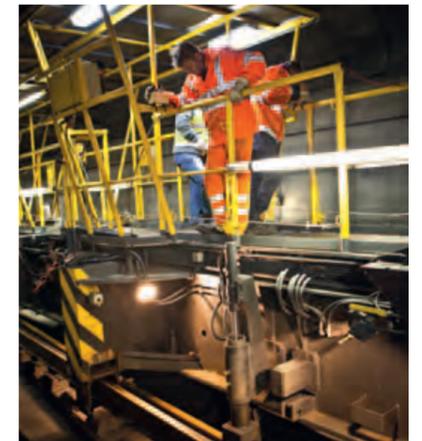
Even with the best rail care, rails eventually have to be replaced. For this large-scale job, Vossloh has the perfect solution: our **production line rail replacement method**.  
 With this rail replacement vehicle, all work sequences are so perfectly interconnected that the entire process can take place during a single shutdown period. Railway traffic interruptions are thus reduced to a minimum. Vossloh's rail replacement system is based on vehicle modules that carry out the entire operation directly on the rail using the production line method.



## All in one: der The SWW rail replacement vehicle

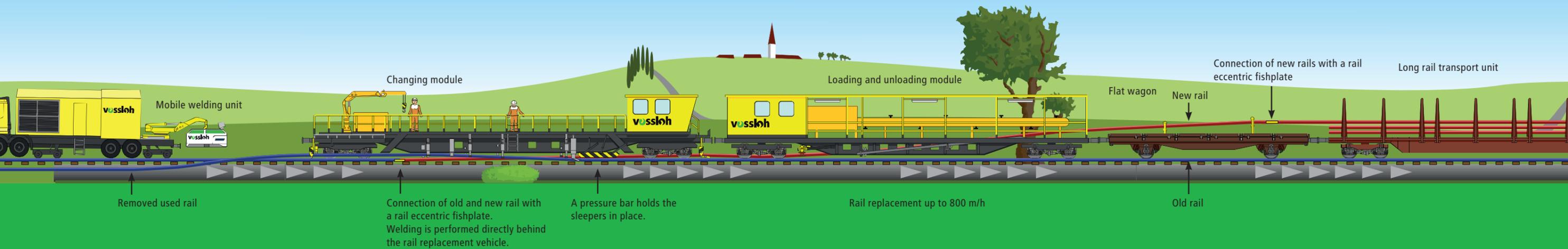
### ALL THE BENEFITS YOU COULD WISH FOR: OUR RAIL REPLACEMENT SYSTEM

- Reduction in shutdown periods and construction times through the use of modules that run continuously at high working speeds.
- Integrated manufacturing of continuously welded track using rail-driven flash welding machines
- Economic deployment thanks to a combination of unloading and replacement
- Use of the long rail transport unit for delivery and removal
- Improvement in quality through permanent process monitoring during rail changing and welding
- Adherence to the rail's bending line



Rail replacement in a tunnel – traffic flow continues uninterrupted on the adjacent track

## Changing rails with the rail replacement vehicle from Vossloh



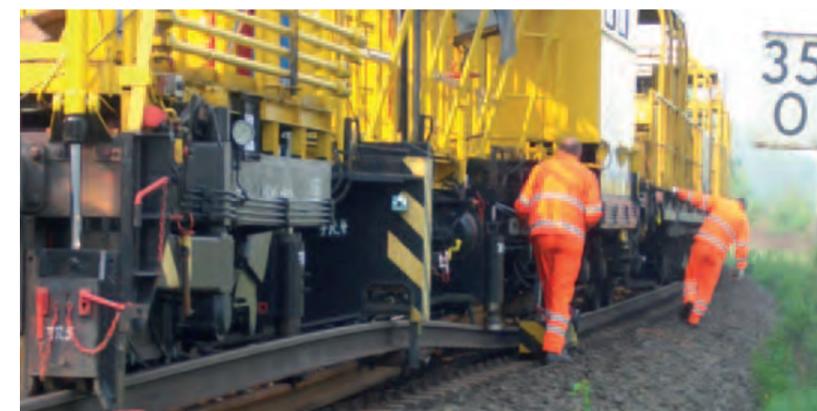
## Vossloh's rail replacement system: Modular efficiency

### NINE STEPS TO THE NEW RAIL

1. When the rail fastenings have been loosened, the rail replacement vehicle enters the track laying site.
2. The crane on the changing module lifts the rails and the changing module's guide rollers adjust them.
3. At the beginning of the construction site, the loading and unloading module is used to pull the new rails through the changing module's guide rollers.
4. With special fishplates, the new rails are connected to the old rails.
5. The long rail transport unit guides the rails to be installed into the rail rail storage, and then the rails to be removed are guided out onto the sleeper heads.
6. After several rail lengths have been replaced, the welding of the installed rails begins, usually by flash welding using the welding module.
7. Stress equalisation is performed at the same time as the welding of the rails.
8. The removed rails are taken up in the reverse working order of the unloading and changing of the rails by moving the rail changing vehicle under the old rails.
9. After that, the follow-up work, such as the reinstallation of the earthing, points, check rails, level crossings, rail anchoring devices, etc. is performed.



Rail replacement in a tunnel near Frankfurt



New rails should be ordered in lengths of 180 m. This reduces the number of welding procedures, speeds up the work, and better utilises the capacities of the long rail transport unit. As much stationary removal as possible of the edge-decarburised zone (rolling scale) is preferred in this case, as this makes the use of a rail grinding vehicle unnecessary.

Find out about  
our other rail  
maintenance  
services:

**vossloh**



**Always ready for the track:  
Asset Management**

- Rail Inspection
- Data Processing
- Availability Management
- Training and Consulting

**vossloh**



**Rails perfectly  
maintained**

- High Speed Grinding
- High Performance Milling
- Flexis System

**vossloh**



**Co-ordinated  
Perfectly**

**Loading & Logistics:**  
Transporting and loading rails and turnouts  
Construction site logistics

**vossloh**



**Factory-based  
Rail Production Services**

- Long rail manufacturing
- Rail transition points and insulated joints
- Profile processing
- Logistics

**vossloh**



**Rail System and Turnout Services**

- Inspection and testing
- Diagnostics
- Maintenance
- Asset management
- Delivery of standard Vignol-rail turnout