Tectyl™

# Case study: Long-Term Corrosion Protection for Railway Wagon Underbodies

## Problem

Railway freight wagons operate under constant mechanical stress and extreme environmental exposure. Moisture, ballast impact, de-icing chemicals, and accumulated contaminants aggressively attack the underbody structures of wagons over time. As a result, corrosion typically develops on structural beams, reinforcement areas, welded joints, and flat steel panels.

During mid-life refurbishment or overhaul cycles, operators frequently discover:

- Advanced corrosion on underbody steel surfaces
- Rust grades ranging from moderate surface corrosion to heavy pitting
- Local structural damage requiring welding and panel replacement
- Insufficient remaining protection from legacy coatings

If corrosion is not properly stabilized and sealed during refurbishment, degradation will continue beneath newly applied coatings, leading to premature failure, repeated repairs, and reduced wagon service life.

Railway operators therefore require a **robust, repair-compatible corrosion protection system** that can be applied under industrial conditions and delivers long-term durability.

## Tectyl proposed approach

Tectyl provides a **two-stage refurbishment corrosion protection system** specifically designed for railway wagon underbodies. The solution combines **corrosion stabilization with high-build mechanical protection,** ensuring reliable performance even on previously corroded steel surfaces.

The system is optimized for refurbishment workshops and integrates seamlessly into standard railway repair cycles.

## Solution

**Refurbishment Corrosion Protection System for Railway Wagon Underbodies**

### 1. Inspection and Structural Repair

Before coating, the wagon underbody is thoroughly inspected:

- High-pressure washing, preferably with steam, to remove dirt and residues
- Visual inspection under adequate lighting, with focus on load-bearing and reinforcement areas
- Identification of corroded or structurally compromised components

Where corrosion has caused structural damage, affected sections are replaced by welding. All structural repairs are completed prior to surface treatment.

### 2. Surface Preparation

Based on inspection results, underbody surfaces are classified according to corrosion severity:

- **Rust Grade C:** Mill scale removed, light pitting visible
- **Rust Grade D:** Mill scale fully degraded, significant pitting visible

In both cases, surfaces are prepared to **ST 2 standard** using mechanical methods such as wire brushing, grinding, and scraping. Loose rust, scale, and contaminants are removed until the surface exhibits a faint metallic sheen.

Final cleaning is performed using compressed air, vacuum cleaning, or clean brushes. Oil, grease, and residues are removed as required. Newly installed steel panels are primed and fully cured before further treatment.

rust grade C

rust grade D

ST 2 standard

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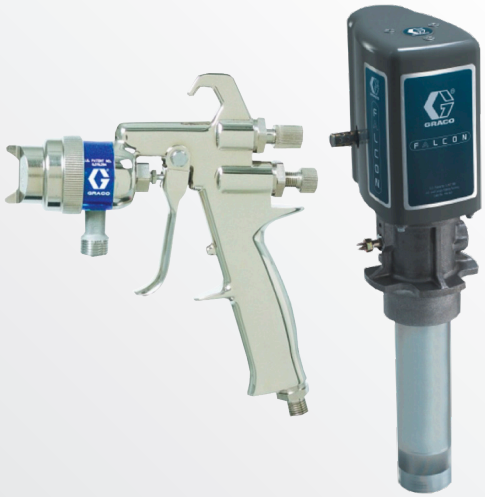



## 3. First Layer: Corrosion Stabilization

**Tectyl 5401 WRC** is applied as the first protective layer.

Key characteristics:

- Designed for application on corroded steel surfaces
- Penetrates remaining rust and stabilizes corrosion
- Can be applied to slightly damp substrates within defined temperature limits

The product is applied by spray, roller, or brush, with industrial spray application recommended for optimal quality and film control. Tectyl 5401 WRC is applied until the surface reaches the dripping point.

After drying under ventilated conditions, the treated surface exhibits a dark grey appearance, indicating effective penetration and corrosion stabilization.

## 4. Second Layer: Long-Term Mechanical Protection

Once **Tectyl 5401 WRC** has cured, a second protective layer is applied within the defined time window.

**Tectyl 5660 W** is applied as a high-build underbody coating using an airless spray system.

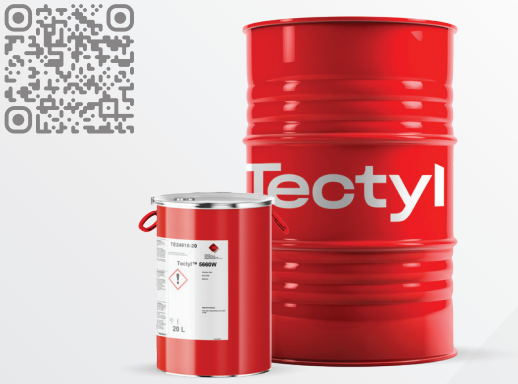
Key performance benefits:

- High resistance to mechanical impact from ballast and debris
- Durable barrier against moisture and corrosive agents
- Thick, elastic coating suitable for demanding railway environments

The coating is applied in a single layer with a minimum wet film thickness of 800 microns. Thickness is verified immediately after application and corrected if required.

Dry-to-touch time allows wagon handling after approximately 1.5 hours, with full curing achieved within 24 hours under standard conditions.

Tectyl™ 5660W




## RESULT

By implementing the Tectyl refurbishment corrosion protection system, railway operators achieve:

- Effective stabilization of existing corrosion
- Extended service life of refurbished wagons
- Reduced need for repeat repairs and recoating
- Improved protection of structural underbody components
- Lower lifecycle maintenance costs

Tectyl enables railway operators to transform refurbishment from a short-term repair into a long-term asset preservation strategy, ensuring wagons return to service with renewed structural protection and durability.

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