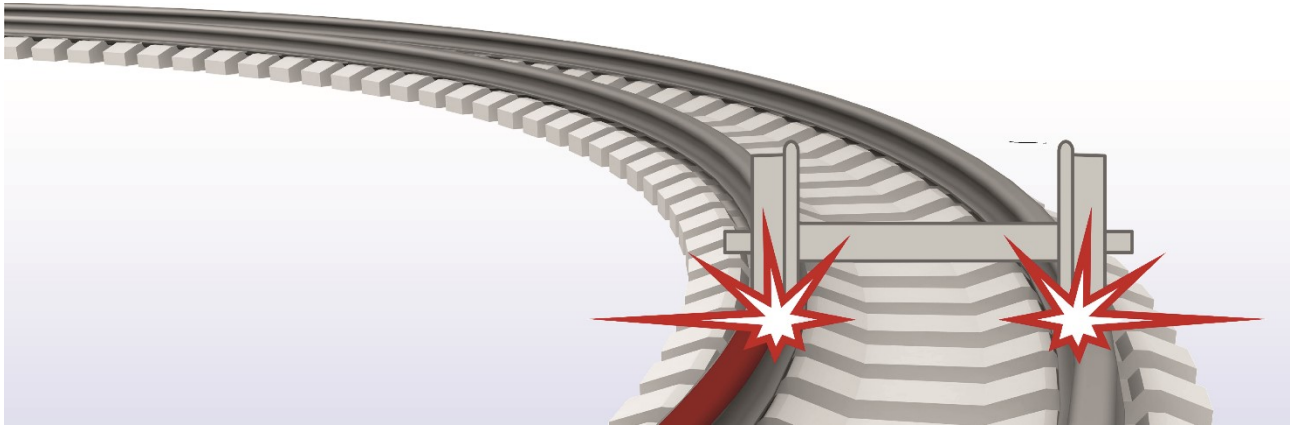


TOP OF RAIL

NOISE AND WEAR MANAGEMENT

Swiss quality and know-how for the prevention of rail squeak on bends




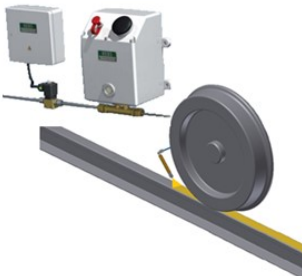

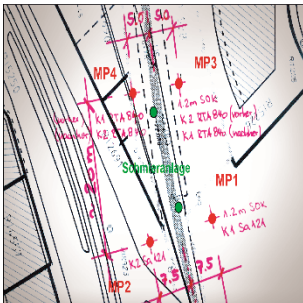
A common issue – noise and wear in railway systems

- Squealing rails convey poor performance to the public
- Squealing indicates ongoing wear between rail/wheel surfaces
- Wear on rail/wheel surfaces means costs.

The solution of the problem

- Choose IGRALUB-experts as noise and wear elimination partners (Total Services Provider)
- Select the correct application system for the network
- Coordinated interaction of conditioner, lubrication device and system controller
- Only use high quality conditioner (for example, the HeadLub® series), proven by laboratory and field tests.

Top of Rail conditioning for noise and wear mitigation an ideal solution for railways, LRV and metros.

| 1. Cause | 2. Strategic planning | 3. Performance | 4. Support |
|--|--|---|---|
| <p>Demonstration and quality proof of conditioning</p>  | <p>Decision on application system and its triggering mechanism</p>  | <p>System installation for the lubrication threshold determination and controlling type evaluation</p>  | <p>Roll out plan, implementation and definition of operating mode</p>  |

“Safety is guaranteed and documented by numerous brake- and adhesion tests”

TOR is used and accepted worldwide by operators after brake- and adhesion tests. Ask for our reference list.

Implementation

“Only mobile Top of Rail conditioning can give you 100 % control over place, quantity and time”.

Indispensable:

- 💧 Conditioner must be applied at correct location on the railhead and in the curve
- 💧 The correct system can apply exact amounts over a definable track length
- 💧 Total spraying time and number of spraying cycles per triggering can be defined

Location



Application in precise locations.

Quantity



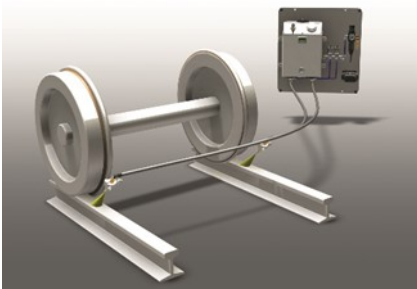
Proper amount of lubricants dispensed.

Time



Lubricant dispensed for the exact duration needed.

The System



Complete Spray system with tank, pump, tubing and nozzles. Tank can also be installed inside vehicles.

Automatic release



Spraying in curves and predetermined locations. Definition where spraying is needed and where it should be triggered.

Manual release



Sign (HL) for driver to start application in a curve (i.e. if no GPS signal or transponders are used).



Top of Rail System with spraying nozzle. On inner and outer rail (separately or simultaneously). Quantity of one cycle: 0,5 g over 100 m.



Controller to automatically activate TOR application based on various signals.



“On driver’s demand” Drivers cabin installation. Adjustable for 1 to 3 spray cycles per impulse, inner and/or outer rail application.

Because of the efficient conditioner (for example, the HeadLub® series) only 10–20 % of the fleet vehicles must be installed with TOR Systems. Onboard systems are the most secure method of conditioner application. Based on the same functioning principle as the wheel flange lubrication system’s precision components (pump, distributor and nozzle) allow for an exact dosage of the conditioner.