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Wheel Flange & Top of Rail Lubrication

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Rowe Hankins has supplied a UK Government-backed project on Crossrail with an intelligent wheel flange lubrication system that enables asset managers to extend the lifecycle of wheel wear & rail infrastructure that makes passenger journeys greener and quieter.

Lubrication serves to reduce abrasion wear of wheel flanges and railheads, which occurs especially on track curves and at track switch points. Rowe Hankins offers the intelligent Wheel Flange Lubrication System (iWFL) as an innovative and cost effective trainborne solution.

The iWFL system is easy to integrate onto the bogie and the vehicle environment. The system incorporates a proven robust design that uses compressed air available either from the vehicle or can be supplied from a dedicated compressor.

We offer bespoke user configurations, to allow the end user to configure route spray parameters, using GPS or track data.

Lubrication consists of spraying a biodegradeable lubricant from nozzles onto the wheels. The nozzles are located and are directed precisely.

The iWFL system improves infrastructure and rolling stock service life, as well as overall safety by reducing both wheel and track wear. The reduced wear of the wheels, means wheels need to be re-profilled less frequently in addition to reducing friction on the track. As a result, the green iWFL system uses less energy and fuel to run the rail vehicle compared to without.

System design

The iWFL System consists of line replacement units:

- Fluid tank (typically 5L, 10L, up to 20L).
- Pneumatic Unit fitted with two or four outputs to the nozzles.
- Intelligent Controller (Falcon Unit).
- Nozzles.

With options such as:

- Air compressor, should train air be unavailable.
- Independent GPS antenna or serial data link for track data from the train.

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Basic System Operation

The lubricant in the tank is not pressurised and is transferred to a pneumatic control unit by an air actuated hydraulic pump located inside the tank. The lubrication is then mixed with air in the pneumatic control unit to a predetermined consistency, which is then sent to the vehicles wheels via a dedicated spray nozzle. The complete process is intelligently controlled by a Flange Area Local Control unit (FALCON).

Each nozzle can be individually switched or activated and provides a targeted application of lubrication only to a wheel flange. This prevents wastage of the lubricant.

Whole spray operation is controlled and triggered by the programmable flange area lubrication control unit (Falcon).

The intelligent spray activation is possible in three ways:

- At intervals of time or distance. The spraying pulses are triggered after the programmable pause time or the travelled distance.
- The spray intervals are triggered by a specially designed sensor which detects when the vehicle is on a curved section of track.
- By GPS/Track Balise/TCMS signals allowing lubrication at specified predefined positions on the track.

Cost benefits of iWFL

Description	Stick Lubrication	Rowe Hankins Ltd. iWFL
Frequency of refilling per year:	25 to 30	6 to 9
Track and Wheel Benefits:	Life x 2	Life x 2 plus*
Lubricant:	Continuous Usage	Intelligent conditional dispensing

The lubricant produced by Rowe Hankins for the iWFL system is biodegradeable.
**Track and Wheel benefits are subject to track layout and nature of operational service, including timetable schedules.*

Top of Rail Friction Modifier is engineered to reduce vehicle noise through curved track sections and switches, and further reduce rail corrugation by the application of a friction modification lubricant to the top of the rail.

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The application of Friction Modifier is achieved by a bespoke compressed air system which transfers the Friction Modifier to the top of the rail. The Friction Modifier is also subsequently picked up by other passing wheels.

The friction modifier reduces rail contact fatigue, making both the rail and wheel more durable and long-lasting. This reduction in contact fatigue improves the environmental impact due to the frequency of replacment materials required, which in turn decreases downtime and costs.

The Wheel-Rail interface is a critical, targetable cost driver for performance, cost of inspection, maintenance, deteriotration and renewal, all highly dependent upon the frictional interfaces.

Cost effective management of this interface to extend rail and wheel life by intelligent dispensing of customised Friction Modifiers from trainborne systems gives assurance and improved financial performance to operators and asset owners.

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Reduced Noise in Vehicle and Operating Environment

- Active noise reduction for train / platform operatives, pedestrians and businesses located adjacent to the railway or tramway.
- Increased driver awareness of in-cab audible signals.
- Control of station approach curve noise exposure levels for platform staff and passengers.
- Improved intelligibility of public address systems at stations.
- Significantly reduces noise levels, contributing to quieter residential areas.
- Bio degradeable lubricant which is safer for the environment and nature.
- Fewer refills lead to a reduced carbon footprint.

With options such as:

- Accurate spray profiles for any rail or tram route.
- Low lubrication consumption compared with stick lube and trackside applications.
- Selective wheel spraying - Flange / Back of Flange or ToRFM
- Highly durable Friction Modifier developed for ToRFM.
- Extension of wheel inspection periods.
- Extension of wheel life.
- Reduced wear and vibration in propulsion drive transmission systems.