

**LB Foster**



# Waterloo Station Lubrication Upgrade

## PW Hydraulic Lubricator





“Initial feedback from the trial is extremely positive and it looks like the L.B. Foster units are possibly the solution to the complicated and onerous lubrication problem at London Waterloo.”

Neil Cassidy  
Network Rail

**London Waterloo is Britain’s largest and busiest station, with over 41 million passenger entries/exits in 2021/22. It is the terminus of the South West Main Line to Weymouth via Southampton, the West of England main line to Exeter via Salisbury, the Portsmouth Direct line to Portsmouth Harbour, which connects with ferry services to the Isle of Wight, and several commuter services around west and south-west London, Surrey, Hampshire and Berkshire.**

Switches and crossings (S&C) on the entry/exit to London Waterloo station’s 19 passenger platforms experience very high levels of traffic. This has resulted in high rates of Rolling Contact Fatigue (RCF) and 053 maintenance inspection defects, causing a high turnover of S&C units and increased maintenance and unit replacement cost. This is primarily caused by track curvature on the entry/exit to the platforms, which increases the lateral forces suffered on the rail.

Network Rail invited L.B. Foster’s specialist friction management team to review the situation and identify a more efficient and cost-effective lubrication solution to reduce the requirement for maintenance teams to work trackside, whilst extending the life of the switches and crossings. The resultant collaboration has seen exceptional results, both in terms of cost savings and enhanced operative safety through reduced time trackside.

## Requirement

Network Rail's initial response at London Waterloo was to introduce a maintenance heavy lubrication regime to combat the large number of S&C defects. A number of automatic lubrication systems were installed on the S&C at the station. The automatic lubrication systems comprise small 480cc canisters, which twist on and dispense grease at a set interval (powered by a battery pack) and typically last a maximum of 28 days. This makes them both labour intensive and costly, as a system is required on both the left and right rail respectively, whereas a typical mechanical or electric lubricator can supply both rails through a piped/blade system.

Since the automatic lubrication systems were installed there had been a large reduction in S&C defects. An examination of both P8 failures and 053 defects showed the effectiveness of the lubrication. The benefits of the lubricant are cited as one of the contributing factors in the reduction of defects, along with a proactive S&C grinding programme to increase the lifespan of the S&C units.

In early 2022 a request came from the Track Authority (TA) to look at ways of reducing Maintenance Standard Tasks (MSTs). The automatic lubrication systems at London Waterloo form a large part of the Lubricators' work bank. The TA request provided a natural starting point from which to look at potential time and attributed cost savings, as the automatic lubrication systems are the most onerous asset to maintain.

## Our Solution

Network Rail contacted L.B. Foster concerning how to reduce the maintenance cycle. The company proposed an innovative new design of hydraulic lubricator with a vertical lubricant reservoir that could be installed trackside, even in restricted spaces such as those experienced at London Waterloo.

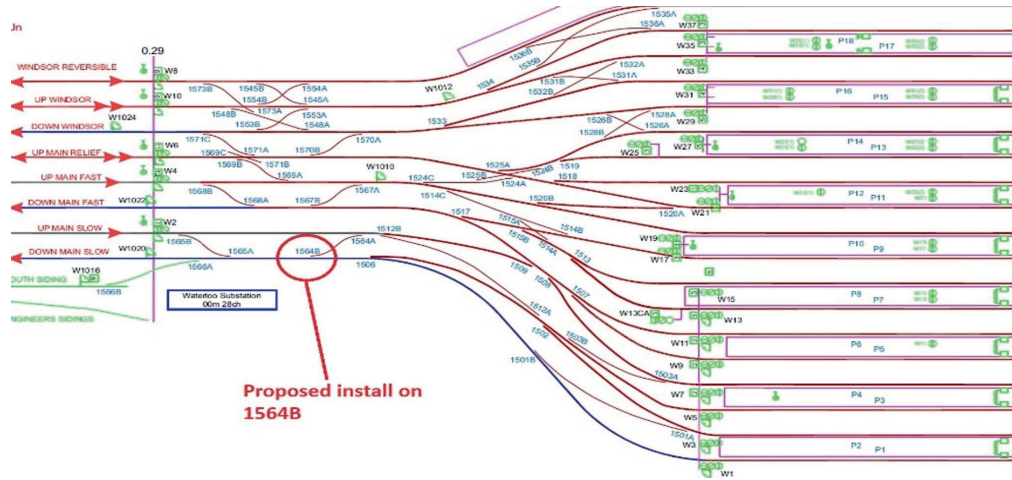
L.B. Foster reimagined its existing PW Series hydraulic lubricator for use at London Waterloo. The PW offers a number of specific advantages over mechanical lubricators, providing an economic and effective method for distributing grease to the rail. The PW is available in 12.5kg and 37.5kg chamber capacities.



## Our Solution cont.

The trial 12.5kg PW unit was partially buried trackside, allowing trains to pass unhindered. As the train wheels pass over the system’s plunger it is depressed and activates a pump, which pushes grease to the applicator bars on the rail. The grease is picked up by the train wheels and is applied over a pre-agreed distance on the rail.

A set of points was selected (1564B) for the six month trial, with a hoped-for lubricant pickup to cover platforms 1,2,3 and 4 and the associated automatic lubrication systems on S&Cs 1564B and 1506 (see station diagram). The result was that both automatic lubrication systems were removed from 1564B, with good grease line noted. The automatic lubrication system was also removed from 1506. Network Rail is subsequently looking to install a further L.B. Foster PW unit on 1564A pts to trial removing more automatic lubrication systems in the Waterloo area.



Network Rail identified a projected cost saving of £18,546.48 over five years where a single 12.5kg capacity PW was installed on two sets of switches and crossings, versus a comparable install of three 480cc capacity automatic lubrication systems (see table below).

	Cost of Lubricant required per visit	Maximum Time Between Re-fills (days)	Maximum Time Between Re-fills (days)	Re-Fill's Required per year	Auxiliary Maintenance on Lubricator		Total Expected Maintenance per unit per year	Total Lubricant Cost	Total Cost per year inc. Install Cost/ Maintenance	Cost over 5 years
Automatic lubrication systems 480cc (single unit)	£71.55	£71.55	28	12	£296.80	Motor Drive - Required 3x times per year	£890.40	£858.60	£1,749	£8,745
L.B. Foster PW hydraulic 12.5kg	£3,189	£104.64	42	8.6	£0	£0	£899.90	£899.90	£4,088.90	£7,688.52

	Assuming 2x automatic lubrication system per S&C unit - Cost over 5 years	Amount of Sets of points covered in trial	Amount of units installed to cover trial area	Projected cost over 5 years of trial area	Projected savings over 5 years	Current MST's in area per year	Projected yearly MST reduction
Automatic lubrication systems 480cc (single unit)	£17,490	2	3	£26,235	£18,546.48	36	24
L.B. Foster PW hydraulic 12.5kg	£7,688.52	2	1	£7,688.52		12	

### What they said

“It is easy to see the cost savings over time and also the Maintenance Standard Task reduction in the trial area alone. There are 24 automatic lubrication systems at Waterloo on a 28 day replacement frequency, so we would look to fully complete the area installing eight L.B. Foster PW units on a 42 day frequency. This affords an exceptional return on investment, as well as reducing the need for boots on ballast.”

Neil Cassidy  
Network Rail