

# Trees versus trains

Railways from the Netherlands to Britain and the United States all know how the green foliage of a lazy summer transforms into an autumnal nightmare. Portec Rail Group, United States, describes its experiences and solutions.

**T**HE phenomenon of fallen leaves compressed by passing train wheels into a thin black Teflon-like layer on the railhead and its impact on train braking, acceleration and signalling is well documented. The leaves that fall during autumn wreak havoc with adhesion, impacting train availability, schedules and passenger safety, and damage the infrastructure and vehicles. One of the key battles is being fought by the British infrastructure manager Network Rail.

Each autumn, thousands of tonnes of leaves fall on railway lines, with weather conditions affecting the severity of leaf fall. A mature lineside tree has between 10,000 and 50,000 leaves and the

worst-case conditions for this tree to shed its leaves are a damp summer and autumn with an early sharp frost followed by high winds, causing leaves to fall before they have withered. At times like these some sections of railway are effectively brought to a halt.

On Network Rail's 33,600km of lines, the cost of basic lineside vegetation management of trees is between £12,500 and £31,000/km, costing the British railway industry alone approximately £50 million per year, including £10 million on vegetation management, £25 million for autumn train-borne operations, £5 million for 'hot spot' teams and other staff/operational costs and £10 million for damage to trains and track from leaf fall. Extensive vegetation management is only part of the solution. Significant investment in new ways to tackle the direct impact of this serious problem is helping

improve adhesion across the system.

Network Rail is investing heavily in new ways to tackle the problem.

Initiatives include:

- daily locally-detailed forecasts, provided by the Meteorological Office, which indicate when trains are likely to have problems on the track with low adhesion

- an extensive treatment fleet - including 32 multi-purpose vehicles (MPV) which use high-pressure water jets to clean the rail - and a system to apply a sand-based gel to the rails for improved adhesion, and

- over 90 manual 'hot spot' teams and 30 trains which either apply the traction gel, perform water jet cleaning or both.

Among the popular remedies for improving adhesion are mobile systems featuring rail scrubbers and traction gel distribution equipment. Trackside solutions also have a significant role to play in improving adhesion. Portec Rail Group has developed a number of advanced friction management systems and practices to combat the problems caused by leaf fall.

## Traction gel

Its specialised traction gel application (TGA) equipment for the dispensing of traction gel has proven the viability of the trackside approach for providing assured treatment of high-risk zones such as stations, level crossings and at signals where satisfactory adhesion is critical to prevent overruns caused by trains skidding.

The first practical trackside TGA system for application of traction gel was designed by Portec Rail in 1998 and extensively tested in Britain. Portec Rail's offering of TGA services includes seasonal commissioning and decommissioning of units, maintenance during the leaf fall season and preventive maintenance outside it, training, site suitability surveys, and portable tribometer friction measurements.

Portec says its commitment to supporting TGA is demonstrated by its continual innovation and development of performance enhancements to trackside units. The latest compact spreader bar features a seal that shields a single, larger, wedge-style port opening while directing traction gel to the wheel/rail interface. This design was inspired by its successful top of rail (TOR) applicators used to apply Kelsan's Keltrack friction modifier to the railhead. Other design changes include the integration of the latest

Portec Rail gauge face/TOR control system, cabinet corrosion protection and a stainless steel hopper feeding a new, more robust peristaltic pump.

The geography and autumnal climatic conditions found in Britain that create leaf fall conditions that can lead to poor wheel/rail adhesion are of course found in many other parts of the world. The TGA trackside solution has begun to find use in the Netherlands and the United States. Building on its continued success and experience in the British market and with fresh design improvements in-hand, Portec Rail has targeted market expansion in Europe and the US. The Trackside TGA is a viable alternative to mobile systems in the passenger rail market but this is not the only opportunity in the United States as some of the Class 1 freight railways have reported instances of signal overruns from excessive leaf fall.

Because of the risk factors and the tremendous expense associated with leaf fall, research and development continues on new technologies. There are sophisticated concepts such as train-

borne lasers, while others are improvements to existing solutions.

An example of the latter is the search for an improved traction gel material. The operational, performance and logistical limitations of existing traction gel products range from poor shelf life to product separation in the TGA hopper as common examples. Portec Rail is able to combine its extensive field knowledge with the capabilities of sister company Kelsan Technologies to develop friction control products to manage wheel/rail interface dynamics. This new traction enhancer is in the final stages of development and is currently being trialled with promising results.

We can't stop the seasons or leaf fall, but the efforts of rail operators and suppliers are making a significant impact. Cross-industry focus groups like the Adhesion Working Group (<http://www.awg-rail.co.uk/index.html>) are ensuring safer and more efficient operation during autumn leaf fall. **IRJ**



Portec's spreader bar (inset) places a compact layer of traction gel on the rail head, supplied from a trackside cabinet..