rightTrack

Issue 24 **Summer 2018**

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Hello, and welcome to issue 24 of Right Track!

With autumn just around the corner, this issue looks at all things adhesion-related. This issue of Right Track is designed to accompany RED 51, which also looks at adhesion. You can watch in on **https://www.rssb.co.uk/opsweb.**

Each autumn, low adhesion contributes to safety incidents, such as SPADs and station overruns, as well as causing an average of around 350,000 delay minutes.

Yet industry aspires to run more trains per hour to meet the growing demand in passengers and freight. To make that possible, we're using new technologies, such as new train control systems, but the benefits that can be derived from these systems could be compromised by not having predictable braking.

Of course, autumn is not the only time of year when there can be poor adhesion: it's something we need to stay aware of all year round: winter ice, spring dew, or even if there's a factory or airport nearby that's likely to leave oily deposits.

As ever, we would love to have your feedback on any of the articles in this issue. If you have any comments, please email us at **righttrack@rssb.co.uk**.

Right Track can be downloaded from Opsweb: www.rssb.co.uk/opsweb

Right Track is produced by RSSB through cross-industry co-operation. It is designed for the people on the operational front line on the national mainline railway, yards, depots and sidings, and London Underground. Their companies are represented on various cross-industry groups, including the System Safety Risk Group, managed through RSSB, and Right Track is overseen by a cross-industry editorial group.

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The problem with leaf fall

For the travelling public, autumn can be a season of despair: summer is over, the nights are drawing in, the mornings are cold, dark and damp… and as commuters wait for their train to take them into work, there's yet another announcement of train delays or cancellations due to "leaves on the line".

These colourful gems of nature are responsible for producing one of the railway's biggest seasonal operational challenges: low adhesion.

What is it that transforms these seemingly benign pieces of colourful vegetation into such a safety and performance risk on our rail infrastructure? The answer is a complex combination of the chemical make-up of both leaves and railhead, and how they interact with each other at the point of contact, in specific environmental conditions.

The Chemistry

Leaves are complex, made up of a multitude of chemical compounds. Some are familiar, such as sugars, cellulose and proteins; although others may not be, including pectin and lignin. Some leaves are fleshier than others, such as Ash, Sycamore and Horse Chestnut. These tend to be more prone to contaminating the railhead than less fleshy leaves.

The railhead is made from carbon steel, which is mainly iron. Everyone is familiar with the rusting process, whereby water and oxygen (in the air) and iron (in the railhead) react to form iron oxide (rust). This continues until the surface of the rail is completely covered in rust. However, examining the rusting process in more detail reveals that the iron goes through several incomplete oxide stages before eventually forming rust. The theory is that, as the iron reacts to form rust, a chemical reaction also occurs with leaf mulch, resulting in a hard, black contaminant, which then presents the subsequent low adhesion risk.

Newswire

2 April, Romania: Tank wagon derails on points at Videle

At 22:15 (local time) on, the locomotive and the first wagon of a freight train derailed on pointwork at Videle station. There were no reported injuries, though the switches were damaged.

3 April, US: Freight derails in Huntingdon County – no reported injuries

In the morning, a freight train derailed in Huntingdon, 75 miles east of Johnstown, Pennsylvania. There were no reported injuries, but five wagons were involved, each spilling plastic, pulp board and dried foods into the nearby river.

6 April, Czech Republic: Crossing collision near Rakovník kills 1

A car driver was killed when his car was struck by a passenger train on a level crossing near Rakovník. The train derailed and one member of staff received minor injuries.

The point of contact

A rolling train wheel is in contact with the rail over an area of only about the size of a 20p piece at any point in its revolution. This tiny contact point is subject to extremely high pressures as the train rolls over the rails. Fallen leaves are swept up by autumn wind, or the slipstream of passing trains, and fall onto the line. As the train passes, these leaves are caught in this high-pressure contact point between wheel and rail, and get crushed. Other leaves are deposited onto the rail on top of the crushed leaves, waiting to be crushed themselves by following trains.

After only a few train passes, what was once a leaf has been transformed into a hard, black teflon-like coating. The railhead side is stuck to the rail head so securely it can barely be removed, even when scraped with the blade of a knife; but the exposed side is so smooth when it's wet that it creates almost no friction with passing wheels. Over time in areas of leaf fall, a continuous black thin film of contamination becomes clearly visible along the running band on the railhead.

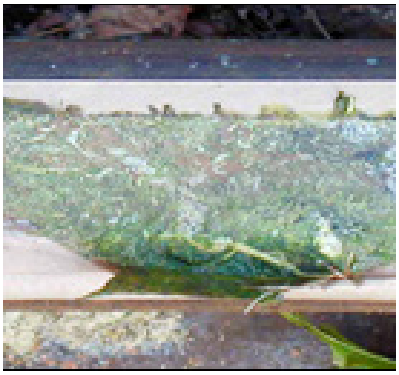
What is the make-up of the Black Contaminant on the rail?

Much research has been done into understanding the chemical make-up and behaviour of the "black contaminant", and why it is such a stubborn layer to remove.

Chemical analysis of samples scraped from the railhead reveals compounds that you'd expect from leaves, such as pectin and cellulose; as well as significant quantities of chemicals you'd expect from the railhead, including iron, rust and carbon.

The exact formation mechanism is not yet fully understood, but our Sheffield scientists' theory concludes that the trigger is the iron oxides "in transition" to railhead rust. These bits of almost-rust react with the chemicals found in the leaves. This all happens under the high-pressure contact point between the wheel and rail. More detailed academic research is currently being conducted into this area so that we can understand it better. Once we do, we can then use this knowledge to provide better low adhesion mitigation – a glimmer of hope for staff and passengers alike.

This article is based on research carried out by scientists at the University of Sheffield. To find out more, see the 2017 *Wear* magazine, volume 378-379 from page 183: *The Low Adhesion Problem due to Leaf Contamination in the Wheel/Rail Contact: Bonding and Low Adhesion Mechanisms.*



Newswire

16 April, US: Freight train derails in Fayette

On 16 April, an empty freight derailed in the McKendree area of Fayette County. 10 wagons of the double-headed 97-wagon formation left the rails as the train was heading to Hutchinson to pick up coal. There were no reported injuries and none of the wagons fell into the nearby river (although the nose of the lead locomotive touched the water).

20 April, Austria: 40 injured during attachment at Salzburg station

Two passenger trains collided while being attached at Salzbury station. Around 40 people were 'slightly injured'.

24 April, Spain: Tanker lorry driver dies after crossing collision in Toledo

A lorry driver was killed when his lorry was struck by a passenger train at a level crossing in Toledo. The lorry was carrying diesel fuel. The train was derailed by the impact.

When and why does the Black Contaminant cause a problem?

When the black contaminant is dry, it doesn't cause a problem for train traction and braking. However, add a little moisture to the contaminant and it becomes activated, turning into a rail coating that will dramatically reduce the friction available to a train attempting to brake or to accelerate. You can compare it to walking on rocks at the beach: when the seaweed is dry there no issue; but stand on the same rocks coated with wet seaweed and the difference is dramatic. In the same way, when the contaminated railhead sees light drizzle, early morning dew, mist, condensation, or even just high air humidity, we get similar results. However, there is an exception: when there's heavy rain. A proper autumn storm may actually soften the contaminant and wash it off as passing trains begin to break up the layer.

Not only can this damp black coating lead to a reduced ability to accelerate and brake, it can also create a layer of electrical insulation that can prevent good metal to metal contact. This means that the good electrical contact between rails and wheels, which track circuits critically depend on, can be compromised. If this happens in areas where track circuits are used for train detection, the signalling system can't detect the train anymore. This situation is known as a wrong side track circuit failure (WSTCF), which can lead to the train 'disappearing' from the signalling system. In a worst-case scenario it could lead to signals showing a proceed aspect when there is a train in the section ahead, and points becoming free to be moved underneath it. As soon as a signaller notices a WSTCF they must take immediate steps to protect the train concerned and any others which might be affected. To manage the risk from WSTCFs, special working arrangements might be imposed, which can result in train delays and reduced line capacity. This could then impact the whole system, causing knock-on delays that could lead to other safety concerns such as overcrowding or detraining as commuters try to get home from the cold.

2 May, US: Freight derails in Fort Worth – no reported injuries

A BNSF freight derailed in Fort Worth, pulling down power lines in the process. No dangerous goods were involved and there were no reported injuries. A BNSF spokesman said the cause of the derailment is under investigation, but added that it occurred during a 'switching operation'.

4 May, Bulgaria: Freight train fire near Druzhba

At 21:35 (local time), an electric-hauled freight caught fire near Druzhba. The traincrew initially thought it was burning insulation material until smoke started to come from the engine compartment and underfloor fans. They stopped at Dolno Ezerovo, where they began fighting the fire with the on-board extinguishers. The flames were eventually quelled by the Fire Brigade early the following morning. There were no reported injuries.

The Lowdown: Jamie Hallam, Driver

We know poor adhesion can contribute to SPADs and platform overruns; so drivers need to take measures to keep themselves, their colleagues and their passengers safe. But what do you do if it happens to you? RSSB's Martha Parkhurst met Jamie Hallam, driver at East Midlands Trains, who faced exactly that problem last autumn.

Railways are in Jamie's blood: his great-grandfather drove a steam loco for almost half a century. Jamie started off doing office work for Network Rail, but he most enjoyed the days he spent in the field. He's now been working as a driver for four years. He drives the Derby Crewe line, passing the place where he was born.

"Driving is the most logical profession for someone who likes railways," Jamie tells me. "You can't get any more hands-on. It's fun, and varied. In a shift, you can do a couple of runs from Derby to Crewe, and see families greeting each other as they arrive. Or you could take hundreds of commuters to London: poke your head out of the cab at St Pancras and there's a wall of people coming at you."

When driving is going right, it gives a tremendous sense of power, responsibility and pride.

But it's not always plain sailing. Sometimes, things do go wrong. When that happens, you need to be even more vigilant. It's mentally exhausting, but Jamie tells me he relishes the challenge. And he knows he has help. "You need to trust the system. There are MOMs, signallers, multi-purpose vehicles, all working to make sure that the most severe risks are avoided, allowing the driver to focus on driving."

But what happens when, despite all the safeguards, there's still an incident?

One day last autumn, Jamie had an adhesion-related SPAD. It was a windy day in the middle of leaf-fall season, and a fine rain had made the leaves on the track extra slippery. Jamie was aware of the potential risks, and adjusted his braking, making sure he applied the brakes earlier than normal.

It was his second trip to Crewe that day. The railhead treatment train had already run over the line, so Jamie knew the track had been cleaned. At Alsager, just before his last stop, there was a single yellow, so Jamie expected that the next one was going to be red. As it wasn't too far away, he decided not to apply full power. He left Alsager and got the train moving, coasting at about 40mph. He slowed to 30mph, with the signal still not in view. He wanted to get to below 20mph before the magnet, so he braked again.

He checked the speedo. But something wasn't quite right. Jamie applied some sand.

The red signal loomed into view, and he knew he wasn't going to stop in time. "I applied the emergency brake and was overtaken by a horrible feeling of helplessness as the signal floated by on the left-hand side," he tells me.

Instinct kicked in. Not long before the incident, Jamie's manager, Dave Hooper, had arranged for the drivers to do adhesion training on a simulator. It meant that when Jamie was faced with those circumstances in real life, his reactions were automatic. He noticed the signs, and knew how to react to them.

He passed the signal by two coach lengths. He called the signaller. Fortunately, the signal was red because the signaller needed to give him a message, and not because there was something in the section ahead – but it could well have been a different story.

After the SPAD, Jamie's first thought was to get on with the job. He says it didn't really sink in until he'd arrived at Crewe. Once he'd reported the SPAD through the official channels, his first concern then was to warn his colleagues on their unofficial group chat so that anyone who was getting ready for a shift could be aware. During his next shift, Jamie was accompanied by an instructor. He was very relieved that this time, the signal where he'd had the SPAD was green

The SPAD review showed that Jamie followed EMT's braking instructions for poor adhesion and that there was nothing more he could have done to prevent the SPAD. The rail swab showed that the rail head was very badly contaminated.

Jamie's now preparing for leaf fall in autumn 2018. He's had the experience now, so he'll be doubly vigilant. He's decided it's better to be a little late than to have an incident. He's also done more simulator and skidpan training. Jamie thinks his incident has also been useful for his colleagues. They're now more aware that it could happen to anyone, and so they'll all be more careful.

I ask Jamie what the industry could do to reduce adhesion-related SPADs. Jamie tells me he used to be a tree surgeon, and that where he had his SPAD there were plenty of birch trees. On a windy day, they lose their leaves "like confetti". So perhaps trees could be managed better, especially on local routes which seem to see fewer treatment trains than the main lines. But it all comes down to resources.

As for Jamie, but to this day he still shakes his head whenever he passes that signal.

GSM-R: Using Acknowledged (Safety) Broadcasts for poor adhesion

Whenever a driver must be told something before proceeding over a portion of line, then it falls on the signaller to do this. The traditional, tried and trusted method has been for a signal to be held at danger to stop the train, then for the driver and the signaller to have a conversation. The train would then be allowed to proceed accordingly.

However, this method has its drawbacks: for example, keeping a signal at danger to stop a train might lead to a SPAD; accelerating from stationary might be difficult if adhesion is poor. And then there's the delay, to that train and the ones that follow it, to consider.

GSM-R has the facility to pass certain types of message from signallers to drivers, without the need for the train to be stopped. The scenarios include poor rail conditions. This has been called "Caution on Greens", "Caution on the Move", but is now "Acknowledged (Safety) Broadcast".

To make life easier, the GSM-R Handbook RS523 has scripts which signallers can follow when they're setting up acknowledged (safety) broadcasts. The script is clear and easy to follow, and helps communications meet the A, B, C (Accurate, Brief and Clear) criteria.

So, what's so great about this technology? Well, it reduces the risk of SPADs, and lowers the impact on performance. GSM-R acknowledged (safety) broadcast calls is the preferred method for signallers to caution drivers of reportable adhesion conditions when the signalling system allows. Don't get caught out by rail adhesion issues, and help others avoid being caught out, too.

This is how it works:

1. The signaller:
   - keeps an appropriate protecting signal at danger with a reminder appliance applied, just like the old method,
   - records a message or selects a pre-recorded message,
   - determines the location where drivers are to receive the message, ideally before receiving any cautionary aspects,
   - sets up GSM-R to broadcast the message to the driver when the train reaches that location.
2. The GSM-R automatically broadcasts the message to the approaching train when it reaches the predetermined location.
3. After listening to the message in its entirety, the driver acknowledges that they have received and understood the message by pressing the ST Button on the GSM-R cab mobile. (If for any reason the driver hasn't understood the message, they do not press the ST button.)
4. If the signaller receives an acknowledgement from the driver, they can clear the protecting signal so as not to stop the train.
5. If no acknowledgement is received, then the signaller maintains the protecting signal at danger, stops the train and uses the old method.
6. When the train has passed the protecting signal, it is replaced to danger with the reminder appliance applied ready for the next train.

Find out more:

- On the RSSB website: search "poor adhesion"
- In your Rule Book, Module TW1, section 8

Newswire

7 May, Germany: Head on collision kills driver and passenger in Bavaria, signaller arrested

At 21:18 (local time), a passenger train was involved in a head-on collision with an empty freight standing on the same line just outside Aichach station in Bavaria. The passenger train driver and a passenger were killed; fourteen other passengers were injured. It was later revealed that the signaller had been detained on suspicion that his negligence led to the accident.

10 May, Poland: Freight train derailment at Wronki

In the afternoon, a freight train derailed on pointwork while departing from Wronki station. There were no reported injuries.

Applying tape to the railhead to simulate low adhesion

Reducing the impact of low adhesion

We all want to avoid the consequences of low adhesion, such as SPADs or station overruns. If you're in the driving seat, then there's a responsibility for you to drive to the conditions – and operators provide guidance for their drivers to help you do just that. But there are also cross-industry ways to reduce the impact of low adhesion. One of the key projects RSSB has led for the rail industry has looked at the best way of using sanders on trains.

The aim of the research was to find out how we can optimise the use of sanders in low adhesion conditions to improve services for passengers and mitigate the need to reduce train services in the autumn.

RSSB and 10 other rail organisations undertook three months of track testing. This took place at the Rail Innovation and Development Centre at Melton Mowbray, using two new Class 387s loaned by GWR. After 220 test runs, covering various configurations of sanders, test speeds and train lengths, we had a robust data set to analyse.

The findings

- Using variable rate sanders, which take into account the speed of the train and automatically apply more sand when braking at higher speeds, improves braking significantly compared with the current fixed rate sanders (which don't vary the amount of sand applied). Using two variable rate sanders on a 4-car train can reduce stopping distances by about half the stopping distance of a single fixed rate sander.
- Two variable rate sanders provide assured 6 % g braking performance. This is an important braking performance measure, as it is the basis for timetable planning on most routes.
- The use of multiple variable rate sanders will improve the consistency of train braking, and is likely to reduce SPADs and platform overruns caused by low adhesion. This should reduce delays, and could help us avoid having to implement special timetables in the autumn

Putting it into practice

Key people from across industry met in February 2018 to discuss the findings, and explore opportunities and barriers to adopting the new, recommended sanding configuration of two variable rate sanders per units.

There are still a number of challenges and possible obstacles to implementing two variable rate sanders across all fleets, but some train operators are hoping to fit and run a small number of units in time for Autumn 2018.

RSSB has been working with some train operators to work on the feasibility, design, approvals and modification plans for pilot fitment, so that operators can:

- Fit double, variable rate sanders and monitoring equipment to some multiple units from Autumn 2018 and;
- Share the lessons learnt and in-service data gathered with industry, to help have a wider roll out for all operators, improving the safety and performance of our railways in the autumn.

For more information on the project, and to see an analysis of the data, go to the RSSB website and search for 'T1107'

RAIB reports – Adhesion

Slippin' and a-slidin'

'Leaves on the line' has become a bit of a joke – something to slap the railway about with, like the wrong kind of snow, or the wrong sort of sandwich. It tends to be seen as little more than an excuse our industry trots out to annoy the journalist who's stuck on the 17:33 home, and who then writes 500 words of glorious vitriol against us and all we stand for.

We know, of course, that autumn leaves can contaminate the rails, helping trains lose their grip and overrun stations or pass signals at danger. They can be a genuine menace, yet the fact remains that very few actual accidents have occurred because of them.

The SPADs at Esher on 25 November 2005 and Lewes five days later did result in RAIB looking into why that year was so bad for autumn adhesion incidents, but the trouble is leaf fall is hard to predict and can vary from day to day, depending on the weather, humidity and the types of tree shedding their leaves.

Low railhead adhesion has always been a problem during the autumn – that season of wheel slide and mellow fruitfulness. 'Black Monday', 28 October 2002, was particularly bad, seeing no fewer than 21 SPADs – more than twice the number on any other day since 1985, when we started collecting SPAD data more systematically. This rash of SPADs, most of which had been caused by low adhesion, had been preceded by unusually bad weather, creating the 'perfect storm' for poor railhead conditions.

It's really more about what might happen; certainly when a train 'picks up its wheels', it can be frightening for the driver who's lost control of the brake (see The Lowdown, page 6). It's also worrying for the signaller when a train 'vanishes' from the panel, as contamination prevents it from operating the track circuits by acting as a barrier between the wheels and the rail surface.

On 8 November 2010, a Charing Cross–Hastings service failed to stop at Stonegate station in East Sussex. The train ran for 2.45 miles with the emergency brake applied, passing Crowhurst Bridge level crossing before coming to a stand. In this case, high winds had caused fresh leaf fall, and the onset of rain had made the adhesion worse. But though the line had been treated, RAIB found that the sand hoppers at the leading end of the train were empty, which was one of the failed defences that led to this incident. Had the sand hoppers been filled, the incident may have been prevented.

The unit in question (a '375') at least had the option for sand. At Exeter St Davids a few months before, an incoming passenger train collided with a stationary one, the unit having probably skidded on moisture on the rail head. There was no sand to drop this time because the unit – a Class 142 – was not fitted with sanders, as the standards at the time did not allow this. (The standards have since been updated.)

Just like a derailment, a collision or level crossing incident, a low adhesion event can have multiple causes. The way to beat it is for track and traction to work together – for sand to be put down, treatment trains to operate and vegetation be managed as well as possible.

The Adhesion Manual

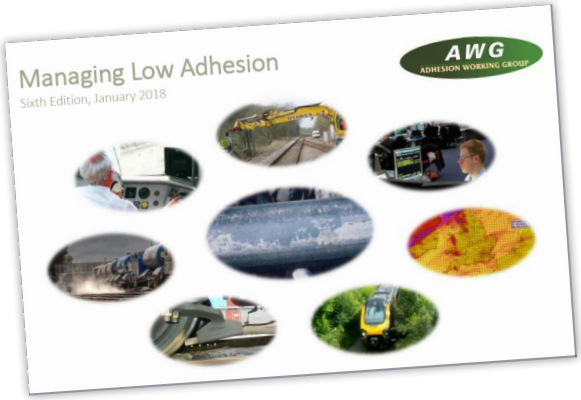
On behalf of industry, the Adhesion Working Group update a document called "Managing Low Adhesion", more affectionately known as the Adhesion Manual. It can be used by anybody in the railway who wants to find out how to reduce the risks associated with low adhesion. Here, they tell us a bit more about it and share some of the key findings.

The Adhesion Manual contains a lot of GB Rail's corporate knowledge on low adhesion and the problems associated with it. It's not a standard, but is our industry's mechanism for documenting and communicating the best practices used in Britain to combat the effects of low adhesion on the mainline railway. Because we're always learning, there have been several versions to include new and updated information. The sixth (and most recent) edition was published in January 2018; although from now on it will be reviewed and updated as new information, technology, recommendations and research and development emerge. This means there won't be a full-scale overhaul every few years; and also means that people who use the manual will have the most up to date information.

The Adhesion Manual is there for anyone and everyone with any interest in autumn and low adhesion. This includes drivers, fleet engineers, controllers, and the front-line practitioners who respond to low adhesion incidents; but also some people you wouldn't necessarily expect, such as companies who supply products, chemicals and services to the industry, to help us improve safety and performance during low adhesion conditions.

Since its last update in 2013, the Adhesion Manual has gone through some pretty big changes. Of course, the content has been updated to include key findings from recommendations, research and development over the last five years. But it's also far easier to use than before. The manual is now hosted online, rather than being in a paper format, with hyperlinks to the relevant sections to make it easier to use. The structure of the manual has been improved, with individual sections which pull together all the available data on operations, infrastructure, rolling stock and train detection. Finally, the manual is written in an accessible and engaging style, avoiding technical jargon where possible.

There are 19 key recommendations in the appendix (see over the page).



To have a look at the adhesion manual, go to www.rssb.co.uk and search "managing low adhesion".

Newswire

19 May, US: Freight derails after 'bridge collapses beneath it' in Virginia

Shortly after 07:00 (local time), a CSX freight derailed near a bridge in Alexandria, Virginia, causing severe damage. There were no reported injuries. It is currently thought the incident was caused by heavy rains washing away the track formation.

23 May, Italy: Two killed at crossing collision in Caluso

At 23:20 (local time), a train struck a heavy goods vehicle that had reportedly crashed through the barriers of a level crossing in Caluso, near Turin. Two people – including the train driver – were killed; 18 were injured. The lorry driver was unharmed.

30 May, Canada: Minor injuries sustained in Ontario passenger train derailment

In the evening, a passenger train derailed 24 miles south of Moosonee, Ontario. Seven crew and 73 passengers were aboard at the time of the incident. Reports note that a small number of minor injuries were sustained.

Recommendations from the Adhesion Manual
The lower SPAD risk and reduced impact on performance mean that cautioning on the move using GSM-R berth-triggered broadcasts [acknolwedged (safety) boradcasts] is the recommended method of warning drivers of low adhesion conditions when the signalling system allows.
Priority should be given to the running of the treatment train as failure to do so may lead to significant delays and safety of the line implications for following service trains; it must not be cancelled unless absolutely essential.
Train Operated Warning Systems (TOWS) should be taken out of use.
Railhead treatment should be used to improve traction where acceleration problems occur particularly on gradients or on the exit of stations.
The definition of treatment sites should be a dynamic process and should take account of the local knowledge of drivers who regularly operate the route, as they are best placed to say where they normally experience adhesion problems… best practice would be to move away from fixed signage to GPS control as this more easily accommodates such changes, as well as reducing the need for track maintenance.
Operating instructions must consider the likelihood of unfitted trains entering TCAID equipped routes, and a TCA failure must be indicated to the driver who can then follow appropriate procedures in conjunction with the signaller
TCAs can only be used with certain types of track circuit. It is very important that the compatibility between TCA and track circuit type is assessed prior to using TCA fitted vehicles over routes not previously traversed with such equipment
In order to minimize the risk of avoidable damage to the UK railway infrastructure, WSP systems fitted to rolling stock intended for operation over the UK railway network should be optimized for the lower levels of adhesion typically encountered on the UK infrastructure… AWG recommends WSP manufacturers and vehicle builders continue to use a simulation approach, using naturally occurring variable low adhesion conditions to produce a better performing WSP under real low adhesion conditions.
Sanders should be treated as 'safety critical' and appropriate instructions put in place for managing trains with empty sand boxes… The inclusion of sand box level detection in the design, flow rate monitoring or usage calculations based on, for example, WSP activity and sanding rate, should be considered to provide targets for monitoring and inspection.
Drivers must be instructed not to apply sand when the train is passing over points and crossings.
All operators are obliged under Health and Safety Regulations to have a COSHH statement on this issue and to have suitable practices in place to minimise the health risk (when filling sand hoppers)… A mask to protect nose and mouth, together with eye protection, is recommended… A hopper design with a filling aperture that is as large as practical will make the process easier.

Newswire

5 June, Portugal: Ground staff killed in shunting incident at Lisboa-Santa Apolónia

A member of ground staff was killed in a shunting accident at Lisboa-Santa Apolónia. An investigation has been launched.

6 June, Romania: Freight derails on points in Dej Triaj

At 21:48 (local time), the twenty-ninth wagon of a freight train derailed on pointwork in Dej Triaj. There were no reported injuries.

8 June, Belgium: ECS derails, having taken points too fast on Brussels-Mons route

At around 10:30 (local time), an empty coaching stock train derailed on pointwork on the Brussels–Mons line. The train is reported to have traversed points with a permanent speed restriction of 40km/h at over 100km/h. The driver sustained minor injuries.

Recommendations from the Adhesion Manual
Wheel contamination should be considered as a significant factor in the braking performance of trains
Water jetting and Sandite treatment provides the best method for improving adhesion in autumn conditions and should be used where possible
Sites identified as risks for freight trains stalling should be risk assessed and incorporated, as necessary, into the railhead treatment programme, with TGAs fitted if appropriate. Network Rail Routes, in conjunction with freight operators and in consultation with passenger operators, need to identify locations where the delivery of 'clear run' conditions would reduce the risk of freight trains stalling on rising gradients
A key element in robust planning is optimising the engineering possessions to enable the proposed circuits to be delivered without conflict with engineering work. This should take place in the early stages of the planning cycle
The review found that TGAs were beneficial and that, subject to appropriate maintenance and overhaul arrangements, reliable…Routes need to ensure that there is a regular review process to identify any reallocation of TGAs required as a result of changes in service pattern or traction type.
The industry should now start to consider a new strategy for managing autumn over the next 15 to 20 years. This should be based upon an understanding of the level of adhesion that will need to be consistently achieved in order to support the intensity of operations expected. This should examine the extent to which improvement can be derived from: • a significant change in vegetation strategy; • the exploitation of further developments in train braking, WSP and sanding systems; • technical innovation such as magnetic track brakes (MTBs), the development of aerodynamic modifications to trains to direct leaves away from the wheel-rail interface, and better understanding of the 'wet rail' phenomena and its mitigation. • the opportunities provided by the use of service trains to lay adhesion modifier; • the design and development of the next generation of railhead treatment equipment (offspring of MPV).
The review of practice across Europe recognised and confirmed the following as good practice: • Immediate action – enhance data collection processes toward a systematic and consistent approach by listing and comparing local data collection practices. This could be used to identify best practice, gaps and further standardisation; • Short-term action – develop a National Risk Register to identify autumn risk locations at local and national levels to justify mitigations. The Register would include associated location history, Geographical Information System data, industry standards, safety and performance data, vegetation management and railhead treatment specification; • Medium-term action – develop a National Railhead Treatment Programme, with an expert steering group comprising a national weather specialist, route seasons delivery specialists and NSC seasonal specialists. The purpose of this group would be to ensure savings can be achieved through improved train and operating efficiency; • Long-term action – design a National Vegetation Management Programme to manage and audit processes that maximise cost effective strategies to promote safety and performance benefits on priority and key locations.

Sneak Peek: behind the scenes of RED

*Network Rail's **Claire Volding** helps RSSB to produce the RED programmes, making sure the film crews have access to the infrastructure, trains and staff they need. She tells us what it's like to be the other side of the camera.*

Lights, Camera, Action! This was my vision of what the making of RED would be like – I pictured caravans of actors and people holding large booms whilst a director sat in one of the fold out chairs. It wasn't completely accurate, although it was still very exciting being behind the scenes.

We were filming RED 50, all about adhesion on the railway, in Dartmoor, Devon. This is a private railway that we had hired for the shoot, and Great Western Railway had kindly offered us a train to star in the film.

Ian Muffett, who's been involved in the RED films for some time, has charged me with arranging this issue with his support as my mentor. We joked that I was Robin to his Batman as we travelled down in the car. Once we arrived, we met with the production company "Big Button", as well as actors and cameramen and everyone involved in the film. We ran through the script and the plan for the next day, and after dinner headed for an early night as we knew we had a chocka day of filming ahead.

The next day was one of those crisp cold mornings, with the sun shining through the autumn colours on the trees by the railway line. It was ideal, a perfect autumn day for an autumn-themed edition of RED. Autumn presents the railway with some unique safety-related risks, and these haven't previously been captured in a RED drama.

As the crew assembled, I got ready to give my safety brief as COSS to the film crew, actors and rail staff. As most of them were not from a railway background, it was important that I made the brief really clear and understandable. We put all the filming equipment onto a trolley, and pushed it down to the filming position next to the fake signal that we'd put up for the film.

The state of the track fitted perfectly with our autumn theme. We were gearing up to film the scene where our train SPADs our pretend signal ON12. This was it –the exciting moment where the star of the film, the train, shines. The crew

Newswire

12 June, France: 7 injured when train strikes landslip near Orsay

A landslip caused by heavy rain caused three carriages of a Paris suburban train to overturn between St-Remy-les-Chevreuse and Orsay. Seven people sustained minor injuries. Paris transport body RATP has announced that the embankment collapsed shortly before 05:00.

13 June, Australia: Fall between train and platform leads to injury in Brisbane

At 16:15 (local time), a man fell beneath a train and the platform at Virginia station in Brisbane. He was taken to hospital with a serious leg injury.

17 June, US: Freight train derailment leads to explosion and evacuation near Princeton

In the evening, a freight train derailed just outside Princeton in Indiana. Five of the derailed wagons were carrying propane. There were no reported injuries, but an explosion led to the evacuation of homes within a one-mile radius of the incident site.

were already at the side in a position of safety, and the train was ready to go. The train started moving and the (real) driver started to build up some speed as he approached ON12. He passed the signal as planned and then slammed on the brakes – but the adhesion on the track was so poor that the wheels locked under him! He slipped and slid until he finally came to a stop. We had it, we had the footage we needed… although we now also had a train with some terrible wheel flats! I suppose you can't get more realistic when filming a scene about autumn track condition than coming away with a train that was bound for the lathe.

After we'd filmed all the scenes with the train, we moved on to the scenes with our (actor) Mobile Operations Manager. There's a scene where the MOM calls for his line blockage. As the actor is not from a railway background, I had to help him sound like a MOM would when calling a signaller for a line blockage. It took a few takes, but we finally got there. It was now time for the all-important climax, where the MOM is potentially hit by the SPADing train we'd filmed earlier. The actor and the train were not filmed together in the same shot for the impact scene: they're filmed separately, and then cleverly merged together by Big Button. The actor had to use all his skills to pretend that a train was approaching and that his life could be in danger. He was so convincing I was really impressed!

After such a busy day on our railway filming set, our actors and crew were ready for some well-deserved lunch. We all sat by the roaring fire and warmed our cold hands whist discussing the success of the day's shoot. It had been a very interesting day and I felt really pleased to be part of it. "You did good, Batman," said Ian as we drove off, and I suppose that meant he was handing the reins over to me. "Thanks Robin," I smiled back.

18 June, Denmark: Level crossing collision at Sig kills 2

At 13:10 (local time), a car drove across an unprotected level crossing at Sig and was struck by a train. Both of the road vehicle occupants were killed.

22 June, US: Freight derails, leaks oil in Doon, Iowa

Residents were evacuated when a freight train derailed in Doon, Iowa, causing an oil leak.

26 June, Austria: 30 injured when passenger train derails near St Poelten

A local passenger train derailed near St Poelten. 30 people were injured, three of them seriously. An investigation has been launched.

Getting to grips with adhesion terminology

Imagine that you're driving along on a typically British autumn day: the air is full of mist and mellow fruitfulness. Green signal follows green signal, and all is well with the world. But when the next signal comes into view, it is showing double yellow. You shut off power and start braking, very little happens so you apply brake a bit more, then a bit more, then even more but… Still no retardation. The speedo drops to zero and you realise that the wheels have picked up and that your train has started to slide. Thankfully, you sight the next signal, and it is displaying a green, so you know that you have got the road across the junction ahead. A heart stopping scenario, but how should you report it?

The terminology used in the Rule Book to describe adhesion has been simplified and made clearer. There are now three ways of describing adhesion conditions: Good, Expected and Reportable.

Level	Definition
Good	Rail adhesion conditions are good.
Expected	Rail adhesion is no worse than would be expected for the location and the environmental conditions.
Reportable	Rail adhesion is worse than would be expected for the location and the environmental conditions.

- There are no adhesion issues, and as a driver you are experiencing no problems. Conditions are good.
- You're experiencing some issues with adhesion, but it's not a surprise: there's fine rain, or the location that is known to have adhesion problems at this time of year. You were already prepared to adapt your driving technique in response. The adhesion is as you would expect it to be for the situation, so the drivers coming behind you won't be facing any surprises either. The conditions are expected. You must follow your train operator's driving policy for low rail adhesion at locations where you expect to experience 'expected' adhesion levels.
- You experience poor adhesion that is unexpected: it's come as a surprise to you, and could pose a risk to the driver following you. You need to take action beyond what is expected for the conditions or the location. The conditions are reportable, and you must report it to the signaller immediately. The signaller will then take appropriate action, which could include using the 'Acknowledged (safety) broadcast calls' arrangement, and/or arranging for the rail to be treated to improve adhesion (see our article on page 8).

If you are a driver, and you have been told about 'reportable' rail adhesion levels, you must approach the location using the method shown in your train operator's driving policy.

Remember: don't get caught out by rail adhesion issues, and help others avoid being caught out, too.

Find out more:

- On the RSSB website: search "poor adhesion"
- In your Rule Book, Module TW1, section 8