rightTrack

Issue 27 **Spring 2019**

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Hello, and welcome to issue 27 of Right Track!

In this issue, we're looking at the risks caused by road driving for those of us who use cars to get to and from work, or travel between sites; and we find out about the risks associated with cognitive underload, when there's so little going on that our brains try to switch off.

There's also an update on how the industry is working together to reduce the risk of SPADs from the chair of the cross-industry SPAD Risk Sub-Group, and some advance notice that RED and Right Track online will soon be moving to a new home.

In our regular features, we're finishing the series on the human factors aspects of SPADs in SPADtalk, this time looking at the importance of teamwork; and hearing about RAIB's investigation into the derailment at Dunkeld and Birnam.

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**.

RSSB A Better, Safer Railway

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.

*RSSB The Helicon 1 South Place London EC2M 2RB Tel: 020 3142 5300 Email: **righttrack@rssb.co.uk** Web: **www.rssb.co.uk***

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Cognitive Underload

You've probably been there: driving on the motorway, open road, little to respond to, you think to yourself, 'I can't remember driving that last stretch of road'. You may find yourself becoming easily distracted, you may find your mind starts to wander… If you can relate to these scenarios, the chances are you've experienced underload. ***RSSB's Sam Waters, Senior Human Factors Specialist****, tells us more about what underload is, and what it means for the safety of the railway.*

The rail industry has known for years that high mental workload (overload) can cause people to make mistakes. But there has been very little recognition of what happens at times when workload is low (underload). For many of us, our work varies from one moment to another. Sometimes, it can be very demanding, with lots to take in (for example, during emergencies, or if we're working in peak hours); but at other times, work can be monotonous and repetitive.

In situations like this, it can be difficult to maintain concentration. This in turn can affect job performance, and can lead to mistakes.

And strangely enough, some of this is down to advancements in technology. The industry has brought in changes in the way that tasks on the railway are performed to make it safer. Take for example the train cab: train traction systems have improved to provide a smoother journey, and over decades the industry has put in a lot of effort to make the cab environment comfortable, through temperature controls and adjustable seating positions, amongst other things.

These changes have brought obvious safety and health benefits, and most drivers would absolutely not want a return to the days of uncomfortable, draughty, smelly cabs which were freezing in winter and boiling in summer. However, this has had the unexpected side effect that the environment in a cab now increases the likelihood of experiencing underload.

Examples of underload:

- Driving a train for long periods of time along the same route and experiencing green signals, with the same hazards and indications
- Working in a signal box on a very lightly-used line with long periods of time between trains
- Working as a member of dispatch staff, dispatching a train from the same platform in the same daily routine on an intense suburban service, where one train can come to look much like the next
- Working as a lookout on a lightly used line (a freight-only line, for example), with few trains to respond to

Are you drifting into a state of underload?

Do you find your mind starts to wander, and you're somehow thinking about other things that don't relate to the task in hand? Or have you suddenly realised you've been running on 'auto-pilot'? These experiences may be a sign of underload. It's important to identify when you begin to drift into underload. Here are some of the signs:

- Boredom
- Fatigue
- Loss of ability to maintain attention
- Distraction
- Mind wandering
- Loss of motivation
- Loss of interest
- Running on 'auto-pilot'

And future developments in automation may reduce engagement even further.

Combatting underload

If you find you are experiencing underload, there are some important things you can do to set yourself up to be as alert as possible.

Studies have shown that the more tired you are, the more likely you are to experience the negative effects associated with underload. On average, we need between 7-9 hours' sleep in a 24-hour period to perform to our best ability. Tests have shown signs of impairment when people get less than 5-6 hours of sleep.

Some people are more alert in the morning, and others in the evening, depending on their body clock. If you are able to swap shifts, you should try to swap with someone who has an opposite preference to yours. Swapping shifts isn't always possible; for example, if there's nobody able to take your shift. If you do swap shifts, you must follow your company procedures.

The fuel you give your body can also affect how alert you are. Scientists advise that people cut down on alcohol and junk food, and instead eat healthy foods and drink plenty of water. Junk food lacks nutrients, so your body is forced to rely only on the sugar within it as a source of energy. This energy is spent quickly, meaning you experience a temporary 'sugar high', quickly followed by a 'sugar crash'. It's also important to avoid large meals before or during a shift, as this can affect your performance.

Newswire

4 January, Hungary: Light loco strikes trolley on line at Sárvár, one injured

In the early hours, a light locomotive struck a maintenance trolley at Sárvár. One member of staff sustained major injuries.

6 January, US: Freight derailment near Bartow spills dangerous goods, clear-up staff suffer respiratory problems

Shortly after 20:00 (local time), a freight carrying dangerous goods derailed near Bartow, Georgia, spilling hydrochloric acid and hydrogen peroxide. As the train was also carrying chlorine, the town was evacuated, along with all residencies within a seven-mile radius. There were no injuries relating to the derailment, although a firefighter and three law enforcement officers were treated at local hospitals for respiratory problems brought on by the spill.

8 January, South Africa: Collision in Pretoria kills 4

Four people were killed and over 600 were injured when two passenger trains collided at Mountain View station in Pretoria. The local mayor later made a statement on social media in which he implied that 'cable theft and vandalism' had caused the accident by affecting the signalling system. An investigation has been launched.

How frequently you eat is also important, especially during night shifts when you are working against your body clock. Grazing healthy foods little and often helps to maintain your body's blood sugar levels. Try having healthy snacks, such as fruit and nuts, at regular intervals.

There is a range of techniques that we can use to help boost our alertness levels. We're all different, and one technique that works for one person, might not work for another. So you might need to try various options to see what works for you (see box).

It's good for anyone who's experiencing underload to try these techniques. If you have your own techniques that work for you then keep using them, but make sure you think through any risks that they might bring and talk to your manager about them.

Popular techniques for coping with underload

- **Verbalising task-related risks** through risk-triggered commentary. This technique is used throughout the rail industry. Over time, we become familiar with the actions that we need to carry out to respond to routine situations. Some of us find that speaking the risks aloud as we notice them helps us focus our attention, so that we keep the critical information at the forefront of our mind.
- **Being active** when completing monotonous tasks can be an effective technique to increase our alertness levels. Take any suitable opportunity to get up and move and do light exercises or stretches to help increase circulation and blood flow to the brain, to make sure it receives the appropriate levels of oxygen.
- Some people conduct **additional task-focused activities** to help prevent the feelings associated with underload. The idea is that, if you're in a state of underload, giving your brain a bit of a challenge can improve your alertness and performance. So, for example, you could self-test on specific features of the task in hand. If you're driving a train, you might test yourself on features such as level crossing names, place/village names, etc. It's important that whatever you do does not distract you from the safety critical task of driving a train, so you should only do things that are relevant to your job.

Find out more

RSSB is developing a toolbox of different techniques that can be used by train drivers to reduce the chances of drifting into a state of underload. For more information, go to **www.sparkrail.org** and search for T1133.

9 January, US: Freight derails in Aubrey – no reported injuries but house narrowly missed

At around 09:30 (local time), an empty freight train derailed near Pecan Street and Main Street in Aubrey, Texas. There were no reported injuries, but a house was narrowly missed by a wagon which had crashed through the homeowner's fence.

10 January, India: Woman trapped and dragged by train at Dahod station

A passenger's clothing became trapped in the door of a departing train at Dahod station, Gujarat. She was dragged along a short distance. Her fellow passengers came to her aid and pulled her to safety as she began to slip between the train and platform.

11 January, Netherlands: Level crossing collision in Leeuwarde

A passenger train struck a lorry carrying milk powder at a level crossing in Leeuwarden, Friesland. Four passengers, the train driver and lorry driver were injured.

Road safety

We run trains; our driving is done on the railway. So what has road safety got to do with the rail industry, we may hear many ask? Isn't keeping our passengers safe our priority?

The answer to passenger safety is yes! And the industry does devote considerable effort to that. But as well as keeping our passengers safe, we need to keep our colleagues and members of the public safe too. And that shouldn't be limited to just the rail infrastructure itself.

Have you thought about how the rail industry relies on the road system too? How many of your colleagues drive to work, or perhaps drive to the station car park first? How many of us drive during our working duties, between one site and another? Have you thought about how many road vehicles keep the rail industry operating: from catering suppliers to construction vehicles; from transit van couriers to taxis? And what about all those bus replacement services?

In 2018, there were 1,770 road deaths reported on UK roads, and an overall total of 165,000 casualties of all severities. Between 30% and 40% of road deaths are work related – that's about 500 people dying on the road while at work, every year. So ask yourself: how many road miles do you travel for work in a month? Network Rail owns and operates over 7,500 road vehicles, which collectively clock up about 100 million miles a year. Freight and Train Operators use taxi firms across the country for staff and passengers.

When we're on the road, whether travelling to the depot for the first service of the day, or ferrying passengers around to allow important works on the infrastructure, we need to keep ourselves – and each other – safe. In January 2019, the CEO of RSSB Mark Philips showed how seriously industry is taking this issue, when he spoke passionately about it at the Highways England's 'Driving for Better Business programme' Public Sector Summit in the House of Commons.

So as an industry, we're looking at road risks trends. Leading Health and Safety on Britain's Railways is a cross-industry strategy that is focused on continuing to improve our railway's health and safety. One of its 12 key risk topics is road risk; which means industry is committed to reducing road risk.

There's a cross-industry group dedicated to looking at road risk and the implications for our safety. The Road Risk Group is working across all parts of our industry, with representatives from each of the industry sector safety groups, including the

Find out more

For more information on Road Risk, go to www.rssb.co.uk and search "Road Risk Resource Centre".

To learn more about the railway's cross-industry road risk strategy, go to **www.rssb.co.uk/h-and-s**

For the Health and Safety Executive's guidance, search "HSE INDG382" into your search engine.

To find out more about the Road Risk Group, go to **www.rssb.co.uk/groups-and-committees**

See also

RED 35 "Fatigue at the wheel" looks at the potential causes of road risk, especially if driving when tired.

Office of Rail and Road and the trade unions, so that we can improve how we manage this significant and often under-considered risk. The group is working collaboratively with 'Driving For Better Business' (DfBB), a government-backed programme led by Highways England to help employers reduce work-related road risk for their staff. This will provide focussed, practical strategies for the rail industry to adopt and use for its own staff, so that we can reduce road risk

The DfBB programme is based around the Health and Safety Executive Guidance Note INDG382 'Driving at Work: Managing work-related road safety'. DfBB helps organisations to comply with the law, and then helps them to continuously improve the management of occupational road risk. There are seven steps in the process (see chart). DfBB also provides member organisations with a wealth of information, guidance and tools, including a work-related road risk assessment based around the journey, the vehicle and the driver.

It is essential that all owners, directors and managers, in any business that uses vehicles, are fully aware of the need to effectively manage the people who drive or maintain those vehicles. The Road Risk Group is advocating for rail organisations to register to DfBB and become a DfBB Champion. There are many reasons why they should do so:

- Reduced road collisions and injuries to staff, passengers and the public.
- Reduced fuel consumption
- Reduced wear on vehicles
- Reduced insurance premiums

The Freight sector are pushing forward with this at real pace. We urge other rail employers to follow their lead.

Route learning

Route knowledge is one of the core skills needed by on-board operational staff to run trains safely and efficiently. It underpins a host of technical tasks, from every day activities to responding to emergency situations. Drivers need to know when to start braking for stations that are not visible; guards need to decide where to dispatch from and which side of the train to stand on before the train arrives in the station.

Despite its importance, until now there has not been a standardised way of training route knowledge across the industry. So RSSB carried out research to develop a new approach to route learning that the industry can implement, so that training is appropriate and consistent.

This new approach is called the route story approach.

The route story approach is based on the route knowledge requirements of the tasks that the member of staff will be required to carry out. So the information you will learn is directly relevant to your role. The route story draws together a sequential list of route cues, with details you need to know about each one. This covers route risks to make sure we've got the required task competence in both normal and degraded modes.

The research considered different learning styles. Our brains all work slightly differently, so we will learn best in different ways, and take different amounts of time to learn. So you should get a range of learning materials, allowing you to select the material that best suits your learning preferences. This way, different types of learners will all have access to learning material that suits them. Learning time should also be flexible, to make sure that assessments are done at the right time for individual learners.

The route story approach is based on robust scientific evidence. The approach has been tested with drivers and guards in several live operational trials, who have told RSSB that they prefer these new learning materials to their company's existing materials, and that they feel the route story approach prepared them better to work the route.

The research has resulted in a new guidance document for best practice when developing route learning processes. It sets out the steps you need to take to implement the route story approach. These steps are detailed in the table opposite. The guidance also includes best practice guidance for monitoring the effectiveness of route knowledge processes.

Newswire

16 January, Norway: Locomotive runs away, passes signal at danger, near Roa station

At 11:57 (local time), the driver of a light locomotive experienced a braking failure as it was approaching Roa station en route to Oslo. At this point, there is a downhill slope with a 1-in-50 gradient. The locomotive passed a stop signal at danger and continued for about one kilometre before stopping by the points at the other end of the station. A northbound passenger train had entered Roa station just before the incident took place. There was no collision and no reported injuries.

30 January, US: Woman carrying pram dies after slipping and falling down stairs to NY subway

A 22-year-old woman slipped and fell as she was carrying a pram down the stairs to the 7th Avenue station on New York's subway. She was found unconscious on the platform that evening. Her daughter was found strapped in the pram. She was conscious and reportedly 'not seriously injured'. The woman later died in hospital. The cause is currently under investigation.

What do I need to do for the new Route Story approach	How will this guidance help me?	Why is it a good idea to do this?
Carry out a generic risk assessment: Take a task based approach to identify the route features that are essential for route knowledge.	This guidance contains a complete ready-to-use generic risk assessment for the role of the driver in colour light signalling and guidance on how to complete this for other roles.	The generic risk assessment was created by risk experts and will ensure that route knowledge requirements are consistent and comprehensive across the industry.
Create a route specific route story: Develop the detailed information for each essential route feature identified in the generic risk assessment for the specific route.	This guidance contains step by step instructions on how to do a route specific review through development of the route story. Guidance on how to use the route story to create interactive and paper based route learning materials is also contained in this section.	The route story combines all information needed to drive a route into one place (route feature information and route risks), simplifying the process.
Optimise route learning time and effectively assess competence: Select appropriate training formats and continually monitor competence during route learning so that learners are assessed at the right time. The route story can be used to make objective and structured assessments.	This guidance outlines a number of training options for route learning, step-by-step instructions on how to monitor learners during route leaning and how to assess.	This approach allows the route learning inside and outside the actual environment (e.g. driving cab) to be optimised. It also ensures that route learning assessments are done at the correct time by basing the assessment timing on an objective evidence base.
Monitor whether route learning competence processes are working as they should.	This guidance contains advice on what you should monitor, and the process you should follow to evaluate your route learning competence processes.	By monitoring your competence processes you will identify any problems as they occur and be able to overcome them.

Find out more

To find out more on route knowledge, go to www.rssb.co.uk and search "Route Knowledge code of practice".

For more information on the research into route story training, go to **www.sparkrail.org** and search T1108.

3 February, India: 'Seemanchal Express' derails near Sahdei Buzurg, killing 8

At 03:58 (local time), the Delhi-bound Seemanchal Express derailed near Sahdei Buzurg in Bihar, India. Eight people were killed and 28 were injured (including the driver). Railway officials have been reported as claiming the train to have been running at 'full speed' when the incident occurred. A spokesperson for the East Central Railway later cited a rail fracture as the most likely cause.

4 February, Canada: Freight train runs away and derails in Field, British Columbia, killing 3 crew

At around 01:00 (local time), a freight carrying grain derailed east of Field, in British Columbia. The train fell from a bridge 60 metres down a ravine and into the Kicking Horse River. All three crew members were killed. Initial findings reveal that a runaway occurred at Partridge. Here, the train's emergency (air) braking – but no handbrakes – had been held 'on' for two hours, during which a crew change had taken place. Shortly after the changeover, the train began to run away and accelerated to a speed 'well in excess' of the 20mph permitted for the steep curves and mountain gradient. Soon after, the derailment occurred.

SPADTalk: Teamworking

This is the tenth and final instalment in our series on the human factors issues which can lead to SPADs (see Right Track issues 18-27). The point of this SPADtalk series is to try and look past the immediate causes of SPADs (driver distraction, sun shining on signals, low adhesion); and to think about the underlying causes: what causes these things to happen in the first place? The series has aimed to present the variety of underlying causes we know can contribute to SPADs (see box opposite), using practical examples and information from SPAD incidents to learn lessons.

The human factors of incidents are varied, highlighting the point that SPADs are not about one thing, and they are not just about how one driver performs on the day. Our final topic, on the impact of teamworking, emphasises the need to think more widely than the individual driver. At first, this can seem like an unusual source of issues for SPADs. The train driving role is largely solitary, with the vast majority of train driving being done with one individual in a train cab. However, there are cases where more than one person is in the train cab, and even cases where teamworking issues before a journey provide distractions which contribute to SPADs.

A second person can be in the train cab for a variety of reasons: supervising trainees, acting as a route conductor, driver assessments and track inspection, for example. And whilst each of these is a good reason to have a second person in the cab, it does inevitably lead to potential distractions, or even confusion. The following types of team factors have been identified as SPAD contributors:

- The tensions between a driver and a driver instructor.
- The management of trainee errors by driver instructors on approach to a signal.
- Distractions from information discussed with train maintenance staff prior to starting a journey staying in the driver's mind during a journey.
- The distraction and stress from a difficult conversation with a line manager prior to driving.

We can even see the driver's family as part of this team, with tensions from home in some cases leading to distractions at work (see RED 51 for example).

Cab passes and company policies for travelling in driving cabs are key in controlling the risks which can arise when there's more than one person in the cab. The need for people other than the driver to travel in the train cab, and difficult conversations as part of work and home life, will not go away. Elements of company policies, for example which allow individual drivers to decline having another person in the cab, are key to managing this issue. But managing these issues will often fall to those people in the team situation.

This is where the non-technical skills of everybody in the team come in to play. The manager needs to have empathy when dealing with difficult topics, and to consider the timing of difficult conversations in relation to operational duties. For example, raising an issue about performance is likely to be a concern for a driver, so it's sensible not to have it before a long shift. The driver needs to be aware of their own requirements for maintaining concentration, such as being assertive in refusing access to the cab when necessary, or recognising when personal or work-related issues can be a distraction from the driving task.

At the conclusion to this series, it is important that we finish on the topic of teamwork. We have considered teamworking as it impacts on individual drivers in this article; but we also need to think of SPADs as a team problem. SPAD management is not just about a single driver, but also about the team around that driver. The responsibility for reducing SPADs lies with all of us in the industry: the driver, the driver manager, the signal engineer designing the signal layouts, the operations standards manager developing policies on cab access and defensive driving, the people writing the Rule Book, and everyone else.

Human Factors of SPADs

- Verbal Communication
- Fatigue
- The Rule Book and company procedures
- Written information on the day
- Training
- Risk management
- Infrastructure and signalling design
- The cab environment
- Workload
- Teams

Reducing the risk of SPADs for a safer railway

The reasons why signals are passed at danger on the rail network are many and complex. Understanding the underlying causes to develop an effective risk reduction strategy, is fundamental to improving safety on our network. We need to recognise that SPADs occur due to a combination of factors such as design of infrastructure, operating and environmental conditions, and human factors.

Over the past decade, the risk posed by signals passed at danger (SPADs) has reduced substantially; and we should all be extremely proud of the work done to achieve this. We should never forget the terrible tragedy at Ladbroke Grove in October 1999; but it is also important to remember that multi-fatality train accidents in the UK decreased after that, and nobody has died as a result of a train accident since Grayrigg 12 years ago.

But neither should we become complacent: since then, there have been more than 50 SPAD-caused derailments and four SPAD-caused train collisions, as well as some notable close call incidents. The most recent of these was the near collision between a steam train and high-speed passenger service near Wootton Bassett on 7 March 2015 (see Right Track issue 14).

One of the significant safety improvements to come out of the Ladbroke Grove investigation was the fitment of Train Protection Warning System (TPWS) at junction signals, dead end platforms and certain speed restrictions. The benchmark for monitoring SPAD risk was reset in 2006 to mark the nationwide implementation of TPWS and make sure the numbers weren't skewed.

Since then, industry has been monitoring the data on SPAD risk, to see whether there are any underlying trends where we could focus improvements. Other than 2012, which was unusually good, the trends have been constant.

In 2013 the risk returned to the 5-year average between 2008 and 2012, and rose steadily until September 2014. Since then, the SPAD risk has decreased, reaching an almost all time low in February 2017. More recently, the trend has been fairly static; although there has been an increase in the last year or so of both SPAD numbers and associated risk.

Newswire

4 February, US: Freight collision in Wendover Canyon injures crew

At around 14:00 (local time), a loaded coal train struck the rear of another that had stopped in Wendover Canyon, Wyoming. As a result, three locomotives and four wagons derailed. Some 6,000 gallons of diesel fuel was also spilled.

The terrain prevented emergency crews from accessing the site, the injured crew members being brought out by a road-rail vehicle owned by the operator, Burlington Northern Santa Fe (BNSF).

6 February, Switzerland: One track worker killed, another seriously injured, in Ticino

A track worker was killed by a train near the entrance of the Gotthard Tunnel at Ticino. Another track worker was flown to hospital with major injuries. An investigation has been launched.

2012

There was a sharp decline in SPAD risk in this year, although the reasons are unclear. They were likely to be due to a variety of factors, including the significant attention given to the rail network during the 'Olympic year'.

Find out more

You can access Phase One of the SPAD Risk Reduction Strategy by going to the SPADs section of Opsweb.
www.rssb.co.uk/opsweb

The National SPAD Strategy

This recent increase, which isn't yet fully understood, ironically coincided with the launch of Phase 1 of the RSSB SPAD Strategy in late 2017. The strategy focuses on industry good practice that can be applied in the following areas:

- The role of the driver or signalling manager.
- Driver and signaller self-management, including non-technical skills and lifestyle.
- Competence management systems.
- The use of on-board train systems.
- The impact of the infrastructure.

It has many examples of day-to-day practices we can all use to manage SPAD performance. It also has new techniques and strategies, that many of us may not have considered previously.

By 2018, it became apparent that the SPAD Strategy had not really taken hold; which meant that a lot of the suggestions in it to reduce the risk of SPADs were probably not being put into practice. So, to make sure we could use the strategy's recommendations and improve the safety of the railway, the group that had created the strategy came back together to implement it across the industry. We are now known as the SPAD Risk Sub Group, and our job is to encourage companies to adopt the strategy wherever they can.

Trevor Parkin of East Midlands Trains, who chairs this group, says "I really hope we can embed these practices across industry. The aim is to reduce SPAD risk (as recorded by the SPAD Risk Ranking) such that it is maintained around the 30% level of the September 2006 benchmark, and to lower it further if possible. Our secondary objective is to look at options for reducing the number of SPAD incidents that occur across the network."

If you work in rail operations, signalling or any sector that may influence SPAD performance, then please have a look at the SPAD Strategy. Ask yourself if there are any areas where you could change the way you operate to reduce the risk from these incidents occurring.Ask your managers and senior executives if they know about this document, and what they are doing to implement it and improve SPAD performance. If you have any questions about how to adopt this within your organisation, or suggestions on how to improve our SPAD performance and make our network safer, please contact us by emailing **SPADGroups@rssb.co.uk**, and we'll be happy to help.

8 February, Spain: Head-on collision near Barcelona kills 1

At around 18:20 (local time), two commuter trains collided head-on between Sant Vicenc de Castellet and Manresa, near Barcelona. One person was killed; around 100 more were injured, three of them seriously.

12 February, South Africa: Passenger train collision in Pretoria kills 3

At 09:30 (local time), a passenger train struck a stationary train at Mount View station in Pretoria, killing three people and injuring around 300 more, 82 of them seriously. An investigation has been launched.

17 February, Germany: Passenger train derails at Basel Badischer – no reported injuries

At 21:00 (local time), a passenger service derailed while approaching Basel Badischer station. There were no reported injuries as the train was starting to pull in. The service was running over an hour late after being delayed in Fribourg following an incident on the line.

RAIB report brief – Dunkeld & Birnam derailment

At about 22:15 on 29 October 2018, a rail head treatment train (RHTT) derailed on a set of points just after passing Dunkeld & Birnam station. It ran for around 100 metres, causing significant track and signalling damage, before re-railing at the next set of points. The train then continued a further 15 miles to Perth.

At some point in the journey, the leading wheelset of the fourth bogie began to slide instead of rotate, resulting in the creation of a large wheel flat on both its wheels. As the train progressed, these flats developed, wearing a groove into the wheel treads and creating what are known as 'false flanges'.

The Dunkeld signaller heard loud noises as the train came off and contacted the driver by radio. The driver told him that he had heard a rumble and felt a reduction in speed; however, because the train had re-railed, its behaviour had returned to normal. The driver thought he'd run over some sand on the track. Because of the noise, and the signalling fault, the signaller decided to inspect the track in person, rather than caution the next train. When he saw the track damage, he blocked the line and contacted the route control office, by which time the RHTT had reached Perth. The signaller at Perth also spoke to the route control office, before telling the driver about the track damage at Dunkeld and that the train wouldn't be allowed to go on.

It's normal practice for train preparers to carry out a 'roll-by' test when a freight leaves the yard to check that all its wheels are freely rotating; but the operator's instructions for dispatching the RHTT from Inverness didn't include this. So the RHTT operative who prepared the train before it left for Perth didn't do the test (although he did check the handbrakes). He believed both wagons were fitted with a working handbrake interlock, which should have prevented the train from moving if a handbrake had been left on. When the wagons were inspected after the derailment, the handbrake interlock on the first wagon had been isolated... RAIB couldn't determine why the handbrake interlock had been isolated, or by whom.

A rolling stock technician had also examined the RHTT earlier that day, and signed off the handbrakes as being fit for service. Because the handbrake interlock was isolated, there was nothing to stop the driver from driving the RHTT with the handbrake accidentally left fully or partially applied. RAIB hasn't been able to confirm the exact status of the handbrake during the journey. The brake blocks associated with the wheels with the 'flats' showed signs of excessive heat, consistent with the blocks rubbing against the wheels for a significant period of time. However, the other wheelset on the same

bogie didn't exhibit any wheel flats or heat marks. This suggests that its brake blocks hadn't been rubbing against the wheels, and that the handbrake was not fully applied on this bogie.

The operative of the RHTT told RAIB that the last time he had used the handbrakes was during a short run to Moy the day before. On that trip, he reported that he had only applied the handbrake on the other wagon while at Moy, and removed it for the return journey. He reported that he did not operate the handbrakes on the wagons after the journey on the previous day. He also reported that, other than to check the handbrakes were off prior to departure, he did not operate the handbrakes at the start of the journey to Perth.

The nature of the RHTT's daily work, and the conditions it operates in, means that it regularly experiences very low adhesion conditions. Evidence from Network Rail engineers responsible for the RHTT fleet indicates that wheel flats are common on RHTTs, and that wheels are routinely changed once or twice during the leaf-fall season. The wheelsets either side of the water jets (the two inboard wheelsets on the wagon) are considered the most susceptible to flats, as they are exposed to airborne water, jetting debris, and pass over a saturated rail during rail treatment operations.

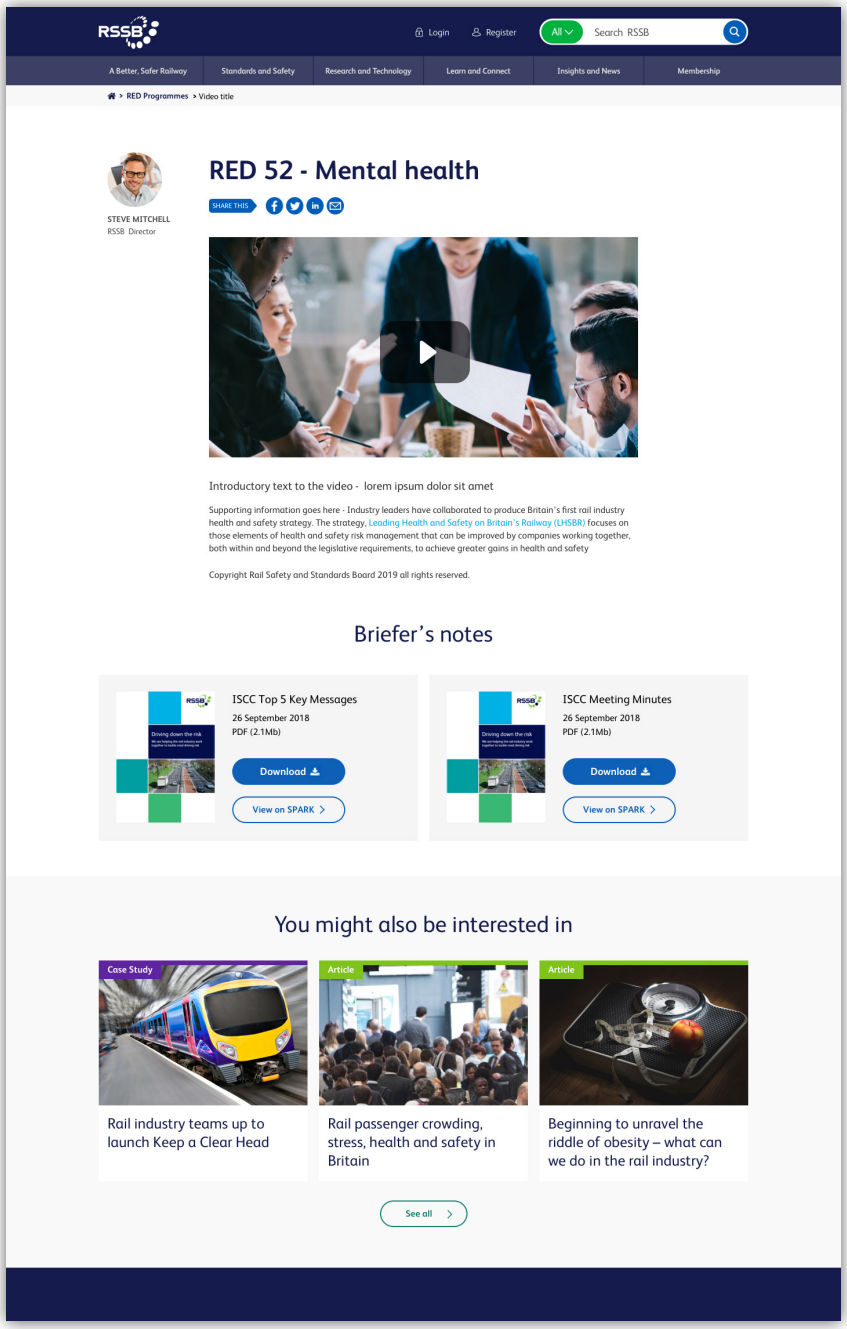
In summary, RAIB notes that this accident demonstrates that wheel flats can cause derailments. It is therefore important that:

- Operators and maintainers of RHTTs closely monitor the condition of wheels and braking systems when operating in low adhesion conditions, due to the increased likelihood of the formation of large wheel flats.
- Operators of freight trains, and other specialist trains derived from freight wagons (including RHTTs), undertake suitable 'roll-by' examinations on departure from yards, to detect non-rotating wheels.
- Maintainers of freight wagons have a process in place to control the isolation of handbrake interlocks on freight wagons.
- Staff preparing freight trains for departure check that handbrakes are fully released and do not place sole reliance on handbrake interlocks.

Opsweb is changing…

The information on Opsweb for operationals staff, including drivers, signallers, track workers and station staff is moving to a new home. RSSB's website is getting a makeover, so the content on similar topics is all in the same place. For example, RED and Right Track, which look at lessons learnt from past incidents, will be with other content in the new "learning from operational experience" section.

It always takes a while to get used to changes, but we're hoping that once you get used to it, you'll find it easier to get to the information you need. To help you until you get accustomed to these changes, we'll keep the Opsweb home page for a few months. There'll be links to where all the content has moved to, including RED, Right Track and the SPAD reports. This means you'll still be able to access all the information you want using the **www.rssb.co.uk/opsweb** URL.

The changes will take place over the summer. Once it goes live, you can keep accessing the content by logging in or registering with the RSSB website using your work email address. We use registration to make sure that the content is only shared with RSSB member companies, and that safety-sensitive information is not shared with the public. Don't have a work email address? You can use your personal email address; we'll just ask you to name someone who works with you and who does have a company email, to confirm that's who you are.

If you have any questions about the changes, please feel free to contact us at **webmaster@rssb.co.uk**