rightTrack

Issue 25 **Autumn 2018**

RAIB reports - fatigue

Our regular features

RAIB reports: fatigue

SPADtalk:
Route Knowledge

Newswire

Also in this edition...

Fatigue and You

'Twas the Night Before Christmas

Shift Fatigue

Off the Rails

Rule Book Changes: December 2018 updates

Managing Fatigue? There's an app for that!

Fatigue and you

Off the rails

RSSB

Headlamp

Contents

3 Fatigue and you
4/5 **RAIB reports:** Fatigue
6/7 'Twas the night before Christmas
8/9 Shift fatigue
10/11 Off the Rails
12/13 Rule Book changes: December 2018 update
14/15 **SPADtalk:** Route knowledge
16 Managing fatigue? There's an app for that!

Hello, and welcome to issue 25 of Right Track!

This issue is all about fatigue. Fatigue comes up repeatedly as a contributory factor to incidents. We're looking at what we can do to identify and reduce fatigue, both individually and what our organisations and the wider industry are doing to tackle it. We find out how new technology can help to better monitor it – and help to keep us safe; and our RAIB report looks at some of the incidents to which fatigue has contributed.

Organisations have their own processes. For more information check out the RSSB website (search "fatigue and alertness"), or watch RED 35 and RED 51 (available on Opsweb).

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.**

Correction: In issue 24 of Right Track, we said that information about adhesion could be found in Rule Book Module TW1, section 8. This should have said Rule Book Module TW1, section 28.

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***

Printed by Willsons Group Services / Pyramid Press.

Right Track is designed to share news and views from individual companies in a positive way. However, the views expressed in Right Track are those of the contributing authors; they do not necessarily reflect those of the companies to which they are affiliated or employed, the editors of this magazine, the magazine's sponsors - the System Safety Risk Group - or the magazine's producers, RSSB (Rail Safety and Standards Board).

Fatigue and You

We've known for a long time that fatigue is a problem for people's safety and for their health. Since the mid-2000s, RSSB has been helping the rail industry to understand how to identify, manage and reduce fatigue. One of our first ever pieces of research was a review of driver fatigue, soon followed by research on fatigue in the freight sector, in infrastructure maintenance companies, and in road driving.

The wide range of topics that we are covering in this issue of Right Track shows how much our understanding of fatigue has developed. We've also come to understand that fatigue is a very thorny issue; and as an industry we struggle with it.

After the Clapham Junction rail crash in 1988, the railway adopted "Hidden 18", named after Sir Anthony Hidden who chaired the enquiry into the crash. Hidden 18 is the implementation of recommendation 18 from the official Hidden Report, which stated 'BR shall ensure that overtime is monitored so that no individual is working excessive levels of overtime'. This brought about limits to working hours; and were the same for all safety critical grades whether you were a signaller; or a train dispatcher or any other safety-critical worker.

Implementing Hidden 18 was a useful first step, but didn't go far enough to manage fatigue. It didn't consider important factors such as the time of day, how tiring the job is, the working environment or the number and quality of breaks. We now know that what works for train drivers might not work for infrastructure maintenance workers. So each company needs to work with its staff to decide what is safe and healthy for the jobs that they do.

Working hours are very important, but they are only one part of the puzzle. Our analysis of incident investigations shows various other reasons for fatigue, such as responsibilities at home, or not knowing the steps to take to be as prepared as possible ahead of a shift. Some companies provide information and training to help staff understand the risks and to highlight good practices.

Newswire

1 July, Norway: Freight brake failure exacerbates lineside fires in Gjøvikbanen

At 20:00 (local time), a fire occurred in several points along the line near Gjøvikbanen. A prolonged dry spell had increased the risk from forest fires in the area. The failure of the brakes on a passing freight train led to overheating, which ignited dry vegetation. There were no reported injuries, but the line was closed for over six hours while the fire was put out.

5 July, Canada: Passenger train derails near Hudson Bay, injuring 2 crew

A passenger train derailed north of Hudson Bay in Saskatchewan, injuring two members of the crew. A spokesman for the Transportation Safety Board of Canada said the train was running at around 50 km/h when it hit a section of track that had been washed out.

5 July, US: Freight derails in Pell City, Alabama

A freight derailed at a level crossing in Pell City, Alabama. 25 of the train's 70 wagons came off. There were no reported injuries and no dangerous goods involved.

RAIB reports – fatigue

Rolling and slumbering

…open a window…stop at a suitable place… get out… walk around…drink a cup of coffee...

Some of us will remember the old 70s public information film warning motorists about the dangers of driver fatigue. Train drivers can open a window (or turn up the air-con); they can drink coffee, but they certainly can't pull over and walk around.

Fatigue can be as dangerous as drinking or taking drugs, and the consequences just as severe.

Why are the signals getting further away?

It is the early hours of 17 August 2010, and a freight train is making its way north on the West Coast Main Line. In the cab, there is no sound save the hum of the locomotive and the occasional horn from the AWS as the driver follows a slower train.

Horn…reset…horn…reset…horn…reset… The usual story.

Except that today isn't 'usual' at all…

At around five past two, the train slows to a stop. The AWS horns continue, but something is wrong…what? The eyes widen and then, through the misty mind, comes a moment of clarity: the 'greens' are getting further away; the train is rolling backwards. On Shap. A few years earlier, on 9 February 2006, another driver suffering from fatigue microslept in his cab at Brentingby. He derailed, yes, but at low speed on trap points. Shap is a gradient of legend, with which locomotives and crew have battled for more than a century. Heading north, it is 1:75; rolling back down again it's 1:75 too, which is why the train topped 50 mph and ran some 2.2 miles.

The incident caused no injuries or damage; but it doesn't take a much imagination to realise how bad the consequences could have been. Fortunately, a quick-thinking signaller re-routed the train into Tebay sidings; but if the driver hadn't braked when he did, the train would've run into the yard at a speed that may have led to derailment, damage and obstruction of the adjacent line.

In its investigation report into the incident, RAIB reported that 'the driver was not sufficiently alert at the time of the incident because he was probably fatigued, his journey was monotonous, he was in a dark and comfortable environment and he had little in his field of view to attract his attention'.

RAIB reported that the Shap driver was working the first of a series of night shifts, and 'had been exposed to a work pattern that was likely to induce high levels of fatigue'. The driver's pattern didn't provide enough recovery time between progressively earlier shift start times in the previous run of consecutive nights, a long-diagrammed turn and so on.

If you're tired, you're more likely to make a mistake. Research shows that the worst times for tiredness are the early hours of the morning, and in the afternoon after a meal – which explains why the afternoon siesta is so popular in some parts of the world. Working shifts (particularly nights and earlies) can heighten the problem by putting us out of step with our bodies' natural rhythms.

You can find out more about any of these incidents online. Search online for:

- Hidden Report Clapham 1988
- RAIB Brentingby 2006
- RAIB Shap 2010
- RAIB Reading Ruscombe 2015
- RAIB Sandilands 2016

Not just Shap, not just heavy rail, not just drivers

But of course, Shap is just one incident where fatigue was in the causal chain. The SPADs at Reading and Ruscombe in 2015 were caused in part by fatigue; as was the fatal tram derailment at Sandilands the following year; and the multi-train, multi-collision, multi-fatality accident at Clapham 30 years ago.

This tragedy, which claimed 35 lives, was the result of a wrongside failure caused by a signalling technician who'd had one day off in the last thirteen weeks. As a result, the public inquiry (chaired by Sir Anthony Hidden QC) recommended that 'overtime [be] monitored so that no individual is working excessive levels of overtime'.

The ruling led to the development of criteria for what was considered acceptable levels of working, known as 'Hidden 18'; and a process to monitor it. Fatigue management has developed even more since then; the rail industry now has a whole new standard on managing the risk from fatigue, and continues to place much focus on this area.

Just after 06:00 on 9 November 2016, a tram derailed and overturned at Sandilands Junction, killing seven people and injuring 50 more. (See the RAIB report in Right Track 23.)

RAIB found driver fatigue to be one of the causes. The incident, and the role of fatigue, were discussed at a workshop in June 2018, just before the Risk Management Forum. We will report back on the findings in a future Right Track.

For more information on what RSSB has doing in this area, stick 'RSSB fatigue' into a search engine and you'll find plenty of useful tips and resources. For access to the guidance on managing fatigue, go to the standards catalogue on the RSSB website and search "RS504".

'Twas The Night Before Christmas

Somehow it's that time again: Christmas number ones from years ago invading your ears as you ramble through the crowded shops to get your gifts. Every other night in your usually empty calendar is now suddenly hijacked by some sort of festive meetup, Christmas party, pantomime show or other event. It can be a fun time of year, but can also be very exhausting – and for those of us working over the holidays, it can be difficult to effectively balance our social life against shift work. ***Network Rail's Claire Volding*** *gives us some practical tips.*

We all know about the dangers of fatigue. But during the festive periods we can easily slip into a dangerous game of burning the candle at both ends, without even being aware of it.

Time and time again we are told that our ability to make safety critical decisions is put to the test when mental or physical exhaustion sets in, but it's easy to forget this during the whirlwind of things to think about at Christmas. It isn't just exhaustion from the various work parties, social gatherings; but for some of us it can also be the mental fatigue that comes along with the financial concerns around gift buying, or the stress of forced family time with the in-laws looming ahead. And for some people, Christmas, despite its cheerful traditions, decorations and songs, can be a time of sadness and loneliness with its own stress triggers.

Regardless of what is affecting your energy and stress levels, everyone needs time to rest and recover. Otherwise, we could make a mistake in the workplace; and when the workplace is the railway track, a mistake could threaten our own safety, or that of a workmate, or the travelling public.

Staying awake for 17 hours can affect our performance as badly as if we were driving over the limit. Add stress into the mix, and it can exasperate things further. Staff and managers all need to pull together to effectively manage fatigue during the holiday season, as it can involve factors both inside and outside of the workplace.

We need to always have safety, for ourselves, our colleagues and our passengers, at the forefront of our mind. It's also important to protect our wellbeing. So if that means not going out the night before our shift, than that's what we need to do.

Newswire

8 July, Turkey: Passenger train derails, killing 24 in Tekirdağ province

A passenger train heading from Istanbul to Greece derailed in Tekirdağ province, killing 24 people and injuring over 300 more. Reports suggest the incident occurred because heavy rains had caused the trackbed to collapse.

9 July, France: Freight collides with lorry, canons into house in Sablé-sur-Sarthe

In the morning, a freight train struck a heavy goods vehicle at an unprotected level crossing in Sablé-sur-Sarthe. The incident occurred at low speed and there were no reported injuries, but the lorry was thrown towards a nearby house and some 300 litres of fuel were spilled. The owner of the house had been absent, but was warned of the accident by police.

10 July, US: Freight train derailment in Tucson, drugs found among wreckage

A freight train derailed on the outskirts of Tucson during a heavy rain storm. Initially, the operator, Union Pacific, told the press that the wagons involved had been carrying consumer and manufactured goods. It later released a statement to say that a package of 'suspected narcotics' had been found among the wreckage and been handed to police. The investigation continues.

But how can we politely say no to people generously inviting us out to share their Christmas season with us? Sometimes it can be difficult to miss out on the various festive events; we might feel like we're missing out, or letting down the people we care about. And how do you decide who to say yes to and who you'll have to decline? It's rude to ignore an invitation; but we can tell our host that we'll let them know once we know what shifts we're working. Thank them for their invite, but explain honestly the reasons why you can't make it.

You might find it helpful to put your social outings in the same calendar as your work hours. That way, you'll be able to see at a glance what your schedule it, and make sure you have enough R&R (rest and recuperation) time built into the schedule. You could even put in your recuperation time, so you know that you definitely won't over commit to social activities.

Your housemates will probably also have a busy schedule at this time of year. Have a chat with them about the importance of rest before working in a safety critical environment. Make sure they're aware if you have early starts or are working nights, so they can respect your rest.

If you have a spouse or partner who's likely to accept social invitations on your behalf, it may be worth sharing your calendar with them so they don't commit you to activities you won't be able to attend. If they've decided that they're going to go to these Christmas outings without you, and you know they'll be returning late, it may be worth having a chat about sleeping arrangements so they don't disturb your sleep.

For the parents among us, Christmas holidays bring an extra demand on our time: someone's got to look after the kids. Don't put your name down as the responsible adult if you should be sleeping to prepare for, or recover from, a shift.

So, don your Rudolf jumper, listen to Rocking Around the Christmas Tree for the hundredth time, and wield a mulled wine – but do keep in mind that we all have a responsibility to be awake and alert when we are working. Because we care for ourselves and each other, and also because it's the law. If you have any concerns about your state of rest, your workload or other pressures, raise them with your supervisor or health and safety representative.

13 July, Egypt: Derailment in Giza injures 55

At least 55 people were hurt when a southbound passenger service derailed in the province of Giza. The injured were taken to hospitals nearby.

20 July, Czech Republic: Shunt leads to collision at Brno, 7 passengers injured

At 11:12 (local time), a shunt move at Brno station collided with a regional passenger train, injuring seven passengers. An investigation has been launched.

20 July, Czech Republic: Passenger train strikes freight near Plzeň

Late on, a passenger train collided with a freight on open line between Plzeň and Chrást u Plzně. There were no reported injuries.

Shift Fatigue

Possessions, running trains, operating fleets and virtually all other work on the railway needs to be planned and staff rostered. An easy to overlook aspect, but potentially the single most important consideration at this early stage is the impact these shifts will have on employees. ***Harsco Rail's Dan Ryder*** *tells us how employees and employers can work together to reduce the likelihood of fatigue.*

As an industry, we widely recognise fatigue as a risk; and we're painfully aware of some of the devastating outcomes it can have – and has had (see RAIB article on p4).

Since the Clapham Junction crash, the industry has done a lot of work to help reduce the likelihood of fatigue. We now understand that when we're suffering from fatigue, we are more likely to struggle with some tasks. Our performance gets worse when we're fatigued (see box). Different people are affected in different ways, so the increase in risk brought on by these factors varies between individuals.

In the past, we've used hard and fast rostering rules such as the so called "Hidden Limits" (see p4) and assumed that this would manage fatigue. We now know that blindly adopting rostering limits is not the answer. In fact, it can cause friction and even disagreement. So what should we be doing?

There are laws in place which we need to follow as a minimum, to keep everybody safe. The Health and Safety at Work etc. Act 1974 requires employers to ensure, so far as is reasonably practicable, the health, safety and welfare of all employees. This includes risks associated with staff fatigue. But the responsibility is shared: there is also a requirement for employees to co-operate with their employer on the subject of fatigue (see section 7 of the Act). For example, we're expected to do what it takes to be adequately rested to do our work safely (see page 6). If we do have concerns about fatigue, we should report them to our supervisor or management promptly.

So when a plan is created – a new train timetable, or a series of possessions – it should always consider the impact on staff fatigue. An important part of this is creating a dialogue between staff who are responsible for creating the workplan, and the staff who will be responsible for the work itself. This should happen from the start of the planning stage, so that employee representatives can share feedback and suggestions. This shouldn't be about the employer, or the employee, seeing what they can get away with; but about working together and using people with the right skills to minimise fatigue risk.

Signs of fatigue

- Feeling of tiredness
- Loss of concentration
- Slowed reactions and responses
- Impaired decision making
- Willingness to tolerate risks usually considered unacceptable

Newswire

21 July, Hungary: Passenger train derails at Kunszentmárton

At 15:08 (local time), a passenger train derailed at 40 km/h on pointwork at Kunszentmárton. There were no reported injuries.

31 July, Peru: Rear-end collision in Machu Picchu injures 54

Two passenger trains collided in Machu Picchu injuring 54 people, 25 of whom required hospital treatment. Reports suggest that one train had stopped because protesters had gained access to the track; the second train then struck it in rear.

1 August, Czech Republic: Fatal crossing collision near Kamenný Újezd

A car driver was killed when a passenger train struck his vehicle on a level crossing between Kamenný Újezd and Českých Budějovic.

This kind of discussion between the planners and the workers is a hallmark of a mature fatigue management policy, and a positive safety culture. It reduces the likelihood of the staff doing the work becoming fatigued from their shifts, as they'll have raised concerns about shift patterns that would cause issue. That kind of relationship takes a long time to create, but the benefits are worth it: employees know they can raise fatigue-related concerns, and that they will be addressed. Employers will know about issues and shortfalls at the delivery stage, and will be able to fix any problems sooner.

This kind of collaborative approach is also good practice when managing rosters, and linking the roster to the plan. But the roster stage is more intricate, and many organisations don't share their rosters with employee representatives. In some cases, the plan is handed over to "best fit" a roster. Ultimately, this increases the likelihood of staff getting fatigued, as the lack of collaboration, input and cognisance puts business requirements and employee requirements at odds with each other.

In an organisation with a mature attitude to risk, suspected fatigue can sometimes result in cancelling a shift. If an organisation doesn't have this mature culture, it can lead to fatigued employees tolerating risks usually considered unacceptable during the course of their shift. To create this culture, employers and employees need to work together.

The Office of Rail and Road says three things are important when planning and rostering work:

1. Follow good practice guidelines to minimise fatigue from working hours
2. Use known 'fatigue tools' to calculate fatigue risk and minimise the risk
3. Get feedback from staff

Strategic napping

CIRAS, the industry's confidential reporting system, has looked into how shift workers can reduce fatigue by napping effectively around shifts. Here are some tips from their research:

1. Create the right environment. Find somewhere dark and comfortable.
2. Time your naps. Night-time naps are best between 01:00 and 06:00; day-time naps should be taken between 14:00 and 16:00.
3. Take a nap before your shift. The more recently we've slept, the more alert we are. Work out the best time to have a snooze so that you're alert from the start to the end of your shift.
4. Take long naps. The longer the better! 20 minutes is always going to be better than 10 minutes.
5. For longer naps, go for 2 hours or more. After 45 minutes of napping, we go into deep sleep. If we wake up from that, we'll feel groggy. We come out of deep sleep after 100 minutes, so waking up after 2 hours is comfortable.

For more information, see issue 2 of CIRAS Frontline Matters. To raise a report, call 0800 4 101 101

Off the rails

Much has been done to improve worker safety on site, but what happens when we're done for the day can have an equally significant impact on injury and incident risk. How do we recognise when we're too fatigued to drive home at the end of a shift? ***Harry Porter*** *tells us what* ***Amey*** *is doing to ensure its staff are safe on and off duty.*

At the end of 2017, the Rail Accident Investigation Branch (RAIB) released a report into the Croydon tram derailment, highlighting the impact of fatigue. It was one of two RAIB reports that drew particular attention to the dangers of 'micro-sleeping' in the rail environment (see page 4).

In this instance, the driver's fatigue – and its devastating consequences – was within the parameters of a normal working day. It shows how fatigue can impact our ability to do our role, with potentially devastating consequences. But the effects of fatigue are not limited to the workplace. And the risks mount up when we're doing anything that's safety critical –like driving a car.

Many factors affect fatigue. Research has shown that sudden shifts in environment can have an impact. Imagine, for example, finishing a night shift on a wet November morning and getting into a nice warm car. Great if you're a passenger; much trickier if you're the driver.

Lifestyle choices also play a part. Exhausting yourself in sport just before a shift, or changes like a new baby in the family, can also play their part in causing even the most conscientious employee to risk not getting enough rest between work shifts.

At Amey, many of our employees work long shifts in sometimes arduous environments such as being out in foul weather, or working remotely as 'lone workers'. So we've created partnerships with organisations such as with the Manufacturing Technology Centre, to set up new technology which can help us learn more about fatigue triggers and warning signs. We can then put interventions in place to reduce the risk to our employees.

'Drowsy Driver'

In July 2017, Amey completed a 'Proof of Concept' trial on two wearable devices to monitor the health of our workforce on one of our Highways contracts. Five employees trialled a 'Drowsy Driver' monitoring device and smart watch for a six-week period. Drowsy Driver monitored vital signs and provided alerts for heat stresses, exertion levels and drowsiness whilst driving. It provided immediate alerts via a smartphone app, vibrating when the driver's readings indicated increased drowsiness. Our staff could the take mitigating action, such as taking a break.

The employee was safer, account managers and supervisors had constant live data about employees working in high-risk live environments so they could react faster if any problems came up, and the data went to the fleet team for driving management purposes, including better route planning.

The data collected during the trial has pointed to recurring areas of concern which we can now address. We now have several rail teams engaged in trialling this technology.

Driver simulator

People who experience a 'close call' often become the most safety-conscious in their teams.

Newswire

1 August, US: Freight derails in South Carolina – no reported injuries

At around 07:00 (local time), a freight derailed in Catawba, South Carolina. Three wagons overturned. There were no reported injuries.

2 August, Poland: Train strikes cyclist using crossing while barriers raised

A passenger train travelling at 151 km/h struck and killed a cyclist at a level crossing in Gniezno. The barriers were raised at the time of the incident.

5 August, US: Freight derails in Pittsburgh, contractor injured during clear-up

In the afternoon, a freight train carrying double-stacked containers derailed in Pittsburgh, damaging around 1,000 feet of track. There were no dangerous goods involved. There were also no reported injuries, although a contractor required 12 stitches in his arm to seal a cut he sustained while working to clear the debris.

Having seen how easily things can go wrong, it makes sense that they wouldn't want it to go wrong again! Knowing that 'shock value' can have a positive impact on approach to safety, we looked for a way to simulate that shock value and encourage employees to apply better fatigue management.

Our Centre of Excellence for Asset Management recently partnered with Keltbray and Holovis to create a Driver fatigue simulator. The simulator uses 360° virtual reality and technologies that affect all our senses to create a hyper-real sensation so that you truly feel like you're living a safety-critical experience.

We've invited staff to use the driver fatigue simulator experience fatigue. It gave them an understanding of what to look out for, and an appreciation of the consequences of not acting correctly. By recreating all the conditions of driver fatigue and the shock and emotions of a near-miss in a totally safe environment, the aim is to make drivers safer, both in and outside work.

Zero Code

We've introduced a new Zero Code safety framework, empowering our employees to speak up when something isn't right in their environment. This isn't limited to their work space, but can include anything that could increase their risk of harm, such as driver fatigue.

Because ultimately, it is our drivers who have to make the decision to get behind the wheel. So, as a business that puts safety at the heart of what we do and makes it our first priority, we have to be confident we have done all we can to support them in preparing to operate their vehicle; and that they feel safe in raising concerns if they don't feel capable of driving. So we give them all the advice, policy and training that will help them to make the safest decision.

These examples show some tools that are available to our industry. These can improve awareness of fatigue risks, provide safe environments to explore consequences, and help both employer and employee make better choices to stay safe.

5 August, Romania: Freight derails on pointwork at Alesd

At 21:56 (local time), the first two wagons of a freight train derailed on pointwork at Alesd station. There were no reported injuries.

8 August, Norway: Snow cover tunnel fire at Bjørnfjell

A fire occurred in a snow cover tunnel at Bjørnfjell, on the Ofotbanen line. Several gas bottles had exploded in the blaze, which made it harder to extinguish. Some of the wood lining had been treated with creosote, which created toxic smoke. There were no reported injuries, but the line was closed for several days.

13 August, Netherlands: Level crossing collision kills one near Scheemda

In the morning, an empty coaching stock formation struck a car on an unprotected crossing near Scheemda. The motorist was killed by the impact. The cause has yet to be determined, but the Dutch media reported that another motorist was killed at the same crossing in 2015; another, non-fatal, incident at the interface was also recorded in January 2018.

Rule Book changes: December 2018 update

RSSB works continuously with the industry to make changes to the Rule Book to improve safety, and to make sure the industry's standards reflect changes to technology and equipment. Some changes were published in September 2018 and will come into operation in December 2018. Here we find out some of the most significant changes. For more information, check out the Rule Book app, or speak to your manager.

Handbooks 8 IWA, COSS or PC blocking a line, 21 Safe work leader (SWL) blocking a line and Module TS1 General signalling regulations

When there is a train within the intended line blockage, the line blockage can now only be granted before the train has passed clear if this is authorised at the location, or the train is disabled and will not be moved.

For any line blockage, additional protection is to be provided wherever possible, and is always necessary if the work will make the line unsafe.

Handbook 16 AC electrified lines and Module AC electrified lines

Bi-mode trains, which can obtain their power from the overhead wires or from an on-board power unit, are being introduced. We've therefore made some changes about trains changing between modes, either when this is planned or when a train could continue in self-powered mode as an alternative to electric.

We've also made changes following an incident in which a driver who had left a train suffered an electric shock from live but damaged OLE. If the driver knows or suspects there is damage to the OLE or a pantograph, he or she must now remain in the cab. The driver must not leave the cab to gather information, examine a pantograph, a train or the OLE, until told by the signaller that the OLE is safe to approach but not touch. The signaller must first have obtained this information from the ECO.

Newswire

15 August, Czech Republic: Freight derailment at Praha-Vršovice station

At 12:00 (local time), four wagons of a freight train derailed at Praha-Vršovice station. There were no reported injuries, and reportedly no dangerous goods involved.

16 August, Czech Republic: Collision with tractor at Čížová level crossing injures staff member

A passenger train collided with a tractor at a level crossing in Čížová. One member of staff received minor injuries.

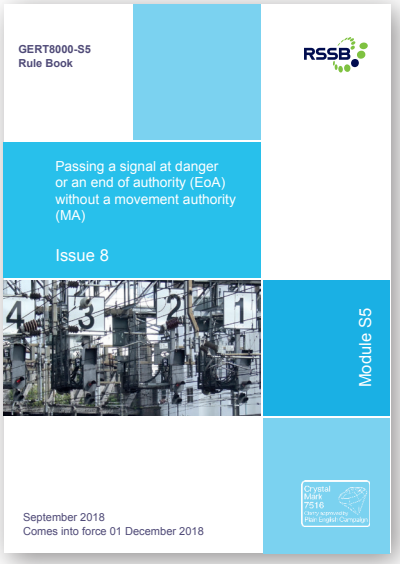
16 August, Switzerland: Freight derailment in Basel freight terminal

In the early hours, five wagons loaded with cement derailed at Basel freight terminal, some of which fell to one side. One wagon struck another standing on the adjacent siding. There were no reported injuries, but there was significant damage to the track over some 40 metres.

Module S5 Passing a signal at danger or an end of authority (EoA) without a movement authority (MA)

There is a new section (S5) for Emergency Special Working (ESW). The principles for ESW are similar to Temporary Block Working (TBW), but ESW does not require handsignallers at the entrance and exit signals. Where points are correctly detected by the signalling system, they do not need to be secured. ESW can be implemented quicker than TBW, with an equal level of safety. ESW requires emergency protection to be provided in the same circumstances as TBW. Modules M1 Dealing with a train accident or evacuation, and M2 Train stopped by train failure, have both been amended to include ESW.

The arrangements following a signal being passed at danger have been amended to allow the train to be moved to a convenient location.

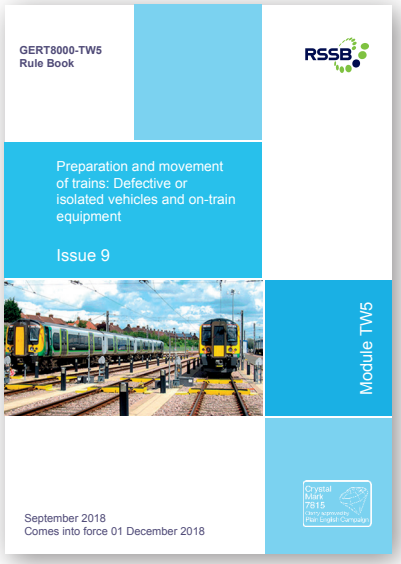


Module TW5 Preparation and movement of trains: Defective or isolated vehicles and on-train equipment

The term 'in service' as defined in the Rule Book glossary was not always understood, which has resulted in an incorrect understanding of the meaning of entering service. The term 'entering service' has therefore been replaced with 'starting a journey'. This has not changed the ability of a train to start a journey with a defect.

Industry has considered the appropriateness of regulations around the permitted speeds for trains with defective AWS, driver's safety device, driver's vigilance equipment and TPWS. This has resulted in updated permitted speeds, which are now generally 50 mph for freight trains and 60 mph for all other trains.

The instructions for door defects have been revised. The previous arrangements were based around individual vehicles, but many new trains have wide gangways with no dividing doors between vehicles. Now, it's often more appropriate to consider the effect of a defective door or doors on the whole train, rather than individual vehicles.



21 August, US: Freight train carrying dangerous goods derails near Devore, nearby buildings evacuated

A freight derailed near Devore. 11 of the 15 wagons that came off were tankers, some of which were reported leaking. As the substances being carried included denatured alcohol, potassium oxide and other flammable liquids, several of the surrounding buildings were evacuated as a precaution. There were no reported injuries.

23 August, Poland: Fatal level crossing collision at Nowy Targ-Szaflary

A passenger train struck a car at a passive level crossing at Nowy Targ-Szaflary. The car driver was killed; the car passenger escaped moments before the impact.

25 August, Vietnam: Two killed in crossing collision in Nghe An Province

At around 10:00 (local time), two people were killed and two more were seriously injured when their car was struck by a train at an open level crossing in Nghe An Province. The car was pushed along the track for 980 feet, being totally destroyed by the impact. Some witnesses said they had tried to warn the car driver to stop as the train was coming near.

SPADtalk: Route Knowledge

This is the eighth instalment in our series on how human factors can lead to SPADs – and how these can be mitigated. The point about the SPADtalk series is to try and look past the immediate causes of SPADs (for example driver distraction, sun shining on signals, or low adhesion) and think about the underlying causes, why these things happen. For example:

- The driver distraction arose due to fatigue from roster pattern design
- The signal shroud design led to a signal being washed out
- Signaller workload led to a signal being at danger unnecessarily
- Track maintenance regimes contributed to low adhesion.

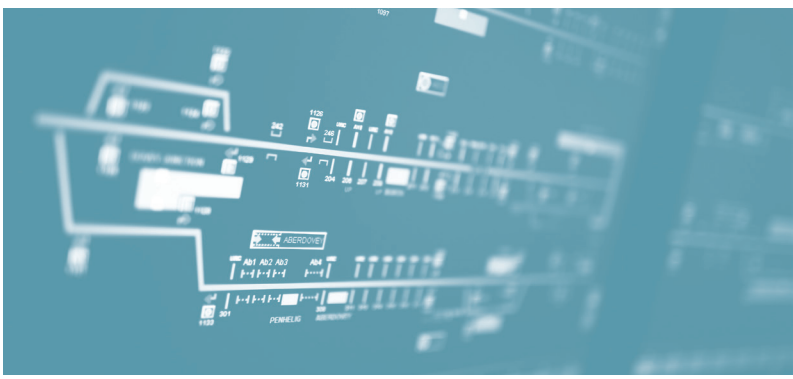
The idea is that if we identify and fix these underlying causes, then we reduce the likelihood of SPADs, rather than just identifying an intervention to help a single driver.

We recently reviewed 250 SPAD investigations. The most frequently identified underlying causes of SPADs related to competence; it was an underlying cause in 26 % of the SPADs. Train driver competence can be broken down into:

- route knowledge competence,
- traction competence, and
- non-technical skills.

By far the most common area related to SPADs was driver route knowledge competence.

Route knowledge is all about the route cues outside the cab which a driver needs to use to drive a route. One significant route cue, particularly for passenger drivers, is the braking point for upcoming stations. Drivers need to be aware that they are approaching a station even when it is not yet in view, identifying which station it is, and what that means for their duties. For example, I'm coming up to Walmington-on-Sea , which means I need to slow down and prepare to stop. I need to look out for the 9 car stop marker as I have a 9 car train, and also this is a 'set down only' service. The driver needs to memorise all this information and recall it correctly at the right point of their journey. Route cards can be consulted, but drivers need to make sure they don't do this at the wrong time, such as when there's a red signal in front of them! They can't just check their route book on approach to the station as they need to be focused on what is ahead of them.



Newswire

25 August, France: Passenger train derails at Marseille, no injuries but delays ensue

Just before 18:00 (local time), a passenger train derailed as it arrived at Saint-Charles station in Marseille. There were no reported injuries among the 350 on board. Widespread delays ensued, as the derailed carriages blocked five of the station's 16 platforms.

2 September, US: Freight derailment in Virginia

A freight train derailed in Newport, Virginia. There were no reported injuries and no dangerous goods involved.

4 September, South Africa: Passenger train collision injures 100 in Jo'burg, possibly caused by error during degraded mode working

In the morning, two passenger trains collided in Selby, Johannesburg. Seven people suffered major injuries, over a hundred more sustained injuries more minor in nature. It was implied in later reports that both trains had been signalled onto the same line in error,

But for all drivers, route knowledge covers many more route cues relevant to SPAD management, each of which the driver needs to memorise. These include risks associated with specific signals (sunlight at signal XY23), areas of low adhesion, permissible speeds and unusually short distances between signals. Just knowing 'where you are' (between Station X and Y or approaching Junction Z), sometimes called 'situational awareness', is critical because it allows a driver to prepare for and anticipate what will happen next, such as stopping the train or double-checking a signal with difficult sighting). Drivers often need to memorise and understand these sequences of route cues over many miles of route, sometimes over different parallel lines and sometimes in both directions on bi-directional lines.

Considering all this, it's not surprising that developing route knowledge is such a significant part of a driver's competence. The industry has recognised the importance of this, and so RSSB has been working on developing a new and more consistent approach to route knowledge for drivers across the industry. This means that drivers in different companies will get similar kinds of training to each other, based on sound principles. Drivers at Northern, MTR Crossrail and East Midlands Trains have undertaken trials using the new approach, and given us positive feedback.

Useful tips for managing your route knowledge competence:

- If you've been rostered to a route you have not driven for some time, consider refreshing your route knowledge with maps or route videos if they are available. If you do not feel confident to drive the route, then raise this with your manager.
- If you're a signaller requesting a driver to do an unusual move, consider the needs of that driver and what support, information or clarification you can give them to help with the move.
- If you're driving and you are uncertain about your location or the signalling, be more cautious and ask for support from the signaller if required. Human memory is not perfect, so we all need to accept that route knowledge recall will not always be perfect.

Find out more

If you want to know more about RSSB's work into creating a consistent approach to route knowledge for drivers across industry, go to www.rssb.co.uk and search for "T1108".

manual signalling being in operation while a signalling upgrade was under way. A number of passengers self-evacuated and were later reported as 'walking around the scene'.

8 September, Switzerland: Passenger train strikes fallen rock and derails in Fiesch

Late on, a passenger train struck a rock and derailed in Fiesch. The rock had fallen from excavation work upstream and rolled on to the track. The driver had applied the emergency brake, but to insufficient avail. There were no reported injuries.

9 September, US: Coal train derails in New River Gorge, West Virginia

At around 03:30 (local time), eight laden coal wagons in a freight train derailed in Fayette County, West Virginia. There were no reported injuries and no fuel leakages, but some of the coal was spilled into the nearby New River. An investigation has been launched.

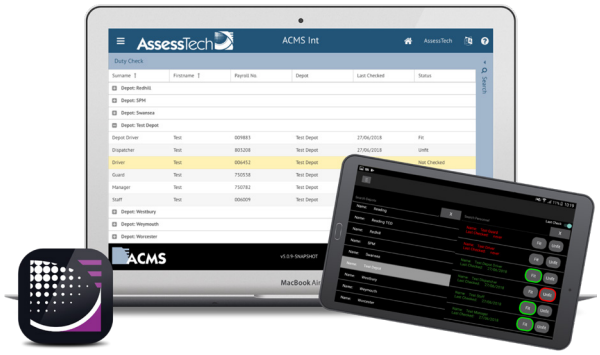
Managing Fatigue?
There's an app for that!

Fatigue management is clearly an important issue for the railway industry – but just how big is this issue? ***Stewart Player of Great Western Railway (GWR)*** *tells us how they're improving data on fatigue, which will point to issues*

Fatigue is cited as a factor in a number of incidents. So it seems pretty obvious that better fatigue and fitness management will likely result in fewer incidents. However, managing the issue after the event is not enough. In order to improve the situation, the railway must be proactive and capture data from day-to-day operations - not wait for an incident to happen and then react.

Here at GWR, we've been working with AssessTech, a company which specialises in using technology in the railway, including their AssessTech Competence Management System (ACMS). We have worked with AssessTech to specify changes to ACMS to include the new aCheck module, which includes the aCheck App. This app allows us to gather and share data, which we can then use to improve processes and reduce fatigue. This in turn will help us reduce incidents and improve performance.

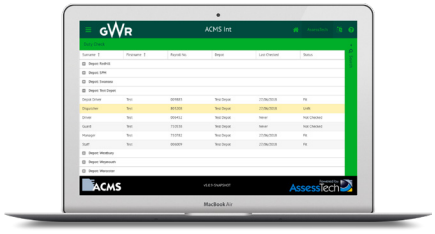
The aCheck app allows managers to sign off on safety critical checks, including fitness for duty, fatigue, safety briefs and all sorts of other important safety-critical issues and tasks. These checks can be done on the go, in the field, using an offline mode and synchronised to the ACMS server when a network connection is available. This helps staff to stay safe, and helps managers to know staff are safe.



But with all this data, there's an added benefit. GWR can look at the data for the whole workforce, and analyse it to monitor a range of concerns.

Crucially the closed-loop nature of capturing the information, commissioning the checks and then verifying that the checks are complete promotes increased oversight and analysis by the Operations Team and removes the inherent failures that are often introduced in human correspondence, especially relying on emails.

Custom reports, tailored for different business functions, can be made available on all data that has been gathered by the aCheck app. So this can be used, for example, to support Key Performance Indicators for the business or monitor a programme of on-going fatigue and fitness improvement.



aCheck allows staff and managers to:

- Monitor fitness checks, to make sure they cover everyone. Managers are prompted to check in on the people they have seen least recently
- Request fatigue checks, or schedule them based on rules associated with a Fatigue Index threshold
- Send out alerts to staff with fatigue related messages, for example explaining new measures that have been put in place
- Register attendance of safety briefs, so we know everyone is up to date with the latest information.