Report 10/2022: Wrong side signalling failure and derailment at Dalwhinnie, Badenoch and Strathspey

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Summary

At around 03:01 hrs on 10 April 2021, an empty coaching stock train derailed at around 33 mph (53 km/h) after being wrongly diverted from the main line onto a crossover south of Dalwhinnie station, Badenoch and Strathspey. No one was injured. However, the consequences could have been much worse; the train could have been travelling much faster and carrying passengers or encountered a train travelling on the line to which the crossover led.

The train was wrongly diverted because, even though the signaller had recently called the double-ended set of points to be in a position for the route along the main line, the points at the facing end of the crossover had remained set towards the crossover, while the points at the trailing end had moved to the correct position. The signaller was able to clear the protecting signal, which allowed the train to approach the crossover in this condition, because of a wiring error in the signalling system that was introduced when the point machine at the trailing end was replaced some nine months earlier. The front of the train was directed over the crossover and then trailed through and forced apart the points at the trailing end. The signalling system only then detected that the points were not correctly set and automatically re-sent a command for both point ends to move to the position that the signaller had earlier commanded. This caused the points at the facing end to move under the train, which derailed the rear of train as it passed over them.

The wiring error was the result of two unwanted conductors, a wire strap and a metal link, within the replacement trailing end point machine. These conductors were only required when this type of point machine was installed at single-ended point locations. The local signalling maintenance team was responsible for installing and testing the replacement point machine. The team did not appreciate that the crossover at Dalwhinnie was unique to the

area and that, because of the design of the point position detection circuit that the two point machines shared, these conductors needed to be removed from the point machine when it was installed.

The need to alter the internal wiring was not identified when the renewal work was planned. The point machine was tested and commissioned following processes that Network Rail prescribes for signalling maintenance work when installing a like- for- like replacement. The checks and wire counting that were required before and after the point machine was installed did not identify the wiring discrepancy. The last opportunity to identify the wiring error before the points were handed back into service was an out-of-correspondence test. However, the specified testing work was interrupted by the need to wait for the signaller to arrive at the signal box. As a result, this and other outstanding testing work was overlooked, the tester in charge believing that it had already been completed.

RAIB found a lack of clarity in Network Rail's signalling maintenance standards concerning the working arrangements of the appointed tester and of those carrying out this type of like-for-like installation work. It has identified this as a probable underlying factor.

Recommendations

RAIB has made five recommendations directed to Network Rail covering:

- the definition of the tasks and responsibilities of its signalling maintenance teams when carrying out pre-planned like-for-like equipment replacement work, and how the independence of testing and installation roles is best assured

- the provision of information and warnings for replaceable items of signalling equipment, and the effectiveness of pre-installation checks

- the arrangements for recording the progress and findings of signal maintenance testing.

Andrew Hall, Chief Inspector of Rail Accidents said:

"Some of the causes of the accident at Dalwhinnie bear an alarming similarity to those found in the multi-fatal accident at Clapham Junction in 1988, and the more recent collision at Waterloo in 2017 which caused huge disruption on routes into London. These accidents share a common theme, that an undetected wiring error resulted in the failure of the signalling system. At Dalwhinnie, this meant that the signalling system did not detect that some points were in an unsafe position, resulting in the derailment of a train. Thankfully no one was injured. However, the train could have been carrying passengers and travelling at a much higher speed, and the outcome very different.

"Wiring within a signalling system is safety critical and needs to be

carefully checked and tested when engineering work is carried out. It is essential that long-established processes and assurance principles, introduced and developed as a result of earlier accidents, are followed. When essential technical information is not readily available, and testing is not completed or carried out in a truly independent manner, the consequences can be very serious.

“Those who don’t remember the past are condemned to repeat it, has been said in many ways by many people. When it comes to fully understanding the importance of hard-learned lessons around the wiring of railway signalling, the accident at Dalwhinnie needs to act as another salutary reminder to the industry.”

Notes to editors

1. The sole purpose of RAIB investigations is to prevent future accidents and incidents and improve railway safety. RAIB does not establish blame, liability or carry out prosecutions.

2. RAIB operates, as far as possible, in an open and transparent manner. While our investigations are completely independent of the railway industry, we do maintain close liaison with railway companies and if we discover matters that may affect the safety of the railway, we make sure that information about them is circulated to the right people as soon as possible, and certainly long before publication of our final report.

3. For media enquiries, please call 01932 440015.

Newsdate: 26 September 2022

New experiments for fusion energy record breaker JET

A new wave of fusion energy experiments on the UK Atomic Energy Authority’s record-breaking Joint European Torus (JET) started this month.

EUROfusion researchers are using the famous JET machine to conduct a series of tests using helium to help inform future operations at ITER, the fusion mega-project under construction in Southern France.

ITER is expected to start operations using helium and hydrogen test plasmas before commencing experiments with deuterium and tritium, the more efficient fuel used by JET to break the world record for sustained fusion energy at the

end of 2021.

EUROfusion researchers will study the behaviour of the plasmas as well as test the impact of helium on JET's tungsten and beryllium wall to help ITER efficiently build up to full power operations. The new experiments at Culham Science Centre, Oxford, started this month and will run for up to 16 weeks.

Dr Tim Luce, ITER's Head of Science and Operation, said:

"An essential element of the ITER Research Plan is to explore control of the plasma interaction with the wall at high fusion temperatures. This needs to be addressed in the initial research phases before deuterium and tritium are used to produce fusion power in ITER.

"We have great expectations for how these experiments can help us optimise our plan to move as efficiently as possible into deuterium-tritium operation."

JET is unique in its capabilities not only for deuterium-tritium operation, but also for operating in the required high confinement mode with pure helium and with the ITER wall materials.

Fernanda Rimini, JET Senior Manager, said:

"The ground-breaking research and innovation being done in the UK, in the framework of the EUROfusion consortium and with our partners across the globe, is all geared towards making fusion energy a reality.

"JET is one of the most important machines in the history of fusion. After breaking the record for sustained energy last year, these important new experiments will prove more science and provide crucial data for the ITER team as they prepare for operations, ultimately saving time and money on our roadmap to delivering fusion power to the grid."

Record JET results announced in February were the clearest demonstration worldwide of the potential for fusion energy, which is based on the same processes that power the sun and stars, to deliver safe and sustainable low carbon energy in the future.

The record fifty-nine megajoules of sustained fusion energy was produced at JET by researchers from the EUROfusion consortium of experts, students and staff from across Europe, co-funded by the European Commission.

Court issues Restriction Order over

land near Norfolk village

Norwich Magistrates issued the Order (on 16 August 2022) prohibiting any person from accessing an area around 15 hectares off Clockcase Road, Clenchwarton, near King's Lynn. It also prohibits the importation of waste onto the designated area.

Any breach will result in criminal sanctions. The Order will remain in force until 11.59pm on 15 February 2023, although this could be extended on further application.

The Restriction Order was issued following an application by the Environment Agency, under section 109D Environment Act 1995. When making the application, the Environment Agency considered the harm that the Clockcase Road waste activities could have on human health and the environment.

It follows the issuing of a Stop Notice by the Environment Agency to the owner of land at Kenfield Farm, Main Road, Clenchwarton in June (2022). They are also associated with the area of land at Clockcase Road. This required an immediate halt to the unauthorised deposit and burning of waste following a major fire at the Kenfield Farm site in May (2022).

Norfolk Fire and Rescue had raised concerns about the potential for more fires, given the prolonged dry weather.

Investigations into alleged waste activities at both sites are continuing.

Andrew Raine, Environment Manager at the Environment Agency, said:

> The Environment Agency continues to target all unauthorised waste activity. Through this Restriction Order we are demonstrating we will continue to use the full range of powers available to us. To protect the environment and people and tackle those responsible.
>
> If anyone witnesses waste being taken onto, or burning at this or any other site, please email EAN-Enforcement-West@environment-agency.gov.uk.
>
> If you have any other information about the site that could help our enquiries or any other unauthorised waste sites or activities contact us. Our incident hotline number is 0800 80 70 60 or via Crimestoppers on 0800 555 111.

The Environment Agency works closely with the Borough Council of King's Lynn and West Norfolk and Norfolk Police on this unauthorised site.

Councillor Paul Kunes, Cabinet member for Environment and CO2 Reduction, said:

I welcome the use of enforcement action by the Environment Agency as this kind of behaviour shows contempt for the environment and local community.

This must not be tolerated, and we will do everything in our power to put a stop to unauthorised waste disposal when we become aware of it.

The borough council will continue to support the Environment Agency, who are the lead organisation, with this investigation and any future incidents. Joint action will be taken as and when needed.

The public can help us by reporting incidents and eliminate the illegal waste market by checking that they only hand their waste to those authorised to take it. Businesses and individuals should also make sure they are aware of their own waste responsibilities so that they are compliant with the law.

Administrative Earnings Threshold to rise for Universal Credit Jobseekers

Press release

Around 114,000 working people on Universal Credit will be supported to boost their wages, helping families improve their prospects and pay.

- Around 114,000 people on Universal Credit will be supported to increase their pay while getting access to more one-on-one time with a Work Coach.
- Workers on low incomes will be able to earn more and still receive intensive support.

The changes will bring tens of thousands of claimants of all ages across

Great Britain into closer contact with a dedicated Work Coach focused on guiding them to increase their hours, progress in their chosen field, or pursue other opportunities – all aimed at helping jobseekers to earn more money.

For people that are fit to work, the Department for Work and Pensions (DWP) places Universal Credit claimants on low incomes into groups known as 'Light Touch' and 'Intensive Work Search'. The Administrative Earnings Threshold or AET determines which group a person is placed in based on how much they earn, and therefore how much support they receive to find work and develop a career.

Changes which come into force today (26 September), mean that people will remain in the Intensive Work Search Group until their earnings reach the new higher threshold. This will mean they continue to benefit from weekly or fortnightly meetings one on one with a dedicated Work Coach, for longer. A single claimant earning below £494 per calendar month and couples with combined earnings below £782 per calendar month will be eligible for the support.

The increased support will ensure claimants who are already in work but earn low pay will continue to receive support from a Work Coach until they are earning a secure income and forging a sustainable career, helping grow the economy.

Existing claimants affected by these changes will receive a message in their journal and can talk to their Work Coach to understand what it means for them and help available. Claimants will receive this journal message at the end of their first full assessment period after 26 September.

The Chancellor announced plans last week to take this measure even further, as part of reforms to the welfare system, with the ambition to raise the AET higher in the coming months. This means more benefit claimants will benefit from the additional support on offer.

- The Administrative Earnings Threshold, which is set at an individual or household level, separates the 'Intensive Work Search' group and the 'Light Touch' group on Universal Credit.
- The current Administrative Earnings Threshold level for an individual claimant is £355 per calendar month and £567 per calendar month for couples. This is equivalent to a single claimant earning the National Living Wage working 8.62 hours per week and couples working 13.77 hours per week between them.
- Regulations which come into force today, Monday 26 September, will raise the Administrative Earnings Threshold level on Monday 26 September to £494 per calendar month for single claimants and £782 per calendar month for couples. In raising it, people will have to earn over the new higher level in order to enter into the Light Touch group.
- A claimant in the Light Touch group still has a claimant commitment but they are not tailored or reviewed regularly. They can also volunteer for Work Coach support.

Media enquiries for this press release

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   First published.

Analysis of Experience Dashboard

GAD provides actuarial advice on all the main UK public service pension schemes, which affects around 15 million people.

The development of our Analysis and Experience dashboard has provided us with a greater understanding of the underlying movements in pension scheme data. This helps us set and validate assumptions and improves the robustness of our work.

The development of these tools helps us support the ambition of the Government's National Data Strategy and National AI Strategy which encourages departments to enable data-driven policy decisions and realise the potential of powerful AI techniques.

Analysis of Experience dashboard

The Analysis of Experience dashboard is an interactive tool. It allows the user to compare the actual experience of membership progression for a pension scheme against expectations.

As with any model, once the assumptions have been set and the results produced, exterior factors then change, and assumptions need updating.

The Analysis of Experience dashboard is an interactive, flexible, and accessible tool. It enables actuaries to visualise emerging experience from a range of perspectives.

Among its features are dropdown menus and range sliders. Buttons allow users flexibility to adjust the calculations and outputs on the dashboard using validated input values

It also

- loads the inputs (from external files) that are relevant to the selected scheme

- performs a standard set of calculations on the input data
- prints output tables and interactive charts to the dashboard itself and external files
- provides an audit trail of data and model versions used
- provides the ability to save the input combination used so that it can be reloaded with ease at a later date

When might dashboards be useful for you?

Interactive dashboards have enabled GAD users to comprehend the meaning of data and to identify trends quickly and effectively. Contact us if you are interested in developing dashboards to better understand data in your organisation.

Dashboard benefits

Among the benefits are interactive charts which can be used to explore the data further and gain greater insights and understanding of its features. Other benefits also include:

- greater interactivity of the tool (compared to previous Excel model) makes it easier for users to test out different proposed assumptions
- access to a wider range of in-built statistical tests and visualisations that Python and R has available
- performs calculations for the various experience items (such as pensioner mortality, withdrawal, age retirement etc) within a single model/code
- single centralised code file means that only one model needs to be updated if the calculation methodologies require updating (rather than needing to update separate Excel spreadsheets for each scheme as in previous valuations)
- better consistency in calculation processing and output formats across schemes (so easier and more efficient for the people involved – more robust against errors)
- greater level of automation leading to reduced risk of errors
- more intuitive experience for users
- users cannot accidentally alter the underlying calculation code while using the dashboard

Developing our data science capability

GAD has been improving its data science capabilities through recruitment and training. We have also used data science techniques to complement traditional actuarial approaches on many client projections, including this one.

As an example, we have developed our knowledge of the ‘Dash’ package in Python for creating the dashboard which enable us to:

- setup the entire dashboard using only Python code – other frameworks can require the use of other languages

- utilise the Plotly package which provides interactive features

Contact GAD if you’d like to discuss how you can utilise data science techniques in your work and help government achieve its strategic ambition in this area.