

World-class experts help Network Rail tackle challenge of extreme weather resilience

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Network Rail has published two independent reviews that look at how the railway can better cope with extreme weather. The organisation commissioned the taskforces immediately following the tragic accident near Stonehaven last August. Three people lost their lives – driver Brett McCullough, conductor Donald Dinnie and passenger Christopher Stuchbury – when a train derailed having struck a landslip following intense rainfall.

Network Rail pledged to learn lessons from the tragedy and tasked world-renowned experts Lord Robert Mair and Dame Julia Slingo to provide engineering and scientific oversight and recommendations to help tackle the challenge of managing rail infrastructure in the face of more frequent bouts of extreme weather.

Transport Secretary Grant Shapps also called for a network-wide review of the impact of climate change on the resilience and safe performance of the railway, and in particular how earthworks – the slopes alongside the tracks – are managed. An initial report was provided in the weeks following the accident and an update has been delivered today, along with the two taskforce reviews.

The reports show that the challenge of climate change on the railway is substantial. Most earthworks

alongside the tracks were built around 150 years ago and poorly engineered by modern standards, overly steep and unstable, and with drainage of a similar age and installed to a pre-set design, regardless of location. When combined with heavier rainfall, as has been experienced in recent years, landslips and flooding can occur.

The reviews recognise it's not practicable to rebuild nearly 200,000 separate slopes alongside 20,000 miles of track, and they commend the work that has been done to upgrade the Victorian infrastructure where possible and manage risk across the network. Investment in resilience work has almost doubled in the past decade, and new systems, technology, standards and practices have been introduced or updated. The reports also note that this work has accelerated further since the summer, with trials of new technology being rolled out more widely across the network, and new dynamic, route-based weather forecasts, using the latest science, trialled in cooperation with the Met Office. Network Rail has also published its Environmental Sustainability Strategy, a plan to reduce carbon emissions and help tackle climate change at its root, rather than only dealing with its effects.

However, while acknowledging the significant amount of work being undertaken, the reports show that there is more that can be done and offer over 50 recommendations for Network Rail to now look at in detail.

Martin Frobisher, Network Rail's safety and engineering director, said: "The UK's railway is one of the safest in Europe, but something went tragically wrong at Stonehaven last summer and our thoughts remain with the families and friends of Brett McCullough, Donald Dinnie and Christopher Stuchbury.

"Heavy rain caused ground slips on many occasions across the entire network last year and although tragic accidents are thankfully incredibly rare and none other than Stonehaven caused injuries, it is clear that extreme weather presents a significant challenge to the way we safely and reliably manage railway infrastructure.

"We do a vast amount to tackle the effects of climate change already but there is more to do. We established two independent, expert taskforces led by world-class specialists to investigate the problems we face and, crucially, to guide us as we make substantial improvements.

"We will carefully consider every single recommendation and develop a science-backed improvement plan, to target available money and technology in the best possible way. This is a real breakthrough."

All recommendations from the reports are being analysed now, with some already implemented. Many of the recommendations focus on the considerable progress that has been made with technology over recent years, bringing Network Rail up to speed. Some technology has been trialled – including a system to provide detailed information on where intense, short-term rain is falling, and monitoring sensors that can be adopted on potentially critical slopes to provide early detection of failure – but the reports are clear that advancements happen quickly and more can be done to keep on top of latest developments.

Crucially, both reports recommend looking at culture and organisational change, upskilling the workforce to better access, interpret and use weather data and technology, to carry out inspections and examinations of earthworks and drainage, and to improve knowledge and competencies consistently

across the organisation.

Other recommendations include:

- Carry out detailed analysis of previous slope failures and washouts, together with accompanying weather patterns and ground conditions.
- Accelerate the deployment of state-of-the-art weather forecasting capabilities through digital platforms.
- Proactively review and maintain earthworks drainage and consider having dedicated teams.
- Use helicopters and drones more widely for inspections, particularly after intense rainfall.

Lord Mair and Dame Julia have both been retained to act as mentors and provide links to a wider group of engineering and scientific peers as longer-term recommendations are considered and implemented.

Transport Secretary Grant Shapps said: “The incident at Stonehaven in August was devastating, and my thoughts remain with the families of Brett McCullough, Donald Dinnie, and Christopher Stuchbury, who tragically lost their lives.

“We must do everything we can to keep our railways safe, and I immediately commissioned this report so that lessons would be learnt without delay. This document sets out how our investment can enhance the resilience of our rail network against climate change and incidents of extreme weather in the future.

“We will be considering these findings carefully as we progress these works at pace.”

- The following documents have been published at www.networkrail.co.uk/stonehaven
Letter from Network Rail chief executive Andrew Haines to Secretary of State for Transport Grant Shapps.

Resilience of rail infrastructure – update report to the Secretary of State for Transport, following the derailment at Carmont, near Stonehaven.

Earthworks management taskforce, led by Professor Lord Robert Mair CBE FREng FICE FRS – final report.

Weather advisory taskforce, led by Professor Dame Julia Slingo FRS – final report.

- A weather risk management steering group has been set up to oversee activity across all the initiatives from the taskforces, as well as other resilience work since the Stonehaven accident. Network Rail will provide further reports on progress to the Secretary of State on progress as needed.
- Spending on earthworks and drainage has increased significantly, from £550m in CP4 to £952m in CP5 and with a CP6 budget of £1.3bn, in recognition of the increased challenges. Funding for long-term recommendations from the taskforces that are taken forward will be built into planning and investment for CP7 and beyond.
- Network Rail’s Environmental Sustainability Strategy and other plans and news stories relating to delivering a sustainable railway can be found at www.networkrail.co.uk/sustainability

Photo credit: Network Rail