

Network Rail: Tilt meter trial offers railway protection from landslips

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Network Rail has revealed details of a monitoring system it is trialling which provides early warning of earth movements at sites across Scotland's Railway.

Surface mounted tilt meters have been located at 26 sites across the network with a further seven sites across the country set to be installed in the coming months including on the main Edinburgh-Glasgow line, East Kilbride branch, between Aberdeen & Inverness and on the line to Kyle of Lochalsh.

It is hoped that they will reduce the risk from landslips and improve the overall safety of the railway by detecting movement in slopes above or below the line.

The system can be used to quickly flag potential issues to engineers, enabling trains to be slowed down and stopped before they reach the problem area.

Alan Ross, director of engineering and asset management at Network Rail said: "In Scotland, we are increasing our use of new monitoring and surveillance technologies to mitigate risks. This includes making more use of drone and helicopter surveys and we are also trialling new weather forecasting methods for

the railway.

“Our weather is increasingly changeable and technology has provided us with tools to proactively monitor and model when and where extreme weather will occur and how it will impact on our infrastructure. The roll-out of tilt meters is another tool which enables us to better monitor the railway and improve safety across our network

“We are at the forefront of deploying remote monitoring equipment, and we continue to support research and development into a wider range of equipment and technologies which will help protect our infrastructure in the future.”

Providing notifications in typically less than two minutes, the system has two banks of wireless tilt sensors, typically spaced 2.5m apart with a centrally mounted pole, logger and cameras to monitor data from the sensors.

Tilt sensors will detect movement in slopes when there is more than a 5-degree tilt and send the alert via the mobile network to alert train controllers to the potential danger. The system is powered by solar panels with battery back-up available for resilience.

All slopes around the railway are subject to the impact of weather and given climate change, are experiencing more and more extreme weather – particularly heavy and prolonged rainfall.

Successful implementation of this system will help keep the railway operating safely during poor weather.

It is expected that by April 2024, tilt monitoring will have been installed at 100 locations across Scotland's Railway.

Use of technology such as tilt meters complements a wider programme of investment improving the resilience of our earthworks and drainage.

Between 2019 and 2024, Network Rail will invest £149m in our infrastructure to make it more resilient. That will include over £30m to improve resistance to extreme rainfall, £13m targeted at known flood sites, £40m for scour protection at bridges and £25m invested in vegetation management.

Photo credit: Network Rail