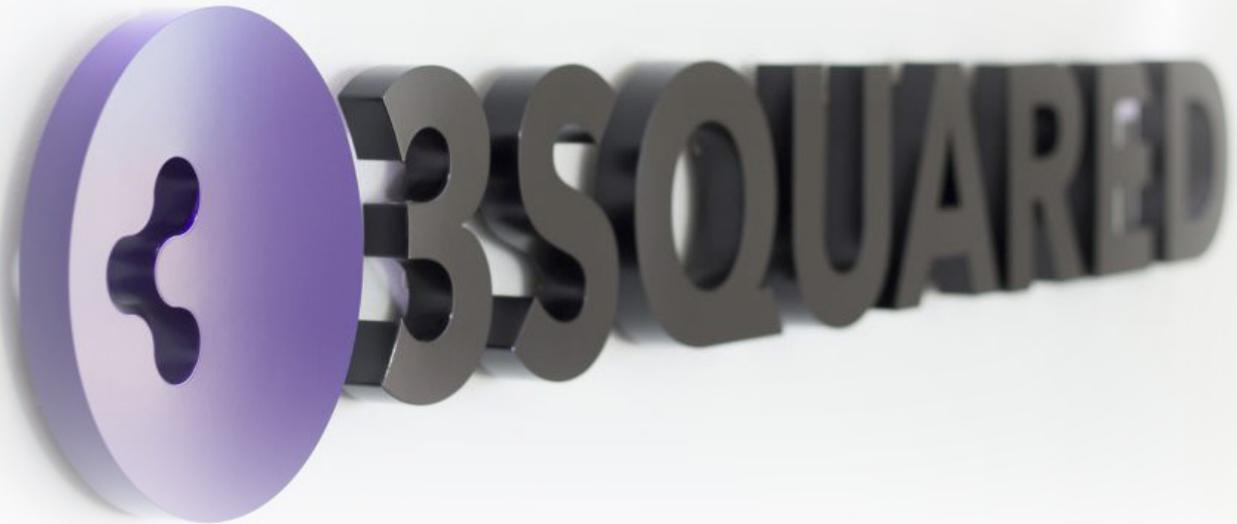


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Harnessing Technology to Prepare for Winter

Year-on-year as winter approaches, the rail industry braces itself for months of timetable disruptions and impacts across the network.

It has long been an annual occurrence that seasonal changes such as leaves on the line and ice on the platform disrupt daily rail life; however as technological advancements are made, so too are opportunities that the industry can take advantage of and tackle these age-old issues head on.

Winter Changes across the Network

The seasonal changes that winter brings can wreak havoc across the country. As **defined by Network Rail**, each weather change can have a significant knock-on effect across the UK, including:

- **Wind:** With millions of trees lining the rail, high winds can cause branches and trees to fall onto the track, damaging the overhead wires that power electric trains and blocking the railway. High winds also mean

that objects from further away can be blown onto the tracks.

- **Rain:** In very wet conditions, trains must brake and accelerate more slowly to keep everyone safe, adding time to journeys. Prolonged, heavy rain can also cause flooding and landslips, which mean trains can't run until lines are cleared and repaired.
- **Snow and Ice:** In very cold weather, snow and ice can build up on the tracks and block points, the equipment that allows trains to move between tracks. Ice can coat

the electrified third rail and overhead power cables, preventing trains from drawing the power they need to run and leave them stranded. Icicles on tunnels, bridges and other structures can also damage trains and overhead power cables. When snow lies deeper than 30cm, trains can't run safely unless they have been fitted with snow ploughs.

Low Rail Adhesion

The leaf-fall months present major issues for the rail network. In basic terms, 'low railhead adhesion' is caused by leaves which have fallen from lineside trees. It is so serious an issue that Network Rail has a dedicated division, the National Delivery Service, which is tasked with overseeing the contracting out of trains which can help improve overall conditions, specifically in known 'black spots' for poor adhesion.

New innovations are currently underway to improve conditions. For example, Sheffield University engineers recently **shared their work** on creating dry ice pellets to tackle the issue. Tried with Northern Trains, the engineers have created a pellet-blasting system that removes leaves more efficiently, and in turn will reduce delays. The system involves pellets of dry ice being fired in a stream of air from the train on to the rails, making leaves frozen and brittle. The dry ice then quickly turns back into gas, causing it to expand and destroy the leaves. Currently, leaves are cleared by 61 special trains that deploy high-pressure water jets followed by a gel containing sand and steel grains to assist with braking.



Technology for Good

The digital railway aims to provide transportation that is efficient, safe, and seamless. It understands the challenges that seasonal changes present and uses its transformative powers to provide tools and solutions to overcome problems.

This has long been an ethos of 3Squared and something that was front and centre when we created our **RailSmart Adhesion Digital Solution (ADS)**. Developed with the support of the RSSB (Rail Safety and Standards Board) and the MET Office, the software aims to provide a digital approach to adhesion management and help operators to model, capture and disseminate accurate adhesion forecasts to help train drivers regulate trains accordingly.

RailSmart ADS employs several features to tackle issues such as leaves on the line, including:

- Actional insight: detailed route-specific adhesion information delivered direct to drivers
- Relevant updates: drivers can report railhead conditions directly within the ADS app, enabling near-live time reports to be disseminated across the network
- Better train regulation: providing the right information at the right time to drivers, helping them to determine how best to regulate the train
- Damage prevention: helping reduce wheel flats, railhead damage and other adhesion-related defects
- Weather warnings: national severe weather warning service provides details on the potential

impact or likelihood of severe weather

The tool provides a wide range of benefits to users to radically improve operations particularly during the winter months, including route-specific forecasting of low adhesion, better train regulation, and a reduction in the likelihood of wheel flats and the impact of delays caused by low adhesion.

The industry has made waves over the years through harnessing technology to develop new projects

and systems to tackle legacy issues, such as seasonal winter changes. This further serves to reinforce the transformative power that innovation holds to significantly improve the way in which we live, work and travel, and make the railways safer and more efficient.

If you would be interested in finding out how RailSmart ADS can support your needs as winter approaches, book a demo with a member of the team [here](#) or email hello@3squared.com.



RailSmart[®]



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