

Winter is coming—new sensors could cut millions from gritting costs

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'Winter is Coming', the motto of the House of Stark, from the hit TV series *Game of Thrones*, warns of the inevitable onset of bad weather and bad times, and implies the need to prepare.

Researchers, funded by the Engineering and Physical Sciences Research Council (EPSRC) at the University of Birmingham have clearly taken note.

They have been developing sensors that could cut millions from road-gritting costs and help [local authorities](#) be ready for the darker days ahead.

Unnecessary gritting of roads and car parks could be avoided and road safety in cold weather boosted, thanks to these new internet-connected, temperature sensors that have already been successfully trialled in Birmingham, London and elsewhere across the country.

Fitted to lampposts, for example, the low-cost devices collect and transmit a non-stop stream of data on road-surface temperatures that local authorities, highways agencies and other organisations can use to target precisely where gritting is needed – and where it isn't.

The sensors have been developed by meteorologists at Birmingham in conjunction with Amey plc, the Oxford-based engineering consultancy and infrastructure support specialists.

Each of the hand-sized sensors costs only around £200, compared with the £10,000 or so needed to maintain a weather forecasting station like those currently relied on by local authorities to help them make tough decisions on when and where to grit.

"Generally, a local authority may have just two or three of these weather stations, which means the decisions they make are based more on forecasts than actual information", says Dr Lee Chapman, who led the project. "But because our new sensors are so inexpensive, local authorities could afford to deploy scores or even hundreds of them and make very localised decisions about the need to grit on a route by route basis. That's extremely useful in view of the fact that there can be a 10°C to 15°C difference in road temperatures across a county, say, on a given winter's night."

The sensors are inspired by the fast-developing Internet of Things by utilising increasingly pervasive WiFi networks to transmit a single number indicating the local road surface temperature every ten minutes. No cabling is necessary, deployment is rapid and the sensor boxes are fitted unobtrusively near ground level on the street side of the lamppost or whatever else they are attached to.

"The UK typically uses 2 million tonnes of salt in an average winter" Dr Chapman says. "Our estimates demonstrate that, by eliminating unnecessary gritting, this new technology could easily enable savings of between 20 per cent and 50 per cent, which would be equivalent to over £100 million per year in salt taken across the country as a whole."

This cost-effective, real-time decision-making approach also has potential to be extended even further, with individual gritting lorries switching their gritters on and off as they go in response to the data generated by the sensor networks.

The next step for the Birmingham team is to continue to work with key industrial partners towards full commercialisation and eventual mass production of the sensors. The team are also now looking to secure further support to enable them to continue their work to other infrastructure sectors, including solving the infamous leaves on the line problem on the railway network.

"We could see networks of these new [sensors](#) becoming a valuable part of local infrastructure in almost every corner of the country within the next 2 to 3 years," Lee Chapman comments.

Provided by Engineering and Physical Sciences Research Council

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