Exploring the future scope of road condition surveying

Emerging technologies used to gather asset data and the sharing of recent experiences from sites promise to help authorities improve highway condition, says Justin Ward.

'Disruption' is a common word when applied to business: just consider how Amazon changed retail and how both Uber and Tesla have entered – and could further disrupt – the car industry.

The same is happening in the roads sector, in terms of the data available to highway authorities to understand the condition of their networks.

Recent years have seen advances in video capture technology, big data and more accurate depreciation software that have shown a potential to drive benefits to local highway authorities.

Machine learning applications are also supporting decision making and showing impressive results. An artificial intelligence system developed by Google, for example, was found to be more accurate in detecting breast cancer than human radiologists.

Surely the time is right for the highways sector to start taking advantage of such developments and apply them to the process for collecting and analysing data from roads and associated infrastructure that make up our highway network.

But what does this mean for national reporting requirements? Is there a challenge for consistency? And what does it mean when we start to see data being collected from other third parties such as the automotive sector to align with connected and autonomous vehicles?

Other wide ranging questions to be asked include who collects and owns data on road condition. It is clear that highway authorities will only be able to make best use of available funding to maintain our roads if they can target such funding well, and this requires good data on their assets.

A report from Parliament's Transport Select Committee last year highlighted that the Department for Transport currently only publishes basic headline data on road condition.

↑ Better data could lead to improved roads

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"It's time to consider how we make best use of technology available."
Alex Wright

The Committee noted that while this is a useful tool to compare a single data set over time, it is limited in scope and does not provide the sort of detail given in other third party condition surveys.

The Committee welcomed the Department for Transport's review of road condition surveying data and technology. This review started last year and has been further explored by TRL's chief technologist Dr Alex Wright in his paper 'Local Roads Network Condition Monitoring: A new approach'.

The paper considers how local authorities can make better use of asset survey data and talks about the new 'VOCAL' Roads Group – Vision for Objective Condition Assessment of Local Roads. Aims of the group include exploring how asset managers can select the right inspection regime, be confident in their data and get best value from inspections.

The Code of Practice 'Well Managed Highway Infrastructure' states that establishing an effective regime of inspection, surveying and recording is the most crucial component of highway infrastructure maintenance.

These inspections provide the data on which local road asset managers rely to make robust maintenance decisions. However, local authorities have many options available to them when designing inspection regimes.

Just as traditional network visual inspections such as CVI – undertaken on foot or from moving vehicles – gave way to routine SCANNER surveys in the 2000s, newer survey technologies are now becoming available. These draw on emerging technologies that can provide evidence of great value to asset managers.

Alex Wright said the VOCAL Roads Group has approached both local authorities and survey companies to be part of its community and says that if a survey company found something successful, it is a good idea to make sure everyone knows about it.

He goes on to say: "The technologies

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↑ **Highways England's 'Harris 3' survey vehicle**

↗ **Texture and defects displayed in colour** TRL

have moved on but national survey specifications such as SCANNER haven't. SCANNER survey systems now use the latest 3D surveying tools, but the data delivered is limited by the specification.

"Companies with new technologies are not constrained by this. It's time to consider how we are making best use of the technologies available to us."

One company working in this area is Gaist, which carries out highway surveys and provides detailed map layouts of a road environment, including full and part detailed network condition maps covering the carriageway and footway condition.

Other companies including Vaisala – known for its technology in winter service operations – have moved into the road survey market. It uses dashboard mounted mobile phone video and machine learning algorithms to assess the condition and deterioration of roads.

Highways England also now collects information on road marking visibility in addition to road surface condition data.

Gaist's managing director Paula Claytonsmith says: "It goes back to what it is that you want and need to know, what is right for that particular authority and where it is in terms of data gaps. It's not about data for data's sake, nor is it about restricting innovation by creating hard edges or monopolistic views by private sector organisations."

The aim of the VOCAL Roads Group is to bring together best practice and real world experience of how to make best use of condition data. This suggestion has been welcomed by the Road Condition Management Group.

VOCAL could help local highways authorities to bridge gaps in knowledge resulting from changes and reductions in resources and may help local highway authorities better engage with their data, sharing knowledge, experience and lessons learned across the industry. This would help asset managers to make better decisions and save money.

"There's going to be all sorts of data soon. You can't keep a box around it."
Paula Claytonsmith

The group is in its infancy and is now seeking interest and engagement from local highway authorities to understand how they would help such a group to evolve – including what it could do for them and what they could do to support its aims. Alex Wright adds: "Everyone is encouraged to get involved, so that the community can get the best from its valuable data asset."

The last UK Roads Board featured a discussion on road condition surveying and a challenge for the sector that although innovation is being encouraged, current rules do not always allow for this.

The pace of innovation is fast and regulations and rules to keep pace need to respond. This is an area the Department for Transport is considering as part of its review as highlighted in evidence to the Transport Select Committee.

We are in a time where some companies are offering 'vision based' self driving car and advanced driver assistance systems and are starting to collect data that could support asset management. But how could defects identified by vehicles be reported to highway authorities?

Alex Wright sees this new data as an opportunity for the sector but cautioned about going down blind alleys, adding that the VOCAL Roads Group would try to understand where standardisation, quality assurance and accreditation fit in, where it is appropriate and where it is not.

Gaist is starting to work with a national logistics company to review how this data could be used. Paula says: "There is going to be all sorts of data out there soon and you can't keep a box around it any more. What if a company said: 'You could have all this data for 1p per km?' – it should be a council's choice. shouldn't it?

"If data is restricted or mandated only by a few with vested interests then this could create an environment where companies or community groups outside of this publish their own data."

To get involved in the VOCAL Roads Group, register your interest at *vocalroadsgroup.org*

● Asset manager XAIS' software suite XA has been accredited as a UK Pavement Management System following the introduction of a new scheme by the Road Condition Management Group (RCMG).

"We are delighted with our UKPMS accreditation," says the firm's director Peter Davidson.

Colour coded approach to assessments

Data on the visual condition of the surface of local roads is provided by the Surface Condition Assessment for the National Network of Roads (SCANNER) survey.

The surveys provide an objective assessment of condition and their primary output – the Road Condition Indicator (RCI) – can be used to underpin decisions on local highways maintenance.

There are three indicators as part of the RCI:

- Green shows that a section of road is in good condition.
- Amber indicates that a road section is not in perfect condition, but would still offer a good driving surface.
- Red highlights that a section of carriageway is likely to be in poor condition and will probably need maintenance within the next year (pictured).