

Future scanning to improve road condition

More consistent and appropriate surveys of road condition can be achieved through SCANNER which is now being improved to potentially allow the measurement of further parameters, such as potholes.

A research project by the UK Roads Liaison Group has sought to improve the SCANNER survey process for assessing the condition of the road network. Justin Ward spoke with Amanda Richards MCIHT, chair of the Road Condition Management Group and member of the UK Roads Board to find out more (see next page).

SCANNER surveys were introduced in 2009 to provide network wide condition assessment of the local A, B and minor road networks. They use survey vehicles that travel at traffic speed. Laser sensors measure the shape of the road surface and digital cameras capture images of the surface.

Data collected is processed and converted into condition parameters – such as rutting – and delivered in a UK Pavement Management System (UKPMS) compliant format to local authorities for loading into their pavement management systems. Lengths of road in need of maintenance or further investigation are identified and the process can be used to identify and prioritise future schemes.

The data also supports asset valuation, via the Carriageway Condition Index and for reporting within local authorities' own accounts.

SCANNER was developed from the Highways Agency's Traffic Speed Condition Survey (TRACS) of the strategic road network. Research supported by the Department for Transport was carried out between 2003 and 2007 to adopt the survey for local roads.

This delivered a range of outcomes including an updated survey specification, a set of 'enhanced' parameters focussed on narrower local roads and the definition for the



↑ SCANNER survey vehicles use laser sensors and camera technology to capture road surface condition

SCANNER Road Condition Indicator (RCI), which is used to estimate the overall condition of each length of the network.

In 2014 a development group led by local authorities, software developers, survey contractors and the SCANNER auditor (the SCANNER Development Group) started a review of the performance and status of the SCANNER survey in the light of the experience of local authority data users, survey contractors and the auditor. The group identified three key areas where enhancements or modifications to SCANNER were required:

- Consistency: Despite detailed quality assessment and accreditation processes employed for all SCANNER data there continue to be issues with the consistency of surveys, in particular in the measurement of cracking. (Task 1)
- Condition parameters: SCANNER surveys report a wide range of parameters on surface condition.

However there is concern that these are not well used, and that SCANNER does not report all of the defects that authorities regard as important to include in a condition survey. (Task 2)

- Appropriateness of the SCANNER RCI: Does the road condition indicator relate well to local highway authorities' maintenance decisions and how authorities might want to track the effects of maintenance? Could the data be better associated with the treatments that are, or would be, undertaken? (Task 3)

Improvements to data consistency and relevance improve the value gained from SCANNER surveys. Therefore the Scottish Road Research Board (SRRB), in collaboration with the UK Roads Board, commissioned work to investigate and develop SCANNER surveys in the three key areas identified above, which have been separated into three tasks. The results of the work will be available shortly from the UKRLG website.

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Justin Ward (JW): How widely used is SCANNER for condition reporting?



Amanda Richards (AR): SCANNER is used for national reporting for classified roads in England, Wales, Scotland and Northern Ireland.

We are also seeing more authorities using SCANNER on unclassified roads. From a survey carried out in 2012 we found 14% of authorities using it on parts of their network. But in a follow up survey in 2016 over 25% reported using SCANNER on parts of their unclassified road network, so a big jump.

JW: What is the issue associated with consistency of data from surveys?

AR: Cracking has been observed to be the main cause of the inconsistencies. Cracking data collected during the winter months is less consistent than data collected during the summer.

JW: Should we not carry out surveys in winter?

AR: One of the recommendations is that surveys are not carried out over the winter. Discussions are being held with the survey sector on the practicalities of implementing this.

JW: Will there be a need for new tests?

AR: There is currently no method to check that the vehicle fleet is consistent in the measurement of cracking and the 'repeatability' test is also weak. It is recommended that a test for repeatability, devised by this project, is implemented immediately.

A new test for consistency has also been devised. This would need to be trialled to allow SCANNER contractors time to respond and improve to any devices found to be inconsistent. At the end of the trial this would become a formal requirement.

JW: Are there any problems associated with rutting?

AR: Small inconsistencies associated with rutting (depression of the surface course in the vehicle wheel paths) can become significant when combined with other parameters. Rutting is one of the input measures for the Road Condition Indicator, so any variances can affect overall RCI figures.

JW: How can the measure of rutting be improved?

AR: It has been shown that higher resolution systems, with wider measurement width, could provide more accurate and repeatable data.

Using a centrally defined and controlled rut algorithm could also improve fleet consistency.

JW: SCANNER delivers more than 20 parameters, but are they all the right ones?

AR: Only a few of these are used to calculate the RCI and few local authorities make use of the enhanced parameters.

The survey does not provide all the condition parameters that are considered to be important to local authorities. Better value could be obtained from SCANNER if the parameters were optimised to reflect the needs of local highway authorities.

JW: Could there be a measure to detect potholes?

AR: There is already a 'bump measure' included in the SCANNER parameters which is similar to a pothole measure. The project team has looked at ways to improve this to provide a more definitive 'pothole measure'.

It could be that high resolution transverse profile data could be adopted to provide full lane width data from which a more reliable bump/pothole measure could be obtained.

JW: Are there any further new measures being considered?

AR: There is a clear call for a measure of fretting, showing the loss of stones from a road surface. The use of multiple texture measurements, extracted from high resolution transverse profile data, shows promise for the identification of fretting. We are suggesting a measure should be developed to deliver this.

JW: Do local authority practitioners use SCANNER in a variety of different ways to inform decision making?

AR: Yes. Work concluded that efforts should be focused on making users aware of existing functionality and sharing examples of best practice.

JW: Some people say there needs to be advice on splitting the 'Amber Band' which flags up possible problems on a road condition survey. Can you explain further?

AR: Making better use of 'amber' data could help to identify roads that are starting to deteriorate where preventative maintenance would be suitable. The Road Condition Management Group recently undertook a survey of local authorities across the UK and asked if they would find it useful if 'amber' data as well as 'red' was reported nationally.

It found that 86% agreed and 87% use 'amber' data for lifecycle and programme planning. It appears there is a need for this.



↑ Refuse trucks are being used to spot potholes

JW: Is there a need for training on SCANNER given changes in staffing over recent years?

AR: There are a range of potential longer term tasks and one of these is for developing an overall education strategy.

JW: What are the next steps for SCANNER?

AR: We have identified improvements for how data is collected and used; some things can be done now, just by raising awareness but the next bigger step will be in finding funding to put these new requirements in place.

Other areas that the SCANNER Development Group has identified for further research includes areas such as making SCANNER more suitable for collecting data on the unclassified network.

JW: What is your view of potentially disruptive technologies that might displace the need for SCANNER surveys; for instance the trial of the 'Pothole Spotter' in Thurrock and York?

AR: As someone who works for a local authority I am interested to understand more about the data that comes out of this trial and how it can be used.

My personal feeling is that it is not something that would replace SCANNER data but could be another tool to help highway engineers better understand and manage their networks. It is certainly an interesting development.

Technology views sought

Department for Transport will be seeking views later this year on whether the highways sector should introduce new technology for monitoring road condition and how this feeds into annual road condition statistics.

It will also seek views on UKPMS and how local highway authorities may be granted more flexibility in the technology they use.

"We are keen to ensure we keep pace with rapidly changing technology and help authorities understand the true condition of the roads and make the best decisions," said Steve Berry from the Department.