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Road asset management

How artificial intelligence improves road asset management

80% of all journeys are on paved roads. Over the past 50 years, road design and maintenance have improved to ensure safer and smoother journeys. But roads are designed to wear out, and maintenance is an ongoing effort that can tax resources and budgets.

While many road maintenance organizations rely on manual methods of evaluating pavement and asset conditions, artificial intelligence (AI) is increasingly helping them improve their planned and reactive road maintenance strategies.

Read on to see how RoadAI is benefitting organizations with faster, more accurate and cost-effective road condition surveys.

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The top course on the road is normally referred to as the wearing course. Road asset management is the practice and process used by road maintenance organizations to understand where the roads are wearing out and focus resources on keeping the roads in good condition.

The process of road asset management comprises three broad areas:

- **Reactive maintenance:** The day-to-day monitoring of network condition ensuring there are no immediate safety hazards on the network

- **Planned maintenance:** Measuring network condition over the entire network and planning what areas and repairs to complete

- **Managing network inventory:** Assessing and repairing other road assets such as signs, barriers, bollards and manhole covers

The challenge for engineers is to manage this complex and dynamic environment that covers hundreds or even thousands of miles.

How RoadAI can help

RoadAI provides a quick, complete, objective analysis of pavement conditions through an automated road survey. The solution combines a user-friendly AI tool, high-quality video data and reliable methodology to quickly and accurately assess pavement conditions up to four times faster and at half the cost of a manual road survey.

Now, inspectors can quickly create thorough, accurate reports about pavement conditions using just a mobile smart phone to support strategic decision making about asset management.

The AI difference

	Traditional human assessment	RoadAI
Inspection speed	Drive slowly to detect and document	Full driving speed; inspector is free to carry out other tasks
Data availability	Takes weeks to get data in usable format	Immediate; data analysis automated
Analytics	Broad and nonspecific	Comprehensive, automated, used in short- and long-term
Personnel	Trained surveyors are needed	Non-experts can complete surveys
Process	Manual and seasonal	Automated and can be repurposed for other needs

Conducting surveys with two trained personnel per vehicle is the typical method of assessing road conditions. The primary drawback of this approach is the limited amount of data that inspectors can gather and record while they're driving the route. Human recording processes tend to cluster defects into broader categories like structural edge or wearing course defects, so the end analysis is more general.

Highly-detailed video data collection, categorization and analysis are all performed automatically with RoadAI. The end result is a fast and cost-effective means of analyzing road conditions, which makes it possible to repair roads faster and keep them safer.

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Planned maintenance

Collecting data is easy enough — place the phone in a vehicle and start driving any part of the route. The following pages provide a few examples of what you can do with that data once it is in the system.
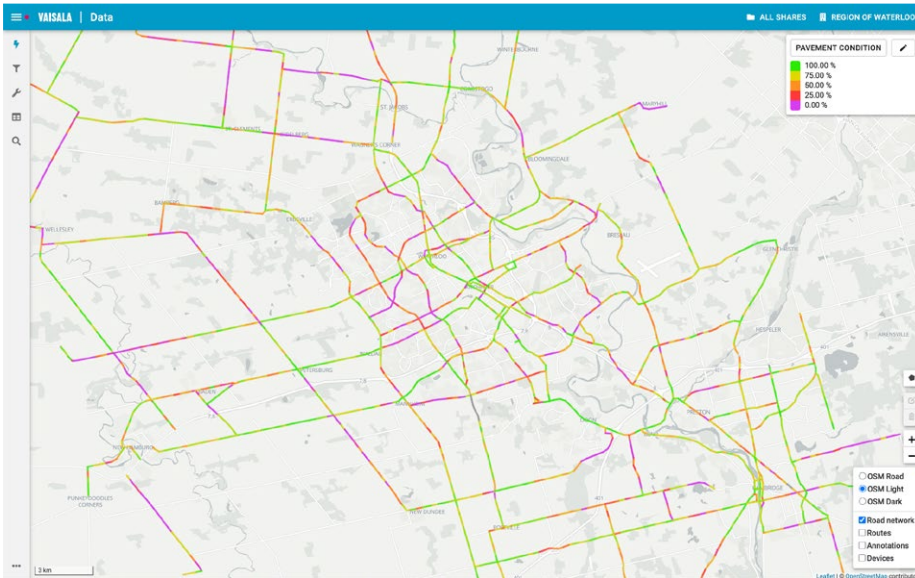
In this example, each color on the heat map represents a different level of pavement deterioration. The system calculates pavement deterioration following the same methodology as the PCI process, assigning a percentage defect value to each 10-meter section of the network. The data can then be viewed as shown or downloaded for importing to third-party GIS or asset management systems.

RoadAI uses a computer vision process to generate this condition data. After the video data is uploaded, the software analyzes each frame, then tags objects and features in the environment.

Anonymization and analysis

As the example below shows on the left side, the vehicles are anonymized and blacked out. The right side shows the rest of the data the system is analyzing: The paved surface, the extent of the pavement and road markings — even different defect types and repairs such as sealing and patching. The system can also report the condition of road markings.

Reactive maintenance

Video footage

In the heat map, you can zoom in to see more detail. Click on any point on the network to review that video footage, using the system as a geospatial video app.

The next time some part of the network needs to be checked, instead of driving to the area an inspector can use RoadAI first to verify when personnel last drove past that spot. If the route was already recently covered, they can save the trip and analyze the issue. This step can cut down on the number of reactive site visits.
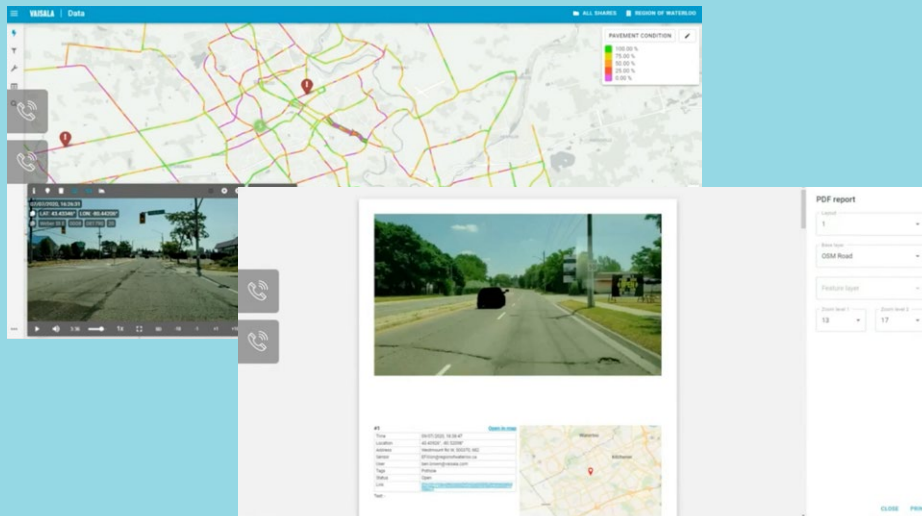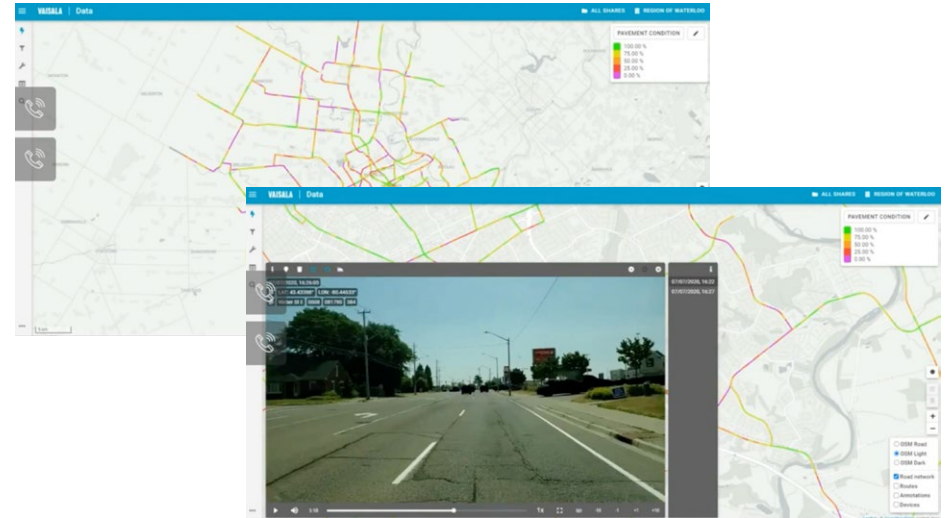
Annotations

The annotations layer allows you to analyze specific areas of the network that have been identified for repairing, such as potholes in this example.

RoadAI includes a media button which connects to the phone via Bluetooth. As you're driving, you can press the button and it will drop a pin on the heat map. You can then quickly generate a report showing the location of each pin, and dispatch crew to repair them. The export data is then included your local sectional reference data.

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Network inventory management

Through computer vision, RoadAI recognizes road assets such as traffic signs, barriers, bollards and manhole covers.

For example, with continuous use the system will automatically identify traffic signs, add each one to the inventory database, record their condition and send alerts for missing or new signs.

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Customer case studies

Client: London borough of Bexley

Challenge
Bexley's legacy third-party road condition survey process only provided full pavement condition data every 4 years (25% of network is surveyed annually) — complicating maintenance and hindering leaders trying to predict and budget for repairs.

RoadAI solution
Bexley's RoadAI deployment uses several RoadAI-equipped mobile phones to capture real-time road condition data, which is streamed back to headquarters. There, road managers can begin using the data almost immediately.

Results
- It takes an inspector just 1-2 days in a "network blitz" to get complete coverage and analysis of their portion of the road network.
- They can now conduct pre-winter and post-winter surveys, which allows Bexley to understand and address seasonal road deterioration much better than ever before.
- The RoadAI data enables Bexley officers to enter budget negotiation conversations with much more strength and certainty.

Read the full case study

Client: Northumberland County Council

Challenge
Northumberland inspectors often travel long distances to complete their tasks. Long distances led to long periods of downtime — up to 45 minutes one way — and lost productivity.

RoadAI solution
The council launched a pilot test, which began with four inspectors using the RoadAI handsets to conduct safety inspections and gather road condition data. The mobile data collection system also generates a video of the road network which can be used for multiple purposes.

Results
- Northumberland quickly eliminated their inspectors' commuting downtime and rolled out the solution to all 12 inspectors.
- The solution has enabled Northumberland to significantly increase the efficiency of their inspectors as well as the rest of the department, and speed up the process of analyzing and maintaining roads.

Read the full case study

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Download the webinar

Download our webinar presentation to learn more, including customer use cases and live demos.

[Watch the webinar](#)

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Vaisala brings deep understanding of the challenges faced by road maintenance decision makers to provide dependable support, training, and project management based on best practices. By providing the best technologies and expert know-how, our support, training and philosophy of partnership are unmatched in the industry.

Drive improvement in your road maintenance strategies.

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