DRISI
Caltrans Division of Research,
Innovation and System Information

Research Results

Implementing a New Pavement Management System

PaveM software analysis tool helps pavement designers better predict performance, consider what-if scenarios, and invest dollars wisely

Pavement

FEBRUARY 2016

Project Title:
Complete Quality Assurance on Automated Pavement Condition Survey and Ground Penetrating Radar Contracts

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WHAT IS THE NEED?

The California state highway system, more than a half-century old, is showing its age. Caltrans must continually monitor and maintain the system, which encompasses over 50,000 lane miles and carries nearly 35 million vehicles per year. To target future repairs and projects that do the most good for the least amount of money, Caltrans is employing various technological approaches to assess and inventory pavement needs. Developing analytic and predictive models requires data on the pavement structure, including the types of materials used and layer thickness, and how the condition of the surface changes over time.

WHAT WAS OUR GOAL?

The goal was to develop a pavement management system that provides decision-makers data to support efficient spending and resource allocation strategies for pavement building, preservation, and rehabilitation projects.

WHAT DID WE DO?

To develop the pavement management system, PaveM, Caltrans worked with the University of California Pavement Research Center to gather the necessary data to establish an inventory of the underlying pavement structure—layer thicknesses and material types—and the surface condition of the entire state highway network. The project used ground-penetrating radar (GPR) to collect the structural information at highway speeds. The researchers then verified the GPR data by comparing samplings to blind test sections that were extensively cored and measured with a more accurate walking GPR unit. PaveM also incorporates data from the annual

Caltrans automated highway pavement condition survey (APCS), which collects pavement surface condition data at highway speeds using lasers and cameras. This data is collected annually and is used to develop the pavement distress prediction models. The researchers confirmed the information by comparing the pavement videos to results from crack recognition software.

WHAT WAS THE OUTCOME?

The quality assurance tests showed that the airborne GPR method provided accurate substructure data for the entire network. The substructure information was not available in the past, but with new GPR data, more accurate performance modeling can be done. The APCS data has been scripted to feed directly into the PaveM software. Districts can now view digital photos of the pavements, along with the analyzed cracking, rutting, and roughness values. The research team developed two software programs during the QA effort that are useful for pavement designers when determining a project's pavement structure. iGPR takes the processed GPR data and displays the layer thickness and pavement type along the route lane-by-lane. The iCore program vets the core data taken from a pavement section and then enters it into the iGPR program for comparison to the GPR data.

WHAT IS THE BENEFIT?

PaveM analysis enables Caltrans to implement a proactive approach for prioritizing, preserving, rehabilitating, and maintaining existing highway pavements. Pavement designers can use PaveM to recommend the best pavement strategies, predict how long the pavement will last, and select the most cost-effective treatments. As more pavement condition data is collected, Caltrans can develop more accurate pavement performance prediction models for the many climate regions, traffic conditions, and pavement types in California.

LEARN MORE

To view route-based route selections on iGPR, visit www.ucprc.ucdavis.edu/iGPR/Default.aspx?iGPR=false& DistrictBasedUI=false

IMAGES

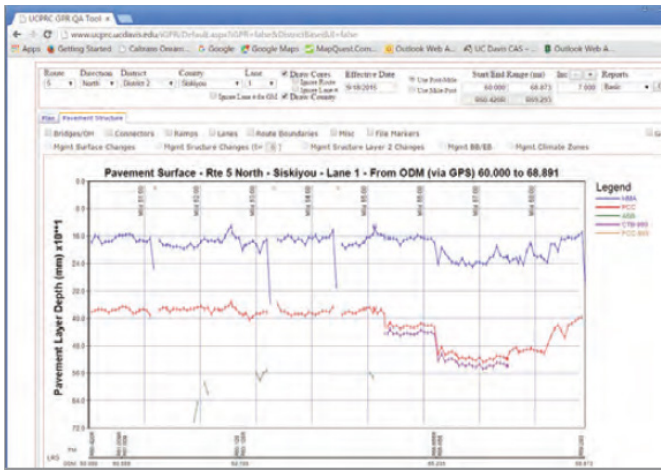

Figure 1: iGPR display for I-5 in Siskiyou County


Figure 2: Core locations in District 3