

**Geotechnical/
Structures****May 2026**

Project Title: Integration of Thermal Infrared Imaging into the Caltrans Inspection Program for Pavements and Bridge Decks

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Integration of Thermal Infrared Imaging into the Caltrans Inspection Program for Pavements and Bridge Decks

Refining California Department of Transportation (Caltrans) concrete bridge deck inspection practices, through development of standard operating procedures (SOP's) and recommendations for best practices.

WHAT IS THE NEED?

Caltrans must inspect pavement and bridge decks to support proactive infrastructure maintenance. Caltrans needs to leverage emerging non-destructive evaluation (NDE) technologies for sensing and data processing to best perform this critical duty.

The Strategic Highway Research Program recognized the utility of Thermal Infrared (IR) for early identification of shallow-seated deterioration in pavements and bridge decks. Early detection allows repair and rehabilitation ahead of significant degradation, saving time and money on maintenance.

WHAT ARE WE DOING?

Caltrans installed a thermal IR system on its 3D Ground Penetrating Radar (GPR) vehicle as part of Task 3924, allowing georeferenced visual and thermal IR imaging of pavement and bridge deck surfaces concurrent with 3D GPR imaging of the subsurface. Task 3924 overcame some significant technical hurdles and produced a deployment-ready system for acquisition of accurately ortho-corrected and georeferenced thermal IR and visual imagery. This research will continue integration of the technology within Caltrans inspection practices, through development of SOP and recommendations for best practices.

This research will gather information and select locations for pilot projects. Then, the research team and Caltrans Geophysics and Geology Branch personnel will conduct multiple pilot projects to gain Caltrans' field experience in



inspecting pavement and bridge decks using IR thermography. The knowledge and experience gained through the pilot projects will enable users and researchers to:

Develop best practices, workflows, and SOP for collecting IR thermography data in the field resulting in accurate high-quality results.

Determine best practices for identifying locations of deteriorated bridge decks and pavement.

Utilize the IR thermography pilot project findings for personnel training in interpretation and presentation of results.

WHAT IS OUR GOAL?

The goal of this research is to produce a guidance document describing SOPs for effective application of thermal IR technology for early detection of delaminated areas of reinforced concrete bridge decks and pavements.

WHAT IS THE BENEFIT?

Early detection allows repair and rehabilitation ahead of significant degradation, saving time and money on maintenance. Caltrans has installed a thermal IR system on its 3D GPR vehicle, allowing georeferenced visual and thermal IR imaging of pavement and deck surfaces concurrent with 3D GPR imaging of the subsurface. Using thermal IR technology to detect delaminated areas of bridge decks reduces the amount of lane closures needed to perform in-depth inspections and consequently the safety risk to Caltrans personnel and the travelling public.

WHAT IS THE PROGRESS TO DATE?

The contract was executed in April 2026, and the kick-off meeting was held on 05/01/2026.