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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION

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# Research Notes

# Evaluation of a Semi-Automatic Pothole Patching Vehicle

Reviewing available semi-automatic pothole patching systems and evaluating their field performance, safety impacts, and suitability for Caltrans maintenance operations.

**Maintenance**

**November 2025**

**Project Title:** Evaluation of a Semi-Automatic Pothole Patching Vehicle

**Task Number:** 4485

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**Task Manager:**

Travis Graham
Project Manager
Travis.Graham@dot.ca.gov

## WHAT IS THE NEED?

The California Department of Transportation (Caltrans) maintenance crews repair a large number of potholes each year under varied roadway and traffic conditions. Many repairs rely on manual processes that expose workers to traffic, require lane closures, and produce patch quality that can differ across districts. Several commercial semi-automatic patching units are now available, but Caltrans does not yet have validated performance data that show whether these systems can meet statewide maintenance needs. Districts have asked for clearer guidance on equipment capability, operational requirements, and long term pavement results.

An objective evaluation is needed to determine if semi-automatic systems can improve production rates, reduce worker exposure, and deliver more consistent patch quality. The Department also requires a review of deployment constraints, equipment limitations, material handling behavior, and cost considerations. This project will help Caltrans understand whether adopting such equipment is practical, efficient, and aligned with maintenance procedures.

## WHAT ARE WE DOING?

The research team is conducting a literature review, a technology survey, and a market assessment of available semi-automatic pothole patching systems. The review covers durability, cost, material behavior, equipment workflow, and safety considerations. Several commercial models are under examination, including the JCB Pothole Pro, Bergkamp SP5E, Roadmaster SP Series, and Jetpatcher. The team is documenting specifications, capabilities, and operational constraints to understand how each system aligns with Caltrans requirements.

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Findings from published studies and previous evaluations are being organized to support comparison across products. The research team is drafting structured performance indicators and data needs that will guide equipment selection and test plan development. Coordination meetings and panel discussions are being used to refine expectations, confirm evaluation priorities, and prepare for later phases of field testing. Early comparison tables and evaluation criteria are underway to create a foundation for the project's next steps.

## WHAT IS OUR GOAL?

The goal is to determine whether a semi-automatic pothole patching vehicle can meet Caltrans production, durability, and safety needs under field conditions. The project will evaluate equipment performance and develop guidance that supports statewide decisions on deployment or procurement.

## WHAT IS THE BENEFIT?

This work will help Caltrans understand whether semi-automatic patching systems can reduce worker exposure and improve safety by limiting time spent in traffic during pothole repairs. The project may identify opportunities for more consistent patch quality and higher production rates compared to manual methods. An analysis of equipment capabilities will support informed procurement decisions and prevent investment in tools that do not meet operational needs.

The project may also highlight potential reductions in labor hours, lane closure durations, material waste, and rework requirements. The development of standardized evaluation criteria and test procedures will support future assessments and help guide long term maintenance planning. These benefits align with Caltrans goals for safe, efficient, and cost effective pavement maintenance.

## WHAT IS THE PROGRESS TO DATE?

The research team has started the literature review and is compiling performance indicators related to durability, cost, workflow, and material behavior. A review of available semi-automatic patching systems is underway. Current models being examined include the JCB Pothole Pro, Bergkamp SP5E, Roadmaster SP Series, and Jetpatcher. Specifications, capabilities, and operational requirements are being documented.

The technology assessment is ongoing. Published evaluations are being reviewed to support the development of comparison criteria. The Advanced Highway Maintenance and Construction Technology (AHMCT) is preparing structured lists of Caltrans procedures and operational needs that relate to testing and equipment operation. Early results are being organized to support the next stage of work, which will include identifying data needs and preparing the test plan.

The remaining tasks will proceed once the initial review is complete. The team will continue refining performance indicators, expanding the equipment survey, and preparing the foundation required for field evaluation and test planning.