

Traffic Operations

May 2026

Project Title: A Time and Space Exploration of Traffic Crash Trends During the Covid Recovery

Task Number: 4617

Start Date: April 1, 2026

Completion Date: March 31, 2027

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A Time and Space Exploration of Traffic Crash Trends During the Covid Recovery

California's post Coronavirus Disease 2019 (COVID-19) traffic patterns suggest that reduced congestion on once busy corridors may be contributing to higher rates of severe crashes, underscoring the need to understand how congestion shapes crash risk.

WHAT IS THE NEED?

There is a critical need to understand how traffic congestion influences both the frequency and severity of crashes, especially fatal and serious injury crashes. Traditional safety programs often focus on free flow conditions, overlooking how congestion fundamentally changes crash risk. During California's post COVID 19 recovery, traffic volumes returned to pre pandemic levels, yet severe crashes rose without fully returning to prior rates. This suggests a potential shift in crash dynamics due to reduced congestion, highlighting the need to investigate whether less congestion on historically busy corridors may increase severe crash risk.

WHAT ARE WE DOING?

Focusing on California's post COVID 19 recovery period, the project will analyze whether reduced congestion on historically busy roadways has paradoxically increased the risk of severe crashes. By integrating crash data from the Safe Transportation Research and Education Center (SafeTREC) Transportation Injury Mapping System (TIMS), traffic performance data from the California Department of Transportation (Caltrans) Performance Measurement System (PeMS), and infrastructure details, the study will develop and test predictive negative binomial models. These models will be calibrated with and without congestion metrics to identify significant explanatory variables. The core of the project is to compare traditional network screening methods with new models that incorporate congestion data to determine differences in the identification of high-risk locations. The primary objective is to provide Caltrans with actionable



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insights that strengthen its traffic safety monitoring programs and improve methodologies for identifying high risk corridors. Key deliverables include a comprehensive dataset and a final report detailing the calibrated models and the network screening comparison.

WHAT IS OUR GOAL?

The primary goal is to determine whether incorporating congestion measures improve crash prediction and high-risk location identification, particularly for fatal and serious injury crashes. Over a 12-month research period, the study aims to produce actionable insights on how congestion should be integrated into statewide safety monitoring methodologies. Success is defined by clear evidence, positive or negative, on the role of congestion in crash prediction, helping refine Caltrans existing safety analysis practices.

WHAT IS THE BENEFIT?

This research will give Caltrans stronger, data driven tools for identifying and prioritizing high risk corridors. By understanding how congestion influences severe crash risk, the department can enhance safety monitoring programs, target interventions more effectively, and update methodologies to better reflect real world traffic dynamics. Even if congestion shows little or no effect, the findings will still guide future policy and practice by confirming where resources should or should not focus. Deliverables, including a comprehensive dataset and final analytical report, will support ongoing statewide safety improvement efforts.

WHAT IS THE PROGRESS TO DATE?

This contract was executed before the planned start date, and the kickoff meeting was held on April 15, 2026. An advisory committee has been established.