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CALTRANS DIVISION OF RESEARCH, INNOVATION AND SYSTEM INFORMATION
TRANSFORMING IDEAS INTO SOLUTIONS

Research Results

Moving Towards Roundabouts in California

Improve the process for adoption and implementation of roundabouts around the state.

Traffic Operations

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Project Title: Moving Towards Roundabouts in California

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WHAT WAS THE NEED?

While roundabout have been around since the late 1700's, modern roundabout design wasn't standardized till 1966 in the United Kingdom. There are three main design features that set modern roundabout apart from their predecessors: 1) vehicles in the circle have the right-of-way; 2) they are smaller (70 to 160 feet in diameter versus 300 feet or more for traffic circles and similar designs), and; they have a splitter "island" to reduce speed just before entry. These are know as 'traffic calming' applications that are intended to cause drivers to slow down and pay more attention.

Because of these features, modern roundabout intersections have proven to be significantly safer than signalized intersections and because they don't require most vehicles to stop they improve mobility in most applications. California in general and the Central Valley in particular has been slow to adopt roundabout intersections. In several cases, public sentiment has affected the decision-making process and resulted in signalized intersections being chosen over roundabout designs.

WHAT WAS OUR GOAL?

The immediate objectives are to assess public sentiment towards roundabout intersections across the state of California, in general, and specifically in the Central Valley, and develop recommendations for messaging strategies, including message content and framing, that may be effective in influencing and improving public sentiment towards roundabouts.

The longer-term goal is to accelerate the adoption of roundabouts in California communities to improve mobility and safety by reducing fatalities and severe injury accidents.

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WHAT DID WE DO?

To support statewide adoption of roundabouts, this project investigates three areas. First, a quantitative safety analysis examines crash frequency, crash severity, injury, and fatality data before and after roundabout construction, with particular focus on California and the San Joaquin Valley. This assessment applies multiple time frames and buffer distances examining property damage only events, multi-party collisions, and crashes involving driving under the influence with an additional analysis for pedestrians, cyclists, trucks and motorcyclists.

Second, statewide and regional surveys are used to look at public and business sentiment toward roundabouts. These surveys aim to identify patterns of resistance, demographic predictors of acceptance, and misconceptions regarding roundabout use and safety.

Third, this project explores strategic messaging and communication frameworks for improving public understanding and support. The project examines targeted outreach approaches to craft messages that resonate with both the public and decision-makers.

The overall objective of this study is to generate data-driven insights and actionable communication strategies that can help agencies and local governments in advancing roundabout implementation. By tackling both perception and communication about roundabouts, this project advances California's goals for safer, more sustainable, and community-focused transportation infrastructure.

WHAT WAS THE OUTCOME?

This study provides a comprehensive, California-specific assessment of roundabouts by integrating statewide crash analyses with public and business perception research and the development of targeted communication strategies. Collectively, the findings indicate that roundabouts can deliver meaningful safety benefits and operational improvements, but that long-term success depends on thoughtful design, focused outreach, and early stakeholder engagement.

The quantitative safety analysis demonstrates that roundabout installation in California is strongly associated with substantial reductions in fatal crashes. Across multiple buffer distances and analytical methods, fatalities declined consistently, and in several San Joaquin Valley cases were eliminated entirely. Average party size per crash also fell, indicating fewer road users were affected per incident. Passenger-vehicle crashes and injuries generally decreased both statewide and regionally, while bicycle-involved crashes typically declined or remained stable, with larger reductions observed when DUI-related cases were excluded. Pedestrian- and truck-related results were constrained by limited samples but trended toward safety improvements.

Crashes involving impaired driving continued to represent a major contributor to severe outcomes; however, when DUI-related incidents were removed from the analysis, many safety metrics declined sharply and in some cases approached zero. This pattern suggests that the lower speeds and yielding environment created by roundabouts may reduce the likelihood or severity of high-risk behavior, although further behavioral research is needed to confirm causal mechanisms.

Motorcycle crashes emerged as a notable exception to otherwise favorable safety trends. Post-installation increases were observed across several scenarios, often in cases not involving alcohol. These results point to potential gaps related to geometry, surface conditions, sight distance, operating speeds, or rider expectations and highlight the need for additional focused investigation and countermeasure development to ensure roundabouts provide equitable safety benefits for all users.

Public perception findings reinforce the importance of experience and education in shaping acceptance. Most cyclists, motorists, and pedestrians reported regular roundabout use and

acknowledged overall safety benefits, yet familiarity with rules and operational details remains uneven—particularly among pedestrians. Each group expressed distinct concerns: cyclists emphasized conflicts and sudden stops, motorists cited entry, exit, and lane-selection challenges, and pedestrians focused on yielding behavior and signage. Design preferences consistently favored single-lane configurations and separated facilities for cyclists, underscoring the value of simpler geometries and multimodal accommodation.

WHAT IS THE BENEFIT?

Study after study in the U.S., Europe and Australia show that roundabouts improve safety. They do this by reducing vehicle speed; reducing the number of conflict points between vehicles; and channeling everyone to move in the same direction. Even in cases where the number of collisions doesn't go down significantly, the severity of the crashes goes down resulting in far fewer fatalities and severe injuries. Federal Highway Administration literature shows that roundabouts reduce fatal and injury crashes anywhere from 78% to 82%.

IMAGES

Image 1: Visual for orange pavement pattern.