

DRISI 2020: Caltrans' Solution Lab

Transforming innovative ideas
into sustainable solutions

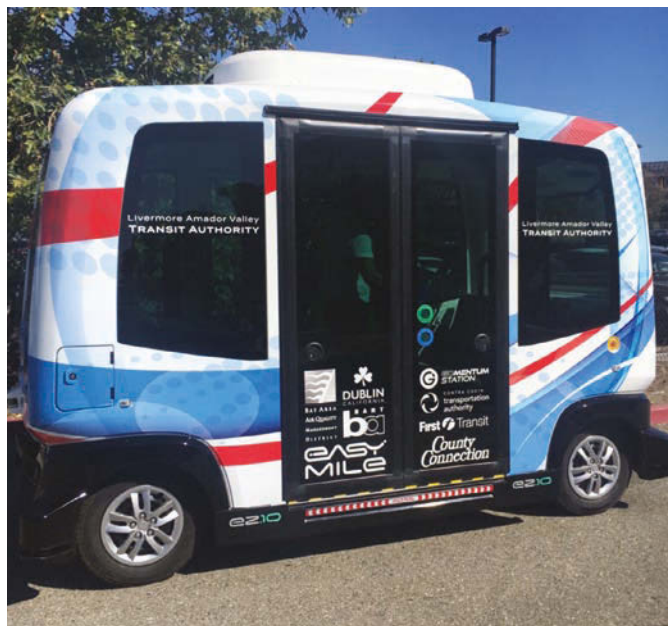


Division of Research, Innovation
and System Information



DRISI 2020: Caltrans' Solution Lab

Transforming innovative ideas
into sustainable solutions



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Acknowledgments

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Shared mobility can have a positive impact on transportation systems by improving accessibility and reducing congestion when deployed strategically. To support planning and regulatory efforts, public agencies need more policy guidance, particularly in the areas of rights-of way management, equity, data sharing, and data management. Based on the input and concerns of 100 participants representing local, state and regional governments, private companies, community-based organizations, and educational institutions, the resulting Shared Mobility Policy Playbook provides resources, information, and tools for local governments and public agencies seeking to incorporate innovative and emerging services or to manage existing shared modes.

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Every traffic barrier goes through extensive crash testing to reduce risks to motorists, bicyclists, pedestrians, and road workers.

Dara Wheeler, Division Chief

All Modes and All Roads



The Division of Research, Innovation and System Information serves as a central resource for technical expertise and solutions to improve California's ever-evolving mobility system—from collecting and analyzing data to identify high-risk areas, researching innovative solutions to support and encourage active transportation, and developing best practices to responsibly manage the State's transportation-related assets.

- Q:** How does DRISI contribute to Caltrans providing a safe, sustainable, integrated, and efficient transportation system and influence policy in California?
- A:** DRISI is Caltrans' "solution lab"—we strive to assist in department-wide problem-solving. We collect the data to support and shape policy and make informed funding decisions and produce more efficient implementable outcomes. We focus on streamlining and standardizing business processes and tools to foster coordination among the divisions and reduce redundancies. Our robust research program tackles a myriad of transportation concerns to ensure that people and goods move safely throughout the State.
- Q:** You've stated that the role of DRISI is to serve all modes and all roads. How do you accomplish that?
- A:** Transportation is beyond roads. We look for better, safer, more efficient and sustainable approaches to mobility to reduce vehicle miles traveled, congestion, and pollution and promote other means of travel. We need to make the transportation system safe for pedestrians, bicyclists, and emerging forms of

micromobility. Our transportation network is connected to the State's economy and well-being. We need to improve freight, plan for the increase in urban deliveries, and address the concerns of some of the biggest ports in the country.

- Q:** DRISI partners with other state and national transportation organizations. What is the benefit of this collaboration?
- A:** DRISI relies on collaborative ventures to stretch research dollars by participating in national initiatives and programs. By pooling funds and expertise, we can sidestep duplicating our efforts and benefit from each other's knowledge and experience. We also partner with university research centers that do cutting-edge research in the areas of safety, seismic engineering, intelligent transportation systems, alternative fuels and vehicles, and pavement.
- Q:** Has DRISI changed its goals or focus in light of COVID-19?
- A:** With the sudden shift to remote work and schooling, the way people travel and shop has changed. For instance, biking and walking have increased, but public transit and shared micromobility use have decreased. The pandemic will have long-term impacts on transportation choices that policy makers will need to navigate. Research and data collection will help us be resilient and respond to emergencies and unforeseen challenges with intelligent, creative solutions.

Q: Promoting communication is one of your goals. What are some of the steps you're taking?

A: Our work as a State agency should be transparent and accessible to all to improve engagement and accountability with everyone we serve. Over the years, we've published annual reports detailing our research results (dot.ca.gov/programs/research-innovation-system-information/annual-reports), which are shared

with transportation agencies nationwide, but it's important to also communicate the breadth of our efforts to a broad audience so that people can see that data collection, analysis, and research are valuable investments that benefit California and beyond. The following articles spotlight some of the work we've done recently to contribute toward Caltrans' five priorities of promoting safety, modality, innovation, efficiency, and partnerships.

5 Caltrans Priorities



Safety

Every day 10 people die on California's transportation system. At least two are pedestrians and bicyclists. We cannot normalize this and must move Toward Zero Deaths.



Modality

We must better leverage managed lanes, transit and active transportation, and freight movement must diversify. This is imperative as over the next 30 years our state population will increase by 25% and freight traffic by at least 75%.



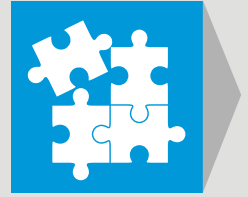
Innovation

We must counter a "business as usual" mindset by embracing bold and transformative ideas. This must include new solutions to help solve major state issues like climate change, the affordable-housing shortage and homeless crisis.



Efficiency

Effective government is efficient government. SB 1 legislation requires Caltrans to generate at least \$100 million in savings annually to reinvest in additional maintenance and rehabilitation projects. We should match those results in all budget areas.



Partnerships

Caltrans projects are for all Californians. To improve our transportation system, we must build great relationships by initiating broad, inclusive conversations with all stakeholders and leveraging the expertise of our business partners.



Find out more about the 5 Caltrans priorities.

caltrans.maps.arcgis.com/apps/Cascade/index.html?appid=d1a286a70e944d83b0afc2f0ca520deb

Innovation Expo 2020: Empowering New Ideas and Technologies in Transportation



Innovation. Defined as the introduction of something new, whether it's an idea, technology, or approach, with the goal of making something better. In November 2020, Caltrans held its first Innovation Expo to present how it's employing innovative ideas, processes, and technologies, big and small, to make the nation's largest and most complex transportation system safer, more efficient, and more equitable. "Innovation is at the core of what we do at Caltrans," stated Director Toks Omishakin. "We're constantly looking for ways to go beyond the status quo to make bold and transformative improvements to our transportation system. This is done through breakthrough technology, creative funding, and new ways of doing things that are far from business as usual."

As demonstrated throughout the weeklong event, the road to innovation can have many paths. It can be a few small steps, a busload of shared ideas, or a quicker way to arrive at your destination. But what is of utmost importance is that experimentation and

Innovation increases Caltrans' ability to react to changes and discover new opportunities. Fostering and developing a culture of innovation allows us to build better products and services.

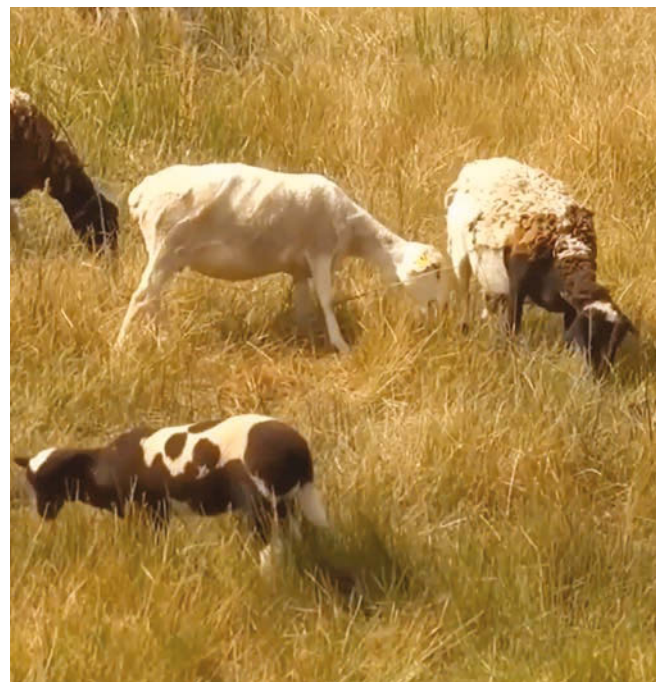
innovation are encouraged. "We are fostering an innovative culture at Caltrans by empowering and supporting staff and partners to think creatively and look for new and efficient ways to provide transportation services around the state," said Omishakin.

Organized by DRISI's new innovation coordinator, Pauline Valenzuela, the Expo demonstrated the magnitude and breadth of what innovation encompasses at Caltrans. The live virtual event of over 60 presentations highlighted the myriad explorations and improvements that Caltrans has initiated and embraced to address the agency's focus on safety, modality, innovation, efficiency, and partnerships. The well-attended event drew 1,350 participants from across California as well as 13 other states.

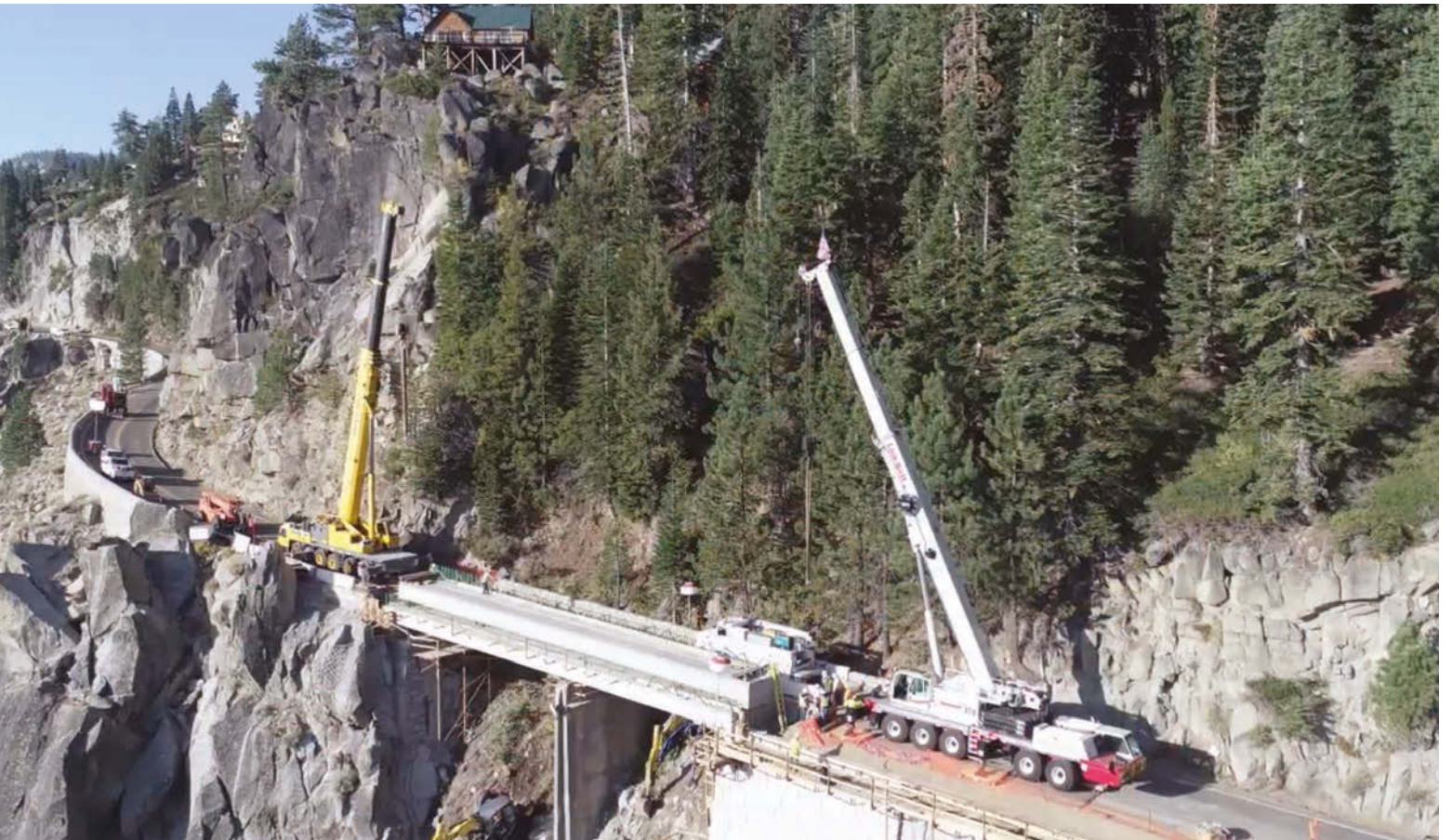
Innovation is not new to Caltrans, and the department is recognized for its success in constructing world-class highways that have been instrumental in transforming California and making it an economic leader. Today, to maintain and enhance California's economy and livability requires applying that ability to innovate more broadly to support other modes of transport. "We must think about the world that we're living in today and the various crises that we're confronting," said Jeanie Ward-Waller, deputy director of Planning and Modal Programs, one of the keynote speakers. "Climate change, wildfires, systemic and institutional racism, the transportation sector's role

Innovation is a process that takes an idea and works through many steps to reach successful implementation. At times the idea may be less than successful, but one step might yield valuable information and could lead to other innovations.

in our housing crisis, and of course, the pandemic, forces us to shift our goals and challenge old processes and methods. We can adapt and come up with new technologies and innovative methods for dealing with the outcomes that we're working for."



Innovative ideas come in all shapes and sizes and don't always need to be new. These two eco-friendly solutions help maintain streets and highways. Caltrans uses zero-emission vehicles to remove trash and debris from streets while along Highway 1, goats replace toxic herbicides to remove invasive, non-native vegetation.



Caltrans employs novel approaches to complete construction projects faster and more efficiently. Full closure of Highway 50 to replace the 1939 bridge over Echo Summit with a structure that meets seismic and safety standards was accomplished 5 days ahead of schedule. The project was a Caltrans first for utilizing accelerated bridge construction (ABC) at a high elevation.

The Expo highlighted the importance of fostering an environment where new concepts and ideas can be explored, take root, and flourish. “Because change is constant in transportation, it is critical that we continue evolving and collaborating on efforts to deploy new and existing technologies,” said CalSTA Secretary David Kim. “We can never get complacent or rest on our laurels. It’s important for all of us to constantly pursue and embrace innovation while at the same time keeping a close eye on emerging trends so we’re always prepared to respond to what’s down the road and just around the corner.”



To view the recordings of the Innovation Expo’s 60 plus demonstrations and presentations:
www.caltransinnovationexpo.com



Expanding multimodal options and encouraging active transportation are key to reducing carbon emissions and vehicle congestion.

Innovation from Within: Digital Transformation

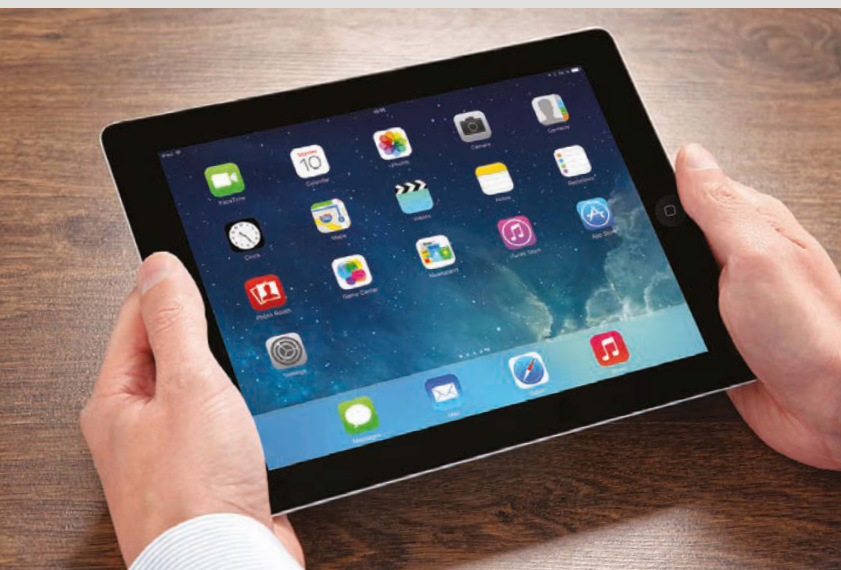
A common thread throughout the Expo was the goal of efficiency—using every transportation dollar effectively and efficiently. Efficiency relies on removing redundancies, adopting best practices for collaboration, and keeping things on schedule. Virtual design construction (VDC) 3D modeling and civil integrated management (CIM) are recent innovations that when combined can provide an environment for collaboration, improve project delivery, streamline maintenance tasks, enhance worker's and public safety, and reduce costs.

As part of its Lean 6 streamlining initiatives, Caltrans has implemented many aspects of VDC and CIM, but a comprehensive plan is needed for broader integration to meet efficiency measures. To identify the gaps, DRISI assessed the current state of technologies used within Caltrans and compared them to known best practices and created a strategic high-level roadmap for future transportation endeavors.



Caltrans uses drones for a range of activities. Drones can access hard-to-reach locations and supplement conventional activities, such as bridge safety inspections, providing a 50 to 70 percent time savings for some field operations. A shortcoming is that the generated images require a lot of storage. Caltrans therefore only needs to continue training to expand its use cases, set policies for what should be stored, and stay up to date on the emerging research.

Half of the construction field staff, engineers, and inspectors are using iPads, and the material technicians and surveyors don't. Caltrans primarily uses iPads for 2D applications, like photos and PDF files, but doesn't make use of the 3D modeling capabilities. Using the iPads can save an estimated \$2,100 per year per inspector due to reducing the need to drive to the field office.





Paving the Way to a Better Commute

It's been 45 years since the ribbon was cut on a heavily traveled stretch of Interstate 5 in southern Sacramento County, and it's about to get much needed care. The SAC 5 enhancement project is in the process of repairing and repaving 67 lane miles using advancements made in pavement design, materials, and construction to extend its service life and minimize future costs and traffic disruptions.

The paved roadway system is one of the State's primary assets, linking people and goods and supporting California's economic vitality in terms of commerce, commuting, and tourism. To preserve this asset that has been constructed over decades, the DRISI Pavement Research Group partners with the University of California Pavement Research Center (UCPRC) and industry to advance innovative and sound construction technologies and material recycling techniques. This collaboration has furthered sustainable resources and processes, such as incorporating greater amounts of recycled pavement materials to extend pavement life and reduce the emissions generated in manufacturing the materials.

The SAC 5 project is breaking up and reusing the existing concrete as a base for the new asphalt pavement, which not only eliminates discarding the old concrete but also provides a stronger aggregate base layer. An intermediate layer uses 20 to 25 percent recycled asphalt pavement. The surface layer is rubberized open-graded asphalt, made by blending ground tire rubber with an asphalt binder, which produces longer-lasting surfaces and reduces road

The long-life pavement strategy reduces the need for future repair projects, requiring only periodic quick surface maintenance to keep it smooth and safe.

noise and maintenance. Giving old tires new life means fewer ending up in landfill—California generates over 48 million scrap tires a year. The SAC 5 project is reducing that number by about 161,000 tires.

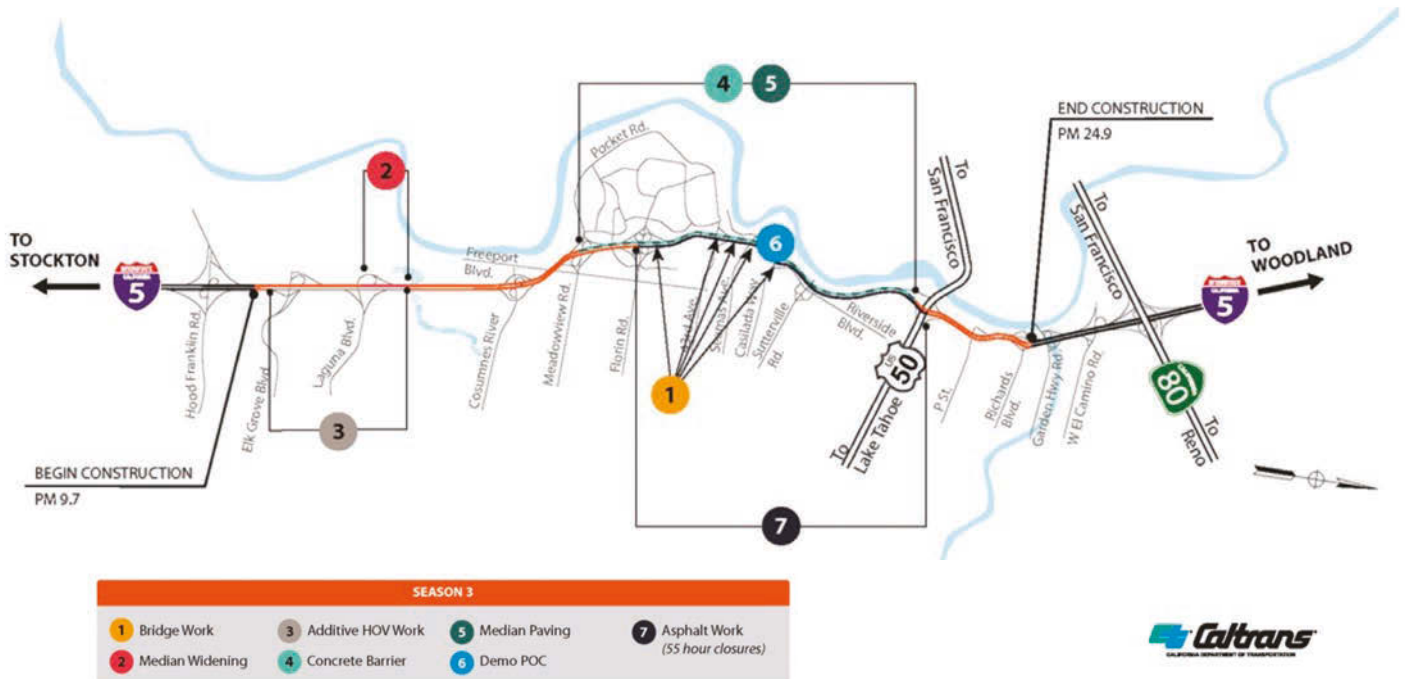
To extend the life and performance of the new pavement, the project is using a long-life pavement concept that integrates mechanist-empirical (ME) structural design, performance-related specifications for the materials and construction, and a three-layer structure, with each layer designed to do a specific job.

What's in it for ME

Unlike the earlier method of pavement design where one mix fits all, the ME approach takes better account of factors that determine performance, adjusting the structural design and materials for the specific location. The ME method considers the existing pavement, traffic loads, regional weather, and material properties, which means that the pavement recipe for Sacramento will differ from the one in Los Angeles. Caltrans uses CalME, a UCPRC-developed application, to calculate the optimum materials and thickness to

avoid under- or over-designing the project. CalME relies on an extensive library of tested materials and mixes used across California to predict performance. It considers innovations in materials design, tighter construction compaction methods, and longer design lives. For example, on one project, the analysis showed that by modifying the material used, a thinner layer could be applied, saving approximately \$1 million for every inch of reduced thickness.

Asphalt samples are collected daily from each paving contractor's plant to confirm that the mix meets the performance-related specifications.



The SAC 5 Corridor Enhancement Project is rehabilitating pavement, constructing new HOV lanes, and extending entrance and exit ramps.

Performance-related specs lead to better roads

Caltrans is a leader in the implementation of performance-related specifications (PRS), a national effort to improve construction quality while reducing costs over the projected life of the pavement. PRS makes it easier to estimate life-cycle costs—the cost of maintenance and rehabilitation necessary throughout the service life of the pavement.

These more comprehensive specifications help ensure that the materials used at the time of construction meet the performance characteristics assumed in the ME structural design. Samples of each pavement layer are tested daily to confirm that the asphalt mixes deliver the required properties.

ME + PRS = Longer-lasting pavement


By applying a new long-life pavement strategy that incorporates ME and PRS, the estimated service life for the lanes is 60 years. In comparison, the expected life when using typical asphalt materials and construction specifications is 40 years. This translates to about a \$37 million savings in asphalt paving costs over the 60-year lifespan. Although the initial cost is 4 percent higher, the pavement requires less maintenance and no rehabilitation over the 60-year period. On top of that is the incredible savings and time accrued from not having to close lanes for maintenance and disrupting traffic.

“Caltrans has been on the forefront in implementing innovations in pavement design and materials,” said Nick Burmas, chief of the DRISI Office of Materials and Infrastructure. “The SAC 5 project brings together years of research and applying lessons learned to improve the lifespan of our roadways and introduce more sustainable practices.”

A project of this scale relies on the collaboration of Caltrans, academia, and industry, each bringing its experience and point of view to deliver the taxpayers and road users of California a state-of-the-art highway and improved best practices for future work.

A recycle plant is located on-site.





eDNA Speeds Up Road Maintenance in Protected Areas

Tidewater goby were detected at this site using eDNA but not with seining. To view all the sites, visit <https://tinyurl.com/y5emmapc>.

What can you learn from a scoop of water? Well, in the case of eDNA, quite a bit. Environmental DNA is an emerging technology that can streamline detecting the presence—or as importantly, absence—of specific organisms by analyzing traces of DNA released from shed epidermal cells or body secretions.

DRISI research enabled Caltrans to employ this emerging technology to determine the presence of the endangered tidewater goby, a two-inch fish that is an important food source for many shore birds and other fish. Tidewater goby are native to California and their historic distribution spanned the entire coastline from Tillas Slough in Del Norte County to Agua Hedionda Lagoon in San Diego County. Coastal developments, droughts, loss of habitat, and the introduction of invasive species have severely reduced the population, warranting protection under the U.S. Endangered Species Act (ESA).

The fish inhabit lagoons, sloughs, and estuaries along the entire California coastline that are often adjacent to overlapping bridges, culverts, and roadways that Caltrans needs to maintain or repair. Routine maintenance activities that can affect tidewater goby habitat are subject to ESA consultation requirements, and Caltrans must often provide mitigation even when the fish aren't detected because the current survey method isn't foolproof.

The established survey protocol uses seining, dip netting, and minnow traps to capture the fish—a time- and labor-intensive method that can potentially disturb their habitat. To confirm accuracy, two survey periods conducted at least 30 days apart are required. And in the case when the fish aren't detected, five consecutive years of negative survey results are needed to establish a history of absence, delaying work and swelling costs for Caltrans projects and maintenance programs.



eDNA offers Caltrans a noninvasive, cost-effective method to detect endangered aquatic species near project sites and meet critical environmental regulations.

Biologists can collect water samples in just months, in what could take years with seining and trapping methods, to detect a species' presence.

Caltrans, with the dual goals of making appropriate conservation and management decisions according to environmental laws and regulations and completing transportation projects in a cost-efficient and timely manner, turned to fish biologists at Humboldt State University to test the effectiveness of eDNA. Over the past decade, eDNA has increasingly been used to detect aquatic species. It's easier, less costly, and more accurate—and less invasive because there is no need to capture and handle the organism. “In seeking cost-effective methods to meet critical environmental regulations timely and accurately, we wanted to test this exciting emerging technology by developing an eDNA protocol for determining whether the endangered fish is present at or near a Caltrans project site,” said Simon Bisrat, DRISI senior environmental planner.

In a mere four months, in what could take years with seining and trapping methods, biologists gathered between one to six water samples from 209 sites along the over 800-mile California coastline to establish a point-in-time snapshot of the species' entire geographic distribution. This distributional information

This endangered California native inhabits lagoons, sloughs, and estuaries near bridges, culverts, and roadways that Caltrans needs to maintain or repair.



provides a baseline of site occupancy for future monitoring of whether the fish population is expanding or contracting in the occupied sites. Because the previous estimates were based on data that spanned longer time periods, sometimes years, the eDNA collection provides a more accurate picture of occupancy within a precise time period.

When comparing eDNA detection to the most recent seining surveys, the results agreed in 86 percent of the cases. The eDNA did detect tidewater goby in 11 sites not detected by seining. However, the eDNA survey missed six locations that the seining method had detected, most likely attributed to insufficient water sampling at sites with high salinity. Previous studies have shown that eDNA has nearly double the detection rate of seining.

The high agreement between the seining and eDNA results indicates that both methods are valid survey tools for detecting tidewater goby. But in terms of cost, time, and invasive contact with the species, eDNA educes all three. Permitting for capturing and handling an endangered species is extensive and can involve several state and federal agencies. In contrast, because collecting water samples is less harmful to species and their habitats, it requires fewer permits, thereby simplifying and expediting ESA consultations, which can often delay a maintenance project. With the added bonus of being able to survey a large spatial area in a short period of time, eDNA can be the way of the future to assist Caltrans in completing sustainable transportation projects in a cost-effective manner.

“eDNA offers an easy-to-use, noninvasive, cost-effective, and more sensitive method to support species conservation,” said Andrew Kinziger, the principal investigator at Humboldt State University. “And it's more efficient. A water sample contains eDNA of all species living in the area, so one sample can also be used to detect multiple species.” Based on the success of this project, Caltrans is now exploring using eDNA to monitor endangered coho salmon at culvert and bridge project sites.

The Power of Information



Gas consumption in California? There's a stat for that. Vehicle registration fees? There's a stat for that, too. Tolls collected? We're counting. Driver licensing, vehicle miles traveled, safety incidents, . . . DRISI collects and reports all this information and more to the Federal Highway Administration.

This critical transportation-related data, collected and aggregated from all states, helps shape transportation planning and legislation, federal funding methods and levels, and the dollars returned annually to each state. It is also used for public and private research, business decisions, and policy making.

Data services is a major component of DRISI's work, supporting critical geospatial information services — everything from map-making tools and resources to agency-wide training and support.

During natural disasters, geospatial data plays an important role in risk management regarding transportation routes. Geospatial data informs strategic planners of potential routes that could be impacted due to the risks inherent to geography and help identify evacuations routes.

Transportation statistics collected and correlated by DRISI informs decision-making at the national level.

California Statewide Collaboration

To prepare the FHWA Section 500 series reports, DRISI collects data from over 300 local, regional, and state agencies representing counties, townships, and municipalities throughout California to ensure that the state is adequately represented at the federal level.

Participating partners include:

- Bay Area Toll Authority
- California Department of Tax and Fee Administration
- California Highway Patrol
- Caltrans internal divisions
- Department of Motor Vehicles
- Foothill/Eastern Transportation Corridor Agency
- Golden Gate Bridge, Highway and Transportation District
- Office of Traffic Safety
- Orange County Transportation Authority
- Public Utilities Commission
- San Diego Association of Governments
- San Joaquin Hills Transportation Corridor Agency
- State Controller's Office
- State Parks and Recreation



DRISI generates information and analysis to help identify, evaluate, and implement opportunities to improve safety in all phases of highway planning and operation.



For lots of interesting facts and figures, check out the latest Caltrans Fact book.

dot.ca.gov/-/media/dot-media/programs/research-innovation-system-information/documents/caltrans-fact-booklets/2020-cfb-v2-a11y.pdf

Sharing the Road



Depending on who you speak to, micromobility services, such as shared bikes and scooters, are the answer to urban transit. These new low- or zero-emission modes increase travel options and encourage people to leave their cars at home. As use of these services grows, cities are realizing a need for more uniform policies to create a supporting infrastructure to ensure a positive experience for riders and non-riders alike.

During the COVID-19 pandemic, the way people travel changed, and the use of shared services declined. This pause has provided an opportunity to better understand which policies are most effective in maximizing the benefits and minimizing any drawbacks of micromobility services.

In response to this need, DRISI is researching how the different micromobility policies correlate with city characteristics, such as size, geographic region, climate, topography, density, demographics, and transit quality, to identify guiding principles and best practices to help cities achieve varying transportation objectives, such as

It is important to understand how different micromobility policies affect broader transportation systems and what strategies need to be in place to ensure policy consistency across jurisdictional boundaries.

increasing equity and inclusivity, reducing vehicle congestion, expanding access to public transit, and meeting sustainability goals. Given the right policies, micromobility services can be an effectual piece in the transportation puzzle.



Trucks, Trucks, and More Trucks

Electric vans can simply replace regular vans, reducing emissions and noise, but not congestion. A major limitation is the lack of a recharging infrastructure.

During the first quarter of 2019, 10 percent of all retail transactions in the United States were made online, more than double from the previous decade, according to the Census Bureau. The push for convenience, with households now receiving more shipments than businesses, has been steadily increasing congestion, pollution, noise, and roadway safety.

Everything that we consume, as well as the materials used in manufacturing or industrial processes, are brought by the urban freight system (UFS). The UFS includes the “last-mile” deliveries of the supply chain—parcels to residents and products to commercial establishments—and therefore it deals with much more complex transport network environments. In the last mile, many factors make the transfer of goods inefficient and expensive, such as the availability of parking and staging areas, curbside access, road restrictions, and the type of commodity, shipment size, and weight.

The recent shutdowns and stay-at-home orders have brought about a major shift from in-store shopping to online buying, accelerating the need to address urban freight and reshape how goods are transported.

For freight transportation, the penetration of the 3Rs is not as widespread or analyzed as for passenger vehicle emissions. The revolution has just begun.



Small containers are loaded onto zero-emission electric cargo bikes. Already on the market, this versatile, low-cost mode reduces congestion and noise, and can potentially use the same infrastructure as regular bikes.



Autonomous mobile robots: the feet of the future? Several companies have tested prototypes for food and retail deliveries. One of the main challenges is how to operate them in the urban system without disrupting regular traffic and pedestrians.

As urban freight takes on a bigger role in the California economy, DRISI research is looking at how to address the resulting consequences from many angles. For example, studies on electrification, automation, and shared mobility, known as the Three Revolutions (3Rs), have mostly focused on passenger vehicle emissions. These technologies could also improve the efficiency of UFS operations, reducing cost, time, noise, and carbon emissions. Yet despite the many benefits that the 3R technologies could bring to delivery operations, there are some challenges and barriers to overcome before being widely disseminated.

From electric vans and bikes, connected and autonomous vehicles, mobile robots and drones, to crowdshipping, these systems have different needs, advantages, and features in terms of cargo capacities, recharging, access, and infrastructure requirements. Some options introduce new services that require new regulations, road rules, and laws.

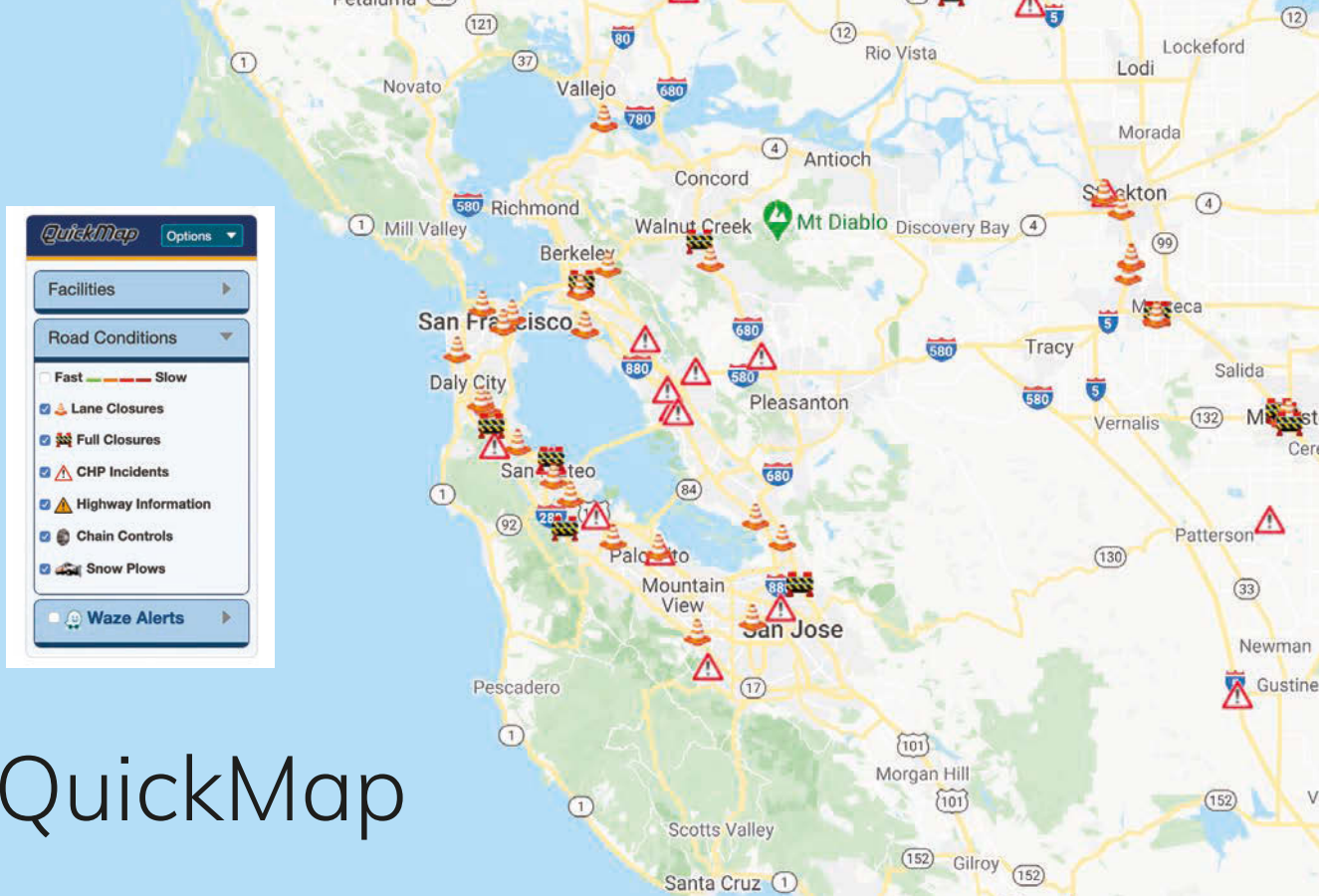
High costs, the lack of supporting infrastructure, such as recharging stations and rights-of-way, and governmental regulations are the biggest barriers for

the diffusion of the 3Rs. Transportation planners and policymakers need to design new policies that promote accessibility and uphold the safety and security of all transportation mode users. Transportation planners and UFS stakeholders must consider modal routes that might become common commercial routes, such as sidewalks, bike lanes, and air space. While stringent policies could block the development of promising technologies, policies that are too flexible could put road users at risk.

“To close this gap, research plays an important role in evaluating the potential benefits and unintended consequences of these technologies, supporting policymakers to design more appropriate policies and infrastructure requirements,” said Miguel Jaller, co-director of the University of California, Davis Sustainable Freight Research Center. “The 3Rs are an exciting opportunity to reshape the way goods and people are transported and how cities will look in the future.”

Drones are versatile and enable new possibilities, such as delivering cargo to sites where traditional modes have restricted access, opening the air space as a commercial route. Privacy concerns and the potential risk of cyber-attacks are important areas to address.





QuickMap

It's Friday before a long holiday weekend and they're predicting snow in the Sierras and wildflowers in the Mojave. You want to get out of town and be aware of chain restrictions, fueling locations, available bike routes, and possible delays. Enter QuickMap, the Caltrans app that travels with you on your phone. It's more than just a mapping application. Beyond real-time traffic incidents and weather conditions, you can plan ahead by checking upcoming lane closures and work zone activity. Zero in on a particular highway, zoom to an entire California region or a neighboring state, and connect to local district websites for transit, rideshare, and bike route information.

QuickMap relies on a linear referencing system managed by DRISI, which accurately charts every mile of the California State highway system by storing geographic locations using relative positions from a fixed point. In coordination with local agencies, Caltrans is in the process of digitizing California's entire road network. Among many things, this precision improves emergency response, construction decisions, and safety assessments. The geospatial data makes it possible to visualize data and see relationships.

Mapping the information lets you identify where events occur, gain essential context, and overlay other information, such as weather, incidents, and structures.



QuickMap is always ready to go when you are:

quickmap.dot.ca.gov



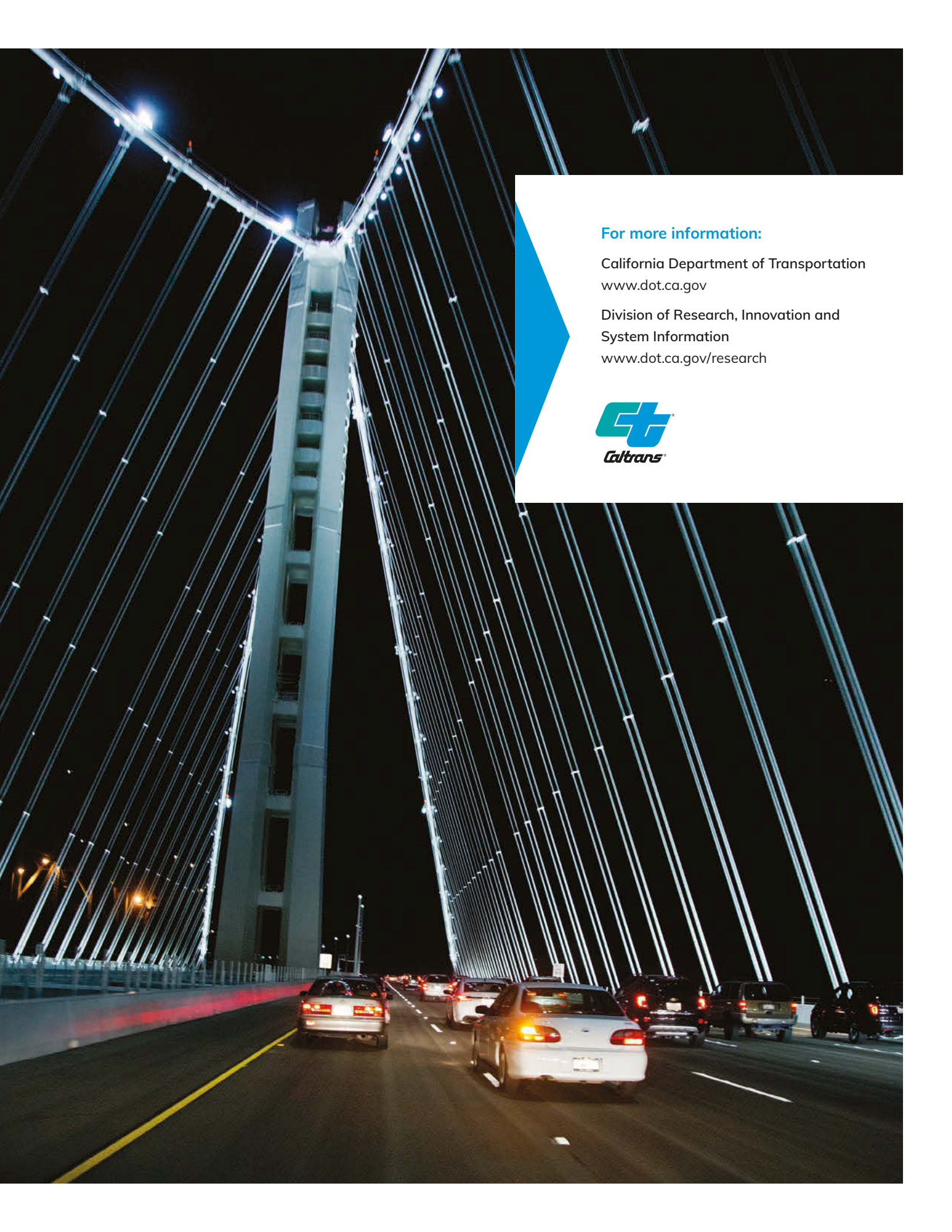


When Crashes Lead to Safety



The traffic rails you see along the road go through extensive crash testing to ensure their durability and performance. They must comply to stringent national and state design and safety criteria. In 2020, the taller CA ST-75 bridge rail replaced an earlier steel-post barrier rail that is widely used in California. Testing begins with the construction of a sample bridge rail that fully replicates the design. And then the crash testing begins. The vehicles are typically self-powered with anthropomorphic dummies in the passenger seats.





For more information:

California Department of Transportation
www.dot.ca.gov

Division of Research, Innovation and
System Information
www.dot.ca.gov/research

