

# THE MILE MARKER

A CALTRANS PERFORMANCE REPORT

2015 SECOND QUARTER ISSUE

## Redding, California

*New Road Diet Improves  
Downtown Business*





**Caltrans' mission** is to provide a safe, sustainable, integrated and efficient transportation system to enhance California's economy and livability.

**On the cover:** Cyclists chat in the foreground while pedestrians stroll along the iconic Sundial Bridge in Redding, California, where Caltrans and local planners have made active transportation safer and more convenient in the center of town. The story of change in downtown Redding starts on page 18.

**This page:** The Bay Area Bikes program allows members to rent bikes for quick trips around the city.

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## The Mile Marker Purpose Statement

The purpose of the *Mile Marker* is to provide a transparent, plain-language accounting of Caltrans' performance.





## MESSAGE FROM THE CALTRANS DIRECTOR

I'm very proud of the improvements Caltrans has made over the last couple of years. We are rapidly becoming a more accessible, more transparent, and more accountable department. We have set course on a new mission, established a new vision and adopted new goals to ensure that California has a transportation system that meets the complex needs of the coming century.

It is the work of many people, both inside and outside of Caltrans. Californians genuinely care about their transportation system and are willing to put in the time and effort necessary to make it better. I am impressed and inspired by their accomplishments. And the fact that you are reading this performance report suggests you are a part of this momentum toward a safe, sustainable, integrated and efficient transportation system that will enhance California's economy and livability.

On the following pages you will find the report card at the heart of *The Mile Marker: A Caltrans Performance Report*. If you've read previous issues, you may notice that this at-a-glance chart has changed significantly. That is deliberate, and is intended to demonstrate our new, broader definition of success.

Our Safety performance, for example, now includes specific break-out data for pedestrians and bicyclists – a strong indication of our expanded focus on transportation alternatives, active transportation and a fully integrated system. But that's just the beginning. The changes reflected on pages 4 and 5 only skim the surface of the deep rethinking that is transforming Caltrans. The Caltrans [Strategic Management Plan 2015-2020](#), which I encourage you to read, has many more measurements than are reported in summary form here.

As we enact our ambitious plan, we will expand our data collection so we can have an ever-clearer picture of our progress. I see this as an excellent opportunity to display the trajectory of change from its beginning. All of this will unfold in a fully transparent way. Over the coming months and years, we will be able to demonstrate with increasing detail the extent to which we are meeting the very high bar we have set for ourselves.

We will make management decisions based on this data in order to ensure that California's transportation system meets the needs of its economy while enhancing the quality of life of its residents. These are indeed exciting times in transportation.

Malcolm Dougherty  
Director of Caltrans

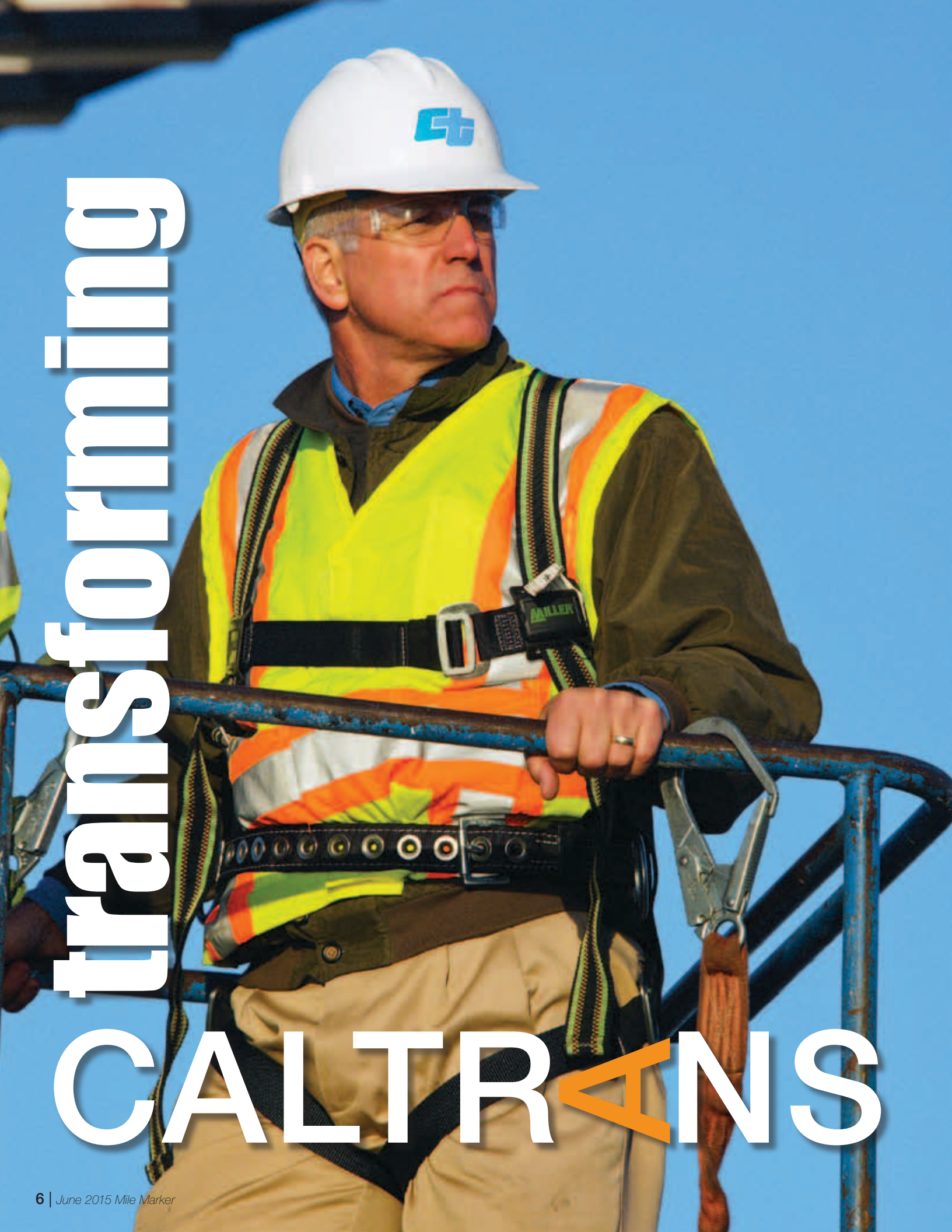
# CALTRANS **MILE MARKERS**

Performance Measures	Targets	Mode (where applicable)
Goal 1: Safety and Health		
Work-zone worker fatalities	Zero per calendar year	
Auto fatalities per 100 million vehicle miles traveled	0.5 or less	
Bicycle, pedestrian, and transit-rider fatalities	Reduce by 10% annually	Pedestrian
		Bicyclist
Goal 2: Stewardship and Efficiency		
Distressed lane miles on state highway system	By 2020, no more than 12% of pavement is distressed.	
Bridge Health Index	By 2020, maintain 95 or better rating on Bridge Health Index.	
ITS elements	By 2020, at least 90% ITS elements healthy.	
Planned projects delivered in fiscal year	100%	
Goal 3: Sustainability, Livability and Economy		
Use of non-auto transportation	By 2020, Triple bicycle Double pedestrian Double transit <i>From 2010-12 California Household Travel Survey baseline (1.5%, 16.6%, 4.4% respectively)</i>	Bicycle
		Pedestrian
		Transit
Goal 4: System Performance		
Percentage of intercity rail trips that reach final destination on time.	90 percent by 2020	
Rate of growth in daily vehicle hours of delay (35 mph or less)	By 2020, less than 8% growth rate	
Goal 5: Organizational Excellence		
Percentage of employees who agree that innovation is encouraged in Caltrans	By 2016, 75% of employees indicate innovation is encouraged, then maintain that level through 2020.	
Partners who agree or strongly agree that Caltrans is a collaborative partner	By 2016 (or next survey date), increase to 75% the percentage of partners who agree or strongly agree that Caltrans is a collaborative partner. Through 2020, maintain or increase the percentage every year.	





Target Met (by Period)	Current Period	Previous Period	Period Change	Current Period Trend	Desired Trend
<i>“Provide a safe transportation system for workers and users and promote health through active transportation and reduced pollution in communities.”</i>					
✓	0	0	0	↓	↓
—	0.67	0.66	+.01	↑	↓
✓	187	216	-13.4%	↓	↓
—	26	17	+52.9%	↑	↓
<i>“Money counts. Responsibly manage California’s transportation-related assets.”</i>					
—	16% (2013)	25% (2011)	-9%	↓	↓
✓	96.3	95.6	+0.7	↑	↑
—	67%	65%	+2%	↑	↑
—	98	98	0	↓	↑
<i>“Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl.”</i>					
—	1.5 (2012)	.8 (2000)	0.7	↑	↑
✓	16.6 (2012)	8.4 (2000)	8.2	↑	↑
✓	4.4 (2012)	2.2 (2000)	2.2	↑	↑
<i>“Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers.”</i>					
—	84.9% (SFY2014-15 Q3)	80.2% (SFY2014-15 Q2)	+4.7%	↑	↑
—	—	6.3% (2010-2014)	—	—	↔
<i>“Be a national leader in delivering quality service through excellent employee performance, public communication, and accountability.”</i>					
—	55% (2013)	45% (2008)	+10%	↑	↑
—	65% (2007)	65% (2002)	0	↔	↑



transforming

CALTRANS

# A New Mission

## Requires New Measures Of Success

It's a new day at Caltrans, with new priorities, new goals, and new commitments. To refer to Caltrans merely as a highway department would be to miss the point of a revolutionary shift in focus and values.

Safety, of course, remains Caltrans' top priority. But now it is linked with health—a connection that is rare among transportation departments.

Making it easier to get around without a motorized vehicle encourages healthy lifestyles. So Caltrans has placed new priority on active transportation and on safe routes for bicyclists and pedestrians.

Reducing transportation-related pollution also fosters healthier lives, while helping California maintain its leadership role in the battle against global warming. So Caltrans has increased its focus on transit systems and sustainable links between all modes of transportation.

At the center of this evolution is the *Caltrans 2015-2020 Strategic Management Plan*, which ensures that change is ordered, purposeful and quantifiable by laying out specific goals and performance measures.

Simply expressing those goals, of course, is not enough. Progress toward them must be measured in order for Caltrans to see where it is succeeding, and where it needs to adopt new methods or new strategies.

Caltrans has a long history of measuring performance and can quickly tell you how much of its fleet runs on alternative fuels, or the overall condition of pavement or bridges. It has years of data on how many people ride trains instead of single-occupancy vehicles. The list is long: Caltrans tabulates the number of work-related injuries, the variances in commute time on specific routes, the percentage of projects completed on schedule and much more.

As Caltrans embraces a more complete vision of the transportation system, it will require even more data, covering specific indicators of sustainable, integrated and efficient transportation that will enhance California's economy and livability.

For some of these new targets there is very little data with which Caltrans can determine its performance. As that data is collected, it will be added to the quarterly *Mile Marker*. The department has a renewed commitment to transparency, so it will share its new data as it becomes available. Caltrans' evolution will take place in full public view.

Here is a short description of the major goals in the ***Caltrans Strategic Management Plan 2015-2020***.

**Safety and Health:** "Provide a safe transportation system for workers and users, and promote health through active transportation and reduced pollution in communities."

**Stewardship and Efficiency:** "Money counts. Responsibly manage California's transportation related assets."

**Sustainability, Livability and Economy:** "Make long-lasting, smart mobility decisions that improve the environment, support a vibrant economy, and build communities, not sprawl."

**System Performance:** "Utilize leadership, collaboration and strategic partnerships to develop an integrated transportation system that provides reliable and accessible mobility for travelers."

**Organizational Excellence:** "Be a national leader in delivering quality service through excellent employee performance, public communication, and accountability."



# Caltrans Steps-Up Efforts “Toward ZERO Deaths”

Caltrans workers are not the only people who die in work zone collisions. Safety for all—workers and users—is Caltrans’ top priority. Overall, fatalities on the state highway system have dropped during the last decade, and the department’s new [Strategic Management Plan](#) sets new goals to move “toward zero deaths” for Caltrans workers, contractors, motorists, cyclists, and pedestrians.

## Strategic Management and Highway Safety Plans

The recently released [Caltrans 2015–2020 Strategic Management Plan](#) provides clear direction on how the department will achieve its mission and vision and establishes benchmarks to monitor its progress. The 2015–20 plan sets new safety goals and adds a performance measure to address bicycle, pedestrian, and transit safety.

Caltrans also participates in the [Strategic Highway Safety Plan](#), a statewide data-driven traffic safety plan to reduce traffic fatalities and serious injuries on all public roads. In coordination with federal, state, local, and private sector safety stakeholders, the Strategic Highway Safety Plan establishes goals, objectives, and challenge areas.

## Work-Zone Worker Fatalities

Since 1921, Caltrans has lost 183 of its workers to fatal accidents. Caltrans’ goal is to have zero work zone-related worker fatalities. The most recent losses were in 2013 when Joseph “Robert” Jones and Shawn Baker died during a rock-scaling accident. In the January 2014 issue of the *Mile Marker*, Caltrans reported 180 worker deaths in work zones. Since then, historic records and family reports have identified three additional work zone-related employee deaths: James Daniel Archer (1921), William Krasevac (1933), and Lawrence Peters (1967).



Most work-zone fatalities are caused by rear-end collisions.

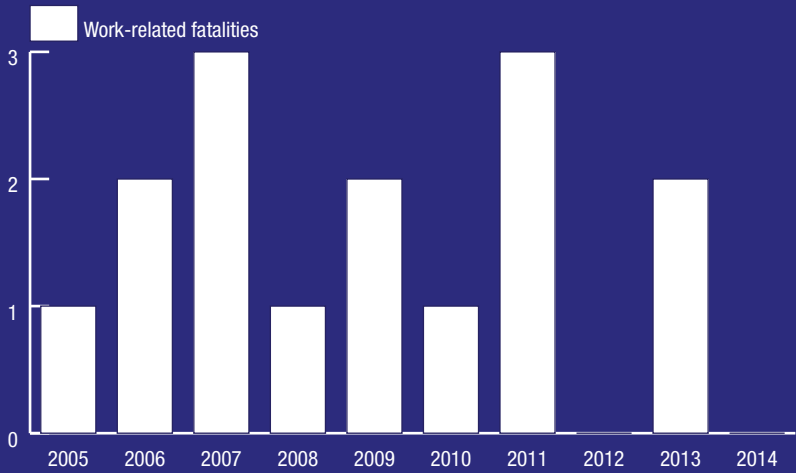


Following the success of California’s “Slow for the Cone Zone” public awareness campaign, Caltrans launched the “Be Work Zone Alert” campaign in 2014. The campaign features the children of actual Caltrans workers as spokespeople, underscoring the real human tragedy that happens when a highway worker is injured or killed. In addition to billboards statewide, the campaign features television ads to educate motorists and encourage them to Slow for the Cone Zone and move over for emergency vehicles.

Caltrans and its contractors are not the only people at risk in highway work zones. An estimated 85 to 90 percent of work-zone fatalities are drivers and passengers. Most are caused by rear-end collisions involving speeding, driver distraction, and aggressive driving. In 2012, there were 4,940 collisions in highway work zones. Of those, 44 collisions were fatal, killing 47 people, none of whom were Caltrans workers. This is why Caltrans and its partners urge drivers to be especially alert near work zones.

## Caltrans Highway Worker Fatalities

(2005–14)



Data Source: Division of Public Affairs  
Note: Data is by calendar year

*Fifteen Caltrans workers have been killed in highway work zones during the 10-year period from 2005 to 2014. During that time, 2012 and 2014 were the only years when the department did not lose any employees in work zone incidents.*

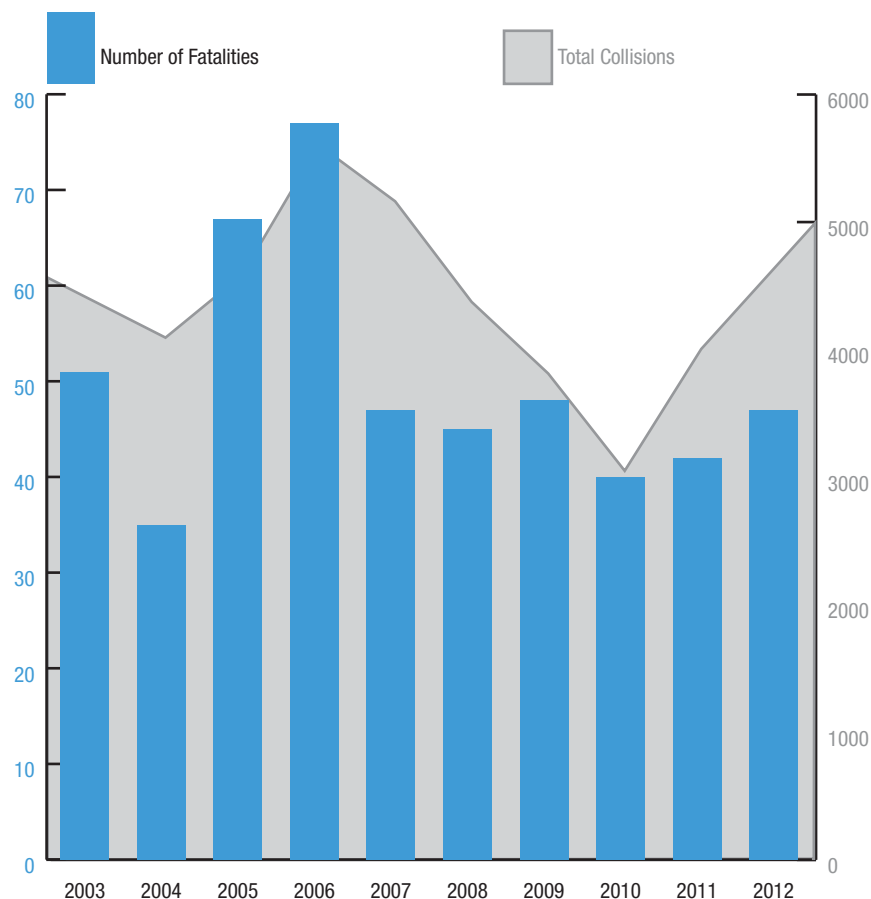




## Fatalities on the State Highway System

In 2012, vehicles in California traveled 175 billion miles on the state highway system and were involved in 138,657 collisions, 1,049 of which were fatal and claimed 1,174 lives. Highway fatalities are measured using a federal standard for every 100 million vehicle miles traveled. In the previous Caltrans strategic management plan, the department's goal was less than 1.0 fatalities for every 100 million vehicle miles traveled on the state highway system. Caltrans' new strategic plan calls for the department to maintain 0.5 or less fatalities for every 100 million vehicle miles traveled on the state highway system.

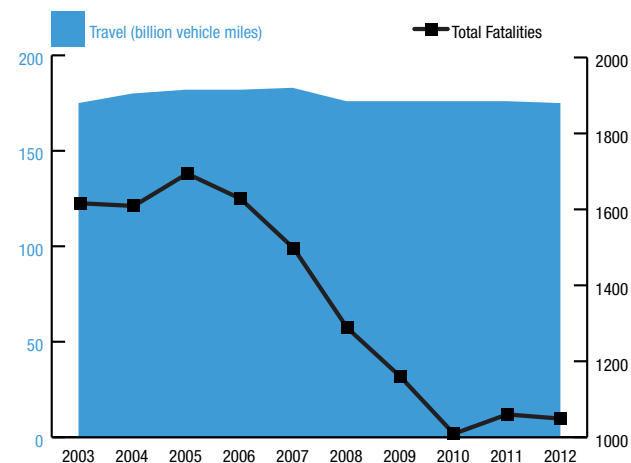
## Fatalities in Work Zones versus Collisions



This graph shows the number of highway work zone collisions for the 10-year period from 2003 to 2012 and the number of deaths from those collisions.

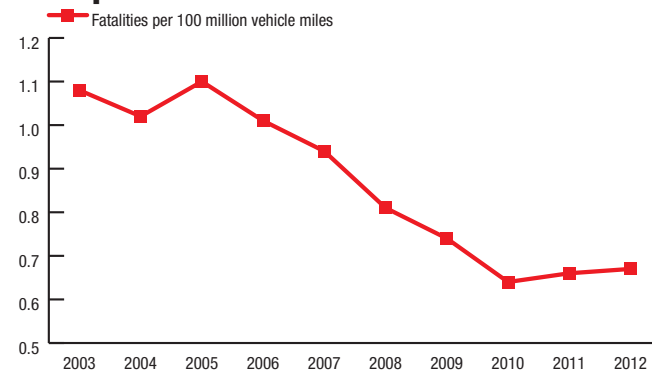
Source: Division of Research, Innovation and System Innovation

## Total Vehicle Miles Traveled versus Fatalities



Sources: Division of Research, Innovation & System Information; Division of Traffic Operations

## Fatalities per 100 Million Vehicles Miles



Source: Division of Research, Innovation and System Innovation





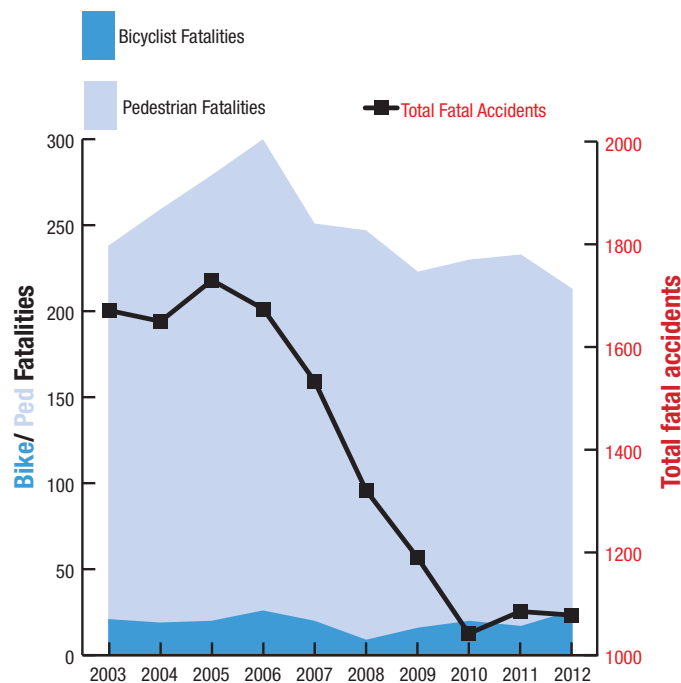
In the 2015 first quarter *Mile Marker*, Caltrans reported that the 100 million mile fatality rate was 0.61 in 2012. That number was based on preliminary data. The final report, published in the spring, showed the actual rate was 0.67, a slight increase from the 0.66 reported for 2011.

## Bicycle, Pedestrian, and Transit Fatalities

The 2010–12 California Household Travel Survey shows that more than twice as many people are choosing to walk, bike, or use public transportation to get to their destinations than in the 2000 survey. Much of that walking, cycling, and riding transit occurs on the state highway system, which is more than freeways and interstates. In some areas, the state highway is the main street running through town.

While motorist fatalities on the state highway system have dropped significantly during the last ten years, the same cannot be said for bicyclist and pedestrian. Caltrans has set a goal of reducing by 10 percent each year the number of fatalities for car, transit, pedestrian, and bicycle travelers on the state highway system.

## Bike and Ped Fatalities Compared to Total Fatal Accidents



This graph shows the total fatal collisions on the state highway system and how many of those involved bicycles and pedestrians for the 10-year period from 2003 to 2012.

Sources: Division of Research, Innovation & System Information; Division of Traffic Operations

# Culverts: A Hidden Risk

## Inspection Program

### Years from Completion



*Sinkholes, which are usually caused by "voids" created in the compacted material that surrounds a failed culvert under or around traveled roads, can disrupt the movement of people and goods.*

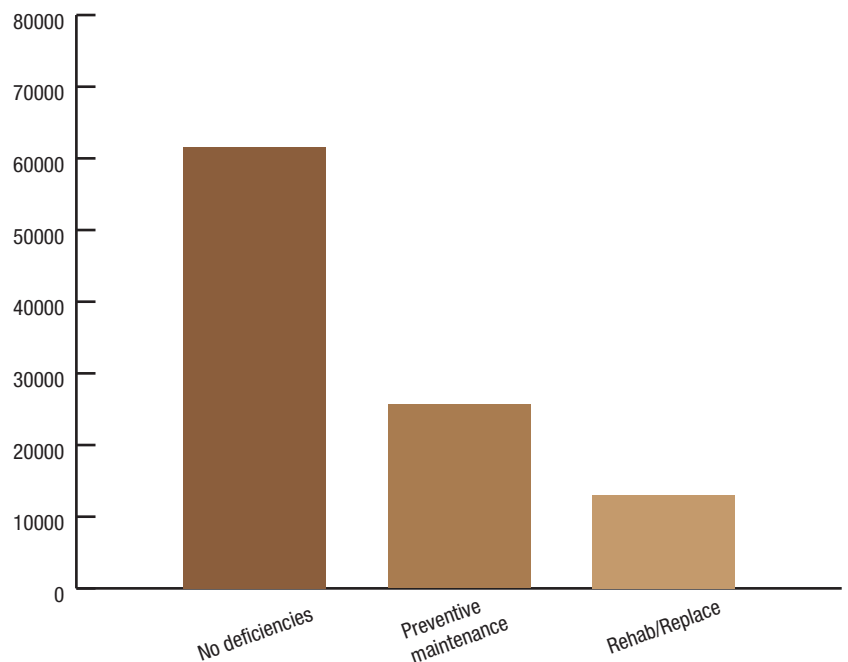
**There are more than 200,000 culverts running below California's highway system.**

When functioning properly, this massive drainage network safely channels stormwater in a way that prevents erosion of the roadbed and limits the risk of flooding in adjacent areas. When clogged or collapsed, however, culverts represent a significant risk to the highway system, which is why Caltrans embarked on a comprehensive inspection program in 2005.

Now at the halfway point of this multiyear effort, inspectors have identified about 13,000 culverts in need of rehabilitation or repair and about 26,000 that required preventative maintenance. At the present rate of inspection, it will take about nine more years to complete the task, which leaves a sizeable question mark about the condition of some 100,000 culverts.

The goal of the Maintenance Culvert Inspection Program (the effort begun in 2005) is to inventory and assess 100 percent of the culverts within the state right-of-way.

### Culvert Health



Source: Division of Maintenance





*The video inspection pipeline exploration rig (VIPER) is used to assess the health of culverts too small for a person to enter.*

Since the program began, inspectors have assessed a little more than half of the estimated 205,000 culverts in Caltrans' inventory.

Of the culverts that have been inspected, about 61 percent are in good health, 26 percent need corrective or preventative work, and about 13 percent need either major rehabilitation or replacement.

It will cost \$490 million annually over a 10-year period, according to estimates, to fix the 13 percent of culverts that need major work or replacement under the State Highway Operation and Protection Program (SHOPP). Corrective and preventative work is funded by the State Highway Account, currently at \$5 million per year plus support costs.

The Maintenance Culvert Inspection Program demonstrates the benefits of the "fix-it-first" philosophy embraced by Caltrans. Experts estimate every \$1 spent on maintenance now saves \$4 in major repair costs. The average repair or preventative work for each culvert costs about \$50,000. The cost of rehabilitating or replacing culverts ranges from \$40,000 to \$1.4 million, depending on location, type of work required, environmental, and other factors.

With the growing backlog of needed repair, culvert drainage restoration projects have received additional emphasis to keep up with the delivery of projects. The annual SHOPP Drainage Rehabilitation allocation was raised from \$11.3 million in 2013 to \$41.7 million in 2014.



*The Microtraxx Tunnel Mucker is a radio remote-controlled front end loader. The Mucker allows safe and easy access to box culverts and ditches for cleaning purposes. These areas can otherwise be hazardous or difficult to access.*

## Why Clean Culverts?

Culverts fail over time for various reasons, such as usage, age, and environmental conditions. Some common causes for culvert failures are clogs, pipe damage, washouts, rusted or failed inverts, cracked concrete, exposed or corroded reinforcing steel, joint separation, and backfill infiltration. Culvert failures can be a hazard to the traveling public. They can cause traffic delays, require costly repairs, and interrupt the transportation system. Culvert failures can also damage the surrounding riparian environment. Debris and sediment from a culvert failure can clog streams and creeks and impede migrating fish.

## Technology Keeps Pace

Culvert work is important, but it can be difficult, often requiring road closures to provide safe access. Robotic equipment is used where possible, entering small and potentially dangerous areas and sending information back to its human handlers. Some locations, of course, are not suitable for the robotic crawlers. Inspectors also use a remote-controlled culvert excavator called the Microtraxx Tunnel Mucker, which has had limited use throughout Caltrans. Four Muckers, used to clear culverts filled with sediment and debris, are rotated throughout the state. The Mucker has shown to be effective in removing debris, but this method is not appropriate for all locations.

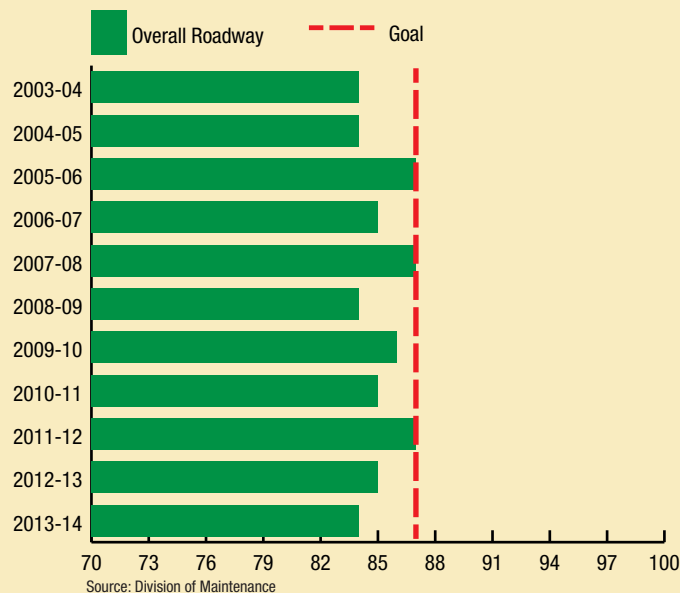
Administered by the Office of Stormwater and Environmental Compliance, the Maintenance Culvert Inspection Program has an annual budget of about \$5 million. Each Caltrans district has at least one culvert inspection crew and a functional database used to manage its culvert inventory.

*Source: Division of Maintenance*

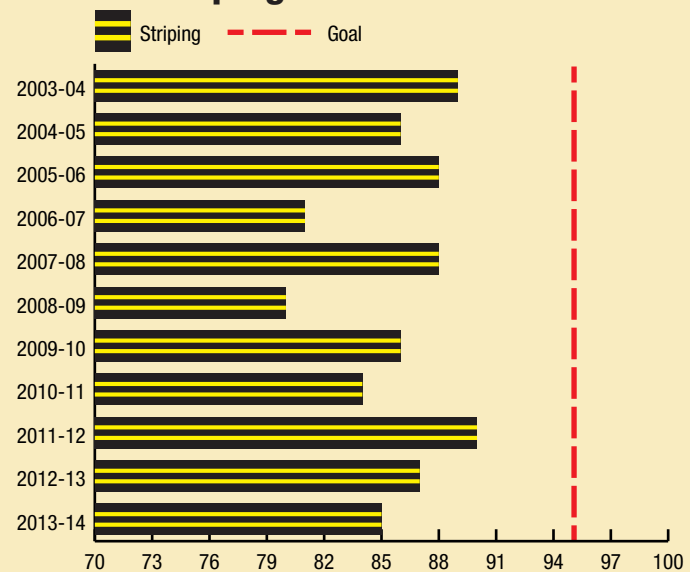


# Caltrans Lags on Several

**Overall Level of Service**



**Striping Level of Service**



Californians care about their state and take pride in the beauty it offers its citizens and visitors. Tending to our roadways assures safety and the state's aesthetic attributes. Caltrans evaluates California's roadways annually and assigns a level-of-service score to demonstrate how well it is maintaining the state highway system. Fiscal year 2014 ended with an overall score of 84, the lowest since 2009. While the department met some performance targets in this area, notably the collection of litter and debris, it did not meet its overall goal of 87.

Level of service scores, with 0 being worst and 100 being best, quantify the department's ability to service an area, and are not a measure of the area's existing condition. Caltrans sets targets it considers attainable with the most efficient use of available resources. With additional funding, targets could be raised to reflect higher expectations in keeping with higher levels of investment.

Caltrans divides California's approximately 15,000 highway center-line miles into one-mile segments, and 20 percent, or approximately 3,000 of these segments across the state, are randomly selected for evaluation. These segments are seen as a statistically viable snapshot of the overall health of the state's roadways. Scores that are within five points from the previous year are considered stable.

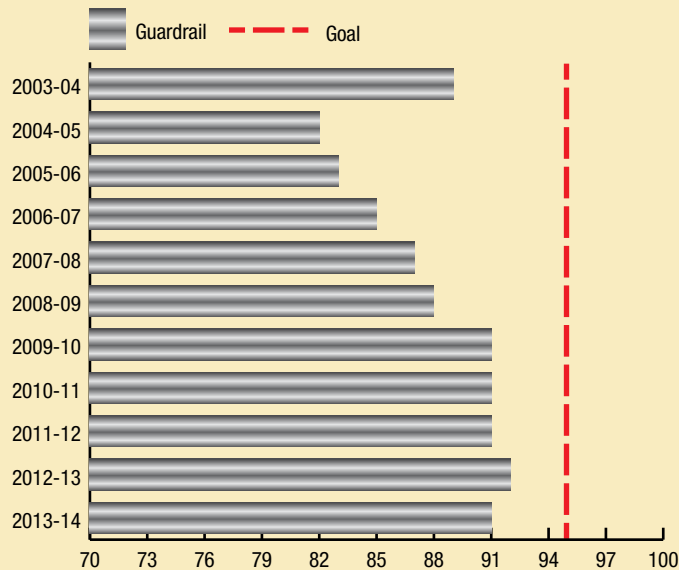




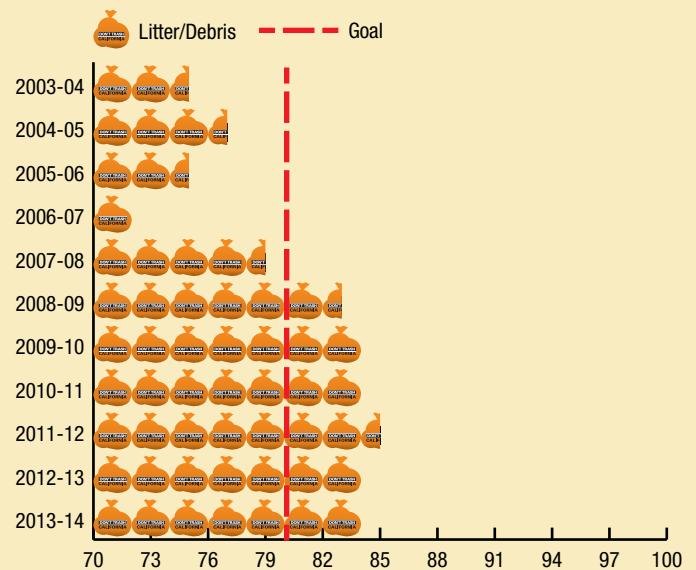


# Maintenance Goals

## Guardrail Level of Service



## Litter Level of Service



In fiscal year 2013–14, Caltrans spent about \$11 million on restriping for 50,814 miles. This is enough to go around the earth twice. Although its statewide score for striping was 85, Caltrans did not meet its goal of 95. Scores in this category have ranged from 80 to 90 since 2005.

For guardrail, Caltrans had a statewide score of 91, down 1 point from the year before and short of the goal of 95. To achieve this goal, the department must shorten the window between when a guardrail is hit and damaged and the time it is repaired. Caltrans can achieve this by increasing the number of guardrail crews throughout the state. In fiscal year 2014, the department spent \$14.4 million repairing and replacing 58 miles of guardrail, compared to \$9.2 million to repair and replace 66 miles of guardrail in 2013.

Level of service has been particularly good for litter and debris, with a score of 84 that exceeds the statewide goal of 80. This comes despite having much lower than average scores in Districts 4 (Bay Area) and 7 (Los Angeles). With scores that range from 72 to 85 in the past 10 years, Caltrans met its goal for litter and debris in each of the past six years. In fiscal year 2014, Caltrans crews spent more than \$62.8 million removing litter and debris, as well as performing sweeping activities, which were not previously included in this category. Adopt-A-Highway program volunteers' collection efforts were valued at an additional \$20 million. Combined, crews collected more

than 190,000 cubic yards—almost 40,000 cubic yards more than in the year before. Caltrans also removed 8.67 million square feet of graffiti, which is equal to almost 151 football fields. For fiscal year 2015–16, the goal has been raised to 90, which exceeds the score achieved in fiscal year 2014–15.

Still, there is room for improvement. A higher overall score would indicate fewer potholes and cracks on the roadways and less graffiti on the road-sides. A higher score for guard-rail, for example, would indicate fewer damaged guardrails on the highways. Increased funding would help Caltrans improve maintenance level of service in many areas.

Source: Division of Maintenance



# Caltrans Garments Feature Fluorescent Color and Increase Safety

Fluorescent and neon colors were popular in the '80s, and Caltrans is bringing them back—for the safety of its workers. By outfitting field maintenance employees with personal protective equipment—including the addition of highly visible fluorescent colors with reflective striping—Caltrans seeks to improve their visibility, which increases the likelihood of returning home safely to their loved ones at the end of their workdays.

## Changing Safety Garments

The Code of Federal Regulations and the 2009 Manual on Uniform Traffic Control Devices require all Caltrans employees to wear American National Standards Institute (ANSI) compliant high-visibility safety apparel when exposed to the hazards of vehicular or equipment traffic. Field workers' vests, jackets, and shirts had for years been orange. But so were Caltrans vehicles and equipment. This created safety concerns that employees working near equipment would blend in with the equipment and not be visible. Caltrans then changed vests, jackets, and shirts to fluorescent yellow-green, the other accepted color for ANSI-compliant garments. In recent years, Caltrans has changed the color of its vehicles to white. Now workers can again wear the fluorescent orange commonly associated with Caltrans.

## Protecting Employees and Honoring Fallen Workers

New personal protective equipment for maintenance workers is more than a simple color change back to orange. The new garments also include safety enhancements. Caltrans also has new rain pants and jackets that are made of waterproof and breathable material with micro-prismatic reflective striping that is more visible in wet weather. The jackets have an opening in the back for fall-protection harnesses. Later this year, Caltrans will introduce safety pants with reflective striping for better worker visibility, sweatshirts, parkas, and bomber-style jackets. The new garments meet the ANSI high-visibility standards. And to honor its fallen workers, each shirt will have "CALTRANS REMEMBERS" on a black band on the left sleeve.

*Source: Division of Maintenance*



# New Fluorescent Orange Striping Improves Safety

Safety—for transportation workers and the traveling public—is Caltrans' top priority. To improve visibility, and thereby the safety of its operations, Caltrans is upgrading its distinctive orange vehicle detection and identification striping to a more retroreflective, fluorescent orange striping. Higher retroreflectivity means more light from a vehicle's headlights reflects back to its source, making the material appear brighter and more visible to the driver. The striping material's fluorescent nature also offers an increase in daytime visibility.

Employees use the Caltrans fleet around-the-clock for road construction and maintenance and in different terrain, weather, and visibility conditions. Caltrans workers are often first responders to the scene of an incident. Making these vehicles more visible improves safety by reducing the chance they will be hit in a vehicle incident.

While higher retroreflectivity material will allow drivers to spot a Caltrans vehicle at a greater distance at night, fluorescent orange will offer optimum visibility during daylight, especially during low-light conditions such as dusk and dawn.


In addition to improved striping, Caltrans also will upgrade its logos and other decals that are an important part of a vehicle's overall visibility. National research has noted the importance of enhanced visibility and conspicuity of vehicles to elicit certain responses and actions from other drivers, for example, slowing down and moving over due to cognitive recognition.

Recent editions of the National Fire Protection Association standard for fire trucks recommends applying retroreflective striping and markings on fire trucks, including retroreflective markings on the inside of vehicle doors, to increase visibility and improve chances that a passing motorist sees that the door is open, and Caltrans also is adopting this practice.

Source: Division of Equipment

*Maintenance truck on the left features new striping.*





*“The foot traffic at  
our business has  
increased threefold.  
It’s fantastic!”*

*~ James Mazzotta,  
owner of the Enjoy Store,  
Redding, California*



## Road Diet Feeds Bike and Ped

When all was said and done, downtown Redding had a smoother street for motorists, a safer street for cyclists, and more foot traffic for local merchants.

And it all started with a bike ride.

What came to be known as “The Downtown Redding Pavement Preservation and Bike Lane Project” was originally dubbed the somewhat less inspiring “Downtown Redding Thin Blanket Overlay Pavement Resurfacing Project.”

The idea was to resurface and restripe State Route 273, which cuts right through the heart of downtown Redding. Pretty standard stuff.

But then came the bike ride and plans began to change.

It was a “May is Bike Month” event. Community members and local officials pedaled their way along a predetermined course.

Caltrans District 2 Director John Bulinski participated. So did City of Redding Public Works Director Brian Crane. As they rode in a friendly peloton of business owners, health advocates, and members of various cycling groups, they heard a lot of ideas about how downtown Redding could be a safer, more accommodating place for cyclists and pedestrians.





Bulinski and Crane got the message. Caltrans and Public Works engineers began weighing the potential of putting California Street on a “road diet,” the phrase used to describe the reallocation of roadway space to make way for active transportation and pedestrian safety. Some subtle changes would have to be made to Pine Street as well.

Caltrans and city officials reached out to Redding residents to see if they wanted those kinds of changes to their downtown thoroughfare. At the same time, Anne Thomas, director of the local advocacy group Shasta Living Streets, started an intense social media campaign to gain support for the road diet and the bike lanes. Thomas took to Facebook, Twitter, Instagram, and several other social media platforms, asking the public to weigh in on the issue and send their thoughts to Caltrans.

As the emails started pouring in, the Caltrans Public Affairs Office organized its own campaign. A new email address, D2PIO@dot.ca.gov, was established to track the responses. Soon the bike lane campaign was in the papers and on the local news. Caltrans invited interested parties to an open house to present the new plan.

Some people opposed the plan, worried that a reduction in traffic lanes would mean more time sitting in traffic. But the majority of attendees wanted safer travel for bicyclists through the downtown area.

Shortly after the open house, engineers determined that a reduction in lanes from three to two would have only minimal impacts to traffic on California Street. On Pine Street, the new proposal included reducing lane widths to accommodate the addition of a bike lane, with just a few changes to striping.

As crews began the striping, another round of emails landed in the Caltrans inbox. This time, they were messages praising Caltrans and the City of Redding for the adjustments to the pavement project. Along with them, came a new digital orange “Keep Calm and Trust Caltrans District 2” image created by Shasta Living Streets, which soon started appearing all over social media.

It’s been more than six months since the final stripe was put down, and now every type of traffic continues to move smoothly through the downtown area. The \$3.2 million project has provided safe and convenient nonmotorized transportation options. It’s also improved the quality of life for Redding residents by providing active transportation alternatives, and it has sparked an increase in business at many downtown shops. James Mazzotta, owner of the Enjoy Store, a fine gifts and gourmet food shop in Redding, said, “I was initially concerned and not happy about the idea to go from three lanes to two on California Street. But, now I love it!” he said. “The foot traffic at our business has increased threefold. It’s fantastic!”

Crown Camera Manager Frank Tona said, “More people are coming downtown to shop and spend money. You are all headed in the right direction with these kinds of projects.”

Not only was the project well received by business owners, but by bicycle enthusiasts from all across the state. The California Bicycle Coalition voted the project “Best Caltrans District Decision” in its All of the Best of 2014 issue.

The project created vital transportation links between modes, such as bicycle, pedestrian, transit, and passenger rail. It also connects two highly traveled river trails with a single, safe, multimodal corridor. This corridor improvement ties together complimentary uses for residents and visitors alike.

“We want everyone, pedestrians, bicyclists, and motorists to be able to enjoy what this beautiful area has to offer,” said District 2 Director John Bulinski. “We will definitely use this as a model for future projects and work with our partners to make improvements benefitting all modes of transportation in Northern California.”

*Source: Caltrans District 2*

# Serious Work Underway at Caltrans to Combat Drought

With California facing one of the worst droughts in recorded history, Governor Jerry Brown declared a drought State of Emergency in January 2014 and directed state officials to take all necessary actions to prepare for water shortages. He called for all state agencies to reduce their water use by 20 percent, and in April 2015 added an additional mandate ordering all urban water users to reduce their water use by 25 percent. In 2014, Caltrans took it one step further, setting a goal to reduce its water use for irrigation and landscaping by 50 percent and stepping up its ongoing work to curb all water use.

As one of the state's largest departments, responsible for 30,000 acres of landscaping, any conservation efforts by Caltrans are more than "a drop in the bucket." In April, the California Department of General Services reported that state agencies used 23 percent less water in 2014 compared to 2013. For all state government, water use fell from 19.4 billion gallons in 2013 to 14.9 billion gallons in 2014, and Caltrans accounted for more than half of the water conserved by state agencies.

Due to dramatic changes already underway to its irrigation practices and landscaping choices, Caltrans reduced its water consumption by an estimated 32 percent since last year, already exceeding Governor Brown's 25 percent reduction order. In 2014, the department used 5 billion gallons of water for roadside irrigation, down from 7.4 billion in 2013, a decrease in 2.4 billion gallons.

Year	Usage (in billions of gallons)
2010	6.96
2011	6.40
2012	7.52
2013	7.41
2014	4.99

**\$3.8M in savings in 2014**

**-32%**



This impressive decrease in water use is part of a general trend by the department, underway since the drought of 1976–78, to actively design and manage sustainable roadsides to reduce water consumption. Caltrans is using roughly half the volume of water to irrigate 33 percent more acreage of landscaping than it did in 1992. This is in part due to a significant shift to choosing plants that require less water and in implementing efficient irrigation systems. Caltrans' Landscape Architecture Program even developed a tool, [TransPLANT](#), to guide fellow landscape architects and landscape designers in choosing plants and grasses best appropriate to their region.

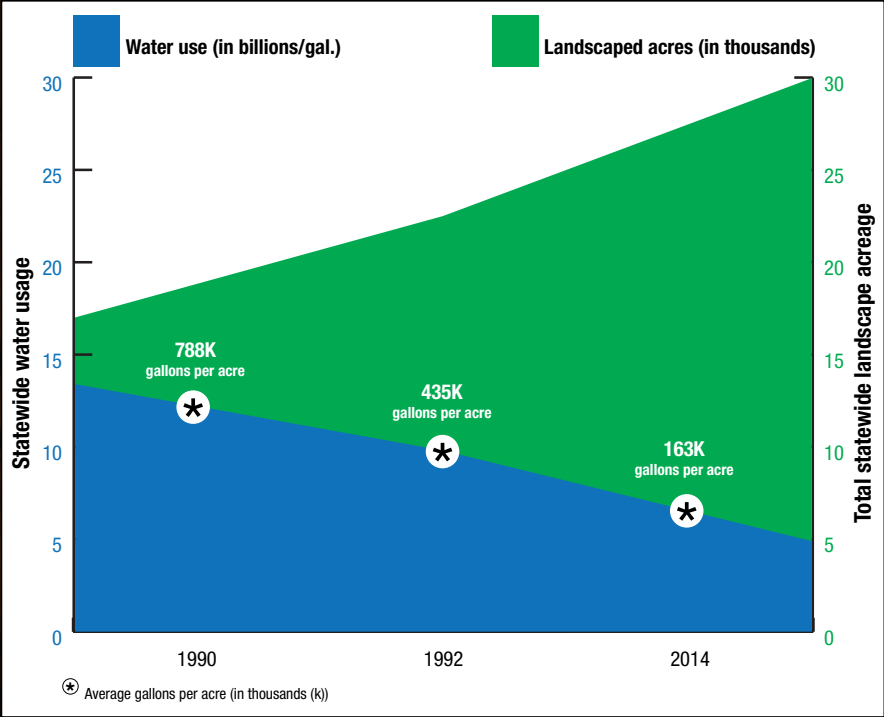
## “Smart” Controller Upgrades

Caltrans reduced use largely by managing water application through 1,250 new “smart” irrigation controllers, which can reduce water usage as much as 50 percent. This technology automatically adjusts watering to weather conditions and soil moisture and alerts water managers of breaks in the system. These devices can receive weather reports via satellite, much as a smart phone does, and adjust watering according to the forecast. They also monitor soil moisture and apply water only when necessary to keep plants healthy. Additionally, the controllers will shut off and notify the water manager if the system malfunctions or leaks.

Caltrans installed these controllers on about 64 percent of the department's irrigation systems, and they were part of a \$47 million investment Caltrans made to upgrade or repair its irrigation systems statewide. At the beginning of April 2015, Caltrans secured an additional \$28 million in emergency funding to install more of these controllers throughout the state.



Water Reduction 1990–2014



## Prioritizing Projects and Other Efforts Underway

Caltrans is also postponing many landscaping projects throughout the state, narrowing down to only the most essential projects. Statewide, it has postponed 34 landscaping projects, 26 that would have been planted this year. The department has also eliminated watering grass, including at all state rest stops, unless recycled water is used.

In addition, Caltrans is working closely with local water providers to ensure the department complies with all local conservation plans and adheres to any additional local actions or reduction requirements. The department received almost \$800,000 in local water conservation rebates for its efforts to reduce water use and upgrade equipment.

As it looks for more ways to cut water, Caltrans must balance the need to protect the state's \$1.4 billion investment in highway planting. The plants along the roadway serve valuable functions such as reducing erosion, preventing graffiti, protecting stormwater quality, serving as a firebreak, and absorbing pollutants from the air.

## Streamlining Water Use Tracking

Another hurdle for Caltrans has been updating and improving a cumbersome and inefficient accounting and billing system to better track its water use. Each year, Caltrans receives more than 40,000 water bills from 250 water purveyors. To further complicate matters, the unit measures for water use on these bills can vary between seven different measurements. Each of these bills must also be manually typed into the electronic accounting system. With the installation of smart irrigation controllers throughout the state that automatically record water use and upgrades to its accounting system, Caltrans will soon be able to provide more timely and accurate water consumption information.

## Water Conservation and Drought Action Plan

While Caltrans has been successful at cutting water use through water-sensitive plantings and smarter irrigation practices, there is always room for improvement. To be a good steward of California's limited water resources, the department kicked off a drought action plan in February 2014. This plan lists 15 different actions for the department to take, including using recycled water for irrigation as much as possible and assigning water managers for each district throughout the state. Many of these are well underway and can be tracked on [Caltrans' Water Conservation](#) webpage.

As drought conditions in California continue over the next months and possibly longer, Caltrans is preparing to carry out further and more drastic ways to increase its water conservation efforts. Caltrans will continue to do its part to reduce water use and help fellow Californians get through the drought with as little impact as possible.

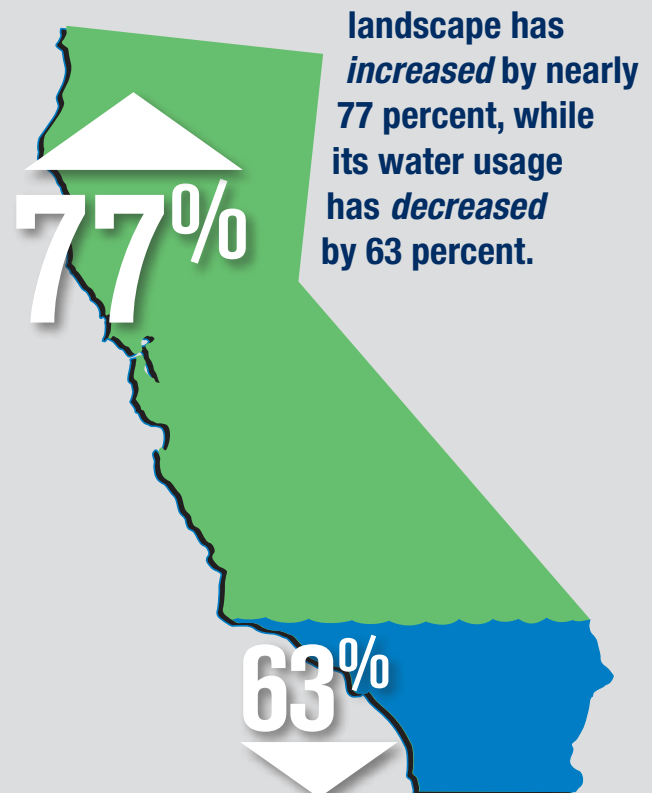
Source: Division of Design

## Caltrans Saving Water Since 1990

**In 1990, Caltrans used 13.4 billion gallons of water to irrigate 17,000 landscaped acres.**



**In 2014, Caltrans used 4.9 billion gallons of water to irrigate 30,000 landscaped acres. Over the last 24 years, Caltrans'**





# Succession Planning Half of Caltrans Could Retire Tomorrow

Caltrans has about 20,000 employees, most of which are full-time employees, and 10,301—more than half of them—are eligible to retire. If multiplied by 16 years (the average length of state service for Caltrans workers) more than 160,000 years of experience could disappear with them. As part of its move to become a more efficient and modern transportation agency, Caltrans created the Office of Enterprise Risk Management to provide various strategic business tools to Caltrans, including a strategic approach to workforce and succession planning.

Succession planning and knowledge transfer are priorities in the Office of Enterprise Risk Management because, as the graph shows, about half of Caltrans' employees are eligible to retire.

## Planning for the Future

Caltrans employees fall into five major program areas, with approximately 400 classifications and 12 bargaining units. Their years of experience are nearly as valuable as the employees themselves, and lessening the effects of their loss is the crux of the Office of Enterprise Risk Management's Workforce Planning Unit. With such a large, diverse, and multidimensional labor pool, workforce planning identifies human resource requirements and develops strategies to meet those needs, and in turn, ensures that Caltrans' strategic plan goals can be achieved.

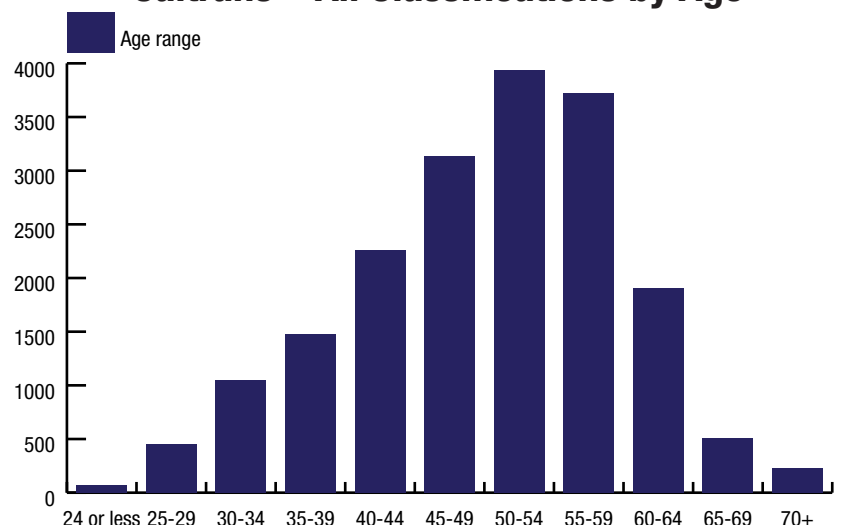
Workforce planning means having the right number of people, with the right skills, working in the right jobs at the right time. Succession planning is an important subset of workforce planning that focuses on having the right leadership in place at every level of the organization.

### *Workforce planning:*

- Provides strategies and tools to analyze current workforce composition.
- Enables proactive planning to address changes in future workforce requirements.
- Highlights the critical need for strategies to transfer knowledge—before that knowledge is lost to employee retirements.
- Encourages early and continuous development of existing and newly hired staff.
- Ensures that recruitment resources are used more efficiently.
- Emphasizes adopting employee retention and workplace of choice policies.

Workforce planning develops Caltrans' most valuable resource—its employees. It identifies emerging risks and finds solutions, continually refining practices and processes. Doing so secures a properly trained and efficient workforce into perpetuity and aligns with Caltrans' mission, vision, goals, and values. Workforce planning contributes to the department's performance and provides management with a way to align the workforce with a business plan, anticipate changes, and address current and future workforce issues.

### Caltrans – All Classifications by Age



## Challenges

Despite Caltrans progressive efforts with workforce and succession planning, challenges remain. One of the reasons the department is able to accomplish its worthwhile public projects efficiently may also limit it in achieving workforce-planning solutions—namely, its size. Although its workforce population has been declining in the last few years, Caltrans is still the nation's largest transportation department, with approximately 20,000 full- and part-time employees. Of those 20,000, about one third are engineers, another third maintenance employees, and the remaining third a blend of administrative and transportation professionals, clerical, and skilled trades classifications. Caltrans' priority has historically been and continues to be delivering projects as efficiently as possible. With its new strategic plan, Caltrans endeavors to make it possible for supervisors to balance operational needs with workforce planning.

The civil service classification and hiring system ensures merit and excellence in employment, but it presents challenges to finding workforce-planning solutions. Caltrans uses at least 400 of the roughly 4,000 established statewide classifications. While the California Department of Human Resources has made strides toward consolidating classifications, the efforts have been incremental. Specifications for many job classifications are outdated, making it difficult to hire the right person for the right job. Furthermore, the application and examination processes are detailed and can be difficult for the average person to understand.

Employee transfer data from external departments plays a significant part in workforce planning efforts. Without access to statewide employee movement data, it is challenging for workforce planning staff and line supervisors to track employee movement between state agencies. This delays the workforce planning processes

and forces managers to make evaluations based on retirement and resignation data, without including transfer information. Caltrans has been working with the California Department of Human Resources to develop a way to track intrastate employee transfers.

A recent audit by the California State Auditor tasked Caltrans with improving certain areas of workforce and succession planning to ensure our current and future leadership remains healthy and sustainable.

The State Auditor's comments focus on four main areas of change:

- Creating a single, unified workforce plan, updated annually.
- Developing quantifiable measurements to track progress and performance.
- Creating processes that evaluate the effectiveness of workforce planning processes.
- Designating a single point to monitor pertinent workforce planning trends and with the authority to apply solutions in each program area.

These challenges are also opportunities for Caltrans to improve and propel into a successful and prosperous future.

## The Future

Caltrans' Office of Enterprise Risk Management, Workforce Planning Unit, held its first Workforce Planning Quarterly Forum in January 2015. Functioning in part as an in-house round table, the forums focus on different divisions and programs coming together to discuss all aspects of workforce planning that have become a





## Caltrans Knowledge Transfer Foundational Building Blocks



pressing issue in their respective areas. Bringing different programs together creates a cohesive culture as the forums help employees see things from other perspectives and relate their role and contribution to Caltrans' mission and vision. Participants share past successes, future goals, and potential solutions from approaching challenges, as each of Caltrans' programs are uniquely different but share many similarities.

In addition to the State Auditor's suggestions, the Workforce Planning Unit instituted its own performance measures to track progress and refine the workforce planning process, including updating all workforce plans, engaging all occupational groups, and producing at least one new workforce plan solution per occupational

group. The [Knowledge Transfer Guidebook](#) is also being updated. This user-friendly and critical tool offers helpful and practical tips on knowledge transfer techniques for supervisor and employee alike, helping each stay connected and cross-trained.

Organizational Excellence, Goal 5 of the [Caltrans Strategic Management Plan](#), aims to develop and cultivate the premiere transportation workforce in the country. The Workforce Planning Office is helping Caltrans achieve this goal. Asking employees to share their thoughts and opinions is a critical step in organizational excellence. In May 2015, the department conducted a survey in support of the Organizational Excellence goal. The survey included several questions to gauge employee awareness of and involvement with workforce and succession planning, career development, training courses, and knowledge transfer. Caltrans is analyzing the survey results and will use the information to address the State Auditor's comments, incorporate best practices, and form a baseline from which to measure its work-force planning progress.

Caltrans leadership has been engaging in multiple national transportation organizations, bringing exposure and collaboration to the necessity of workforce planning by participating in a Transportation Research Board Task Force for Knowledge Management, serving on a National Cooperative Highway Research Plan (NCHRP) panel to create a Knowledge Management "primer" for state departments of transportation. Caltrans also recently completed its part in national survey for the NCHRP that focused on all levels of knowledge transfer and management within several state departments of transportation, allowing the organization to recognize trends and patterns, forecast strengths and weaknesses, and continue to refine knowledge transfer best practices.

In spearheading the knowledge transfer movement at Caltrans, employees are able to share their skills and their insight from their current position through the department's employee intranet, as well as through direct interaction in their work unit. Sharing institutional expertise is one of the most effective ways to engage in knowledge transfer.

Caltrans is working to ensure knowledge from experienced employees who may soon retire is transferred to the employees who will be the department's future.

Source: Office of Enterprise Risk Management



# Caltrans Late Payment Penalties Continue to Drop

Time is money—especially when it comes to penalties for late payments. The California Prompt Payment Act requires state departments to calculate and pay late payment penalties if they fail to pay properly submitted, undisputed invoices or grants. By measuring the interest penalties that Caltrans issues each fiscal year, the department is able to determine if it is effectively meeting its financial obligations and being good stewards of taxpayer dollars.

When payments are made on time, Caltrans can use its budgeted funds for goods and services that help accomplish the department's goals. Paying interest penalties reduces Caltrans' available resources that can be used for tangible items.

## **Caltrans' Goal is Zero Late Payment Penalties**

Caltrans has a goal to pay \$0 in interest penalties and tracks its total expenditures for late payment penalties. The amount is reported each fiscal year to the California Department of General Services. The on-time passage of a state budget for each of the past three fiscal years has helped Caltrans pay their obligations on time and minimize interest penalties. In the past three fiscal years, the penalties Caltrans paid represent a tiny proportion of its overall payments—less than one-hundredth of a percent.



## Prompt Payment Act Interest Penalties Paid

Fiscal Year	Total Payments in Billions	Total Invoices Paid	Number of Late Invoices	Penalty Amount Paid
2004-05	\$4.50	809,790	834	<b>\$257,897</b>
2005-06	\$5.30	861,843	1,110	<b>\$238,150</b>
2006-07	\$6.40	866,605	1,696	<b>\$398,261</b>
2007-08	\$6.50	875,433	2,466	<b>\$529,922</b>
2008-09	\$7.10	860,296	2,678	<b>\$468,083</b>
2009-10	\$6.20	823,728	1,645	<b>\$477,869</b>
2010-11*	\$7.10	742,792	2,456	<b>\$1,050,209</b>
2011-12	\$7.80	916,894	529	<b>\$122,072</b>
2012-13	\$7.80	928,632	242	<b>\$89,197</b>
2013-14	\$8.40	929,653	240	<b>\$46,165</b>

\* Fiscal year 2010-11 reflects a spike in interest penalties due to two factors:

(1) California's budget was enacted on October 5, 2010, rather than June 30, 2010, and (2) Caltrans transitioned to a new financial management system.

## Annual Rebates

Year	Cal-Card Rebates
2004	<b>\$34,256.56</b>
2005	<b>\$54,643.94</b>
2006	<b>\$53,689.52</b>
2007	<b>\$258,946.22</b>
2008	<b>\$311,268.96</b>
2009	<b>\$247,610.77</b>
2010	<b>\$167,503.59</b>
2011	<b>\$289,666.40</b>
2012	<b>\$390,709.47</b>
2013	<b>\$324,733.11</b>
2014	<b>\$302,178.53</b>

*Every year, Caltrans  
pays an average of  
867,000 invoices  
worth \$7.5 billion  
to vendors and  
contractors, and  
pays more than  
99.99 percent of its  
invoices on time.*

Consistent on-time state budgets have contributed to reductions in Caltrans' late penalties. This pattern has enabled Caltrans to focus on monitoring and communication that has resulted in improved timely payments. In addition, Caltrans' reductions in late interest penalties has also benefited from lower interest rates upon which the penalty payments are based.

There are rewards for Caltrans making prompt payments. Because of its success in making timely payments, Caltrans has received bank rebates. Over the last three years, these rebates have totaled more than \$1 million.

## Communication is Vital to Success

Managing the resources of a department the size of Caltrans requires sound business processes, effective financial tools, and trained staff who understand the importance of paying vendors on time. All Caltrans employees who request, receive, and approve invoices for services and goods play an active role to meeting the department's stewardship goals.

Caltrans' Division of Accounting and Division of Procurement and Contracts work together to communicate and train staff on the importance of the Prompt Payment Act. The Division of Accounting offers prompt payment training to ensure staff know the timelines to review and issue a payment and the interest penalty if vendors are not paid on time. Caltrans' Division of Procurement and Contracts communicates the importance of this information in its contract manager training. The Division of Accounting measures the amount of interest penalties paid and communicates this information statewide to Caltrans management, resource managers, and budget representatives.

Source: Division of Accounting

# Never Too Old for Change



**In recent years, Caltrans has used “innovative delivery” to build transportation projects faster and at lower costs.** Innovative delivery is an industry term for nonstandard ways of delivering projects, but often refers to the construction manager/general contractor, also called CMGC, and design-build methods of delivery. Innovative delivery methods will not work for every project, but they are showing promise that they can be effective for appropriately selected projects.

## Progress So Far

Caltrans has long relied on design-bid-build delivery. Its manuals and processes speak mostly to that method. So Caltrans has provided innovative delivery training, created new processes where needed, and used existing processes where possible. Caltrans has begun to achieve what it set out to do for the design-build program, which was to capture innovation and speed delivery of projects. Early projects, however, were not delivered faster. Later projects appear to be faring better. Caltrans will continue to evaluate these innovative delivery techniques to determine where and when these tools are best used.

## Why Innovative Delivery?

Projects using innovative delivery methods are funded the same way as any other Caltrans project, through the State Highway Operation and Protection Program, the State Transportation Improvement Program, or with local funds. Innovative delivery methods can bring new ideas and new processes to a project, allow a project to be delivered faster, lessen the risks associated with the project, transfer appropriate risks to the contractor, and help avoid cost overruns.

## Design-Build and CMGC

Under Caltrans’ standard design-bid-build method, the department is responsible for 100 percent of the design. Once the plans, specifications and estimates are complete, the project is advertised and contractors make their bids. The lowest responsible bidder is awarded the contract and builds the project.



With the design-build delivery method, a contract for both final design and construction is awarded to a single entity. In 2009, the California Legislature authorized Caltrans to use design-build on as many as 10 transportation projects. Caltrans is wrapping up that first set of design-build projects, and the Legislature has authorized as many as 10 more in the next decade. The department will assess what worked on the first set of design-build projects and what did not work and apply what it learned to the next set of projects.

The CMGC delivery method allows Caltrans to engage a construction manager during the design process to garner their construction expertise to develop a more efficient design. At an agreed upon point, Caltrans and the construction manager negotiate a price to construct the project, and the construction manager becomes the general contractor.

***Caltrans selected six projects for the new CMGC pilot delivery method:***

- The [Ferguson Slide Restoration project](#) will reopen and restore full access to a slide-damaged section of State Route 140, eliminating detours and giving travelers a direct route to Yosemite National Park and other destinations along SR-140. Construction began in March 2015.
- Caltrans has awarded the project and plans to start construction in December 2015 on a realignment of State Route 99 in Fresno County to accommodate high-speed rail.
- A contract to remove the foundations of the old San Francisco–Oakland Bay Bridge was awarded in August 2014, and Caltrans is working with the construction manager to design the demolition strategy. The first construction contract for this project was awarded in April 2015, and construction began the next month.
- A project to add 14 miles of carpool lanes on Interstate 5 in San Diego will also improve transit and restore a coastal lagoon.
- The fifth project will reconstruct the Barton Road Interchange on Interstate 215 in San Bernardino County.
- Caltrans has selected the construction manager for the sixth and final project to widen State Route 58 in San Bernardino County from a two-lane conventional highway to a four-lane expressway.

## Savings to Date

Design-build has achieved both time and cost savings. The earlier projects did not achieve the anticipated savings due to the time it took to start the program. The later projects, however, have achieved significant time savings, such as projects awarded up to 27 months earlier and the potential for completing projects up to 11 months earlier using design-build. Cost savings to date have been primarily due to innovation using alternative technical concepts. Alternative

technical concepts are proposed changes to Caltrans' supplied basic configurations, design criteria, or construction criteria that provide a solution that is equal to or better than the requirements in the request for proposals. Caltrans achieved an average cost savings of 13.8 percent, or \$142 million, through innovative ideas proposed during the procurement of the design-build projects.

For CMGC, it is too early to tell whether Caltrans will achieve time or cost savings, or both. The department will not know definitively until the projects are complete, although, it does appear that Caltrans is on track to achieve savings in both time and costs.

The design-build and CMGC delivery programs have helped Caltrans learn how to use these methods and on which projects. Having more options in its project delivery toolbox helps Caltrans match the strengths and weaknesses of each option with appropriate projects. Pilot project delivery methods like CMGC allow Caltrans to tap into the talents of its contractors and strengthen its partnerships. As the projects are completed, Caltrans will need to continue to collect best practices and incorporate those practices into future projects.

*Source: Division of Design*



# Sustainable Signs **Shine** Without Electricity



Caltrans is replacing its lighted green-background highway signs with retroreflective signs that, in most applications, require no electricity because they are fully illuminated solely by headlights. The new signs require no catwalks to replace burned-out bulbs. This saves money, reduces risks to workers, and decreases opportunities for graffiti and copper-wire theft.

The new signs use high-performance retroreflective sheeting for both the background and the text. Retroreflective materials bounce light from vehicle headlights back to drivers' eyes, making the signs appear brighter and easier to read. Caltrans anticipates these sign sheeting products will last 20 years or longer.

## More than a Half a Million Signs Aren't Cheap

California's highway system has more than 600,000 signs. For fiscal year 2014–15, the State Highway and Operation Protection Program will invest about \$89 million for approximately 15 projects that will replace about 1,800 old signs with new high-performance ones. In fiscal year 2016–17, an additional \$28 million will replace obsolete signs in two projects in the San Diego region.

Source: Division of Traffic Operations



## *From the Caltrans Archives*

Hollywood's intersection of Cahuenga Boulevard (foreground and to the left) and Highland Avenue to the right in June 1940.





# When Timing is Set in Stone

“Get in, get out and stay out” is the name of the game when it comes to major projects on busy highways. Repair and rehabilitation needs to be done as quickly as possible and last as long as possible. Engineers kept that in mind as they planned major repairs for a 1960s-era box girder bridge on Interstate 280 in San Francisco. It was the planning and preconstruction testing that made all the difference.

## Project Description

Engineers had to decide whether to close the viaduct completely or to conduct their work in stages. Staged construction, which would have allowed constant, if partial, traffic flow could have taken 140 working days, put workers at risk, and caused serious traffic jams. They concluded it was better to completely close a portion of the viaduct and do an entire hinge during consecutive shifts, adding up to approximately 100 hours.

To minimize commuter disruption, the work was scheduled around three separate three-day holiday weekends: Memorial Day, Fourth of July, and Labor Day 2014. For each of the closures, work began on the day preceding the weekend and finished in the early morning hours of the day immediately following the weekend. Using lessons learned from the two earlier weekend closures, two hinges were done during the Labor Day weekend.

## Unconventional Concrete

To stay within the 100-hour work window, the project development team proposed using Rapid Strength Concrete, in lieu of Portland Cement Concrete (PCC), to reconstruct the hinges. Rapid Strength Concrete could attain the design concrete strength in four hours, rather than the conventional 28 days for PCC, allowing the complete reconstruction of a hinge, from demolition to striping, within the 100-hour closure.

Rapid Strength Concrete was the solution for “getting in and getting out” during the extended holiday weekends. However, this project was the first time this type of concrete was used on a bridge application of this magnitude. The contractor was required to do a mock-up test before construction, simulating the entire concrete placement operation from material to forms to the equipment used, to ensure that the concrete would attain the design strength of 3,200 pounds per square inch in four hours.







There are always inherent risks associated with partial-bridge demolition and reconstruction, and there was great uncertainty during the first weekend closure, knowing that the structure had to be returned to traffic by 5 a.m. for the first commute day after the holiday weekend. The risks of demolishing a portion of a structure (10 feet on each side of the hinge was removed) were that the methods, equipment, and techniques used could damage the remaining portion of the bridge beyond repair. The contractor was required to submit a demolition plan that addressed these possibilities. There was also a danger that once the hinge was removed, the adjacent spans would be unloaded and sag, or worse, collapse. Temporary supports built before the demolition were the solution, and they were monitored and adjusted as needed during the entire process.

Based on research of archived “as-built” drawings it was found that some of the existing rebar that was to be spliced did not match contract drawings. Anticipating this, extra reinforcement of all sizes and extra mechanical couplers were brought on site along with a mechanical reinforcement bending table. Reinforcement cages for the hinge diaphragms were prefabricated. During the demolition and reconstruction, the structure was monitored and surveyed continuously at multiple locations for any lateral or vertical movement. Adjustments were made as necessary during demolition and prior to concrete placement.

Although the closures were scheduled during holiday weekends, there were still traffic impacts to consider. The public was notified weeks in advance of the weekend closures through changeable message signs and highway signs. Caltrans’ District 4 Bay Area office also effectively used traditional media outlets and social media to get out the message. Outreach to the communities resulted in no adverse reactions from the public during the weekend closures.

## Lessons Learned

This project was a good example of intelligent risk taking. In the interest of the public and the project, the team collaborated to find solutions that were well thought out, carefully planned, tested, included back-up plans and contingencies, reduced costs, and increased safety. Every possibility was considered and countered to ensure the benefits gained in theory came to fruition in practice. Excellent partnerships with the City of San Francisco, the California Highway Patrol, Bay Area media groups, and the public translated into success for this project.

*Source: Caltrans District 4*



**BE ALERT,  
MY DAD'S AT WORK.**



# Caltrans Districts

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State of California

**Brian P. Kelly**  
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Caltrans Social Media  
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Reports to the California Legislature  
<http://www.dot.ca.gov/reports-legislature.htm>

2013 10-Year SHOPP Plan  
[http://www.dot.ca.gov/hq/transprog/SHOPP/prior\\_shopp\\_documents/10yr\\_SHOPP\\_Plan/2013\\_Ten\\_Year\\_SHOPP\\_Plan.pdf](http://www.dot.ca.gov/hq/transprog/SHOPP/prior_shopp_documents/10yr_SHOPP_Plan/2013_Ten_Year_SHOPP_Plan.pdf)

Division of Maintenance  
<http://www.dot.ca.gov/hq/maint>

Complete Streets Program  
[http://www.dot.ca.gov/hq/tpp/offices/ocp/complete\\_streets.html](http://www.dot.ca.gov/hq/tpp/offices/ocp/complete_streets.html)

Smart Mobility Framework  
<http://www.dot.ca.gov/hq/tpp/offices/ocp/smf.html>

Freight Mobility Plan  
<http://dot.ca.gov/hq/tpp/offices/ogm/cfmp.html>

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