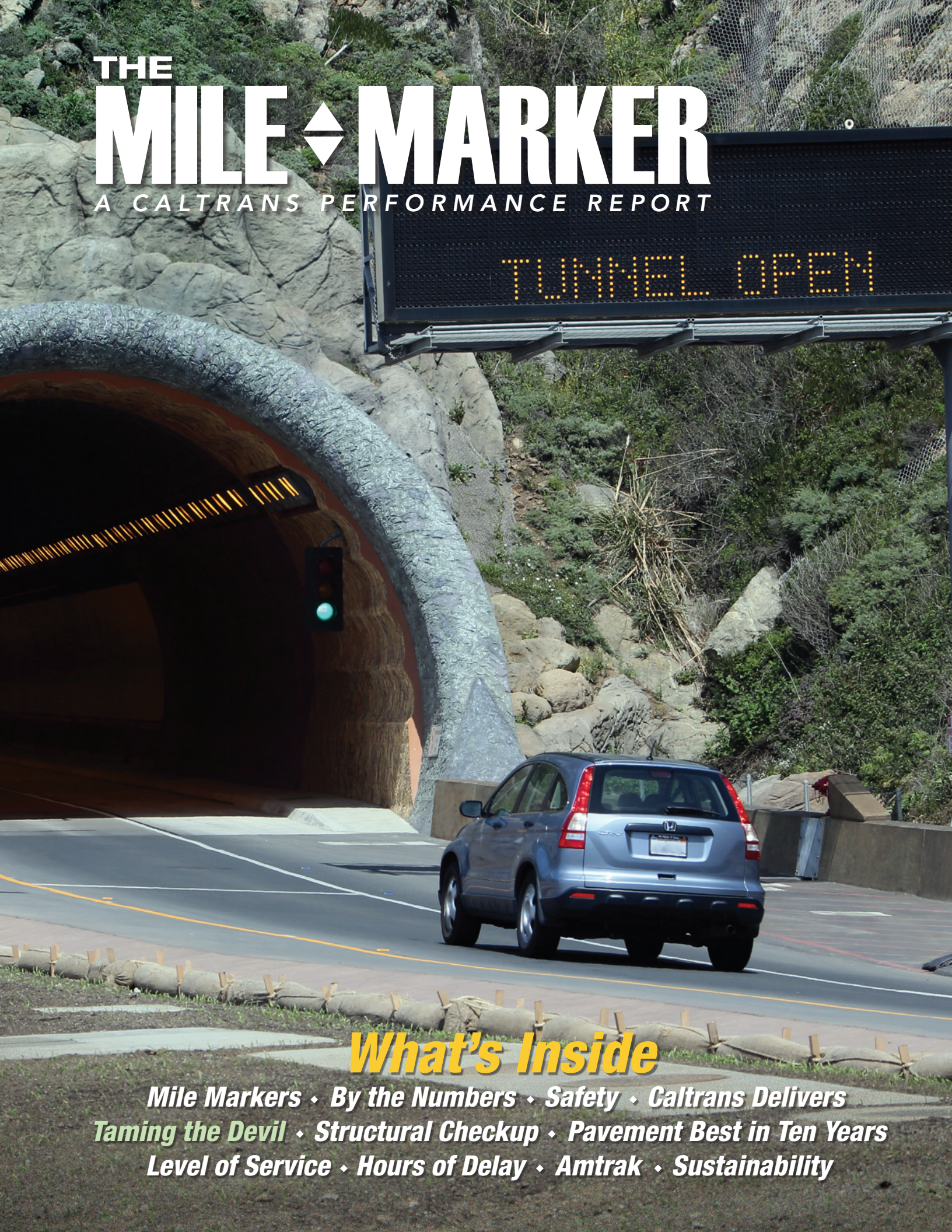
THE MILE MARKER

A CALTRANS PERFORMANCE REPORT



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Mile Markers • By the Numbers • Safety • Caltrans Delivers
Taming the Devil • Structural Checkup • Pavement Best in Ten Years
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On the cover: In March 2013, Caltrans opened tunnels on State Route 1 at Devil's Slide, in San Mateo County, the state's newest tunnels in nearly 50 years.

This page: The scenic roadway on the California coastline was vulnerable to rockslides that often closed the highway. The new tunnels, pictured in the center, provide a safe and reliable route for travelers.

Message From The Caltrans Director

This is the first issue of the *The Mile Marker: A Caltrans Performance Report*, a plain-language, multimedia accounting of the California Department of Transportation. *The Mile Marker* is reform. It raises the bar on transparency and accountability, providing in one place a clear way to communicate our performance.

Caltrans this year will provide 24 specific reports to the state legislature. Some of them are complicated and include reams of data that can be difficult to decipher. *The Mile Marker* is different. It delivers information that policy experts want in plain language and clear illustrations. The report is written for anyone who wants to know how well the Department of Transportation does its job.

This report is a natural extension of reforms I began since being appointed the director of Caltrans. It addresses ongoing efforts and improvements coming from my departmentwide Program Review. The report was prompted by the secretary of the California State Transportation Agency and the chair of the Senate Transportation and Housing Committee. It also addresses input from various transportation stakeholders to ensure transparency of the department's operations.

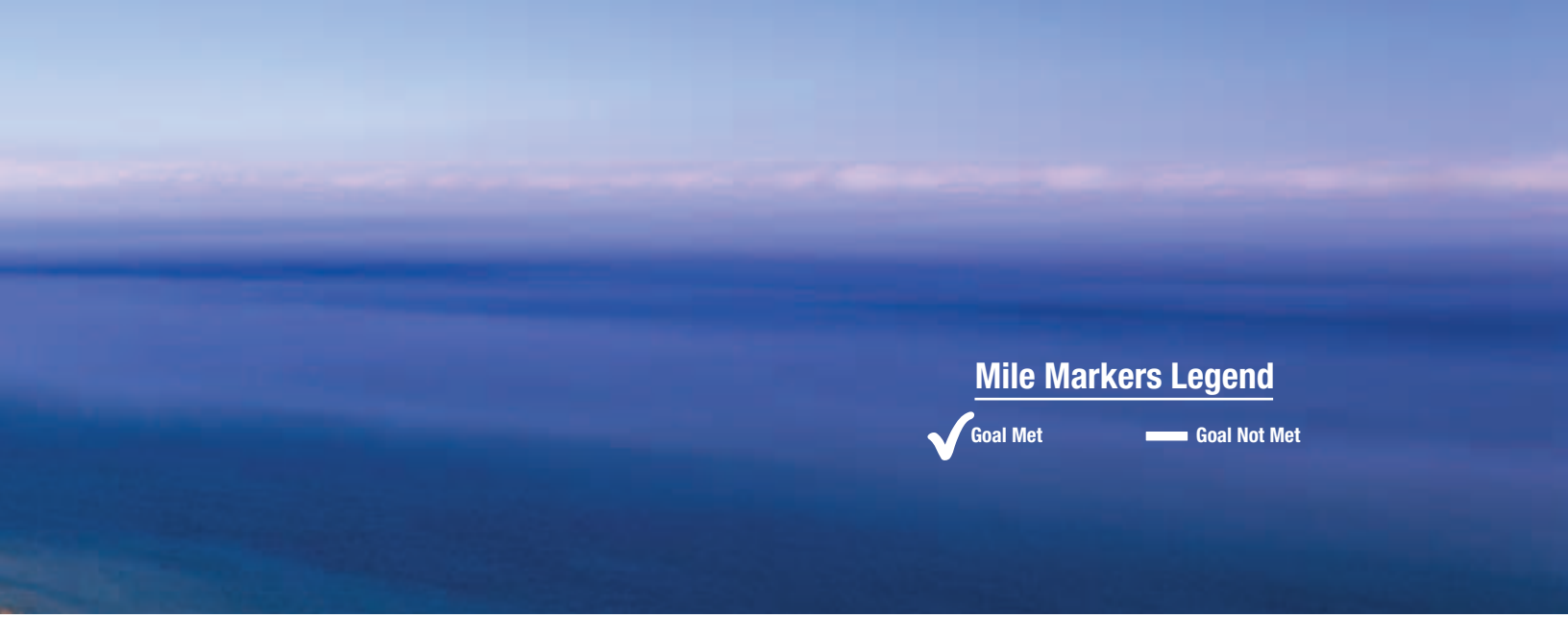
Performance reporting—the clear measurement of government activity—is a growing trend among transportation departments around the country. The federal Moving Ahead for Progress in the 21st Century program specifically calls for performance measurements. *The Mile Marker* will be the tool with which we communicate our performance results with policymakers, the media, and the public.

This first report does not pretend to be anything but a start, a beginning on a road that will lead to greater transparency and real accountability. As we develop this process and this report, *The Mile Marker* will grow, adding relevant measurements that can be monitored over time, so that the performance of the department and the condition of California's transportation infrastructure can be plainly understood.

I hope you find this first issue useful, and I look forward to your comments and suggestions.

Malcolm Dougherty

Performance Measure	Previous Period	Current Period	Goal	Goal Met	Five-Year Trend (unless otherwise noted)	Desired Trend
SAFETY						
Number of fatal accidents in 2011, on the California state highway system, for every 100 million vehicle miles traveled.	0.64	0.66	1.0 or less	✓		↓
Number of work-related injuries and illnesses per 200,000 employee hours.	7.10	6.83	6.09	—		↓
MOBILITY						
Total train and bus revenue for Amtrak California for federal fiscal year 2013 resulted in a 1.8 percent increase over the prior year.	$134.8M	$137.3M	$140.6M	—		↑
Amtrak California ridership (in millions) for calendar year 2012.	5.5	5.6	6.1	—		↑
STEWARDSHIP/SUSTAINABILITY						
Percentage of Caltrans' total annual state expenditure that went to small businesses.	23.53	21.6	25	—		↑
Percentage of Caltrans' total annual state expenditure that went to disabled veteran business enterprises.	4.04	1.96	5	—		↑
Percentage of Caltrans' total annual flexible pavement placed, consisting of rubberized hot-mix asphalt, which uses recycled tires.	35.9	29.2	25	✓		↑



Performance Measure	Previous Period	Current Period	Goal	Goal Met	Five-Year Trend (unless otherwise noted)	Desired Trend
DELIVERY						
Percentage of planned projects delivered on schedule and ready for construction in fiscal year 2012–13.	99	98	100	—		↑
Percentage of project awards not exceeding more than 10 percent of the estimate in fiscal year 2012–13.	86	82	100	—		↑
Percentage of planned project approval/ environmental documents delivered in fiscal year 2012–13.	93	88	90	—		↑
MAINTENANCE						
The fiscal year 2012–13 overall maintenance roadway service score, on a scale of 0–100, with 100 being the best.	87	85	87	—		↑
Percentage of state highway system pavement that is healthy. Caltrans' goal is expected to be reached by 2023.	75	84	90	—		↑
Overall condition of California's bridges on a scale of 0–100, with 100 being the best.	95.3	95.6	94	✓		↑
Percentage of Caltrans' vehicle detectors that are "good" or functioning properly.	65.2	64.6	70	—		↑
Level-of-service score for highway litter and debris collected statewide for fiscal year 2012–13.	85	84	80	✓		↑

Caltrans®

Number of lane miles in the state highway system .. **50,486**

Number of state highway system centerline miles ... **15,133**

Number of state highways **265**

Annual vehicle miles traveled on all public roads ..... **325 billion**

Number of state-owned bridges and other structures **13,063**

Number of carpool vehicle-lane miles in California. This is more than 40 percent of the nation's total carpool lanes ..... nearly **1,600**

Number of carpool vehicle miles traveled, in billions, in California.....**3.54**

Number of potholes Caltrans has repaired over the last five years, at a cost of $29.9M..... **584,262**

Photo: A highway worker carries lumber toward a helicopter bucket during the U.S. Highway 395 widening project.

By The Numbers

Number of construction projects that Caltrans completed in fiscal year 2012–13..... **542**

Percentage of national transportation funds California received in federal fiscal year 2013, or $3.4B..... **9.43**

Amount California's annual base fuel tax revenues have decreased since 2006..... **$344M**

Statewide total time spent in delayed traffic, in 2012, in millions of hours, at up to 35 miles per hour..... **93.7**

Tons of greenhouse gas emissions Caltrans or our contractors have reduced annually. This is the equivalent of removing 31,000 cars from the road **161,079**

Caltrans fleet size in 2013, a reduction of 1,324 since 2011 ..... **12,137**

Number of Caltrans structures statewide on which we have installed solar panels, between late 2009 and early 2013 ..... **70**

Amount Caltrans expects to save with our solar energy systems..... **$4.3M**

Number of vehicle charging stations Caltrans is installing statewide to accommodate our 2013 purchase of electric vehicles **33**

Level-of-service score for highway litter and debris collected statewide for fiscal year 2012–13. Our goal was 80..... **84**

Roadway striping score for fiscal year 2012–13. Our goal was 95..... **87**

Level-of-service score for guardrails for fiscal year 2012–13. Our goal was 95 ..... **92**

Overall level-of-service score for roadway condition for fiscal year 2012–13. Our statewide goal was 87..... **85**

Number of California public-use airports that Caltrans regularly inspects for safety and permit compliance..... **245**

Number of hospital heliports that Caltrans regularly inspects for safety and permit compliance..... **177**

Amount Caltrans awarded, from the State Bicycle Transportation Account, to bike projects over the last five years **$40.7M**

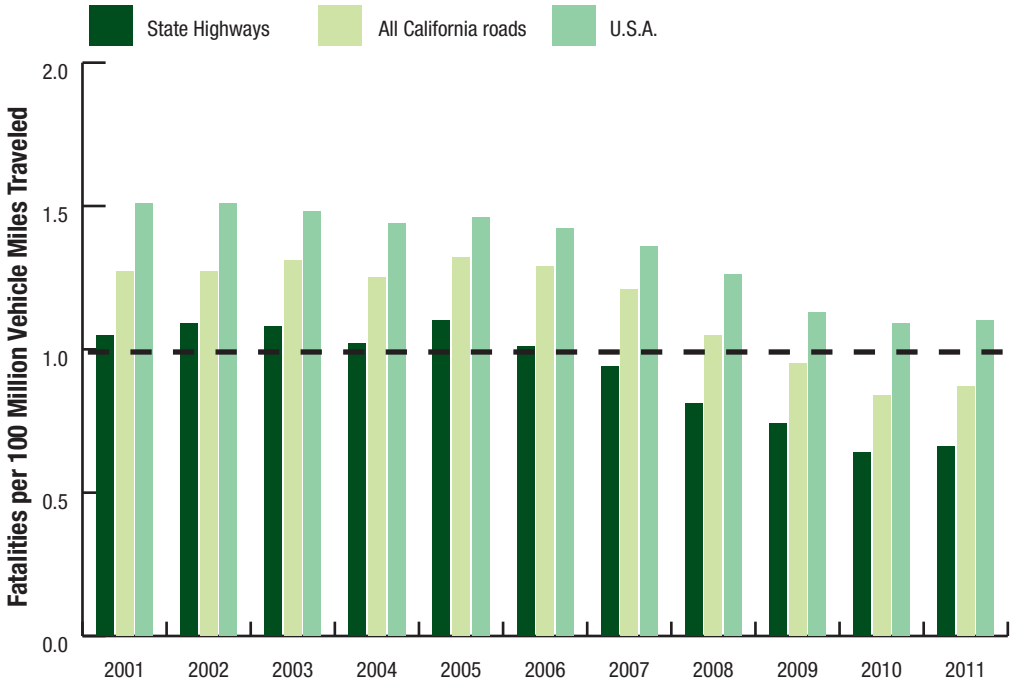
Caltrans' No.1 GOAL is Safety For Workers and Motorists

Caltrans has a goal of reducing fatalities to zero on California's state highways. Caltrans measures safety on the state highway system by reviewing and tracking fatal accidents and comparing them to the national average. The chart below shows that California's state highway fatality rate is lower than the national average and lower than the national goal of less than one death for every 100 million vehicle miles traveled.

Caltrans also tracks the number of work-related employee fatalities and has a goal of no work-related employee deaths. Since 1924, Caltrans has lost 180 of its employees on the job. One of the biggest hazards is motorists who do not exercise caution while driving near highway workers. Caltrans works to change motorists' behavior through its *Slow for the Cone Zone* and *Move Over* campaigns.

In 2012 Caltrans had no work-related deaths. In April 2013, however, two workers died in a rock-scaling accident.

Fatalities on the California State Highway System



Data Sources: National Highway Traffic Safety Administration and Division of Traffic Operations
Note: Data is by calendar year

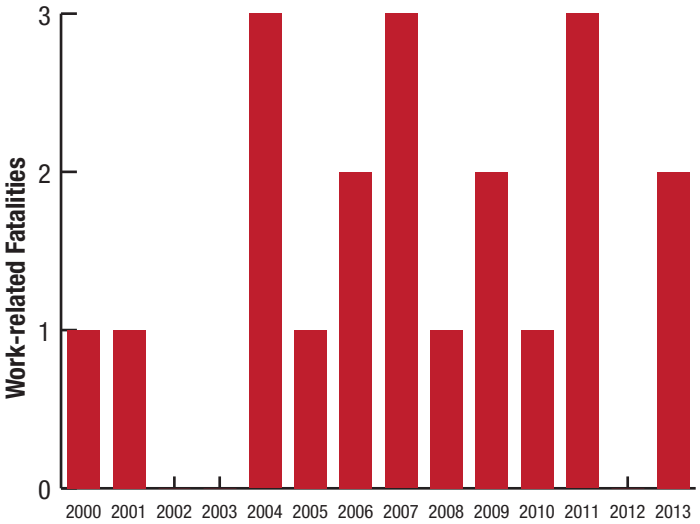
California is among the top states for safety, ranking 11th in the nation for lowest fatality rates on all public roadways. The state highway system is even safer.

In addition to work-related deaths, Caltrans measures work-related illnesses and injuries, referred to as the worker incident rate (IR). An incident is any work-related injury or illness that requires medical attention. Worker IR is an effective performance measure of our employee safety program.

For 2013, Caltrans' worker IR was 6.83 reflecting a slight decline from 7.10 the previous period. Our current goal is 6.09, and we will work to continue to reduce our worker IR each year, with a 2018 goal of 5.58 incidents for every 200,000 employee hours.

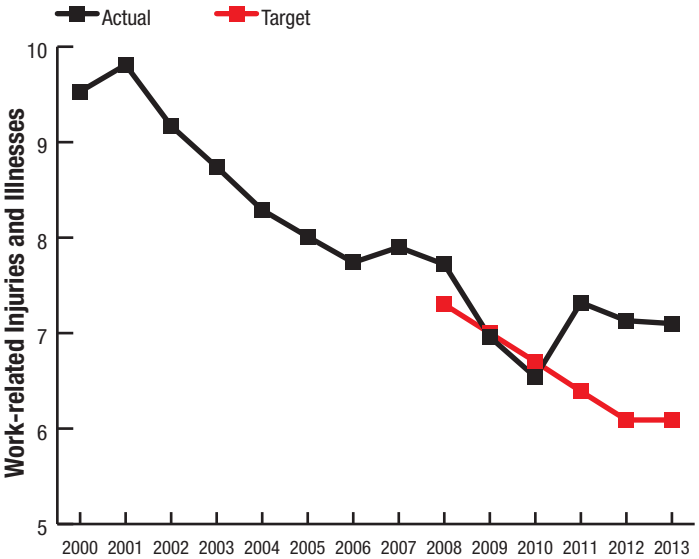
To help reduce worker IR, we have renewed our focus on worker safety, which has contributed to the decline in work-related illnesses and injuries. We have greatly enhanced our safety programs, and most recently, we have begun focusing our efforts on maintenance staff, since they sustain about 70 percent of our departmental injuries. We have also hired safety officers specialized in maintenance safety. In addition to the constant efforts of our safety officers to ensure the safety of all our employees, we are purchasing defibrillators, and placing them in Caltrans facilities.

Number of Caltrans Work-Related Fatalities



Data Source: Division of Human Resources
Note: Data is by calendar year

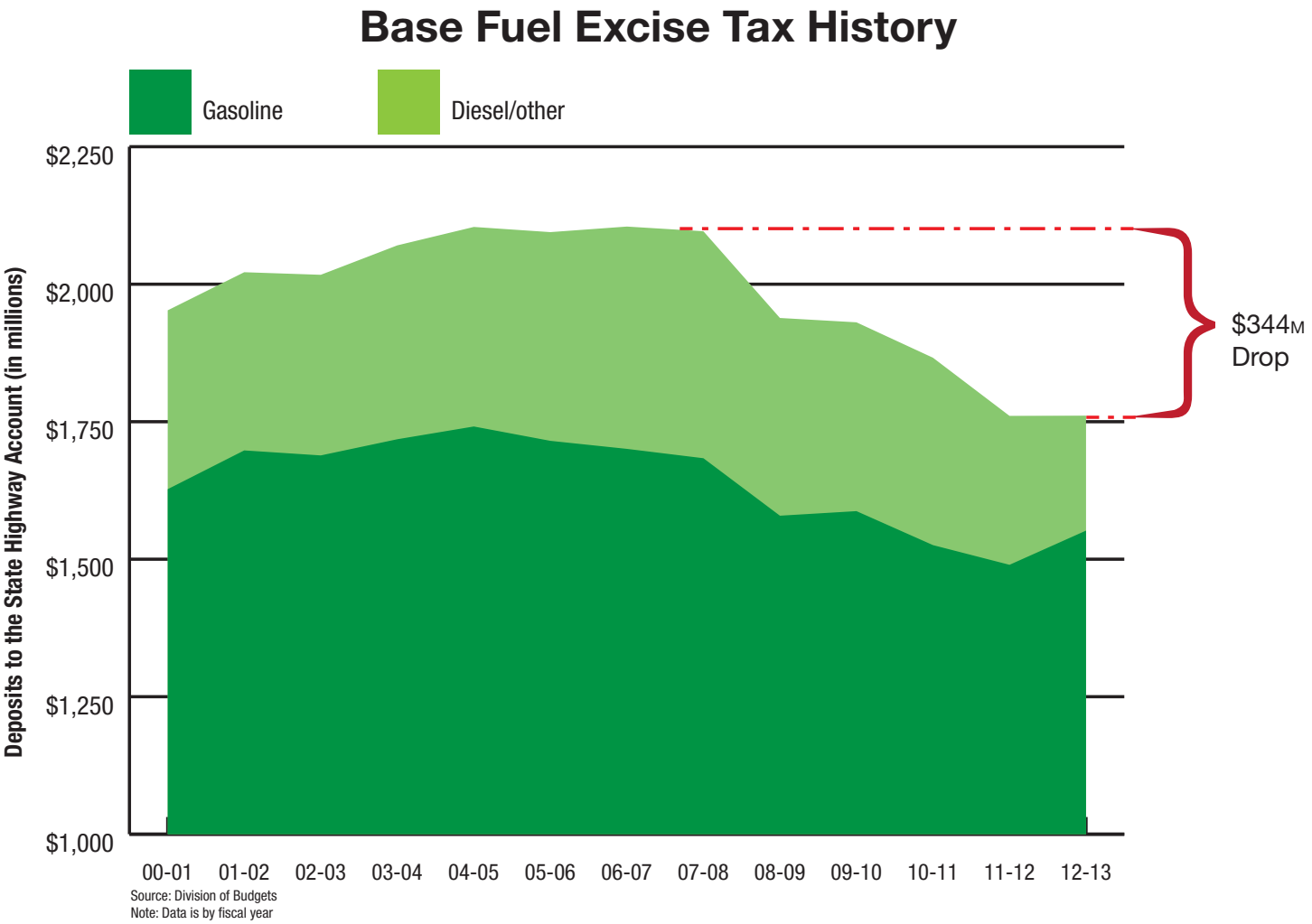
Work-Related Injuries and Illness
(per 200,000 employee hours)



Data Source: Division of Human Resources
Note: Data is by calendar year

A Caltrans highway worker looks for oncoming traffic on Interstate 80 in Sacramento. Highway workers have one of the most dangerous jobs in America.

Revenues Down $344 Million from 2006 Peak

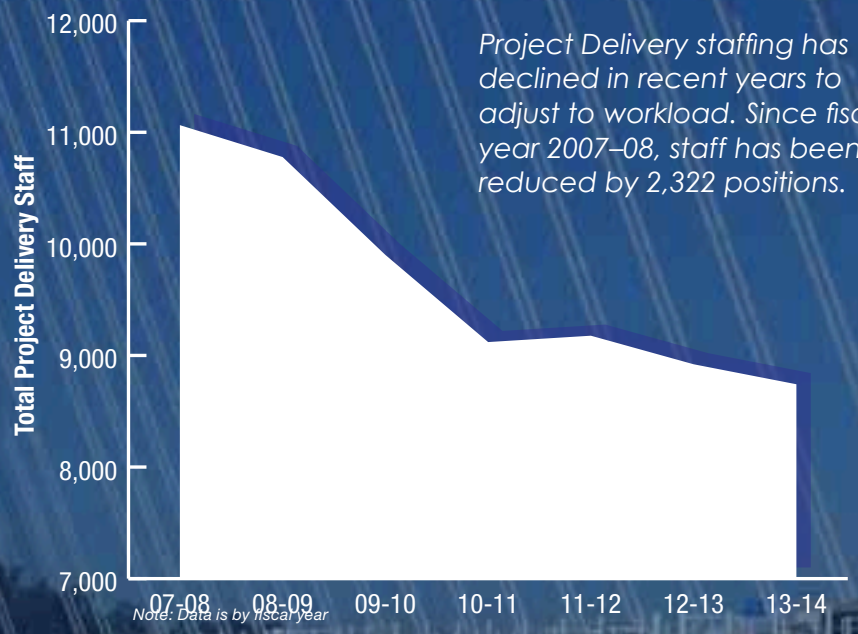


Caltrans receives funding through multiple state and federal sources. The primary source for maintenance and operation of the state highway system is the base fuel excise tax. The excise tax, unlike many other taxes, is collected on each gallon of fuel sold. The revenue collected by the state from fuel taxes has increased over the last couple of decades, but 2006 was the peak year for fuel tax revenue. Since then, fuel tax funding has declined to levels not seen since 1996. The most drastic drop occurred in fiscal year 2008–09, concurrent with the beginning of the "Great Recession"—a time when people drove less. Furthermore, vehicle emission and fuel efficiency standards have lowered fuel consumption and will likely continue the downward pressure on fuel tax funding. Even if people drive the same amount, vehicles require less and less fuel, which means less funding for transportation. While greater fuel efficiency means less air pollution, revenues are insufficient to address the needs of the state and local transportation systems. As available transportation funding decreases, difficult decisions must be made to prioritize maintenance and repair projects.

Caltrans Delivers

Caltrans Project Delivery is made up of several functional areas, which all provide a core purpose in solving transportation problems. Under the leadership of the chief engineer and the 12 district directors, the functions of project management, environmental analysis, design, right-of-way and land surveys, engineering services, and construction work together to conceive, design, and build highways, bridges, and other transportation facilities for the traveling public. All Project Delivery functions design and build projects collaboratively with stakeholders, on schedule and within budget, and adhere to all laws and regulations. Specialized and experienced staff and consultants, knowledgeable in their field, provide the best quality projects, products, and services.

Project Delivery Staff

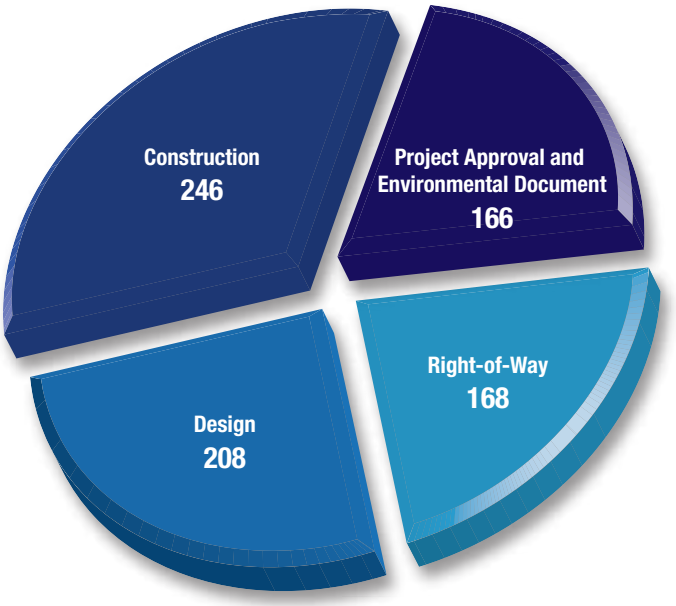


Project Delivery staffing has declined in recent years to adjust to workload. Since fiscal year 2007–08, staff has been reduced by 2,322 positions.

This 525-foot-tall tower supports the world's largest self-anchored suspension span, and is the signature element of the new San Francisco–Oakland Bay Bridge East Span.

Delivery Products by Phase

During development, transportation projects are broken into phases that have defined achievement milestones, such as environmental, right-of-way, design, and construction.



Total Deliverables (actual) - 788
Data Source: Division of Project Management

Project Approval and Environmental Document

As part of project delivery, it is important to get final approval to proceed on a project and to document environmental conditions and identify mitigation. In fiscal year 2012–13, Caltrans Project Delivery delivered project approval and environmental documents on 166 projects.

Right-of-Way

A delivery commitment is to secure and certify all necessary right-of-way requirements for all projects scheduled for delivery. In fiscal year 2012–13, Caltrans Project Delivery certified right-of-way on 168 projects.

Design

During the design phase, a complete set of plans and specifications are developed for a project. In fiscal year 2012–13, Caltrans Project Delivery completed development of plans and specification for 208 projects.

Construction

Delivery in the eyes of the public is achieved when construction is complete and the roads are open for use. In fiscal year 2012–13, Caltrans Project Delivery completed construction on 246 major State Highway Operation and Protection Program (SHOPP) and State Transportation Improvement Program (STIP) projects.

Below: Dignitaries celebrate the Caldecott Tunnel Fouth Bore punch through.

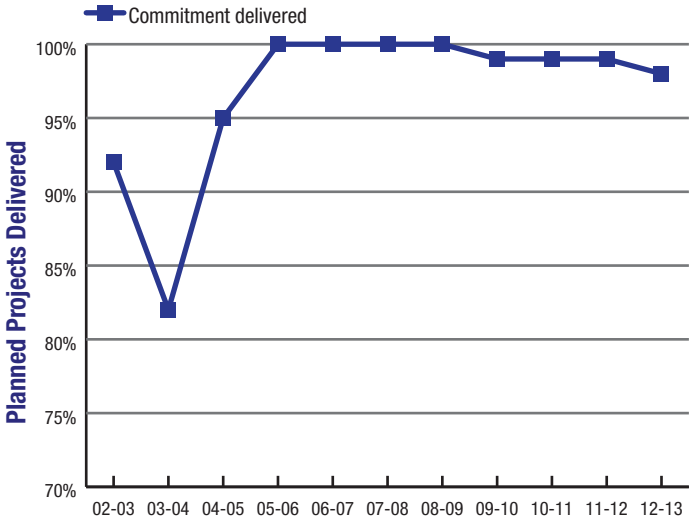
Right: Crews construct a new overcrossing at Alondra Boulevard on Interstate 5 in Los Angeles County.

Contract to Deliver

Since fiscal year 2005–06, the Caltrans Director has signed a contract with each of the department's 12 district directors, committing to deliver projects on schedule and ready for construction. This *Contract for Delivery* is Caltrans' plan for the year, and it includes major projects funded from various sources, including state, federal, and local transportation agencies.

The goal is to deliver 100 percent of the projects, and Caltrans has delivered nearly all. In fiscal year 2012–13, we committed to delivering 170 projects valued at $1.4 billion. We delivered 167, or 98 percent, of the highway construction contracts with an estimated value of $1.2 billion. The three projects that were not delivered had not secured coastal commission permits by the planned delivery dates.

Project Delivery Performance



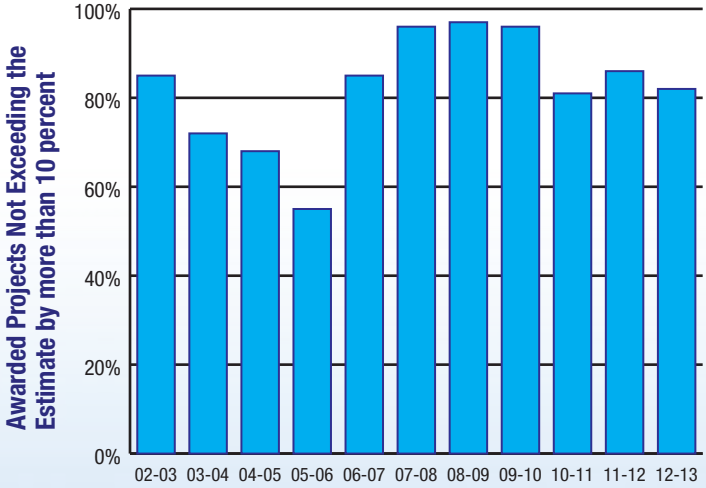
Data Source: Division of Project Management
Note: Data is by fiscal year

Managing Cost is Part of the Process

Caltrans tracks estimating performance to ensure the most effective use of transportation dollars. Engineers prepare cost estimates during the design of a project, based on the location, prices of items, and the type of work to be done. Contractors will submit bids to perform the work, and the lowest responsible and responsive bidder will be awarded the contract.

The graph (right) shows the percentage of low bids that did not exceed the engineer's project cost estimate by more than 10 percent. In fiscal year 2012–13, 82 percent of the low bids fell in this range.

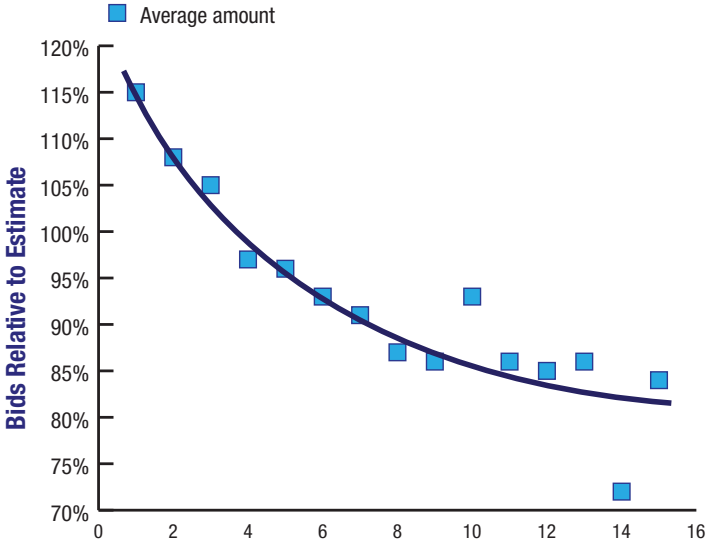
Cost Estimating Performance
Percent of Bids at or Below Target Range



Data Source: Division of Construction
Note: Data is by fiscal year

Many variables, including the number of bidders, the time of year, amount of work available, and the complexity and level of risk of a project determine the final bid amount. The following chart shows how low bids will vary with the number of bidders on a project, relative to the cost estimate.

Bids Affected by the Number of Bidders
(Low bid data from 2011 through 2013)



Data Source: Division of Engineering Services

One way Caltrans tracks and manages the total cost of delivering a project is by comparing the amount spent by our own staff to complete the design and manage the construction of a project (support cost) to the amount spent on building the actual project (capital cost). We have different support cost goals depending on the size of a project. For larger projects, we aim to have lower support to capital ratios than we do for smaller projects.

Project Cost (millions)	Support/Capital Goal	Support/Capital Results
$1-5	Less than 60%	51.1%
$5-10	Less than 45%	34.0%
$10-15	Less than 35%	28.8%
$15-25	Less than 32%	23.0%
Greater than $25	Less than 30%	26.5%

Support/Capital data for fiscal year 2012–13

Open for Business

In fiscal year 2012–13, we completed construction on 542 projects, which includes 246 major SHOPP and STIP projects, opening nearly $2.5 billion worth of infrastructure for the public. As of January 2014, Caltrans has approximately 650 projects under construction valued at more than $11 billion.

It is a great source of pride for Caltrans when we can deliver a safe, functional highway, bridge, or rest area to the public, regardless of the project size, and we strive to do so on time, and on budget.

Ongoing Construction by Year*

Project Delivery is a significant part of how we accomplish our mission of improving mobility. In the last year, we have had multiple major projects open for business, such as the new San Francisco–Oakland Bay Bridge and the fourth bore of the Caldecott Tunnel.

Data Source: Division of Project Management

** In July of the noted year*

On Interstate 80, the San Francisco–Oakland Bay Bridge has undergone a major seismic retrofit and replacement following the 1989 Loma Prieta earthquake. This vital transportation lifeline bridges the bay with a new side-by-side design with panoramic views of the San Francisco Bay and the East Bay hills. The new bridge is the longest self-anchored suspension span bridge in the world, with a length of 2,047 feet.

Caltrans works on hundreds of projects each year. As of January 2014, Caltrans has approximately 650 projects under construction valued at more than $11 billion.

The new $417 million Caldecott Tunnel Fourth Bore project, on State Route 24, provides congestion relief to residents and workers in the East Bay. The new two-lane, 3,300-foot-long tunnel ends the daily process of switching the traffic direction of the third bore to accommodate travel between Alameda and Contra Costa counties.

Our next story highlights another historic project: the new tunnels between Pacifica and Montara on State Route 1, a project we call “Devil’s Slide.”

In 2013, Caltrans opened the new Devil's Slide twin tunnels and bridges on a section of State Route 1, about 15 miles south of San Francisco. The area was notorious for road closures due to slides.

TAMING THE

by Angela Tillotson
Caltrans Research Writer

Pictured: Plastic lining helps keep water out of the tunnels during construction.

Devil

It's mesmerizing and majestic.
It's breathtaking—
and it was temperamental.

Taming the Devil

After decades-long debates between citizens, environmental groups, and government, the new Devil's Slide tunnels and bridges fix a coastal route notorious for rockslide closures.

Located in San Mateo County, on California's coastal State Route 1, *Devil's Slide* winds across California's coast between Pacifica and Montara, carved out of the steep cliff sides. Route 1 hugged the coastline across the aptly named Devil's Slide region, a steep, unstable section of highway with a long history of closures due to rockslides and land slippage.

With the Devil's Slide project, Caltrans created a safe, reliable route along California's unpredictable coastal Bay Area.

The Devil's History

It took two years for the California Division of Highways, Caltrans' predecessor, to complete the original section of State Route 1 at Devil's Slide, opening the famed stretch in 1937.

That same year, California Division of Public Works District Construction Engineer E. G. Poss boasted that before his new road, "the highway along the cliff face required men with the agility of mountain goats, courage, experience, and complete lack of nerves. One false step meant a tumble into the breakers."

But just one year later, State Route 1 at Devil's Slide experienced the first of many slide-related closures; significant slides would happen each decade thereafter.

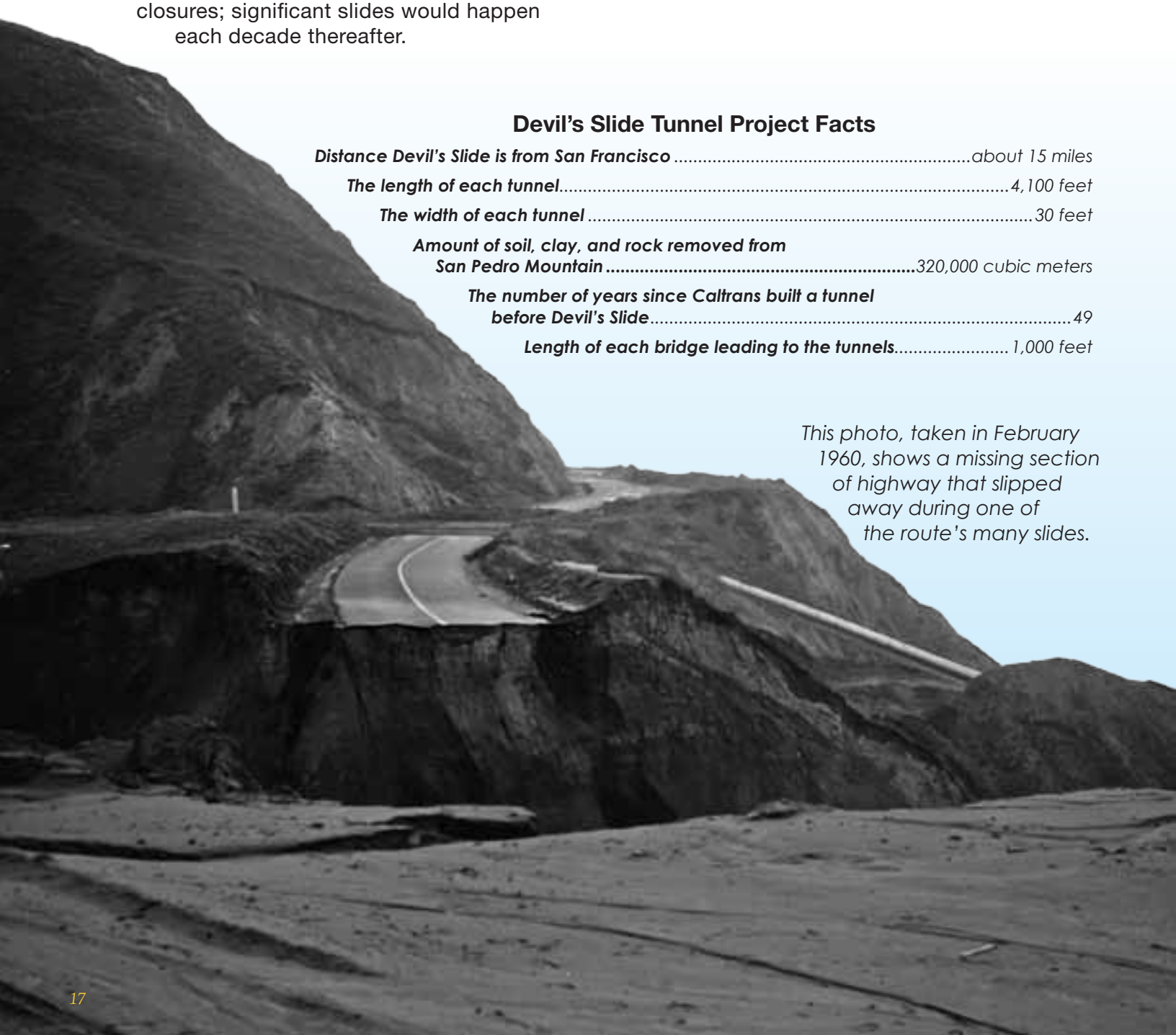
Tunnel Project Means Safer Drive

Caltrans' No. 1 goal is safety, and the new Devil's Slide project helps the department achieve that goal.

The previous route through Devil's Slide was a two-lane divided highway with no median and many short-radius curves, typical of a mountainous route. The new route eliminates the tight-radius curves and divides the highway with twin tunnels and bridges for opposing traffic, eliminating the potential for cross over. It gives drivers a smooth, safe route, and the bridges, which go over the Shamrock Ranch below, have guardrails to help keep drivers from crashing, thus enhancing safety.

Devil's Slide Tunnel Project Facts

Distance Devil's Slide is from San Francisco	*about 15 miles*
The length of each tunnel	*4,100 feet*
The width of each tunnel	*30 feet*
Amount of soil, clay, and rock removed from San Pedro Mountain	*320,000 cubic meters*
The number of years since Caltrans built a tunnel before Devil's Slide	*49*
Length of each bridge leading to the tunnels	*1,000 feet*



This photo, taken in February 1960, shows a missing section of highway that slipped away during one of the route's many slides.

A Continuing Battle

In 1958, the search for a permanent solution to the area's landslide problems began. The Division of Highways proposed an overland bypass, but advocacy groups concerned about the effects of constructing a highway over the mountain area opposed the project. This would be the beginning of a series of battles. Environmental lawsuits would follow, with Caltrans proposing projects and local residents insisting on maintaining the area's scenic beauty and considering the ecological effects of a proposed project.

The first plan to tame the area came in 1960. The Devil's Slide Bypass, a six-lane freeway would run for about seven miles from Half Moon Bay, over Montara Mountain, to Pacifica. Developers hoping to bring buildings and people to the area supported the project, but residents weren't enthusiastic about turning their rural area into an urban one.

Environmental awareness increased in the 1960s, and on January 1, 1970, President Nixon signed into law the National Environmental Policy Act (NEPA) of 1969. The California Environmental Quality Act (CEQA) also became law in 1970, with both laws requiring more in-depth environmental impact studies for projects, which would drastically change the process for building transportation projects.

The bypass idea reemerged in the early 1970s when developers sought greater freeway access. Once again, residents opposed a bypass. Then, in 1972, California voters passed legislation limiting coastal development. That same year, the San Mateo Board of Supervisors approved plans for a new freeway, but citizens and environmental groups filed a multiplaintiff lawsuit to stop the freeway based on NEPA and CEQA requirements. Later that year, a U.S. district court judge ruled in favor of the environmentalists. The bypass plan was abandoned due to the new environmental requirements and the costs involved.

A tunnel was first proposed in 1973, but Caltrans initially dismissed the idea as too costly. In the early 1980s, the department decided to look at new ways to fix the problem highway while also adhering to environmental requirements. The Marine Disposal Alternative proposed to scrape the unstable part of the mountain, dump it into the ocean, and replace it with a new road on the new ledge. Federal officials refused to endorse it, and this alternative was also dismissed as too costly. Then, in 1983, the Devil was sliding again—this time closing State Route 1 for 84 days.

The video above shows the progress of the new tunnels from the damaged highway, to the groundbreaking, and through the opening ceremony.

Another slide in 1995 closed the road for about five months, making life nightmarish for residents and costing more than $3 million to repair.

Desperate for a solution, a panel of local engineers and geologists, with the approval of county supervisors, recommended a tunnel as a permanent fix and in November 1996, San Mateo County

Jet fans clear smoke from the tunnel in the event of a fire.

voters—74 percent of them—approved Measure T, the Devil's Slide Tunnel Initiative. Caltrans again reviewed the tunnel proposal and this time found that it would cost about the same as a bypass.

The final design not only put an end to the ongoing road closures at Devil's Slide, but also met public approval, preserved the environment, and complemented the natural surroundings. Tapered piers and curved struts give a graceful shallow arch look to the two bridges that connect the north portal of each tunnel to Highway 1. An open-design tubular steel pedestrian/bicycle guardrail preserves spectacular views from both bridges. The community was heavily involved in the process from the beginning, and the project was designed based on community and stakeholder input. Caltrans gave regular project tours and engaged the media, creating excitement for a long-awaited project.

Tunneling is Challenging

The new Devil's Slide tunnels are Caltrans' first completed tunnel project in nearly 50 years. To prepare for the tunnel work, crews took core samples from the mountain so they could choose the best equipment to dig the tunnels. The samples showed both soft rock and hard rock; however, work got really tricky in the last third of the tunnels when crews met with rapidly-changing rock formations. As crews met with a rock change, they had to swap out some of the equipment—even the ventilation system. This meant more time and money. As if that wasn't enough, at one point, the tunnel began to shift, requiring increased reinforcement of the structure.

In order to deal with the unforeseen changes in the rock formations, the project's schedule was increased from five to six and one-half years, and the cost was raised from $263 million to $439 million. Federal emergency relief funds were allocated to cover the additional cost.

Protecting the Environment

The Devil's Slide project has two bridges that pass over a valley at the Shamrock Ranch, which contains a pond and wetlands. The wetland was fenced off to protect the environmentally sensitive area, home to many species, including pelagic cormorants, white-crowned sparrows, western scrub jay, California newts, peregrine falcons, and several endangered species such as the California red-legged frog, the San Francisco dusky-footed woodrat, the mission blue butterfly, and San Mateo County's only known remaining population of Hickman's potentilla. To make sure that the best care was taken of these sensitive populations, all project engineers went through endangered species identification training.

An offsite mitigation project, required by Caltrans' regulatory partners, restored additional habitat. Biologists cultivated plants and monitored native species with drought-tolerant characteristics, while removing other invasive and noninvasive varieties. Biologists also monitored all migratory nesting birds on site.

To preserve the natural beauty of the area, an earthen berm was built to surround the operations and maintenance center. The building has a vegetation-covered roof, and is located about 1,000 feet south of the south portal. These elements help the facility blend into its natural

surroundings and shield it from the highway view. A small maintenance crew ensures safe operation of the tunnel and carries out routine maintenance tasks.

So What is the Public Getting?

The total cost of the Devil's Slide project was $439 million. U.S. Senator Barbara Boxer helped get additional emergency funding for the stretch of highway in addition to the original $50 million secured by Congressman Tom Lantos in 1983. The project received 100 percent of its funding from federal emergency relief.

The project was split into six contracts: one each for tunnels, bridges, south rock cut, and three for mitigation: one onsite and two offsite. The largest contract, the tunnel contract, constructed twin tunnels, approach roads, an operations center, and public access features. The project includes a separated two-lane road, one lane in each direction. The new road passes through twin tunnels, over twin bridges, and connects with an existing nonseparated two-lane road at each end. The new road is approximately 6,500 feet long, made of roughly 4,000-foot twin tunnels, and a 1,500-foot north approach road, which includes the 1,000-foot parallel bridges, and the 1,000-foot south approach road, with the tunnels running through a portion of the San Pedro Mountain. The new tunnels are the longest in the state.

The tunnels have 10 emergency cross passages, three equipment chambers, three underground equipment rooms and 16 fans in each tunnel for ventilation. The tunnels also feature a day and night lighting system with brightness transition at each end and state-of-the-art detection systems for fire suppression, carbon monoxide, nitrogen oxide, and over-height vehicles.

Electronic message signs displaying safety/advisory information, closed-circuit television monitoring, and emergency and call box telephone systems allow Caltrans to watch and communicate tunnel activity. The tunnels are designed to withstand the largest expected earthquake for the area, and each tunnel is accessible to bicyclists.

Motorists can now enjoy the new stretch of highway on State Route 1, but the old scenic route isn't a complete thing of the past. Caltrans relinquished the old stretch of highway at Devil's Slide to San Mateo County to convert it into a public facility for hiking and bicycling. People drawn to the devilishly beautiful area will still be able to enjoy it, but instead of driving it, they can walk or bike and breathe in the beauty the area has to offer.

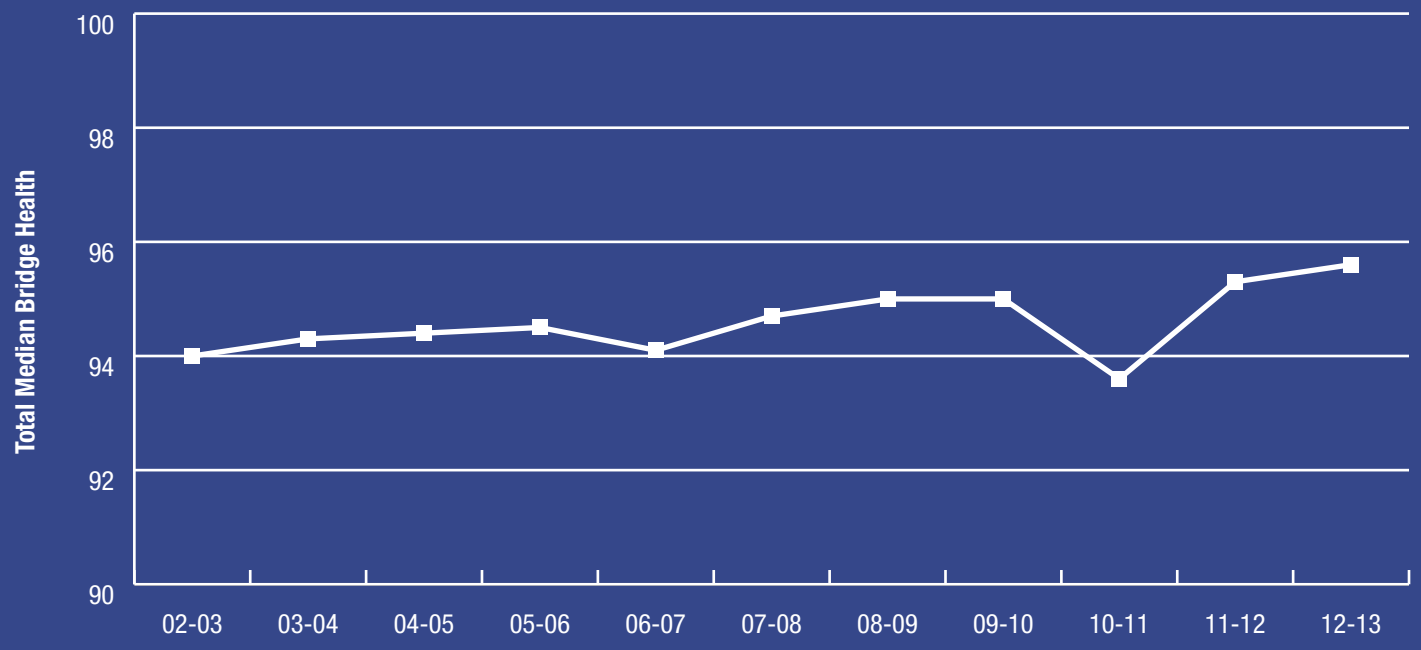
While the area has long been known as Devil's Slide, California Senate Concurrent Resolution 71 (2008), authored by State Senator Leland Yee, officially named the tunnels the "Tom Lantos Tunnels at Devil's Slide," in honor of the congressman who worked to get the first funding for the project.

You can learn more about the Devil's Slide tunnels and bridge project at the *Caltrans District 4 website.*

Antique cars were the first to drive through the Devil's Slide tunnels during the opening celebration.

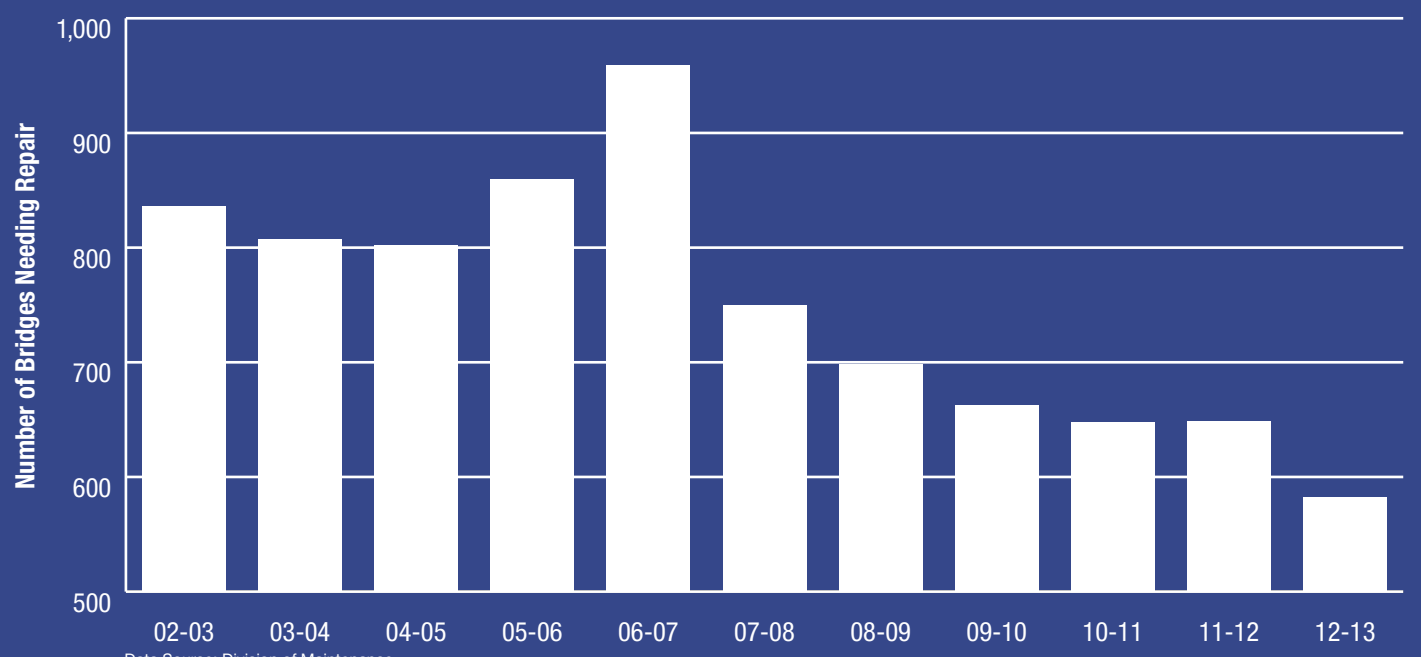
Structural Checkup:
Bridge Health Increased

Bridge Health Index
(Total median bridge health)



Data Source: Division of Maintenance
Note: Data is by fiscal year

Number of Bridges Needing Repair
(Caltrans is responsible for more than 13,000 state-owned bridges)



Data Source: Division of Maintenance
Note: Data is by fiscal year

Caltrans *regularly inspects* more than 13,000 state-owned bridges to ensure they are safe for the traveling public. If inspectors find any issue that could compromise the bridge's structural integrity, they do whatever it takes to protect public safety, including closing the bridge or posting weight limitations until it's repaired.

Caltrans spends about $450 million annually on bridge maintenance, preservation, and inspection. District bridge crews usually handle small repairs, and contractors perform more extensive repairs.

The most recent data on bridge health shows that investment in inspection, repair, and retrofit has improved the health of California's bridges. Of the more than 13,000 bridges Caltrans inspects, the number of bridges that need repair has declined from 750 in fiscal year 2007–08 to 582 in fiscal year 2012–13.

A healthy bridge may have cracks and some corrosion, which are not unusual and don't affect the integrity of the structure.

Caltrans also measures the overall condition of the state bridge network through the Bridge Health Index (BHI). The BHI is a number from 0 to 100, with 100 being the best.

During the 2012–13 fiscal year, the average BHI of the state-owned bridge inventory was 95.6. The health index showed a significant improvement as a result of Caltrans' aggressive effort to address bridge issues with lower-cost preservation to slow deterioration that would require major rehabilitation or replacement.

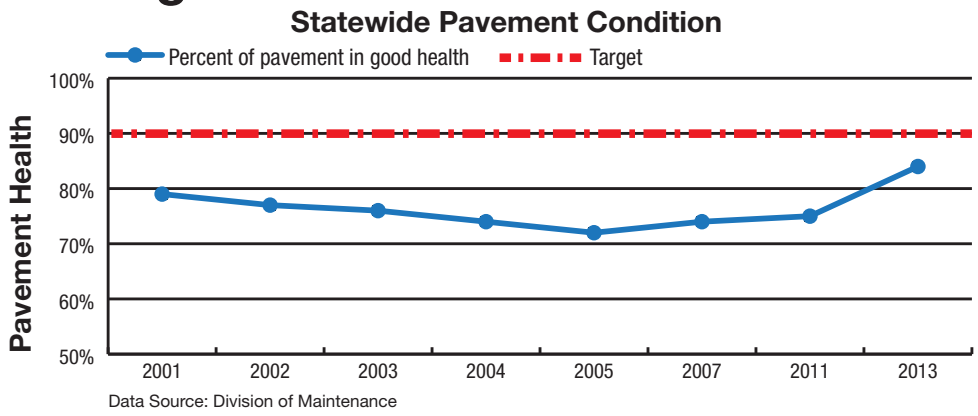
Southern California's San Diego-Coronado Bridge, with its distinctive curve and soaring sweep, is 2.12-miles long and has a vertical clearance of approximately 200 feet so the tallest ships can pass beneath it.

Monterey County's Bixby Creek Bridge is one of the country's highest single-span, concrete-arch bridges. With a view of the Pacific Ocean, it crosses 260 feet above the Bixby Creek and Canyon and has an arch span of 330 feet.

The Tower Bridge, in Sacramento, was opened in 1935 and was the first vertical-lift bridge on the state highway system.

Best in Ten Years!

Higher Overall Pavement Health



Caltrans is responsible for maintaining and operating California's 50,000 highway lane miles and measures the health of the pavement to determine future maintenance needs. This *pavement survey* is completed annually.

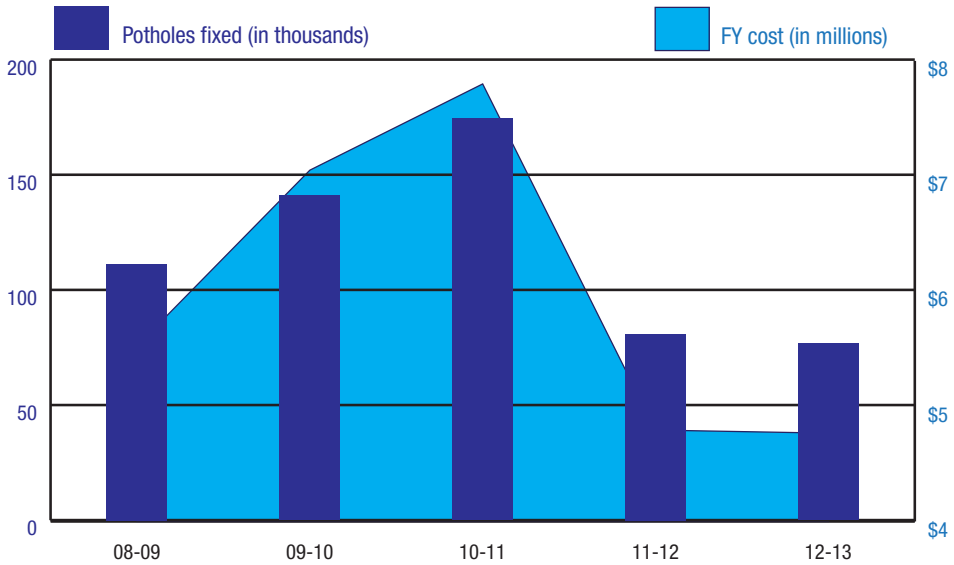
Most of California's 50,000 highway lane miles were built more than half a century ago. Traffic volumes have quadrupled since the 1960s, and vehicle loads are ever increasing. Today, the state's highways carry 40 percent of the nation's imports and 10 percent of the nation's vehicle miles traveled.

Generally, Caltrans gets about $685 million a year for pavement needs, but has benefitted from one-time funds from the Proposition 1B 2006 transportation bond, and the 2009 Recovery Act. This has brought us to the highest level of pavement health in more than a decade with 84 percent or 42,000 lane miles of healthy, well-maintained pavement. Caltrans' goal is to improve to 90 percent, which is 45,000 healthy lane miles of pavement by 2023, at a cost of $2.8 billion a year for the next 10 years to pay for pavement rehabilitation, reconstruction, and preservation. Preventative maintenance on the roadways helps prevent costlier repair and replacement by a factor of 4-to-1.

Caltrans repaved Interstate 80 over the Sierra, as shown here at Gold Run in Placer County.

One-Time Funds Pay for Smoother Ride

Potholes Fixed and the Cost to Fix Them



Data Source: Division of Maintenance

Healthier Pavement Means Less Potholes

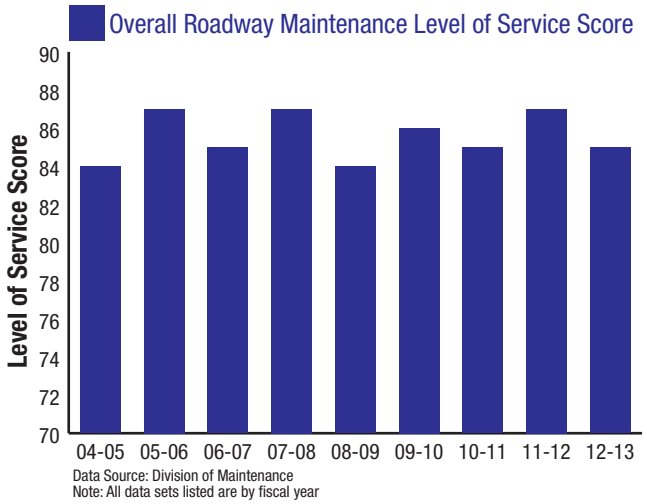
Caltrans measures the number of potholes it fixes in a year to ensure we are properly maintaining the state's 50,000 lane miles.

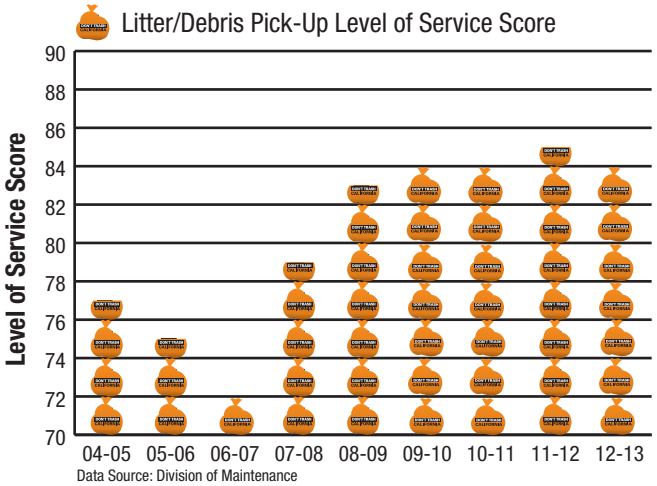
Caltrans fixed more potholes in 2010 and 2011. In 2012 and 2013, Caltrans filled fewer potholes because we had repaved much of the old worn highways throughout the state with additional one-time funding from the 2006 transportation bond Proposition 1B and the Recovery Act. Caltrans also benefited from lower construction bids during the recession. Repairing potholes and worn pavement helps us meet our goal to continually maintain and increase the miles of healthy, or smooth, pavement throughout the state.

A Recovery Act-funded road paving project using rubberized asphalt, a new recycled tires technology, and shoulder backing on State Route 33 in Newman.

Maintenance

Overall Roadway Level of Service





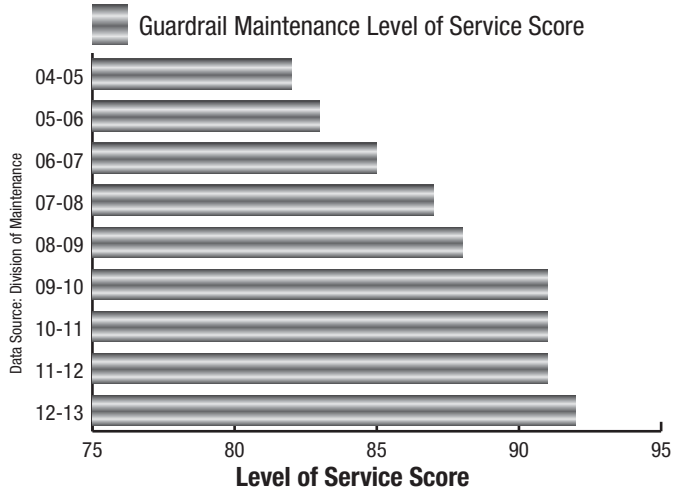
Caltrans measures and evaluates the roadways once a year to determine how well we maintain the state's highways. Areas are given scores, which is level of service, between 0 and 100, with 100 being the best. This is a score of our ability to service the area and is not a score of the area's condition. Guardrail, striping, litter and debris, and overall roadway condition are the major components we evaluate. Caltrans divides California's approximately 15,000 highway centerline miles into one-mile segments, and 20 percent, or approximately 3,000 of these segments across the state, are randomly selected for evaluation. Scores may have a five-point variance from year to year, and scores that are within five points from the previous year are considered stable.

In fiscal year 2012–13, Caltrans spent $9.3 million and applied more than 88,000 miles of striping on California highways. This is enough to go around the equator of the Earth about three and a half times. Although our statewide score for striping was 87, we did not meet our goal of 95. Completing all annual striping night inspections statewide will help us meet our goal.

For guardrail, Caltrans had a statewide score of 92, but we did not meet our goal of 95. To achieve this goal, we must shorten the window between when a guardrail is hit and damaged and the time it is repaired. We can achieve this by increasing the number of guardrail crews throughout the state. In fiscal year 2012-13, we spent $9.2 million repairing and replacing nearly 60 miles of guardrail, which is

Level of Service

Drops Slightly, but Remains Steady



On the Job with Caltrans

In the video, right, Caltrans Director Malcolm Dougherty shows some of the ways that Caltrans builds and maintains the state highway system.

Photo left: Caltrans' maintenance forces remove snow and ice 24 hours a day, seven days a week during winter storms.

the equivalent of stretching the guardrail end to end between Los Angeles and San Bernardino, California.

Caltrans also evaluated highway segments for litter and debris. The score for litter and debris was 84, which met our statewide goal of 80. To maintain this goal, allocations for litter and debris removal must not decline from the prior year. In fiscal year 2012–13, *Caltrans crews* spent $37.2 million removing litter and debris, and *Adopt-A-Highway* program volunteers' collection efforts were valued at an additional $16.7 million. That's more than 155,000 cubic yards, or the equivalent of almost 9,700 dump trucks full of litter and debris, which if placed bumper to bumper, would stretch approximately 50 miles. We also removed 7 million square feet of graffiti, which is equal to 121 football fields.

Our overall roadway score was 85 in fiscal year 2012–13, and we did not meet our statewide goal of 87. Increased funding for travelway and roadside maintenance will help us meet this goal. The overall roadway score measures maintenance needs of the entire 15,000 highway centerline miles and is calculated based on the average of more than 30 elements that include the travelway, which is the visual driving surface, and ride-ability, striping, guardrail, litter and debris, landscaping, drainage, and components that guide drivers. The overall level of service on the state's highways has remained relatively stable during the past three years.

Caltrans Uses Technology to Improve Your Drive

The lines pictured here on the pavement are sensors that count vehicles and measure their speed. The data Caltrans collects from devices on the highways is sent to transportation management centers (pictured below) to help Caltrans and California Highway Patrol employees manage traffic and respond to incidents.

Caltrans doesn't just build infrastructure. Smart expansion of the system starts with good data that accurately relays what is happening on California's transportation system and help determine the most effective investments to get travelers from point A to point B safer and more efficiently.

In the future, there will be smarter cars and an intelligent roadway system that will help meet transportation challenges—from safety improvements in automobiles, to traveler information advancements, to the next generation of system management and congestion pricing.

Throughout the state, Caltrans operates 12 *transportation management centers* to monitor highway and weather conditions within a region. These centers are a hub for intelligent transportation system (ITS) technology devices.

In the last decade, Caltrans has invested in more than 50,000 of these ITS devices that measure and report vehicle speed, weight, and traffic volume on California highways. Caltrans transportation management centers use the information these

devices send each day to manage traffic, provide information to travelers and partners, and to plan long-term improvements.

To better manage traffic, Caltrans uses technology and innovation to collect information about how motorists are using the highways. Those data-collection devices include electronic message signs, ramp meters, and closed-circuit cameras.

Caltrans' inventory of all field devices has more than doubled in the last decade, while staffing has not.

Caltrans investments for detection include magnetometers and radar sensors. Another tool that has proven useful in managing congestion is ramp meters, which stagger cars entering freeways to prevent merge chokepoints. Caltrans now has 60 percent of all ramp meters in the United States and plans for more.

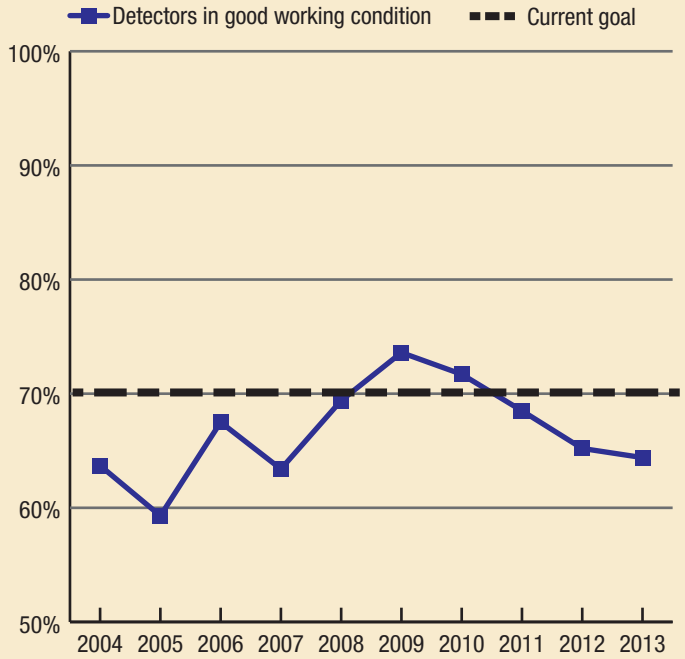
In addition to posting drive times on electronic message signs on California freeways, Caltrans has developed an online service that provides real-time traffic and travel information that allows motorists to make better decisions about how to reach their destination more rapidly. It is called *QuickMap*, and it shows the public current traffic speeds, incidents, lane closures, closed-circuit TV camera images from the highways, and snow chain requirements.

Caltrans also installs and monitors its 39,000 vehicle detectors, imbedded in urban freeways, which collect traffic vehicle volume and speed data and send it to the traffic management centers every 30 seconds. This allows us to monitor and evaluate the highway system in real time. The detectors also help with long-term planning and analysis, and traffic management. Maintaining vehicle detectors in good working condition is critical to ensuring the state's transportation system data collected can be used in making operational and road improvement decisions.

Caltrans' target is to maintain at least 70 percent of the detectors in good working condition with a longer-term goal of achieving 90 percent by reducing construction-related outages and developing funding strategies to maintain and replace ITS elements, over the next 10 years.

Caltrans is currently falling short of the 70 percent target for several reasons. Many detectors are reaching the end of their lives. Some are temporarily disabled because of construction, and others are disabled because of the theft of field equipment and copper wire, which has become a larger problem in recent years. Since the inventory of ITS devices has more than doubled in the last 10 years, but the staffing to maintain them has not, keeping up with the maintenance demand is increasingly difficult. To prevent future copper theft, we are investigating the use of aluminum wire and reducing the number of places someone can gain access to the wires. Caltrans is developing additional tools to help identify and report failed detectors.

Statewide Detector Health



Data Source: Division of Traffic Operations
Note: 2013 data is for the year through December 17, 2013
Note: Data is by calendar year.

Caltrans measures how well its traffic detectors are working to ensure we are collecting accurate data. Caltrans has the same staffing levels and over 5,000 more detectors now than it had in 2007, yet the percentage of operational detectors has remained the same. We have worked toward increasing detector health, as shown in 2008 and 2009, but copper wire theft, aging detectors and temporarily disabled detectors due to construction have dropped the percentage of functioning detectors.

This magnetometer is one of the various types of sensors Caltrans uses to collect traffic volumes and speed.

Hours of Delay Increased

Caltrans uses sensors to collect vehicle counts and speeds at all hours of the day on metropolitan-area freeways throughout California. This information helps identify congestion bottlenecks. Our core goal is to reduce the amount of time Californians spend accessing the people, jobs, goods, and services they need.

Caltrans measures congestion in terms of vehicle hours of delay, or the extra time spent in traffic beyond what people would experience if they were traveling at a certain speed. Caltrans uses a 35 mph and 60 mph speed on the freeways to distinguish heavy congestion (motorists traveling less than 35 mph) from all congestion experienced for motorists traveling less than 60 mph.

Statewide Average Daily Vehicle Hours of Delay*
(at 35 miles per hour)

2009	2010	2011	2012
273,000	332,000	303,000	328,000

** non-holiday, weekdays.*

California has some of the most congested freeways in the nation. The time motorists spent in traffic on the state highway system increased in 2012 from the year before. Nobody is more likely to get stuck in traffic than someone driving in Los Angeles County. The graph below shows increases and increases on delay trends most likely due to the economy that is beginning to grow again and the

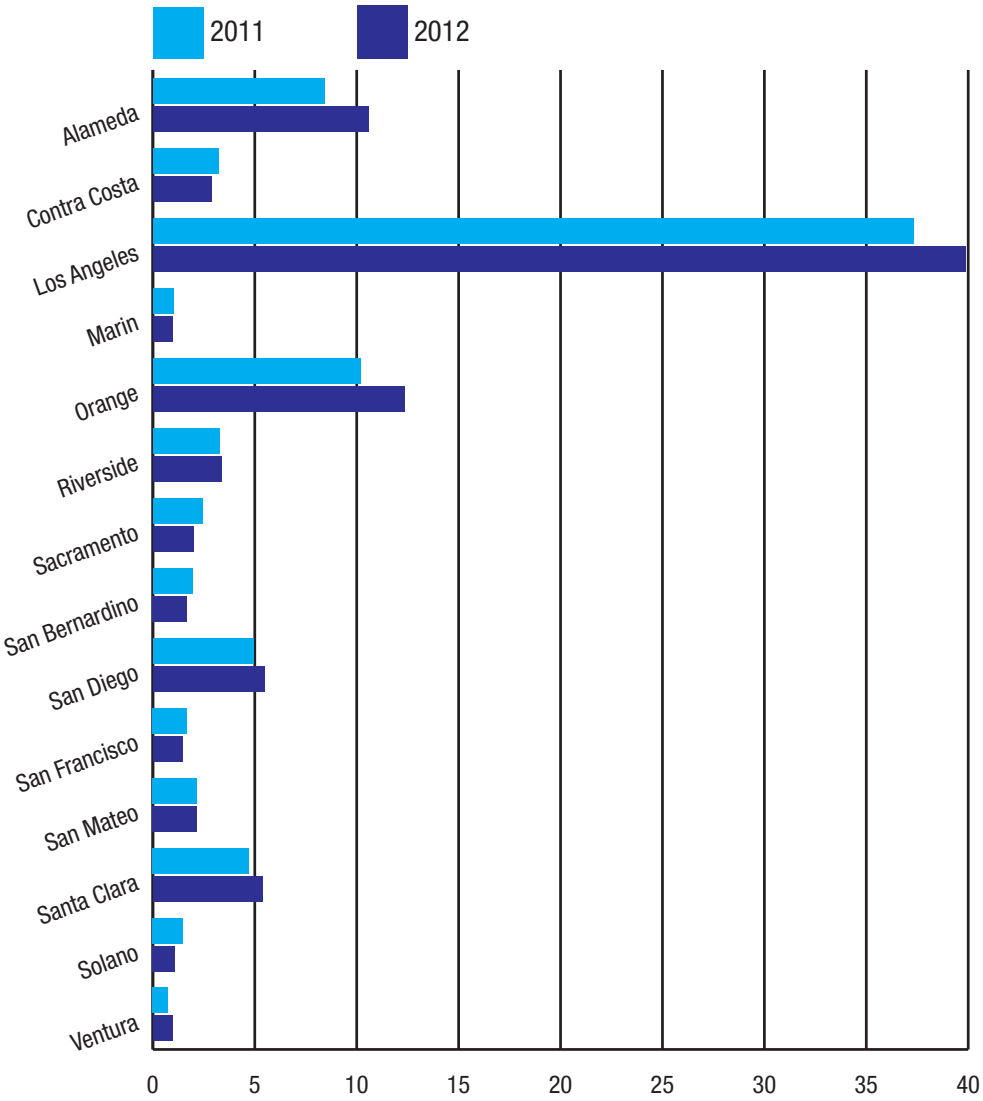
Delay Trend with Associated Costs

Year	2009	2010	2011	2012
Total annual vehicle hours of delay (at 35 mph)	78.9 million	95.7 million	86.5 million	93.7 million
Total annual cost of delay (at 35 mph)	$1.3 billion	$1.4 billion	$1.5 billion	$1.6 billion

Hourly Cost of Delay provided by the Economic Analysis Branch, Office of State Planning, Division of Transportation Planning

Time Spent in Traffic* for Selected Metro Areas

(in millions of hours)



Data Source: Division of Traffic Operations

* (at 35 mph)

benefits achieved from highway investments funded by the federal American Recovery and Reinvestment Act and California's 2006 Proposition 1B bond program.

Caltrans' "*Mobility Performance Report*" provides detailed data about highway system performance related to congestion and mobility.

In addition to measuring congestion, Caltrans is partnering with local and federal governments to obtain data that measures overall travel times, how reliable California travel time is, how many people travel on a given mile of roadway, and vehicle miles traveled per person relative to population growth.

Most Congested California Freeways

Caltrans measures freeway traffic congestion throughout the state to determine which freeways have the greatest need for improvement. Half of the most congested freeways in the state, listed here, are in Los Angeles County, with Interstate 5 being No. 1.

Route	County	Vehicle Hours of Delay*
5	**Los Angeles**	6,581,609
405	**Los Angeles**	5,722,148
101	**Los Angeles**	4,516,141
60	**Los Angeles**	4,440,585
5	**Orange**	3,346,209
10	**Los Angeles**	3,294,890
210	**Los Angeles**	3,152,598
405	**Orange**	3,119,284
580	Alameda	2,648,174
80	Alameda	2,520,715
110	**Los Angeles**	2,402,760
101	Santa Clara	2,392,486
880	Alameda	2,015,921
91	Riverside	1,888,264
605	**Los Angeles**	1,878,749
5	San Diego	1,820,953
57	**Orange**	1,797,855
101	San Mateo	1,648,420
55	**Orange**	1,460,141
91	**Los Angeles**	1,402,309
105	**Los Angeles**	1,344,034

* (at 35 mph) 2012

Amtrak California

A service of Caltrans and Amtrak

Revenues Up, Ridership at All-time High

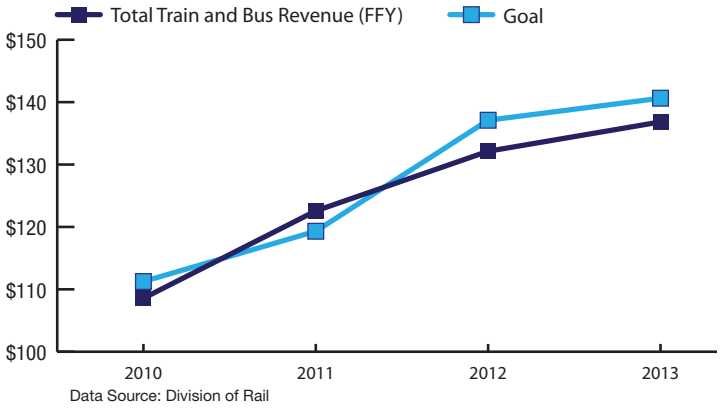
Under the Amtrak California banner, Caltrans funds three of the five busiest intercity passenger rail routes in the Amtrak system: the Pacific Surfliner corridor (ranked second), the Capitol Corridor (ranked third), and the San Joaquin corridor (ranked fifth). Caltrans manages both the Pacific Surfliner and San Joaquin corridors. The Capitol Corridor, although funded by Caltrans, is managed by the Capitol Corridor Joint Powers Authority. Caltrans' goal is to increase intercity rail ridership on these state-supported routes.

Federal fiscal year (FFY) 2013 (October 2012–September 2013) train and bus revenue was $137.3 million, a 1.8 percent increase from the previous fiscal year.

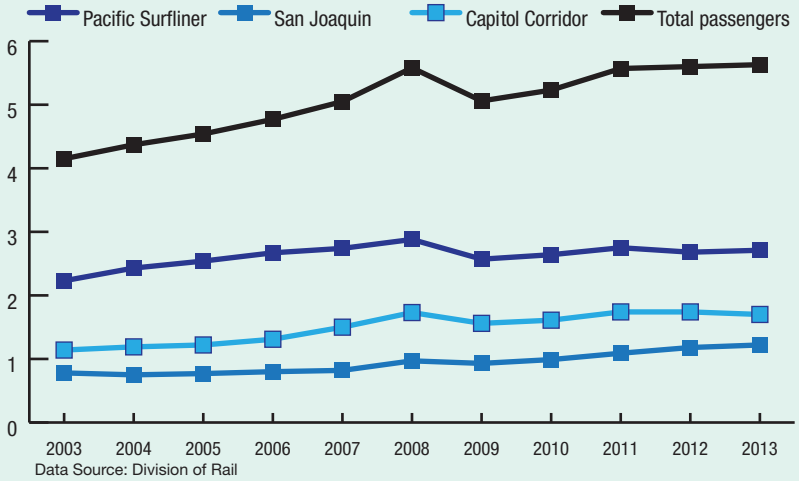
Amtrak California's Pacific Surfliner gives travelers a scenic view of the southern coastline.

Ridership for FFY 2013 was up 1.7 percent and was 99.3 percent of the performance goal. Ridership increased by 95,471 passengers systemwide from FFY 2012 to set an all-time ridership record. Ridership on the Pacific Surfliner route was up 2.5 percent, up 6.6 percent on the San Joaquin route, and down 2.6 percent on the Capitol Corridor. The ridership decline reflects a more accurate ridership count for users of multiride tickets. Since FFY 2003, ridership has increased more than 37 percent.

Total Train and Bus Revenue
(in millions)

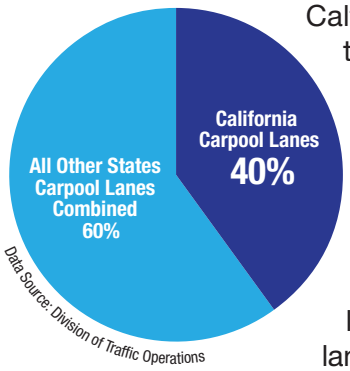


Intercity Rail Ridership by Route
(in millions by FFY)



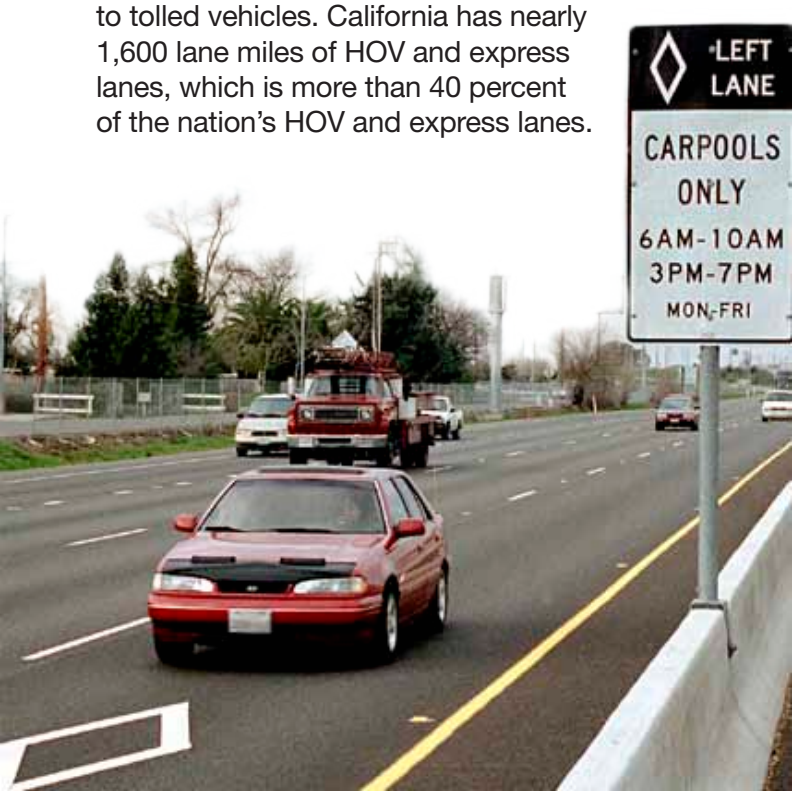
Carpool Lane Use Increased

California Maintains 40 percent of the Nation's Carpool Lanes

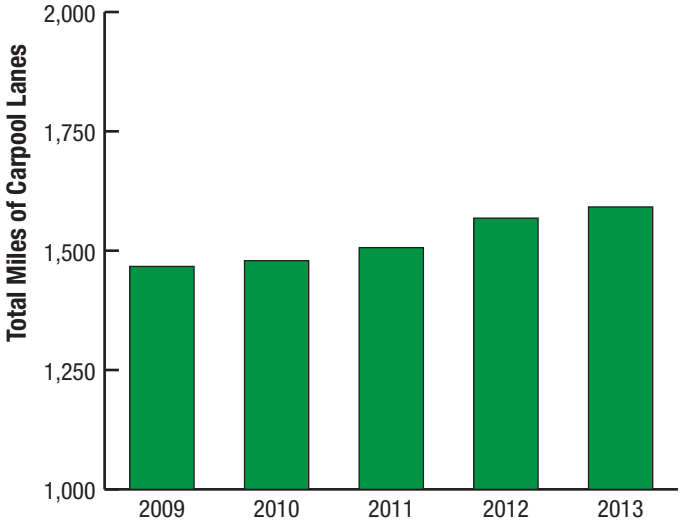


Caltrans uses managed lanes to improve air quality, reduce congestion, and improve travel time reliability.

Managed lanes include high-occupancy vehicle (HOV) lanes, also known as carpool lanes, and express lanes. Express lanes are HOV lanes that may be used by tolled vehicles, offering a congestion-free alternative for motorists. Caltrans staff routinely conducts manual vehicle occupancy counts on managed lanes to measure their use. Based on vehicle occupancy counts, HOV lanes carry an average of 2.25 people per vehicle, compared to 1.15 people per car in the general-purpose lanes. Data also shows that more and more vehicle miles are being traveled in managed lanes as Caltrans continues to build the system and opens HOV lanes to tolled vehicles. California has nearly 1,600 lane miles of HOV and express lanes, which is more than 40 percent of the nation's HOV and express lanes.



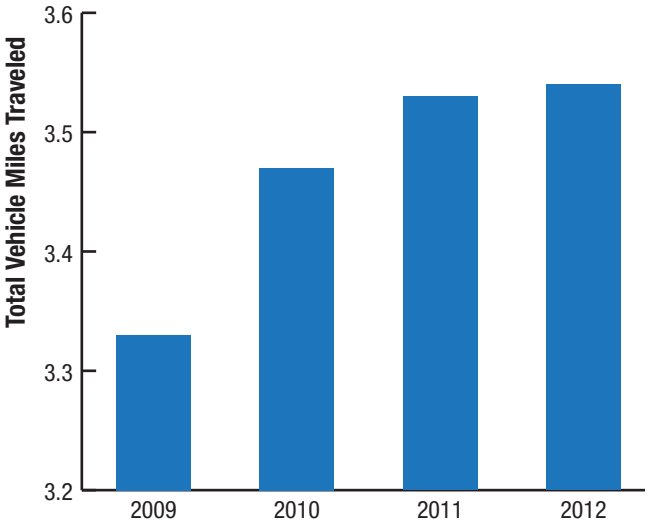
Statewide Total of Carpool Lanes



Data Source: Division of Traffic Operations
Note: Data is by calendar year

Total Vehicle Miles Traveled in Carpool Lanes

(in billions of miles)



Data Source: Division of Traffic Operations
Note: Data is by calendar year

Bicycling

It's healthy, it's green, it's great!

Bicyclists and pedestrians use the new San Francisco–Oakland Bay Bridge bike path.

Bicycle commuters help improve air quality, reduce traffic congestion and parking demand, save energy, and promote healthy living through enjoyable exercise. In concert with the members of the *Strategic Growth Council*, Caltrans began this year exploring new ways to measure effectiveness and efficiency of California's transportation system, including transit, biking, and walking. Caltrans promotes bicycle safety and convenience to the public by funding bicycle projects and providing technical expertise to our federal, state, and local transportation partners, bicycling advocates, and legislative staff.

Improving bicycle safety is one of the focus areas in California's Strategic Highway Safety Plan, a comprehensive, data-driven effort to reduce fatalities and serious injuries on public roads statewide. Caltrans has worked with the Department of Motor Vehicles (DMV) to put bicycle safety language in the DMV drivers' handbook, improved bicycle trip and collision data collection, and integrated bicycle facility design in the 2012 edition of the Highway Design Manual.

Caltrans is also looking at all modes of travel to help reduce greenhouse gas (GHG) emissions in the state. This includes bicycle-friendly policies and an increase in bicycle and pedestrian project funding.

Bicycle projects are primarily funded through the Bicycle Transportation Account (BTA), and over the last five years, Caltrans awarded $40.7 million in BTA funding to 127 bike projects. Bicycle projects may also be part of a larger project, and additional funding comes from a variety of local, state, and federal sources. On September 26, 2013, Governor Brown signed legislation (SB 99, Chap. 359) that creates the Active Transportation Program (ATP). The ATP will consolidate existing federal and state transportation programs into a single program focused on making California a national leader in active transportation. It will also provide more than $130 million a year in state and federal funds to bicycle and pedestrian transportation projects.

The ATP will enhance public health and safety by encouraging an increase in bicycling and walking and advance the efforts of regional transportation agencies to achieve GHG reduction goals. The ATP will ensure that disadvantaged communities fully share in the benefits of the program, and will provide a broad spectrum of projects that will benefit many types of active transportation users.

Projects Funded Through Bicycle Transportation Account

Fiscal Year	Projects Awarded	Awarded (in millions)
2012–13	39	$11.9
2011–12	24	$7.2
2010–11	23	$7.2
2009–10	23	$7.2
2008–09	18	$7.2
Total	127	$40.7

Data Source: Division of Local Assistance

Sustainability Through Innovation

Caltrans' new Philip S. Raine Safety Roadside Rest Area on State Route 99 earned the Platinum "Leadership in Energy & Environmental Design" certification from the U.S. Green Building Council.

Sustainability and environmental stewardship are key priorities for the California State Transportation Agency and Caltrans. In early 2013, Caltrans released a comprehensive report, *Caltrans Activities to Address Climate Change*, detailing our efforts to address climate change by curbing greenhouse gas emissions (GHG) and embracing new technology, such as low-energy cement and efficient LED lighting. The report shows that Caltrans or its contractors have reduced emissions by more than 161,000 tons annually, the equivalent of removing 31,000 cars from the road. Furthermore, Caltrans was one of the first state agencies to successfully certify its GHG inventory with the California Climate Action Registry. The registry provides estimates of the amount of GHG emitted to and removed from the atmosphere by human activities.

Climate change poses a growing threat to California's economy, environment, and infrastructure. To prepare for climate change and adapt to its effects, Caltrans is focused on preserving our state's existing transportation infrastructure, while continually developing better solutions for reducing GHG emissions.

Caltrans is the only state agency in California that applied to issue federally backed Clean Renewable Energy Bonds, or CREBs. In 2009, the state announced the sale of $20 million in CREBs to pay

Summary of Caltrans' Efforts to Reduce GHG Emissions

Strategy	Average Annual GHG Reductions (tons CO^2)
Alternatives to conventional concrete*	47,236
Alternatives to conventional asphalt*	61,475
Roadway lighting	38,819
Alternative fuels and vehicles in fleets	2,182
Renewable energy projects	1,391
Building energy and water efficiency	3,511
Workplace commute programs	6,465
Total	**161,079**

*Annual reduction values are based on 2011 data instead of average annual reductions

Source: April 2013 report, "Caltrans Activities to Address Climate Change"

(continued on page 36)

Caltrans Seeks to Increase Small Business and Disabled Veteran Business Participation

Caltrans Contract Analyst Betty Graham talks to small business owners at a Caltrans-sponsored workshop in February 2012 at the Rancho Cordova City Hall.

Caltrans is committed to increasing the economic opportunity and development of small business (SB) and disabled veteran business enterprise (DVBE) firms within California by setting goals of participation of these firms in our contracts.

State Small Business and Disabled Veteran Business Enterprise Participation

Caltrans has established an overall annual SB participation goal of 25 percent; Caltrans' overall annual DVBE participation goal is 5 percent, which exceeds the state-mandated requirement of 3 percent.

In fiscal year 2012–13, Caltrans fell short of achieving its overall annual SB and DVBE participation goals. SB participation was $500 million, or 21.62 percent, and DVBE participation in Caltrans projects was $45 million, or 1.96 percent. This is due, in part, to the availability of certified SB and DVBE firms qualified to work on Caltrans projects, and passage of the 2006 transportation bond, Proposition 1B, which has affected the scope and dollar value of state-funded projects. Caltrans has taken steps to increase participation by sponsoring educational opportunities for SB and DVBE, reevaluating goal-setting methods, and strengthening the process of collecting and reporting SB and DVBE data.

Caltrans *reports annually* to the Department of General Services its levels of SB and DVBE participation, broken down by category of expense: information technology goods and services, noninformation technology goods and services, and construction services. Caltrans compares SB and DVBE participation to the total annual state expenditures, in the categories mentioned, in a given fiscal year.

Small Business and Disabled Veteran Business Enterprise Participation in Caltrans Contracts FY 2012–13

Participation	Contracts awarded	Participation	Goal
Small business	$500 million	21.62%	25%
Disabled Veteran Business Enterprise	$45 million	1.96%	5%

Federal Disadvantaged Business Enterprise Participation

In addition, Caltrans has established an overall annual disadvantaged business enterprise (DBE) goal of 12.5 percent for federal-aid projects. A DBE is a for-profit small business that is at least 51 percent owned by one or more individuals who are both socially and economically disadvantaged. In the case of a corporation, 51 percent of the stock is owned by one or more such individuals, and whose management and daily business operations are controlled by one or more of the socially and economically disadvantaged individuals who own it. The DBE program benefits small businesses that qualify for DBE certification. For more information about Caltrans' DBE program, please review Caltrans' *DBE Annual Element Report* for federal fiscal year 2013.

In an effort to be more energy efficient, Caltrans uses a photovoltaic system to produce solar power for its Stockton offices.

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for solar projects on 70 Caltrans structures, including maintenance facilities and equipment shops, safety rest areas, office buildings, laboratories, and toll/management facilities.

These projects generate 2.4 megawatts of electricity, enough to power approximately 500 homes per year. It is anticipated that these projects will ultimately generate approximately 3.6 million kilowatt hours annually, keeping more than 1,000 tons of GHG emissions out of the atmosphere each year.

Because the solar projects began generating electricity one year after bond sales, it is estimated that the bond debt will be fully paid through the annual energy savings. After accounting for the cost of paying off bond debt and maintaining the facilities, this translates into millions of dollars in savings over the anticipated 25-year life of the solar panels.

Other steps Caltrans is taking to adapt to climate change include using native plants, mulch, and hardscape, which uses elements such as sidewalks and retaining walls, in lieu of traditional landscaping plants to reduce the need for irrigation, and developing a standard for cool pavements that reduce urban heat in the face of global warming.

Caltrans is also installing 33 electrical vehicle charging stations statewide, to accommodate the plug-in electric vehicles that will be purchased for the Caltrans fleet, to further reduce greenhouse gases.

Additional efforts to reduce greenhouse gas emissions include continually working with our partners to reduce traffic congestion, expanding active transportation such as walking and biking, and embracing new technology in construction materials, alternative fuels, efficient lighting and renewable energy.

Caltrans has installed electric vehicle charging stations like this statewide.

For more information on Caltrans data please see the following links:

QuickMap

Program Review

Caltrans Performance Measures Quarterly Report

Structures Maintenance & Investigations Annual Report

State of the Pavement

Strategic Highway Safety Plan

California State Rail Plan

Division of Maintenance

Map21 - 2012 Congressional Reauthorization of the Federal Transportation Program

Caltrans Five-Year Maintenance Plan

Caltrans Earth

Executive Fact Book

Other Transportation Reports

Caltrans

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