

Welcome to California!

Tony Tavares, Maintenance Division Chief
California Department of Transportation

International Symposium on Pavement LCA 2014
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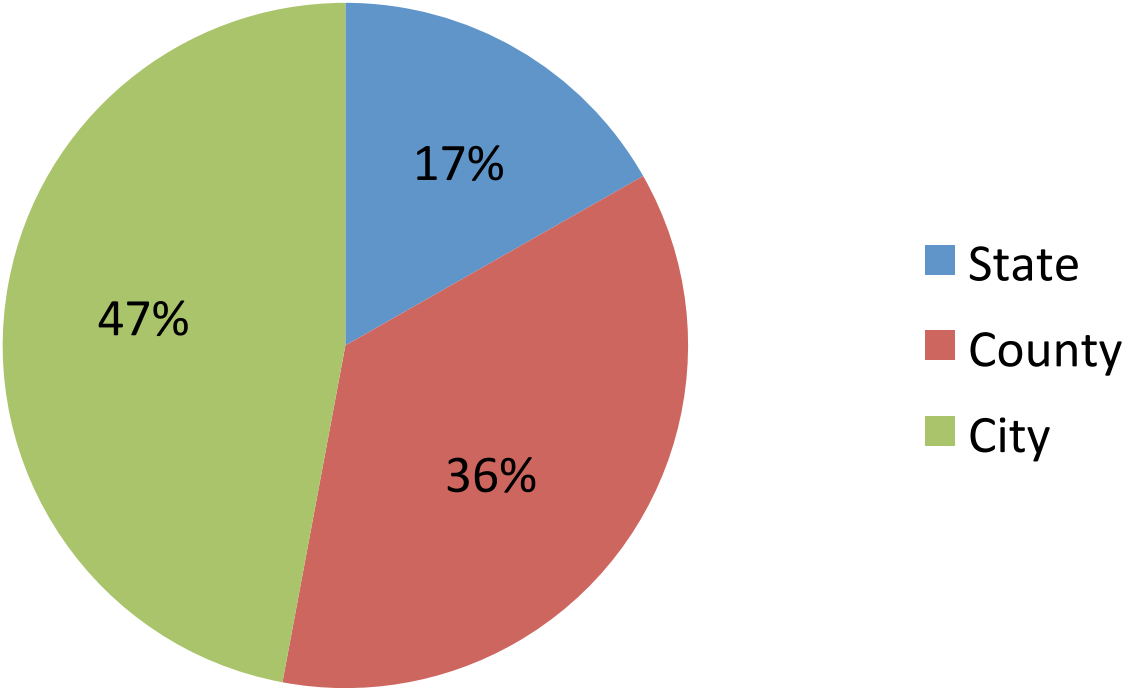


California State Highway System

- 50,542 lane miles of pavement
- 13,063 bridges and other structures
- 205,000 Culverts
- 42,952 ITS/TMS Elements
- 5,782 traffic signals
- 30,000 acres of landscaping

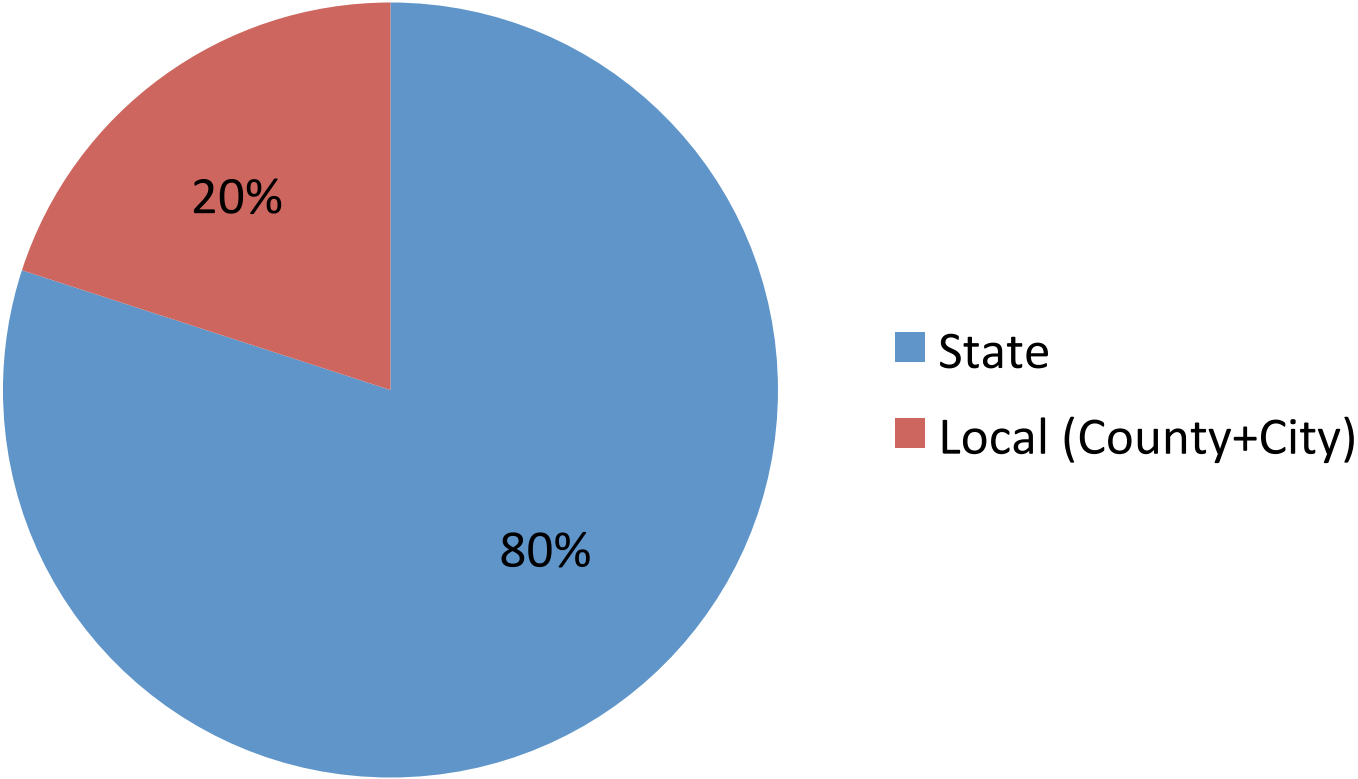
California Roadway System Inventory

2013 HPMS Data



Total state network: Approx. 300,000 lane miles

California Vehicle Miles Traveled (VMT)

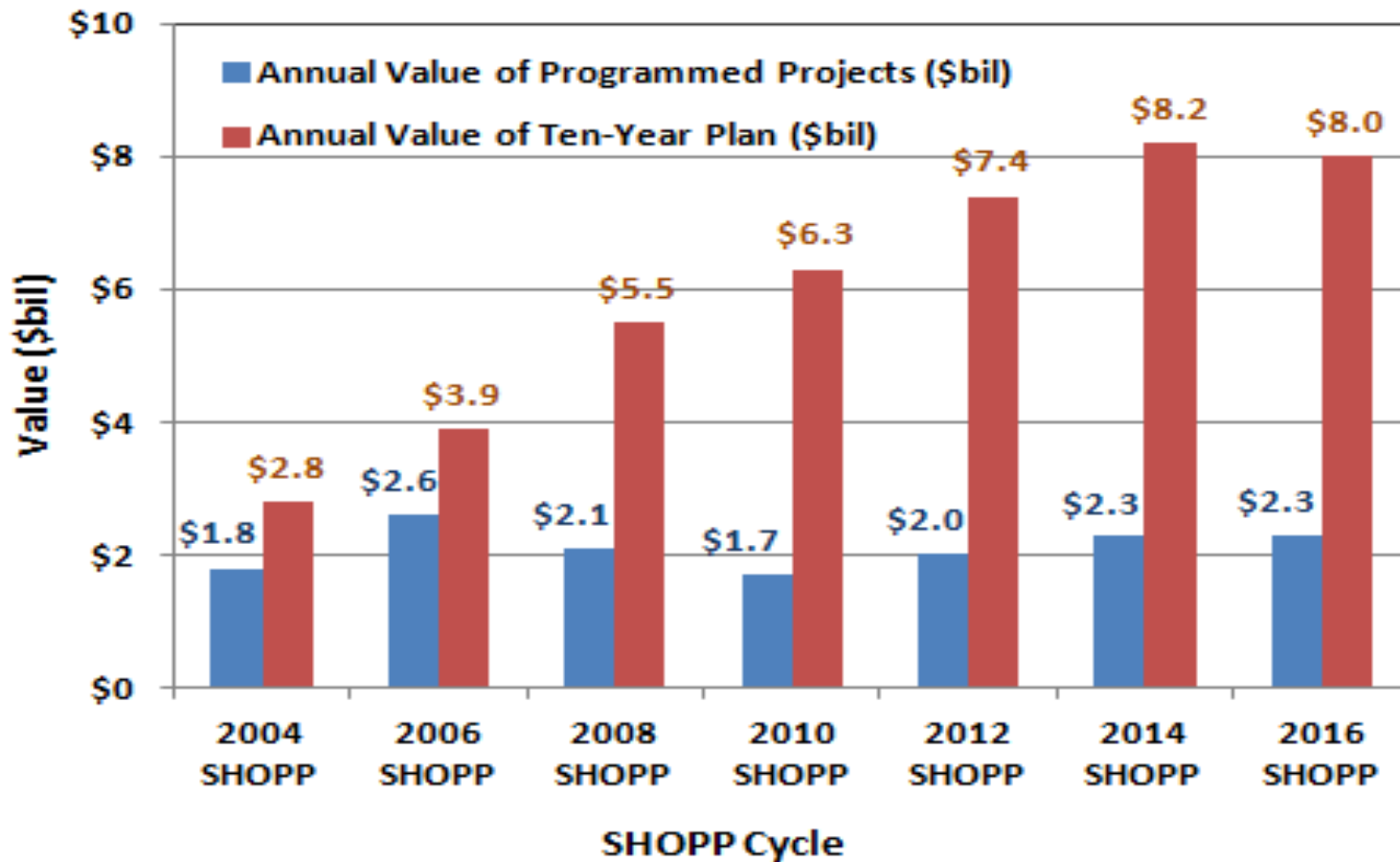


The state highway system accounts for 17 percent of the total lane miles in California yet carries 80% of the vehicle miles traveled.

Challenges – Aging System

- 80% of State Highway System built between 1959 and 1974
- 16% of pavement lane miles are distressed and need rehabilitation or major reconstruction
- Culverts exceeded design life (25% require replacement)
- Median age of the State's bridges are approaching or exceeding their original design life
- Over 33% of all the ITS/TMS elements are no longer functioning and need replacement.

Challenges – Funding



Opportunities - Sustainability

- Executive Order S-3-05 and AB32 established GHG emission reductions similar to the Kyoto Protocol



Caltrans Mission

- Provide a safe, **sustainable**, integrated, and efficient transportation system to enhance California's economy and livability.



What is Sustainability?

“Meeting the needs of the present without compromising the ability of future generations to meet their own needs”

World Commission on Environment and Development, 1987



What is Pavement Life Cycle Assessment (LCA)?

A mechanism to evaluate pavement environmental Sustainability.

- Caltrans is partnering with UCPRC for the development of pavement LCA.



How Is Caltrans Addressing Sustainability?

Caltrans is interested in using LCA to evaluate sustainable pavement strategies:

- Longer life pavement
- Use of recycled materials
- Maintenance and rehabilitation
- Improve pavement condition
- Implement new pavement practice

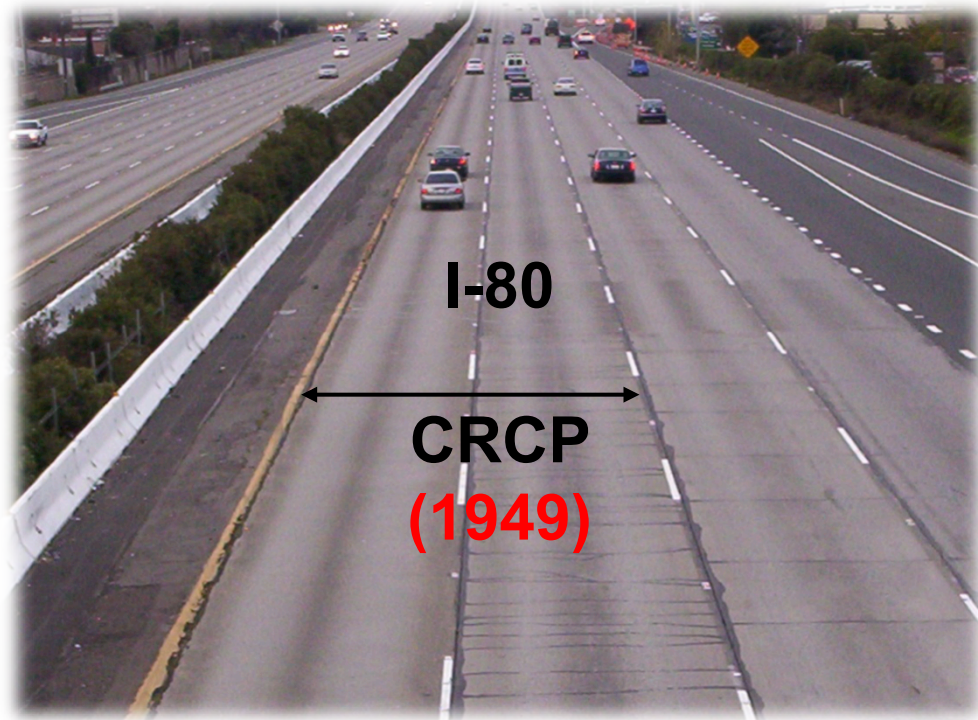


Caltrans Sustainable Pavement Initiatives

- 1. Minimize impact on environment:**
 - Long-life pavements: concrete and asphalt
- 2. Focus on pavement preservation**
- 3. Explore and employ sustainable technologies:**
 - CRCP, SCM and recycling concrete
 - RHMA, WMA, RAP, RAS and in-place recycling
- 4. Manage assets:**
 - Pavement, Bridge, Culvert, etc
- 5. Resource responsibility**

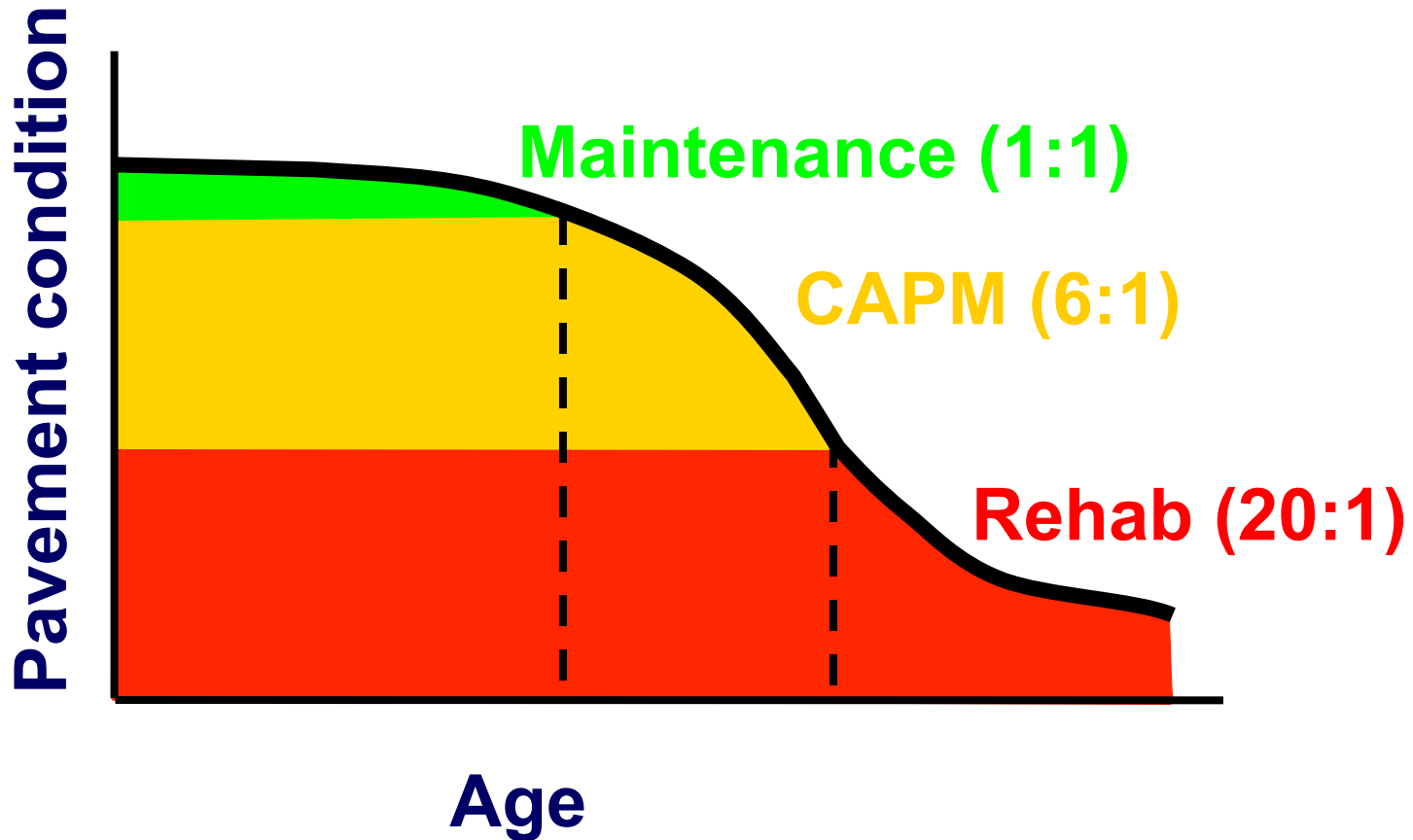
Long-Life Pavement Projects

- Minimize impact on the environment by building long-life concrete and asphalt pavements:
 - **Concrete:** I-680, I-710, I-15, I-10
 - **Asphalt:** I-710 , I-5, I-80



Focus on Pavement Preservation

- Extend the service life by preserving pavements when they are still in good condition



Explore and Employ Sustainable Technologies for Concrete



Explore and Employ Sustainable Technologies for Recycled Concrete Aggregate (RCA)

- Explore potential re-use of plastic concrete
- Development of new and revised standards
- Use of available materials



Explore and Employ Sustainable Technologies for Asphalt



Rubber Hot Mix Asphalt (RHMA)

- RHMA been successfully used in CA for over 30 years.
- CA generates more than 44 million scrap tires every year.
- A two-inch RHMA overlay uses about 2,000 scrap tires per lane mile.



Warm Mix Asphalt (WMA) Additives

- **Benefits**

- Used in Hot Mix Asphalt and Seal coats
- Improves working conditions for employees by reducing temperature and fumes
- Ability to pave at lower temperatures
- Reduction of fuel consumption and GHG emissions
- Ability to have extended paving season
- Ability to haul material from a plant to remote location

Reclaimed Asphalt Pavement (RAP) & Recycled Asphalt Shingles (RAS)

- Adds recycled asphalt pavement to HMA mix
- Pilot projects in 2012/2013: High RAP and RAS
- Caltrans supports use of RAP/RAS because it
 - Is cost effective
 - Reduces the use of virgin aggregate and landfill space
 - Reduces green house gases emissions



In-Place Recycling

- Cold in-place
- Full Depth Reclamation:
 - Pulverization
 - With foamed asphalt and cement
 - With cement



Manage Assets

1 DATA COLLECTION

EVERY ROUTE



Comprehensive Pavement Structures
GPR: Ground Penetrating Radar



Distress Identification
APCS: Automated Pavement Condition Survey

One Time

Annual

2 ROUTE SEGMENTATION

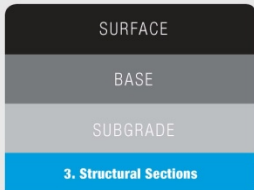
EVERY ROUTE



1. Truck Traffic



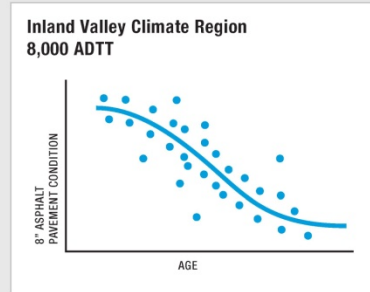
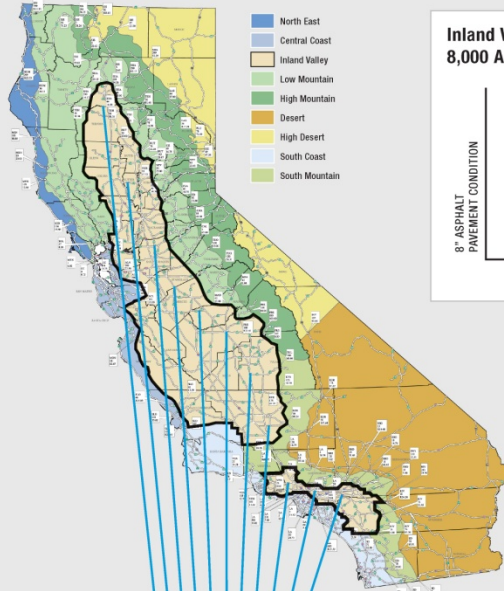
2. Climate Regions



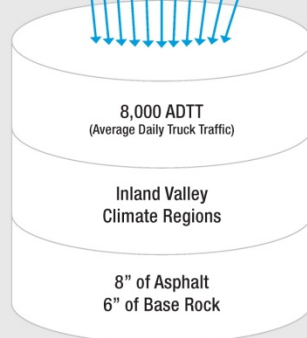
3. Structural Sections

3 MODELING

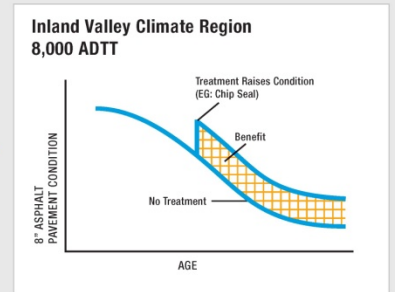
NINE CALTRANS PAVEMENT CLIMATE REGIONS



ASPHALT PERFORMANCE MODELING EXAMPLE



4 DATA OUTPUT/WORK PLAN



CONDITION PREDICTION FROM ONE OF 330 PERFORMANCE MODELS

What?	Where?	When?
<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Which treatments to apply	To which sections	In which year

COST/BENEFIT:

1. How much will it cost to get the roads to a certain condition?
2. What condition will the pavement be in with the funding available?

ROUTE SEGMENTATION OF THE NETWORK COMBINES SIMILAR TRAFFIC, CLIMATE AND STRUCTURAL SECTIONS.

Efficiently Managing California Roads!

Thank You

