Welcome to California!

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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

- 47% City
- 36% County
- 17% State

Total state network: Approx. 300,000 lane miles
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

![Bar chart showing annual value of programmed projects and annual value of ten-year plan in billions of dollars from 2004 to 2016.](image-url)
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 has 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 greenhouse gases emissions
In-Place Recycling

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

1. **DATA COLLECTION**
   - GPR
   - Comprehensive Pavement Structures
     - GPR: Ground Penetrating Radar
     - APCS: Automated Pavement Condition Survey

2. **ROUTE SEGMENTATION**
   - 1. Truck Traffic
   - 2. Climate Regions
   - 3. Structural Sections

3. **MODELING**
   - NINE CALTRANS PAVEMENT CLIMATE REGIONS
   - Inland Valley Climate Region
     - 8,000 ADTT
   - Asphalt Performance Modeling Example

4. **DATA OUTPUT/WORK PLAN**
   - Inland Valley Climate Region
     - 8,000 ADTT
   - Condition Prediction from One of 330 Performance Models

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

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?
Efficiently Managing California Roads!

Thank You