Caltrans is responsible for managing

- 12,559 Highway Bridges.
- 347 Short Highway Bridges.
- 89 Highway Tunnels.
- 789 Earth Retaining Structures.
- 1,115 Pedestrian and Railroad bridges.
- 24,000+ Overhead sign structures.
- Inspect 11,637 local agency bridges.
State Bridge Inventory

12,559 Bridges
- 223 million square feet
- Median Age of 41 years

Structure Types
- 89% Concrete
- 7% Steel
- 4% Timber
Bridge Preservation Organization

- Inspection is centralized from three offices.
- Inspectors are licensed Civil Engineers.
- Inspectors have design, construction and inspection experience.
- Projects are managed from 12 districts.
- Bridge maintenance crews operate out of all 12 districts.
Identification of Bridge Needs

- Regular bridge inspections identify bridge specific deterioration based needs.
- Structural analysis identifies vulnerabilities to seismic events.
- Hydraulic and structural analysis identify bridges with vulnerabilities to scour.
- Changing bridge safety standards identify bridges with deficient bridge rails.
- Raising and strengthening needs are identified through evaluation of goods movement and system constraints.
Changing Safety Standards  
Seismic Analysis  
Operational Improvements  
Scour Analysis  
Inspection Findings

All Bridge Needs

Caltrans Crew Work  
(Minor repair work and bridge painting)

Major Maintenance  
(Major repairs and preventative maintenance)

SHOPP  
(Rehab, replacement, safety and risk mitigation)

- Crew work is tracked by date of recommendation.
- A priority for the repair is determined by the engineer.
- Performance measures are used to monitor program.

- Needs are tracked by date of recommendation.
- Needs are minor or preventative in nature.
- Priority for the repair is determined by engineers.
- Performance measures are used to monitor program.

- Needs split out into components based on the type of need.
- Priorities are based on structural needs, economic analysis and risks using utility functions.
- Full project management in place.
Bridge Maintenance Crews

- Caltrans employees bridge maintenance crews in all districts.

- Crews respond to bridge damage and minor repairs identified by inspectors.
  - Spall repair
  - Pourable joint replacement
  - Painting

- Performance is measured by the time it takes to retire inspection recommendations.
Bridge Major Maintenance Contracts

- Maintenance work beyond the crews capacity is packaged into bridge maintenance contracts.
- Contract maintenance work includes major repairs and preventive work.
- Performance is measured by the time it takes to retire recommendations (backlogged work).
Bridge Major Maintenance Percentage of all preservation dollars

- Paint: 24%
- Decks/Appr: 51%
- All Others: 18%
- Joints: 7%
Bridge Maintenance Contract Funding and Backlog

Bridge Maintenance Program
2001 - 2005
Bridge Maintenance Contract Funding and Backlog

Funding Level (Million $)

1,000
2,000
3,000
4,000

01/02 02/03 03/04 04/05 05/06 06/07 07/08 08/09 09/10 10/11 11/12 12/13 13/14

1,500
2,000
2,500
3,000
3,500
4,000

Fiscal Year

2005 Five Year Maintenance Plan

Actual

2005 Five Year Maintenance Plan
Rehabilitation and Replacement

- Capital rehabilitation, replacement and risk mitigation projects in four year funding plan.
- State Highway Operation Protection Plan approved by Transportation Commission.
- Performance is measured by reporting distressed bridge counts.
  - A distressed bridge is defined as a bridge with an identified rehabilitation, replacement, scour or seismic need.
Major Bridge Needs
Percentage of dollars by action type

- Replacement: 24%
- Seismic: 26%
- Rail Upgrade: 17%
- Deck Rehab: 10%
- Super Rehab: 7%
- Scour: 7%
- All Others: 9%
Major Bridge Needs
Percentage of dollars by nature of need

- **Replacement**: 24%
- **Traffic Safety**: 17%
- **Condition**: 26%
- **Vulnerabilities**: 33%
Prioritizing Capital Needs

- Needs consist of condition, vulnerability and safety needs.

- Project level decisions are based on Peer Reviews
  - Consensus recommendation by multi-discipline team.
  - Life cycle cost analysis considered.
  - Constructability and traffic handling evaluated.

- Projects prioritized using multi-objective utility functions
  - Allows condition, vulnerabilities and safety to be considered in a benefit cost framework.
2005 - 2009 Bridge Preservation Programs

- **Maintenance Program**
  - 8,623 Bridges
    - Current: 69%
    - Goal: 85%
    - 300 Bridges/Yr
  - 2,544 Bridges
    - Current: 20%
    - Goal: 10%
    - 40 Bridges/Yr

- **Preservation Program**
  - 1,333 Bridges
    - Current: 11%
    - Goal: 5%
    - 17 Bridges/Yr

- **Rehab. Program (SHOPP)**
  - 9,122 Bridges
    - Current: 71%
    - Goal: 85%
    - 560 Bridges/Yr
  - 2,835 Bridges
    - Current: 22%
    - Goal: 10%
    - 20 Bridges/Yr
  - 870 Bridges
    - Current: 7%
    - Goal: 5%
    - 20 Bridges/Yr
Summary

- Three pronged approach to bridge preservation (crews, maintenance contracts and capital contracts)
- Flexibility to move funds between Capital and Preventive funds allows better network management.
- Inflow of preventive maintenance contract needs are increasing but new rehab needs are decreasing.
- Priorities of crew and preservation work is set by inspector as a timeframe for completion of work.
- Capital rehabilitation and replacements compete in a multi-objective utility cost benefit framework.
- Simple performance measures help decision makers understand bridge preservation needs.