



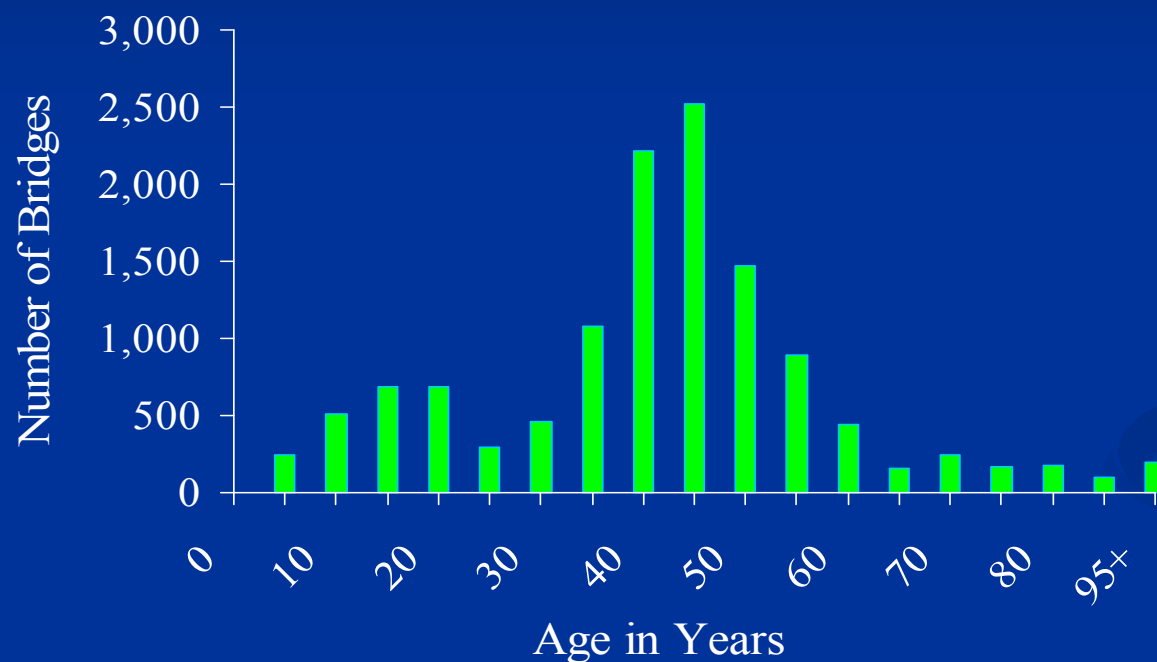
Bridge Preservation Decision Making

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Structure Assets Managed

- 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.

Caltrans Bridge Preservation Process

Changing Safety Standards



Scour Analysis



Seismic Analysis



Operational Improvements



Inspection Findings



All Bridge Needs

Caltrans Crew Work
(Minor repair work and bridge painting)



- 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

Major Maintenance
(Major repairs and preventative maintenance)



- 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

SHOPP
(Rehab, replacement, safety and risk mitigation)



- 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

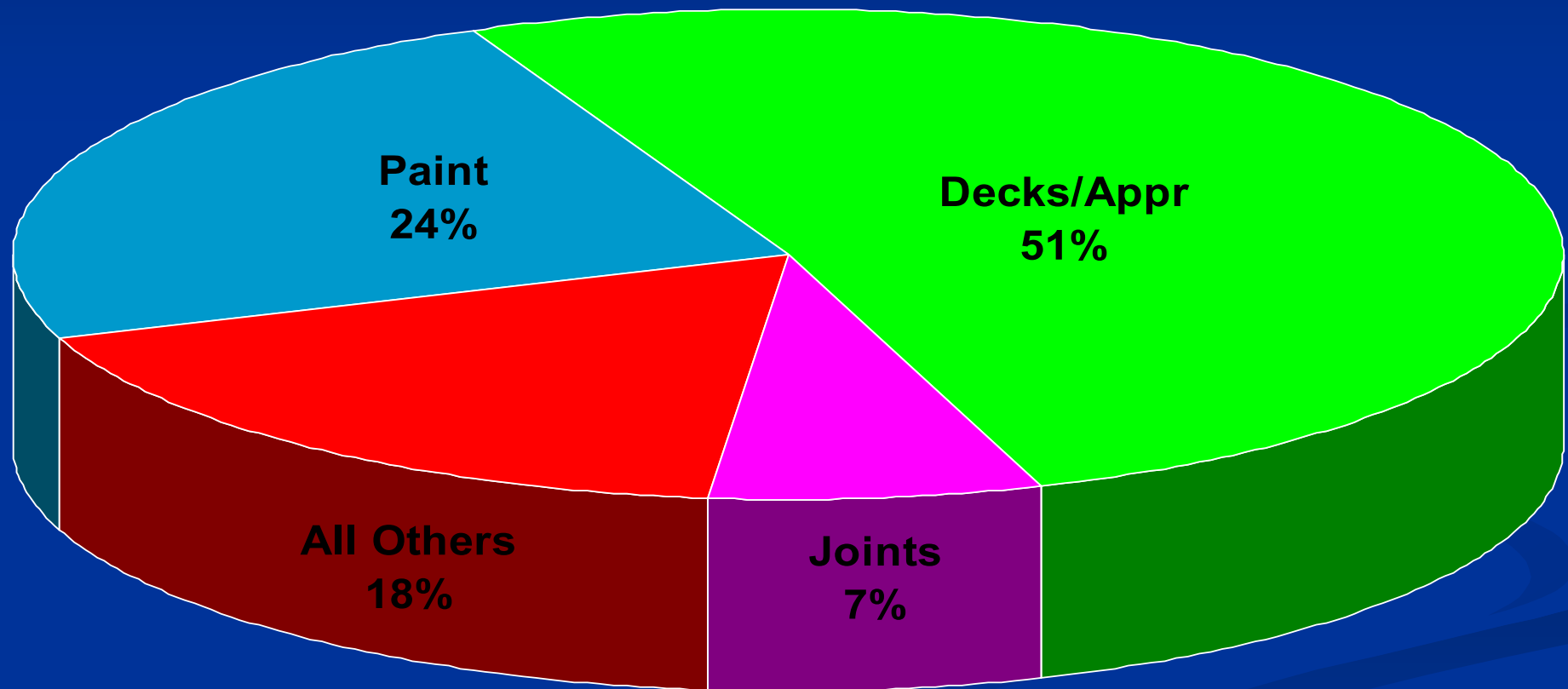
- Caltrans employees bridge maintenance crews in all districts.
- Crews respond to bridge damage and minor repairs identified by inspectors.
 - Spall repair
 - Pourable joint replacement
 - Painting
- Performance is measured by the time it takes to retire inspection recommendations.

Bridge Major Maintenance Contracts

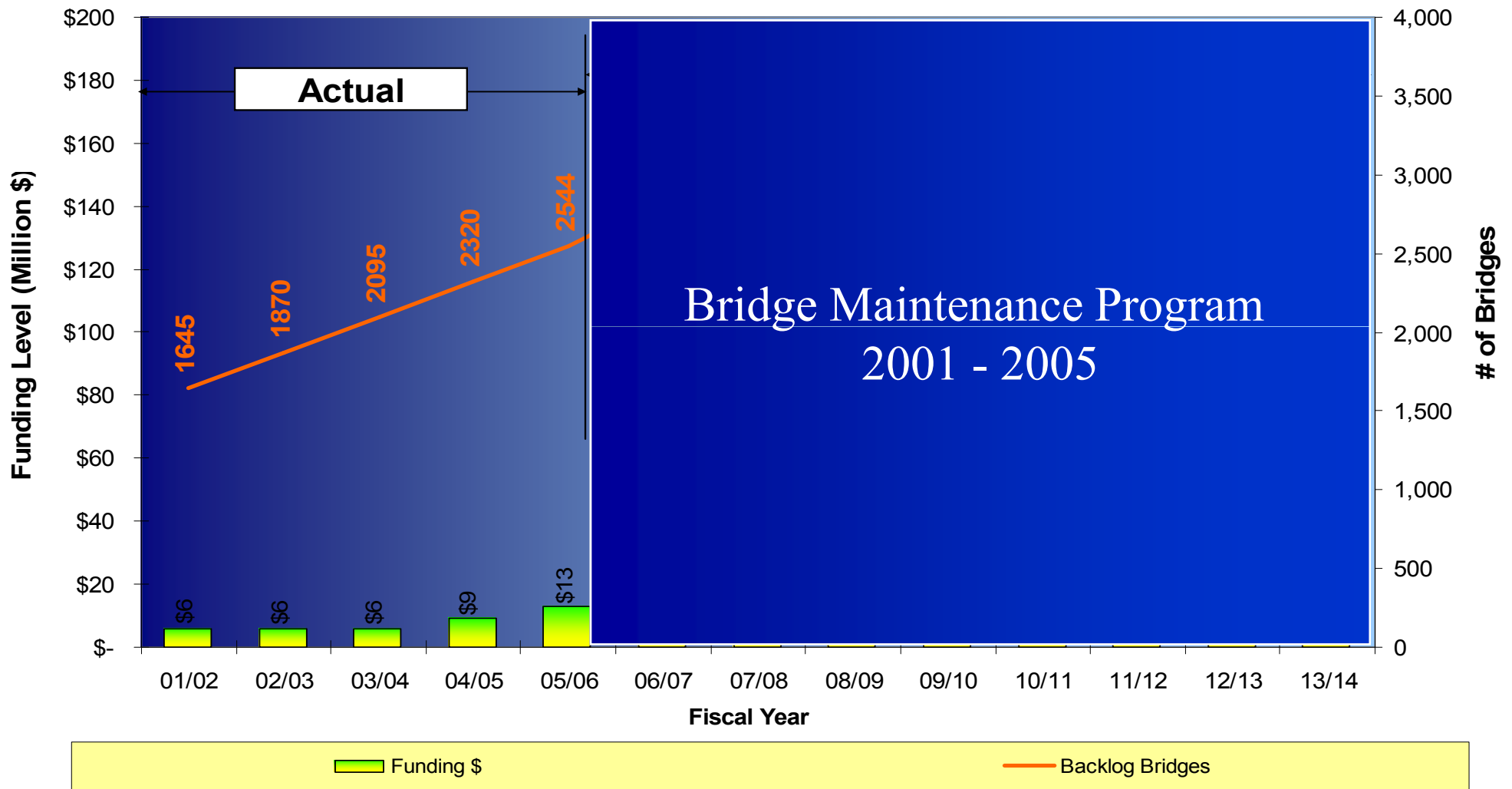
- Maintenance work beyond the crews capacity is packaged into bridge maintenance contracts.
- Contract maintenance work includes major repairs and preventive work.
- Performance is measured by the time it takes to retire recommendations (backlogged work).

Bridge Major Maintenance

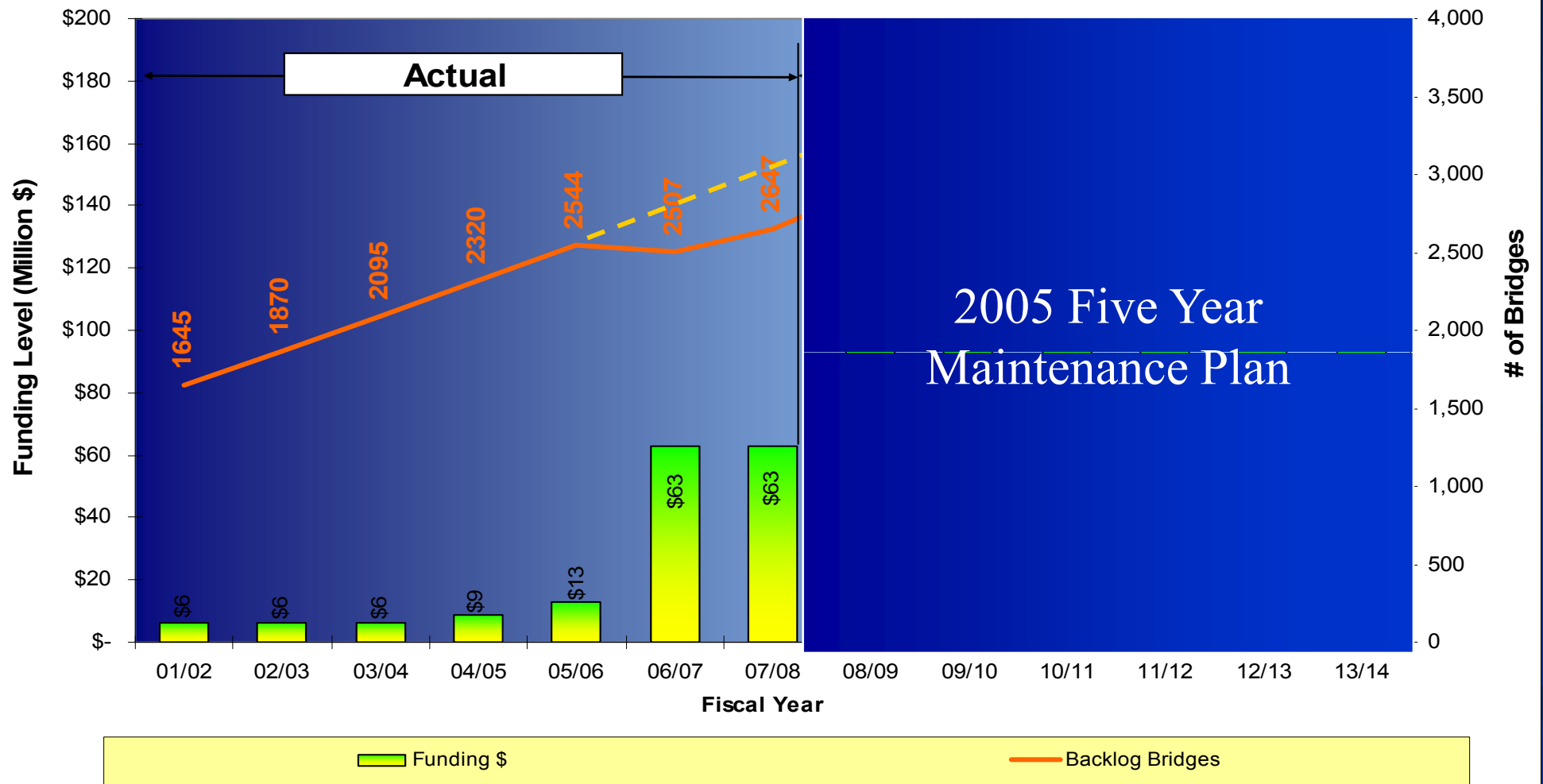
Percentage of
all preservation dollars



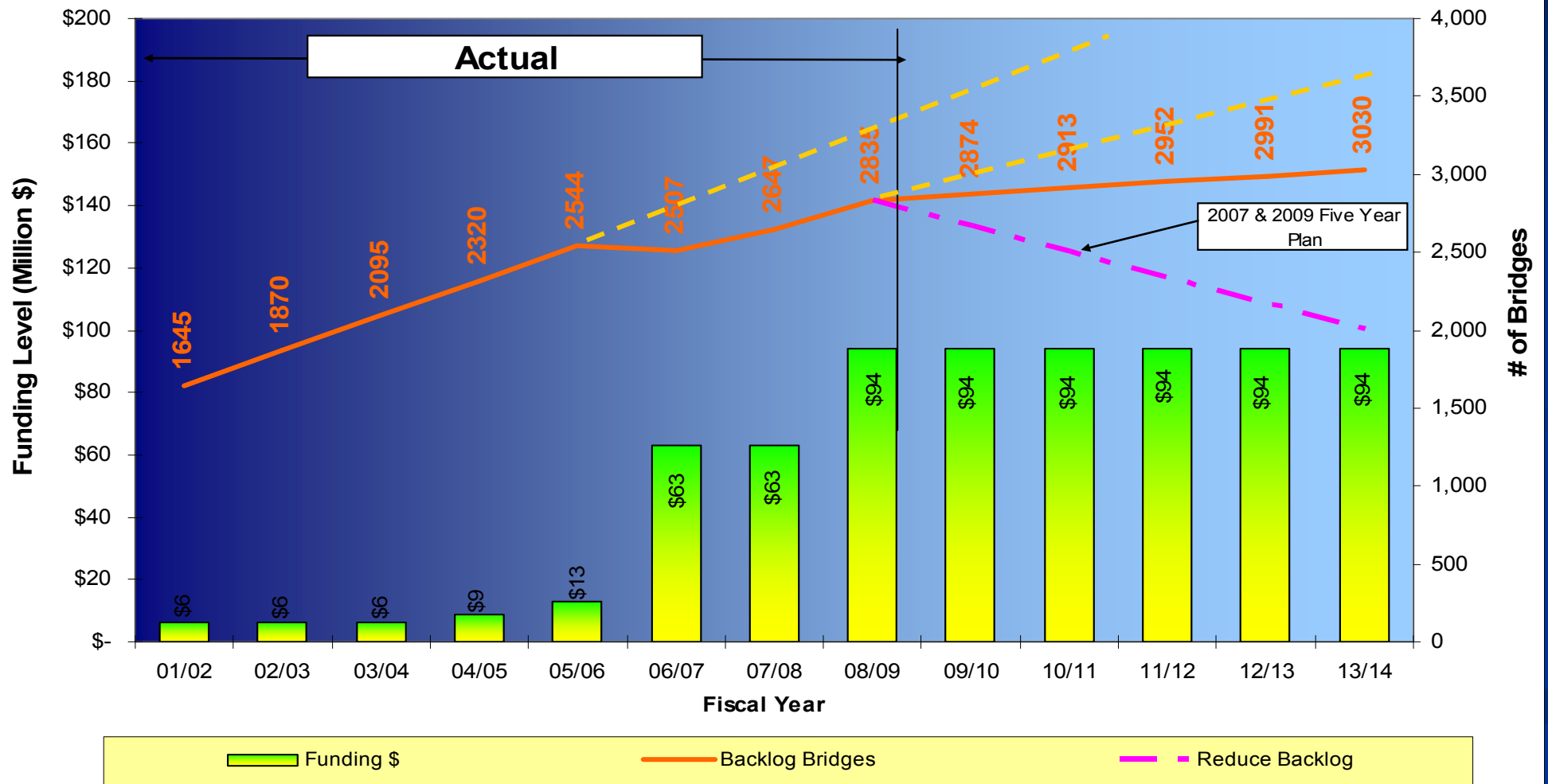
Bridge Maintenance Contract Funding and Backlog



Bridge Maintenance Contract Funding and Backlog



Bridge Maintenance Contract Funding and Backlog

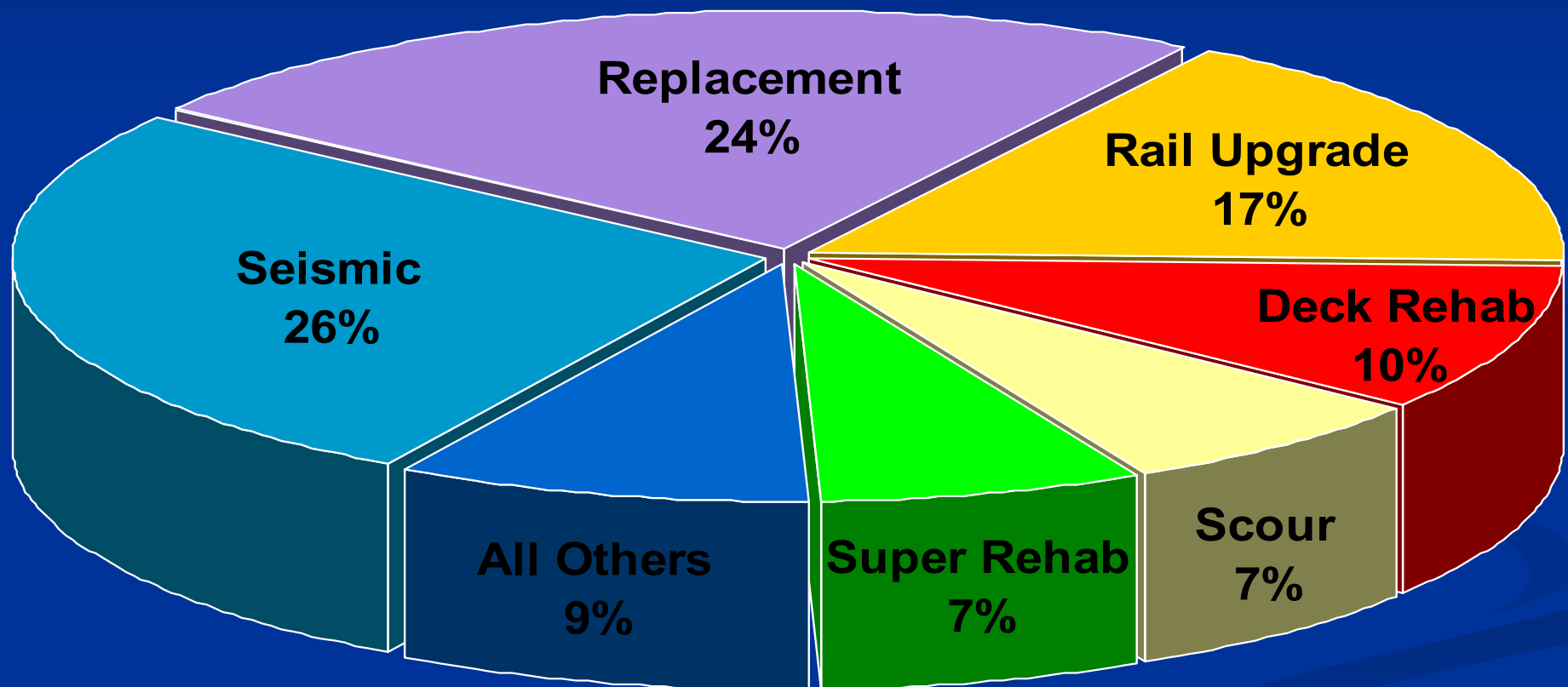


Rehabilitation and Replacement

- 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.

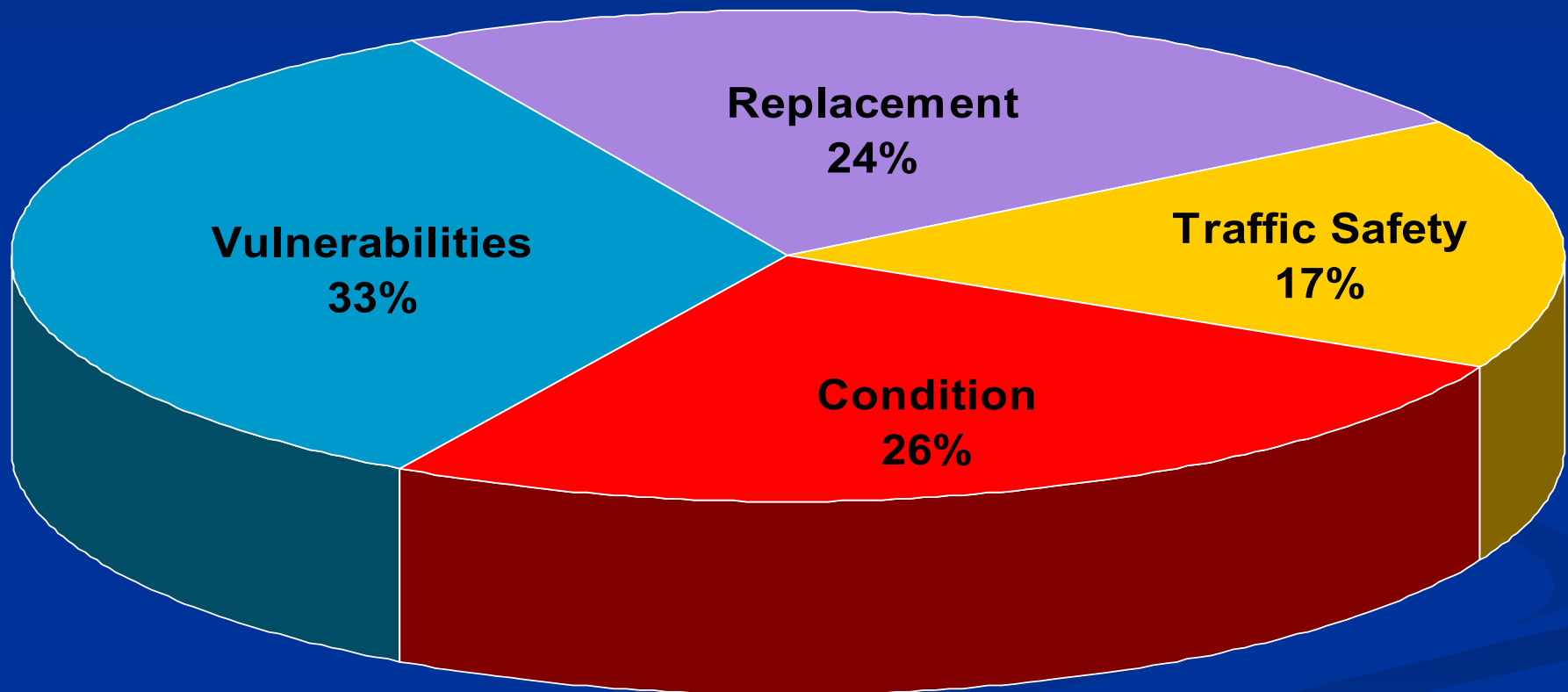
Major Bridge Needs

Percentage of dollars by action type



Major Bridge Needs

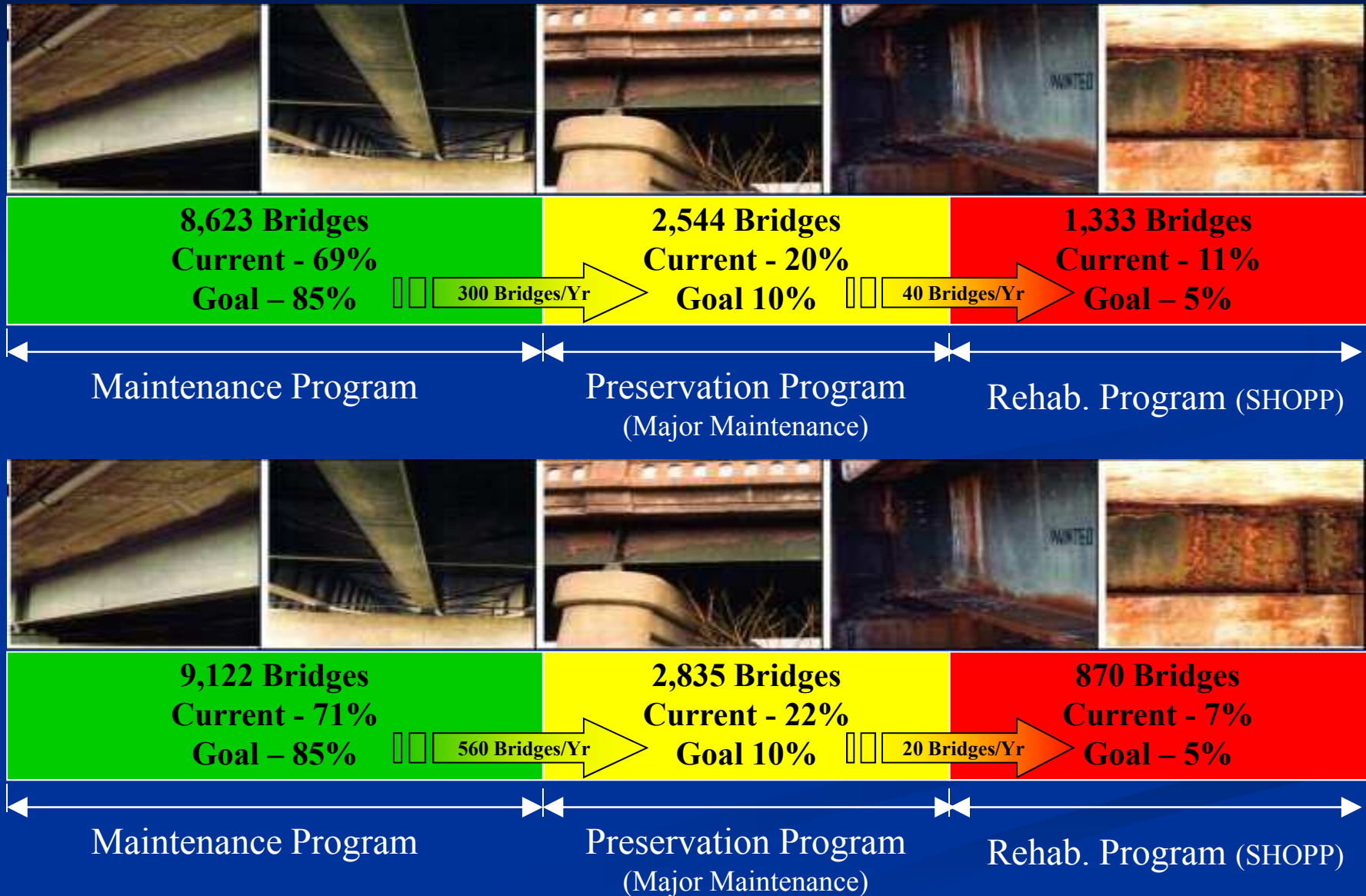
Percentage of dollars by nature of need



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



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.