

National Practices



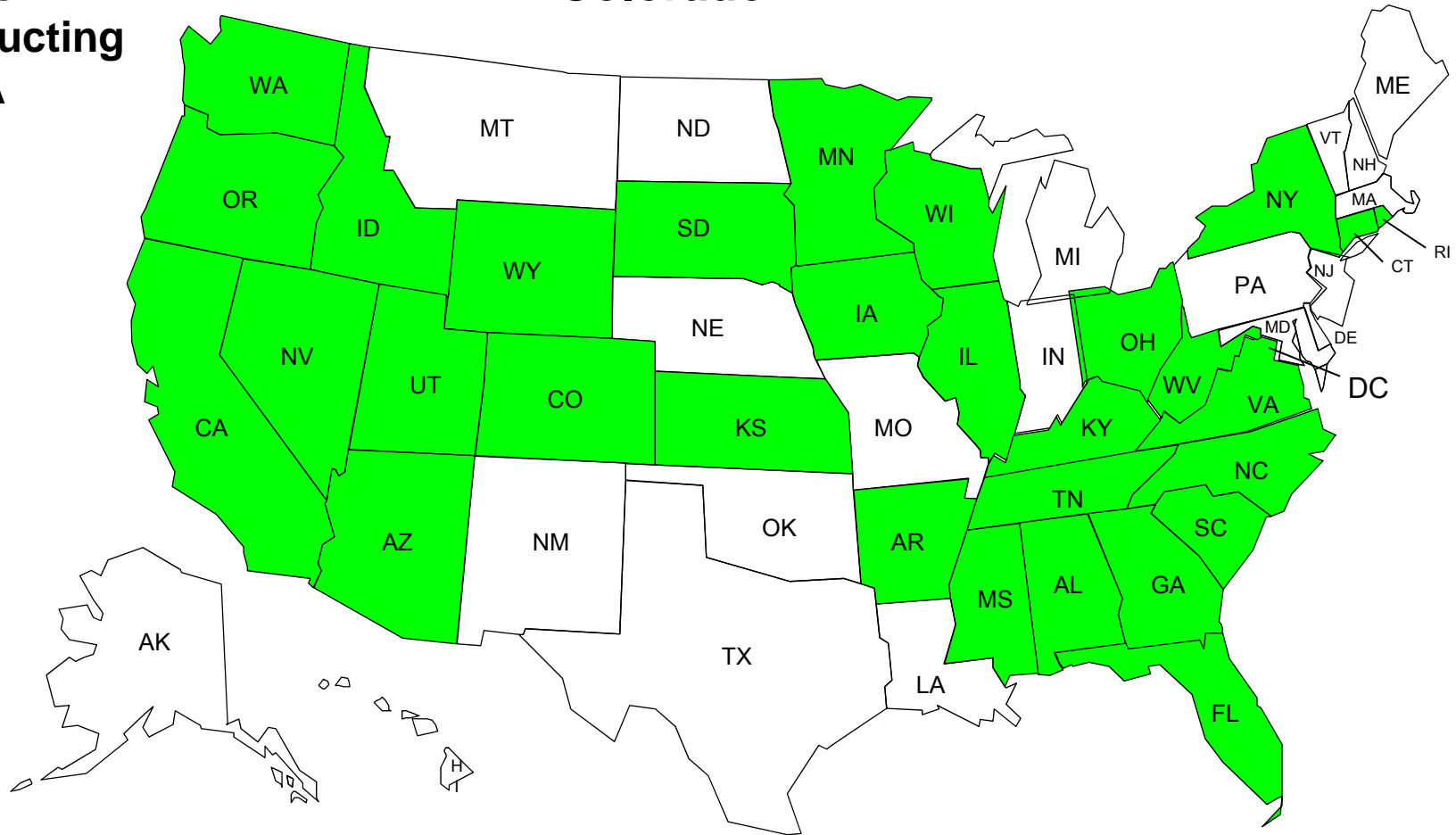
Tashia J. Clemons
Federal Highway Administration
Office of Asset Management



2007 AASHTO Survey on Pavement Type Selection

Colorado

 States
Conducting
LCCA

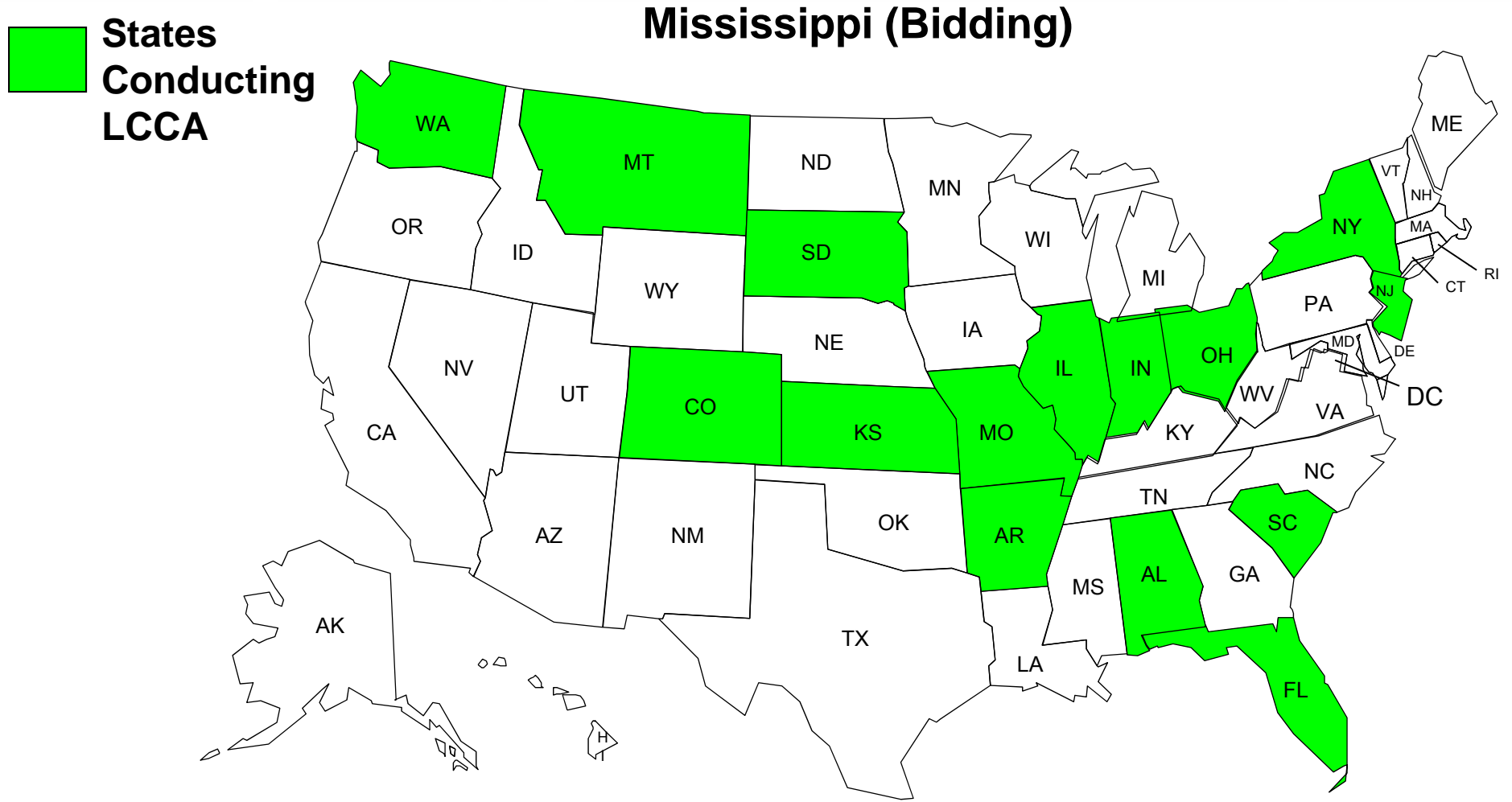




2007 AASHTO Survey on Pavement Type Selection

1. Does your agency currently utilize LCCA for determining pavement type?
2. How many years long is your analysis period?
3. What discount rate do you utilize?
4. Do you include user costs in your analysis and if so, please briefly explain how that cost is determined?
5. Flexible Alternative Maintenance Treatments Please list below the treatments you account for in your LCCA for HMA and at what year(s) during the analysis period do you assume they will occur
6. Rigid Alternative Maintenance Treatments Please list below the treatments you account for in your LCCA for PCC and at what year(s) during the analysis period do you assume they will occur
7. Does your agency utilize LCCA to develop alternate pavement type bidding procedures?

2007 AASHTO RAC Survey LCCA for Pavement Type Selection



2007 AASHTO RAC Survey LCCA for Pavement Type Selection

1. What is the standard process(es) for selecting the pavement type?
2. What experimental methods have been used for selecting the pavement type that show promise?
3. What experimental methods have been used for selecting the pavement type that you are not planning to use again?
4. Several methods for selecting the pavement type are listed for your information.
 - a) Owner makes the selection
 - b) Owner makes the selection with the use of life cycle cost analysis
 - c) Owner makes the selection with the use of life cycle cost analysis and a pavement type selection committee.
 - d) Alternate bids are used with a life cycle cost adjustment factor.
 - e) Some type of pavement warranty is included with the pavement type selection.

2006 South Carolina LCCA Survey

- Two Step Process:
 - initial survey (identify resources)
 - focused survey
- Objectives:
 - improve the existing SC LCCA approach for pavement type selection
 - determine which states are conducting an LCCA and how
 - compare present results to previous surveys





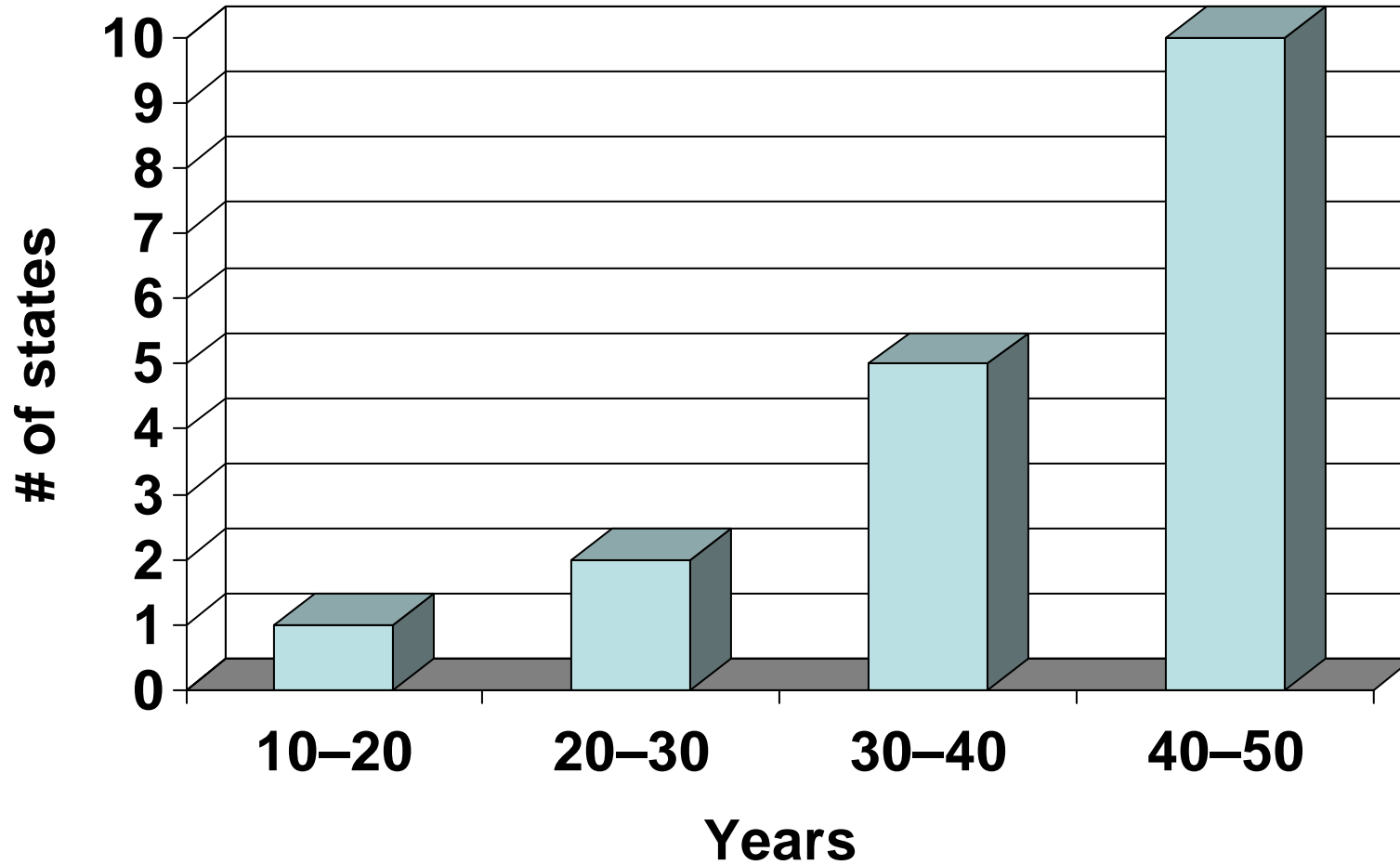
Establish Alternatives

- Rigid Pavement
- Flexible Pavement
- Slurry Seals
- Diamond grinding
- Joint Repairs
- Crack Sealing
- Chip Seals
- Mill and Overlays



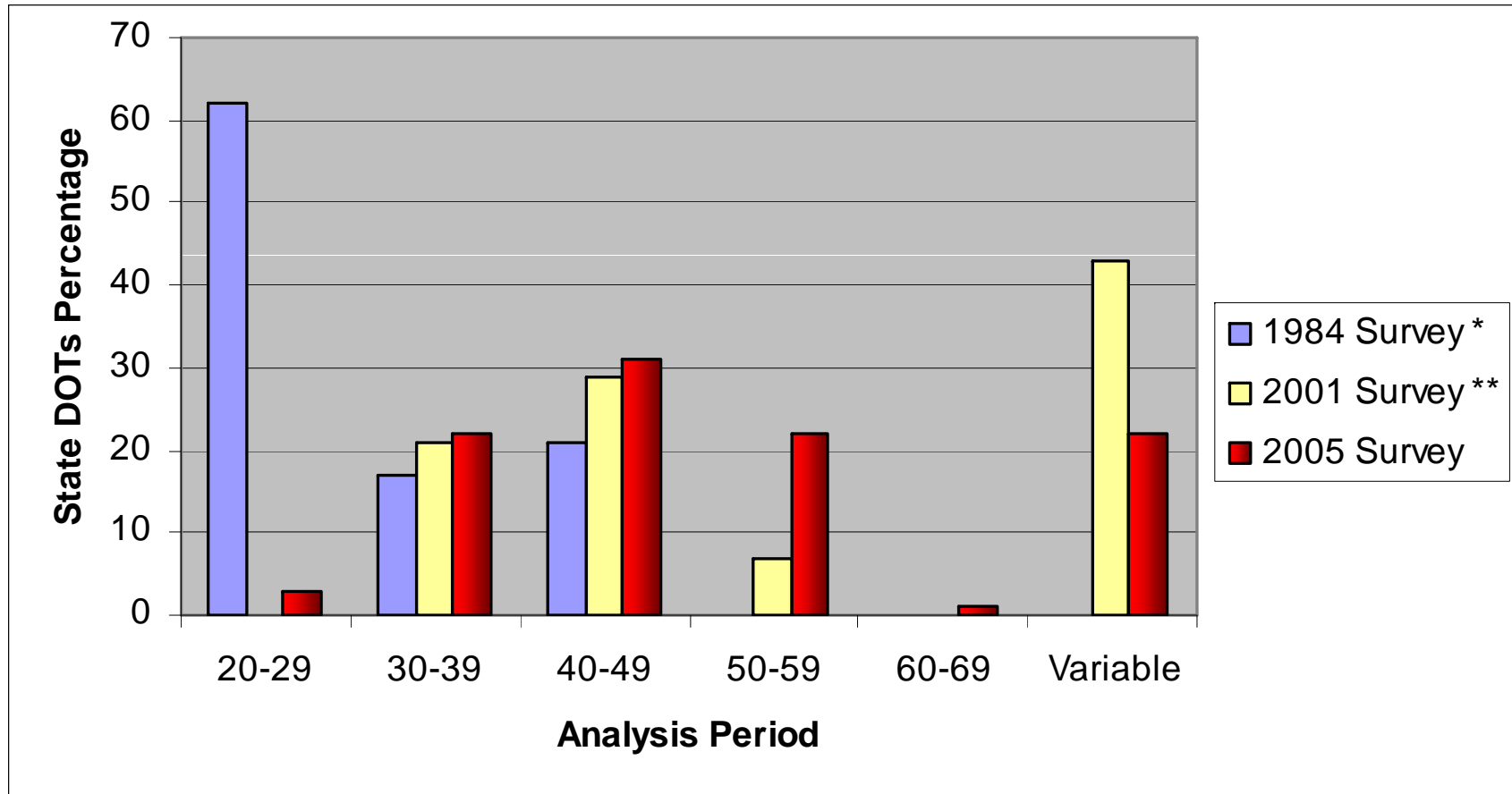


Analysis Period (AASHTO RAC Survey)

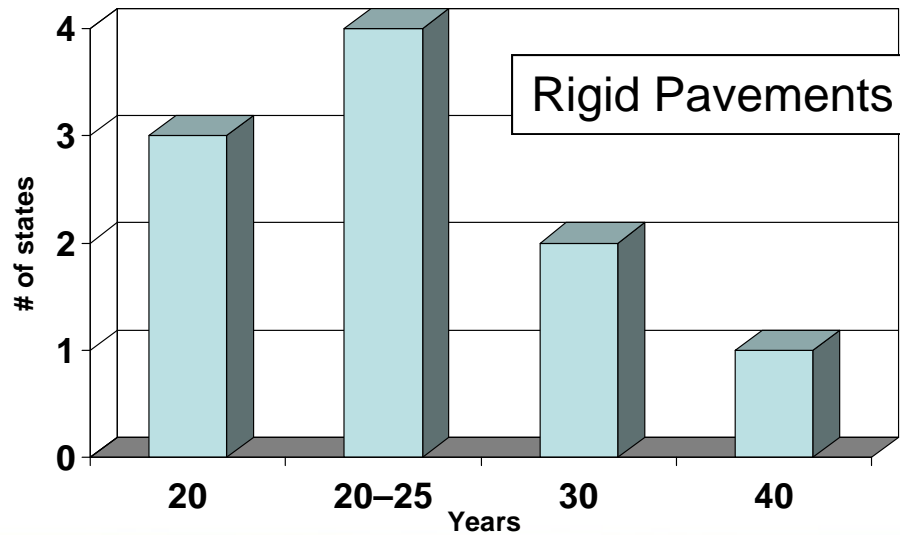
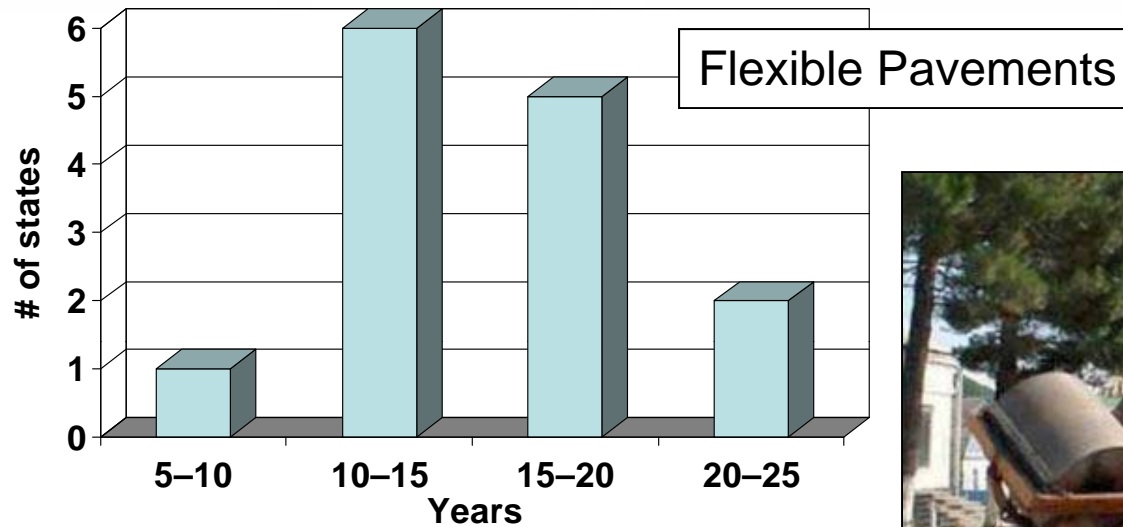




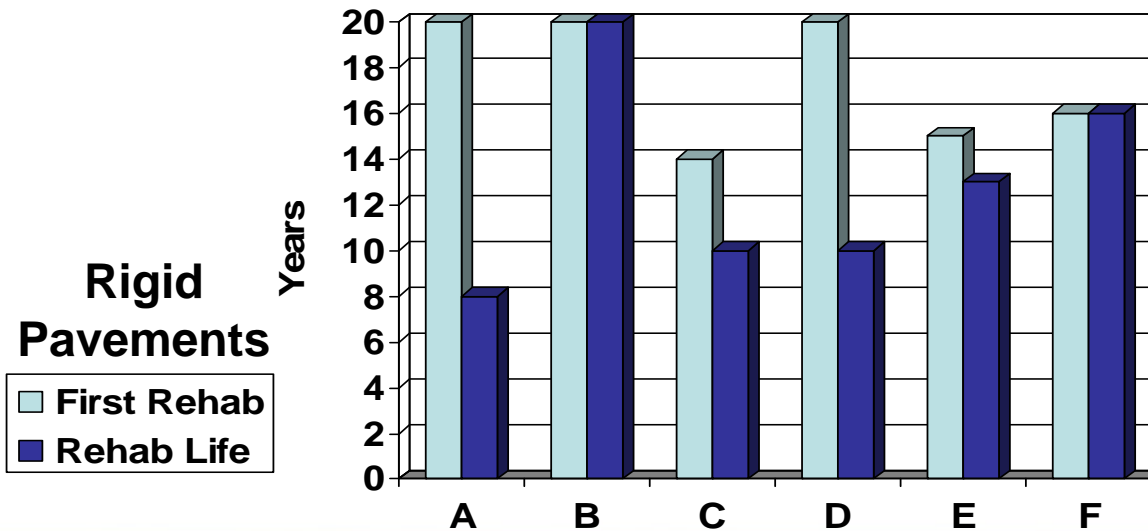
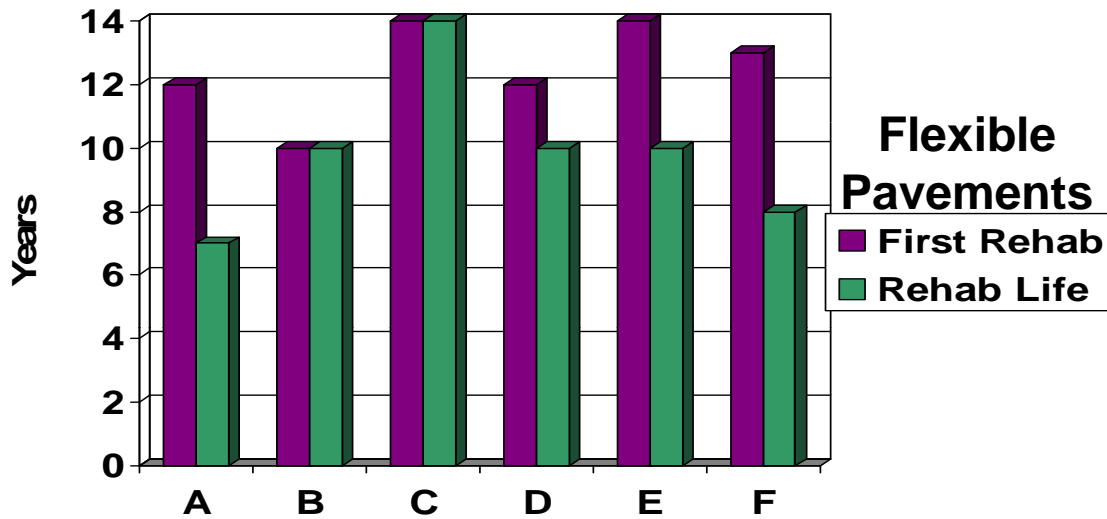
Analysis Period(SC Survey)



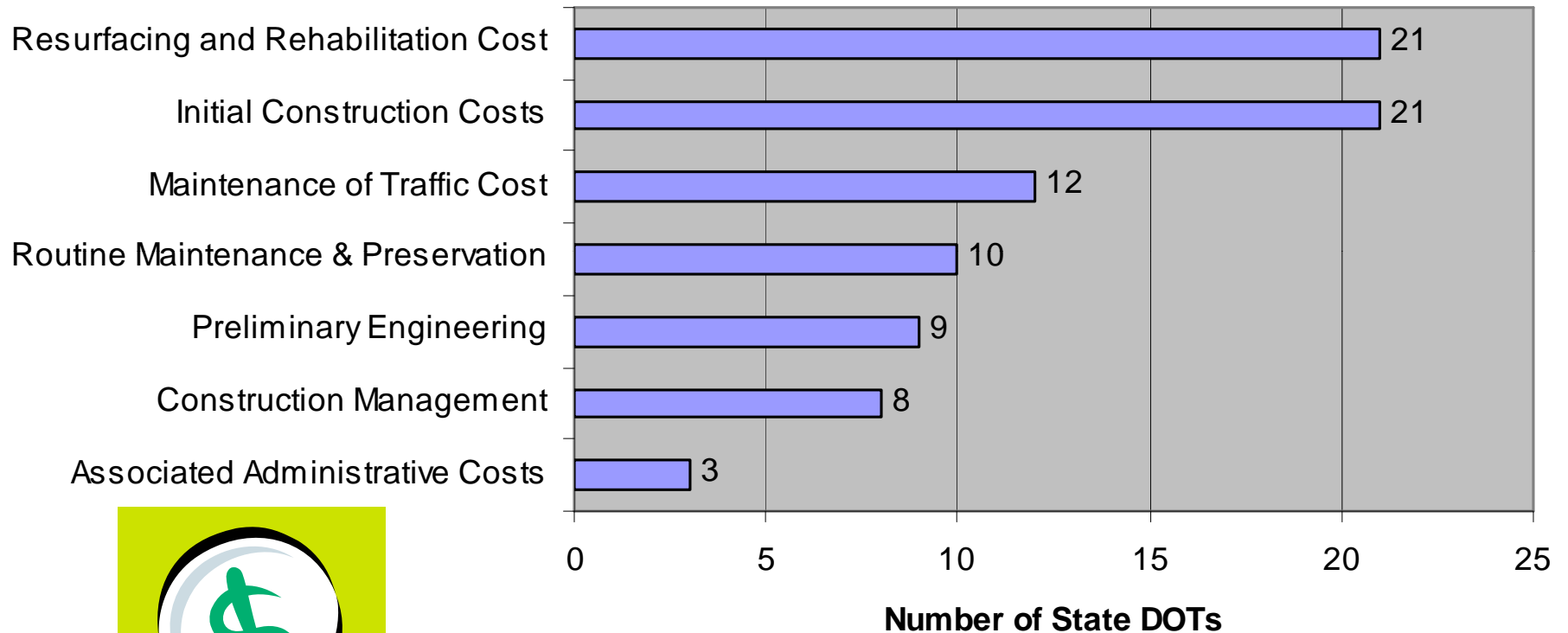
Time to First Rehab (AASHTO RAC Survey)



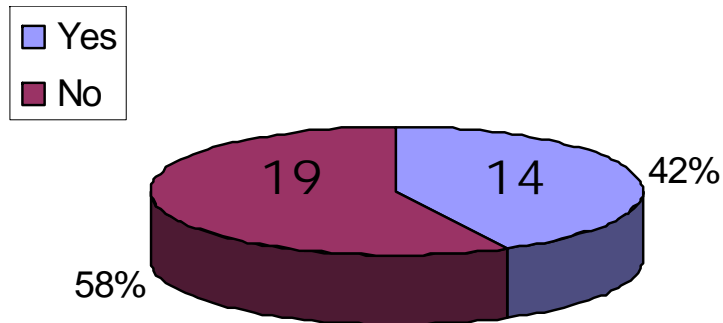
Time to first Rehab(AASHTO RAC Survey)



Costs Elements



User Costs(SC Survey)



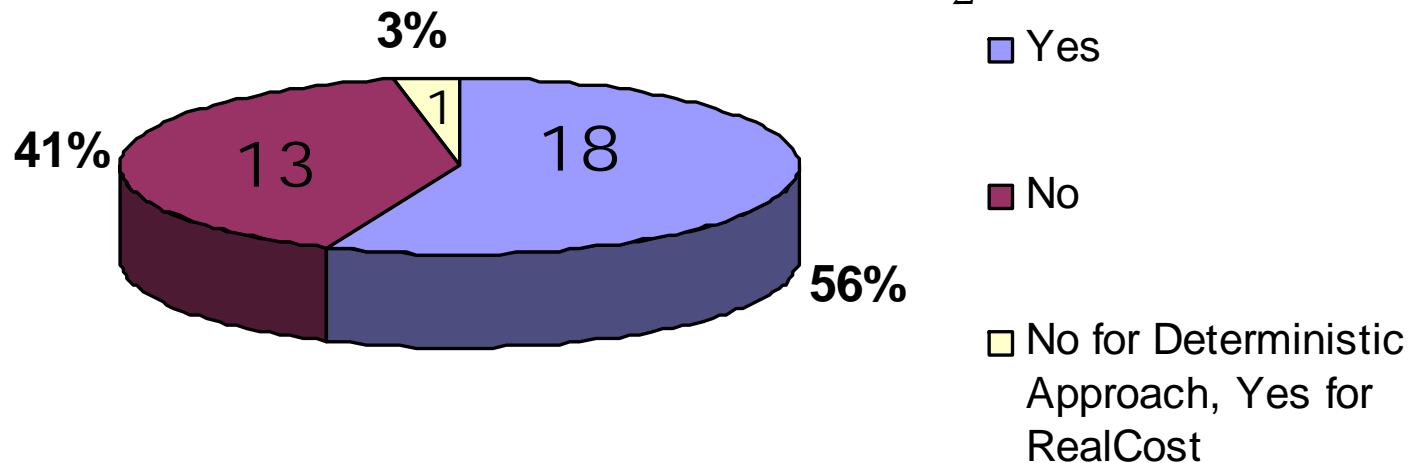
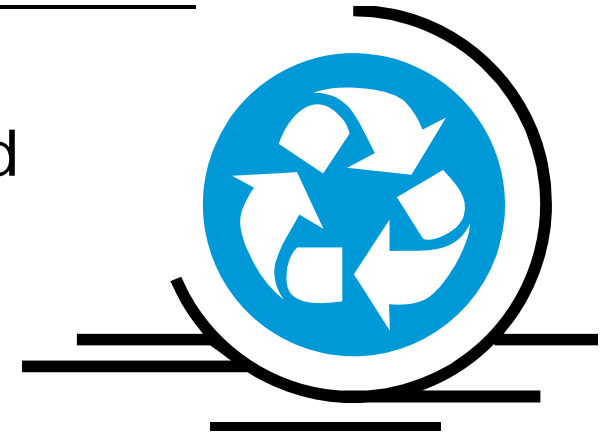
Out of 14 DOTs that include user costs in the analysis

- 10 DOTs consider work zone user delay costs
- 1 DOT uses all user cost components outlined in the LCCA Technical Bulletin

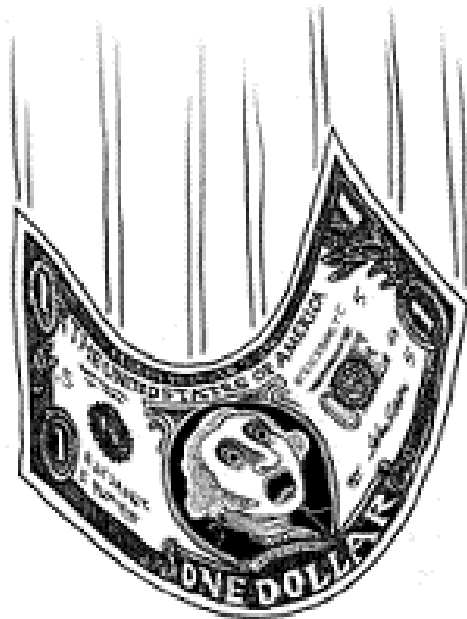
Is Salvage Value used in LCCA calculations?

The value of recovered or recycled materials

- Assumes roadway is removed from service at the end the analysis period
- Salvage value is only realized when materials are actually reclaimed



Discount Rate Utilized by State DOTs



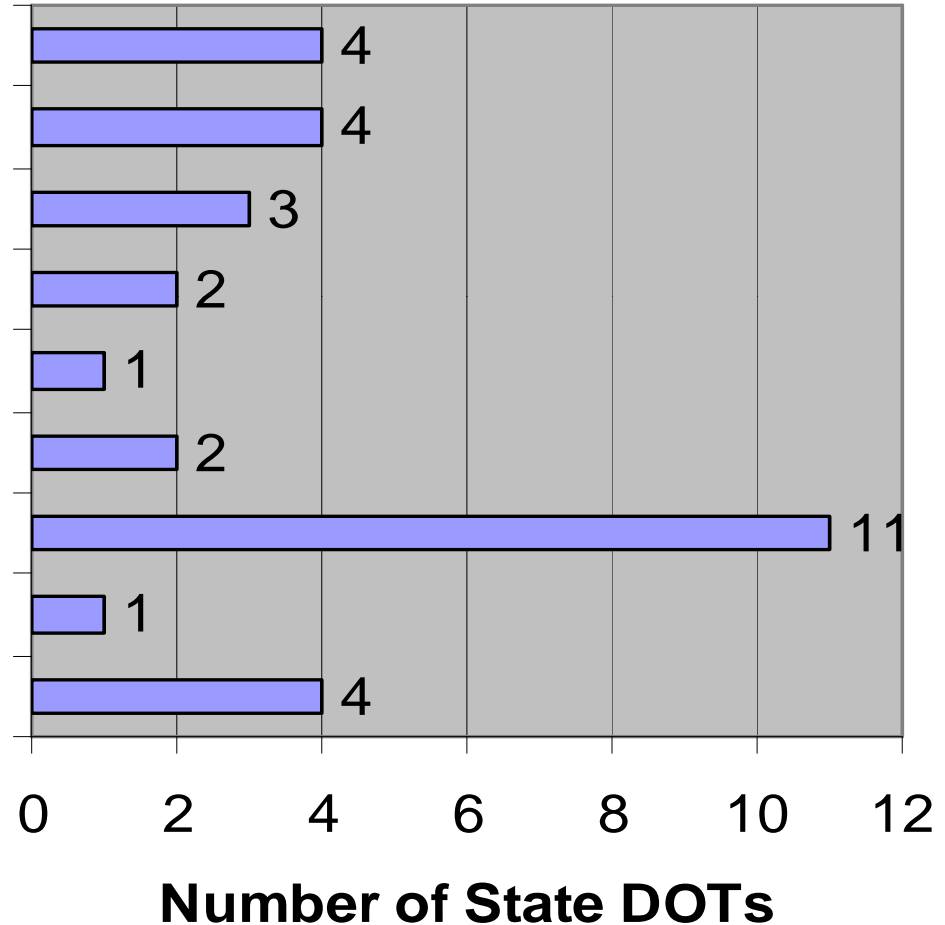
Probabilistic Approach

Varies

5.30%

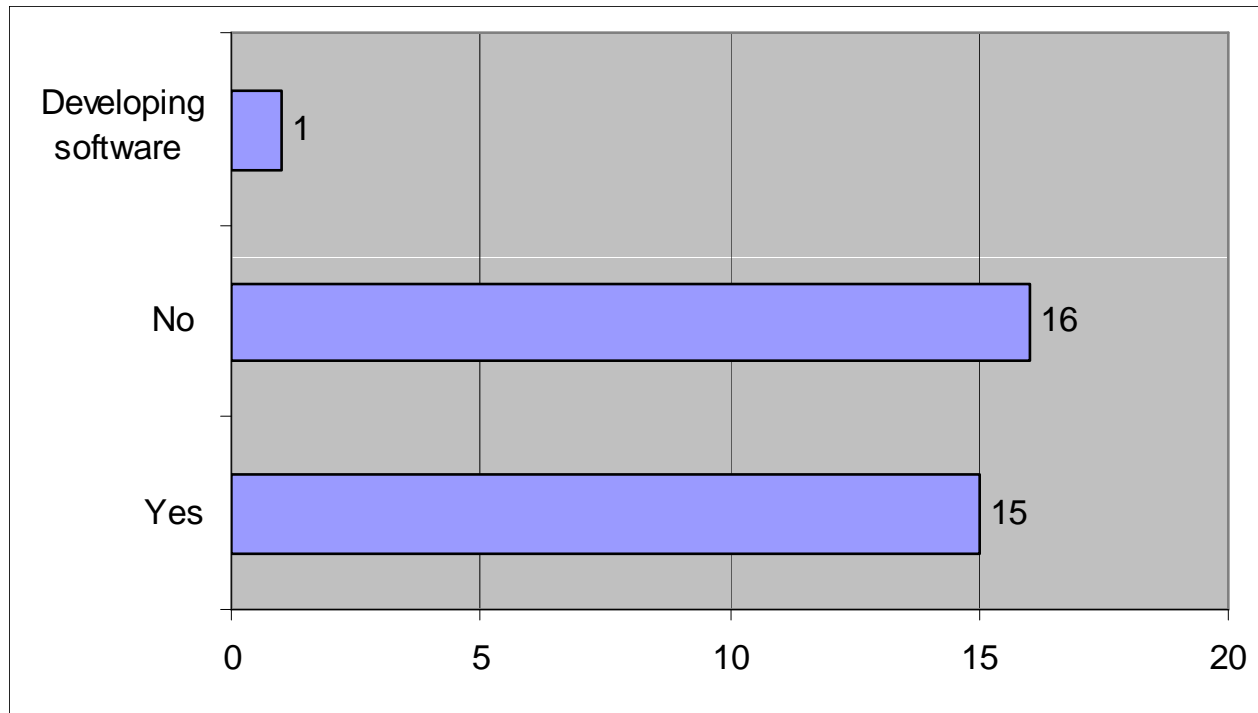
4%

3%

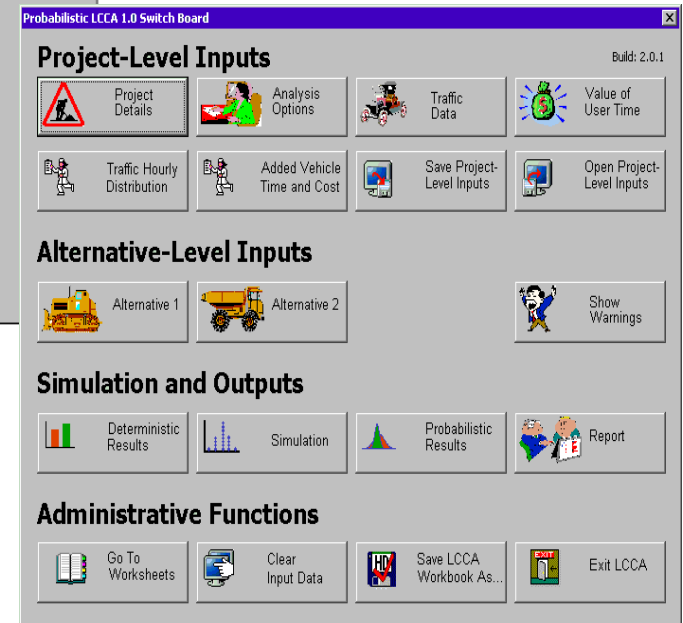
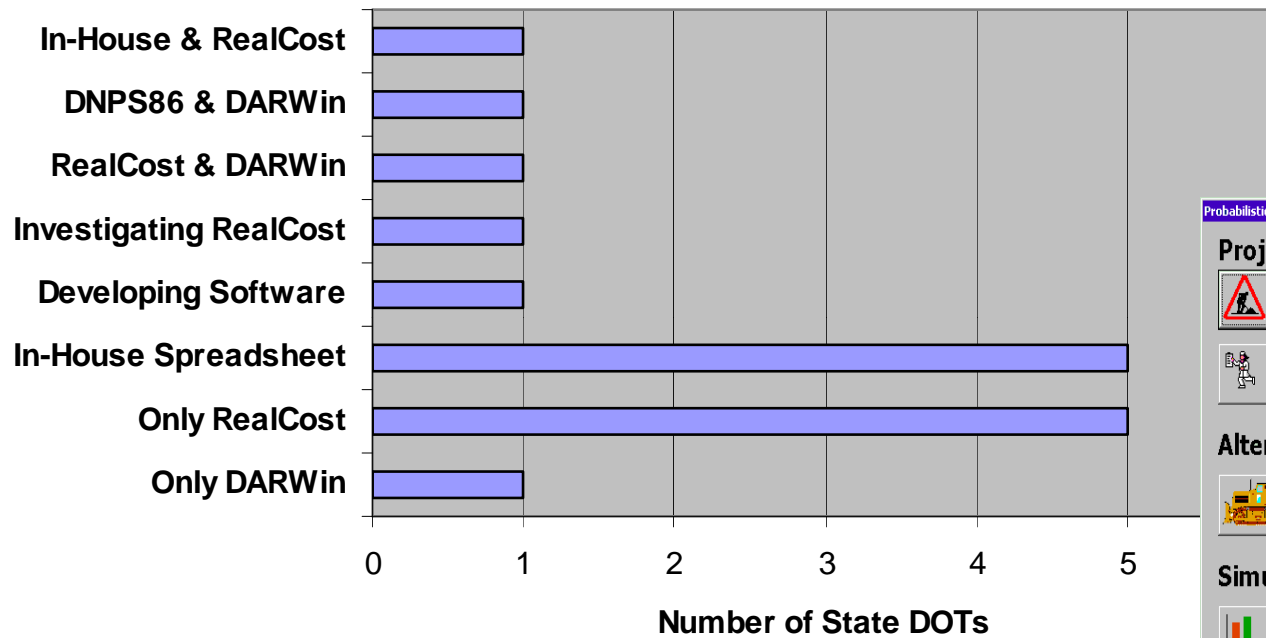




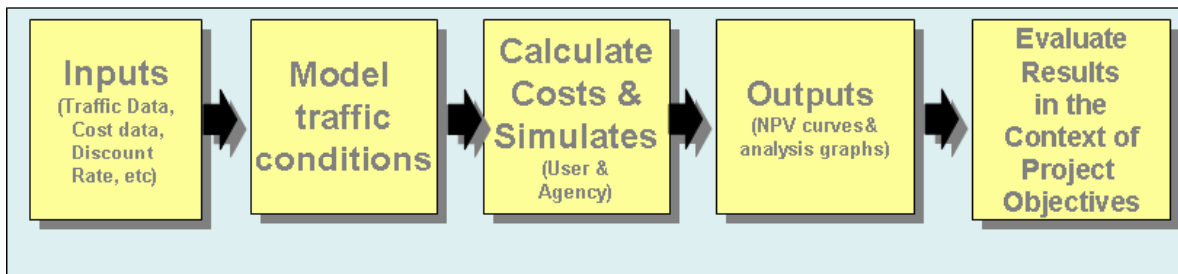
Software Utilization in LCCA



Software Utilization in LCCA



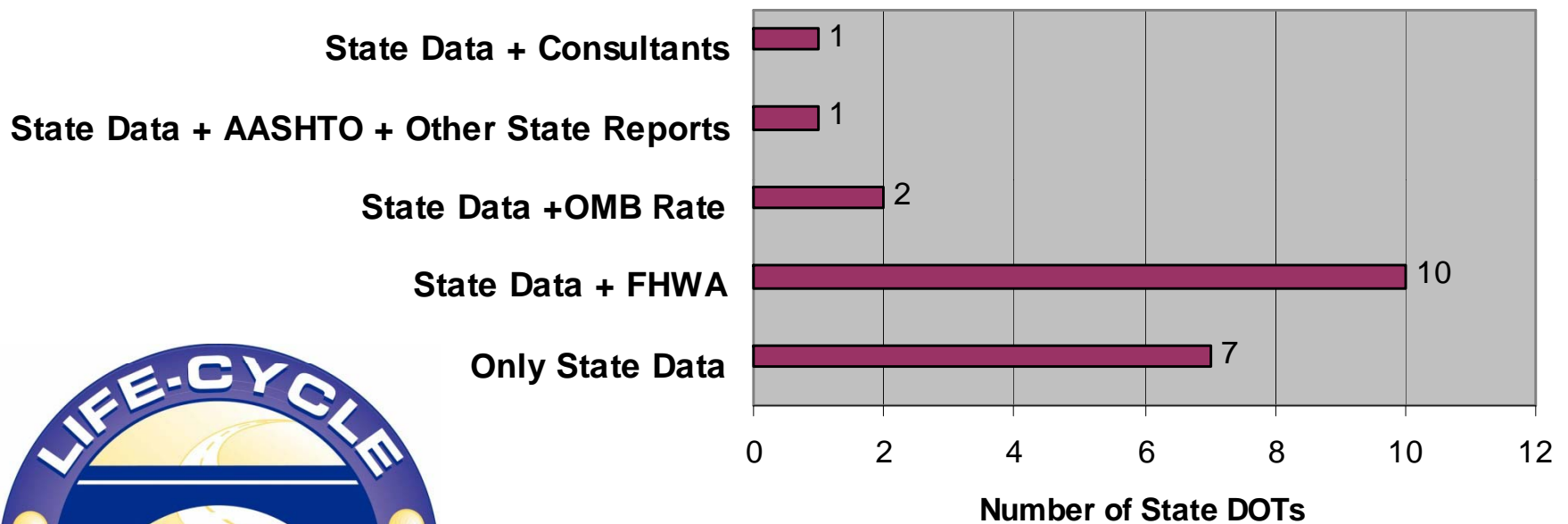
Use Function REALCOST FUNCTIONS User Function



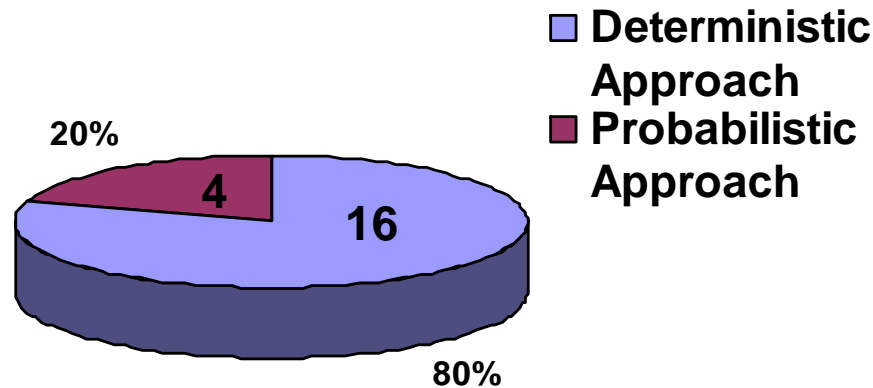
RealCost
Software

Inputs to the LCCA

Data Sources Used in Selecting the Input Parameters



Approach Used



- **Deterministic Analysis**

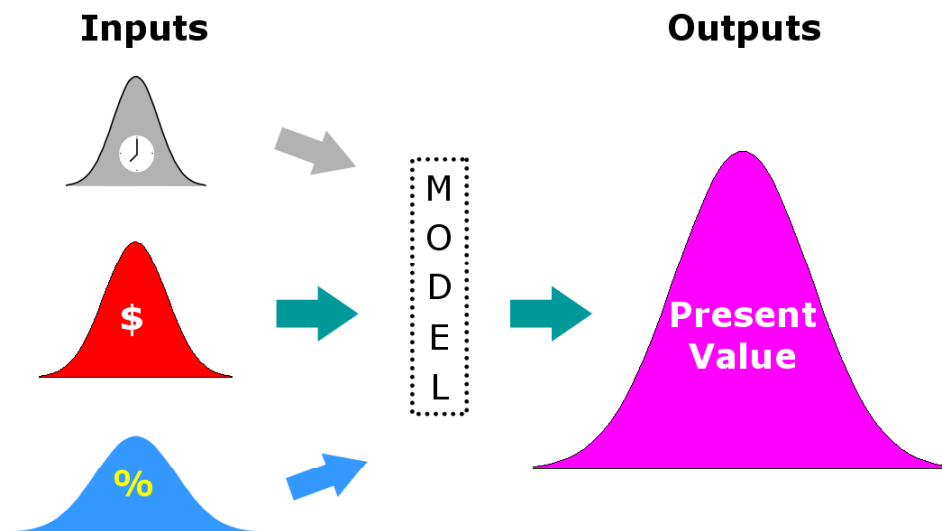
Static Inputs (No Uncertainty)

- **Sensitivity Analysis**

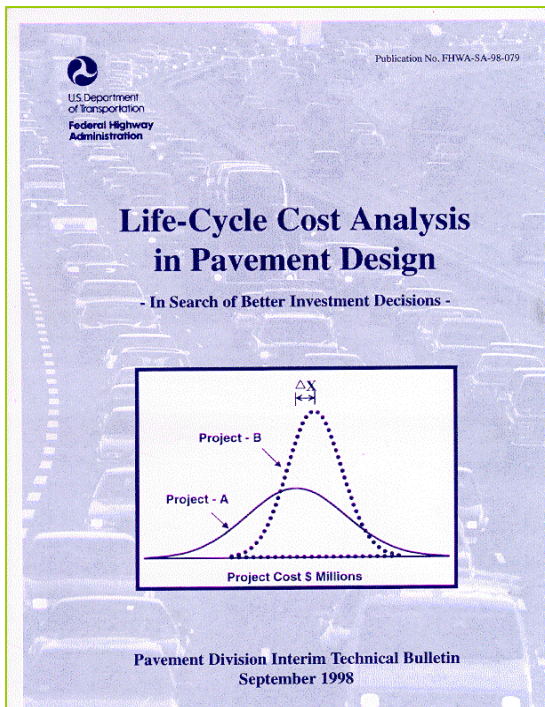
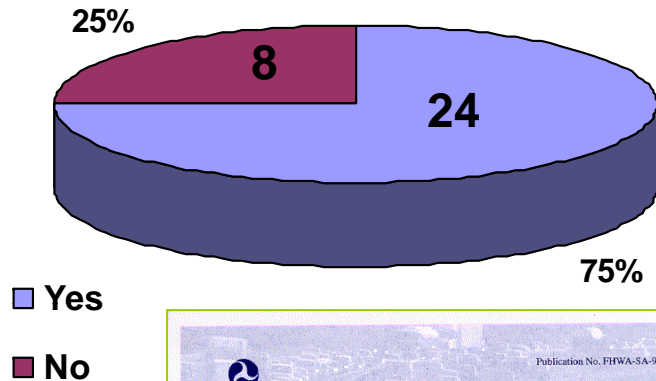
Vary one input at a time

- **Probabilistic Analysis**

Simulating/Modeling inherent uncertainty in variables and their effect on investment choices



Policy or Guidelines for Type Selection

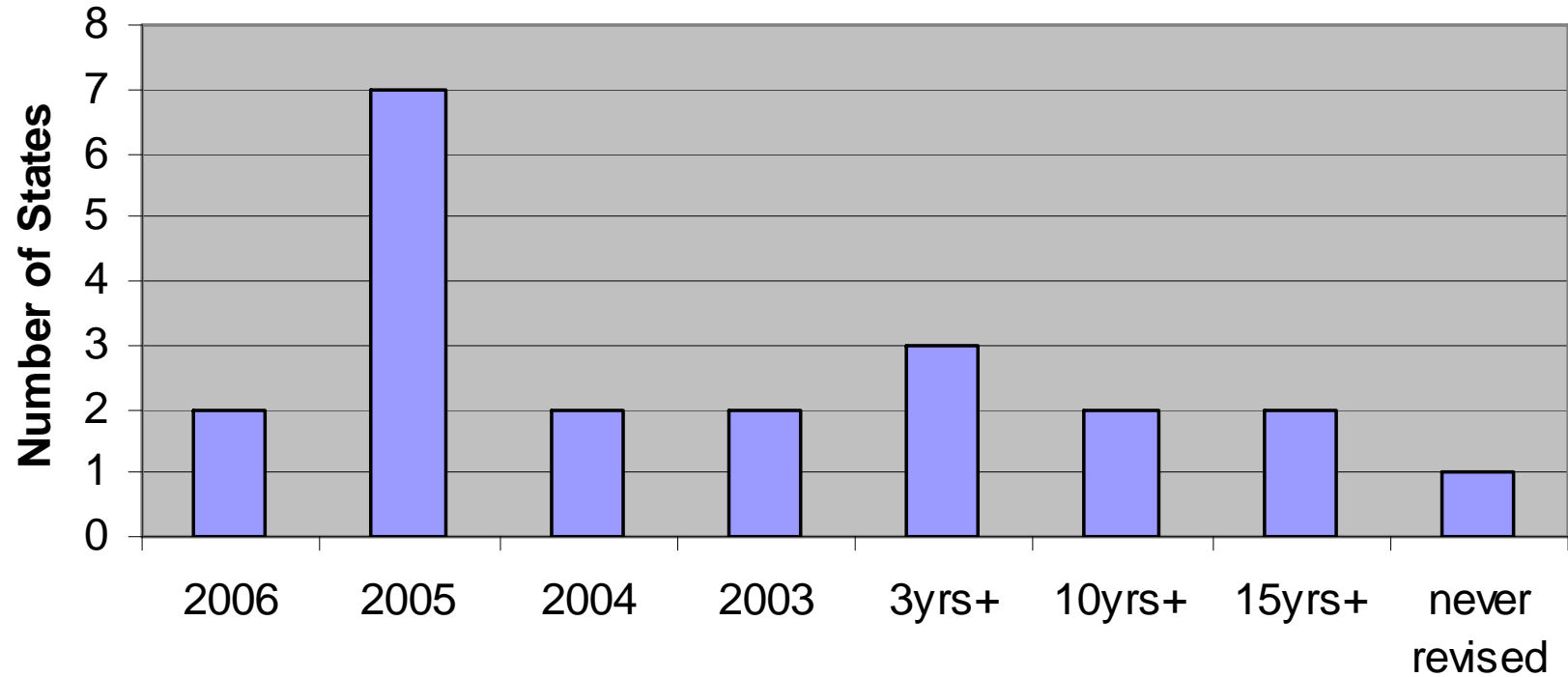


- California DOT LCCA Manual
- New York DOT Pavement Design Manual
- Washington State Pavement Design Manual
- FHWA LCCA in Pavement Design Technical Bulletin
- Other References available on FHWA LCCA Webpage



Policy

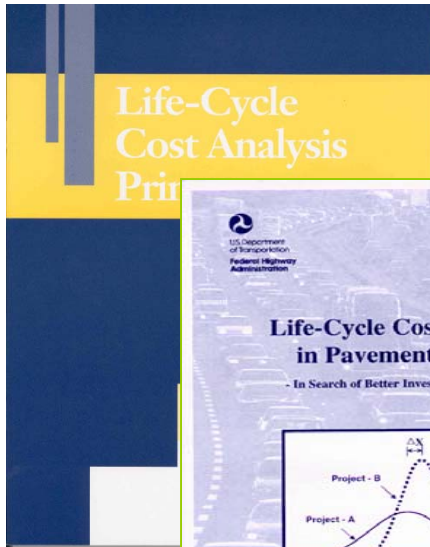
Time of the Last LCCA Policy Revision



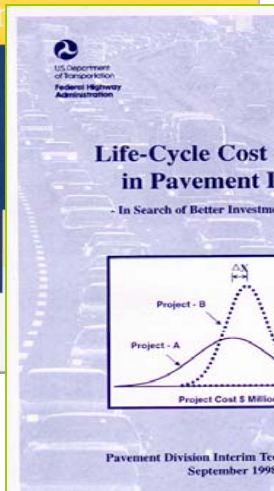
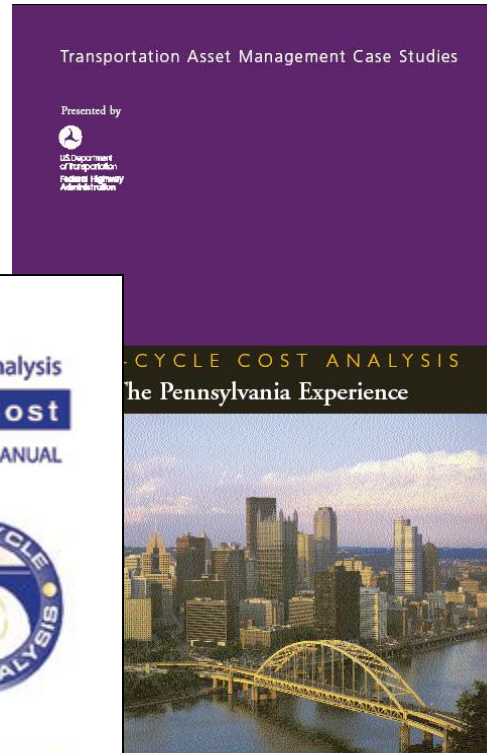
Summary – National Recommendations

- Chose an Analysis Period between 30 to 50 years
- Establish triggers for the LCCA
- Use Software to support the analysis
- Evaluate impact to Users (User Costs)
- Implement policy guide for practitioners
- Identify performance periods for activities
- Perform a probabilistic analysis to quantify uncertainty
- Use a discount rate between 3% and 5%
- Use available data sources (PMS, etc)
- Get Industry input

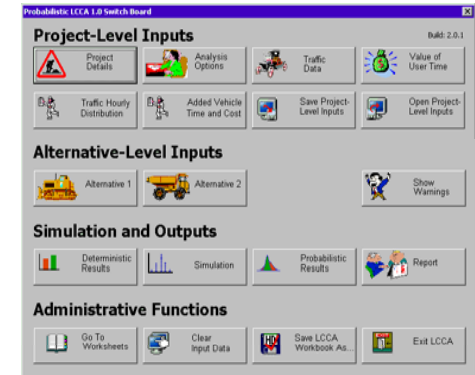
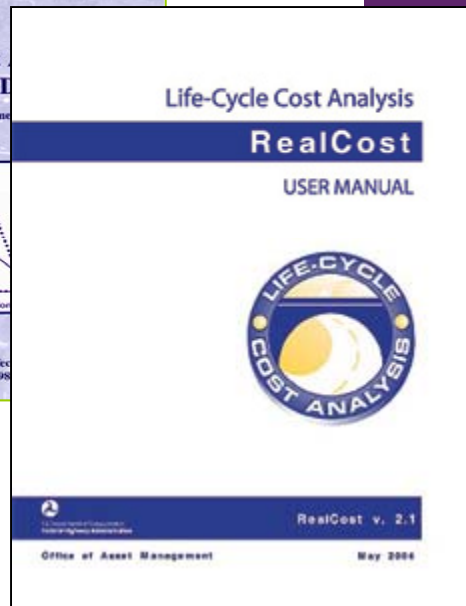
Resources



LCCA Primer
FHWA-IF-02-047



Technical Bulletin
FHWA-SA-98-079



LCCA Software
RealCost 2.5
and
User Manual

<http://www.fhwa.dot.gov/infrastructure/asstmgmt/lcca.cfm>

Thank You

Evaluation and Economic
Investment Team
FHWA Office of Asset
Management
Washington, DC



Tashia Clemons
Tashia.Clemons@dot.gov
202.366.1569

Nathaniel Coley
Nathaniel.Coley@dot.gov
202.366.2171

<http://www.fhwa.dot.gov/infrastructure/asstmgt/invest.cfm>