Marketing Bridge Preservation

UTAH Perspective

Southeast Bridge Preservation Conference

Orlando, Florida
April 2010

David Eixenberger, SE, MBA
Utah Branch Manager
T.Y. Lin International

Special Thanks To:
Carmen Swanwick, UDOT State Bridge Engineer
Chris Potter – UDOT Bridge Operations Engineer

T·Y·LIN INTERNATIONAL
engineers | planners | scientists

UTAH ? - Why ?

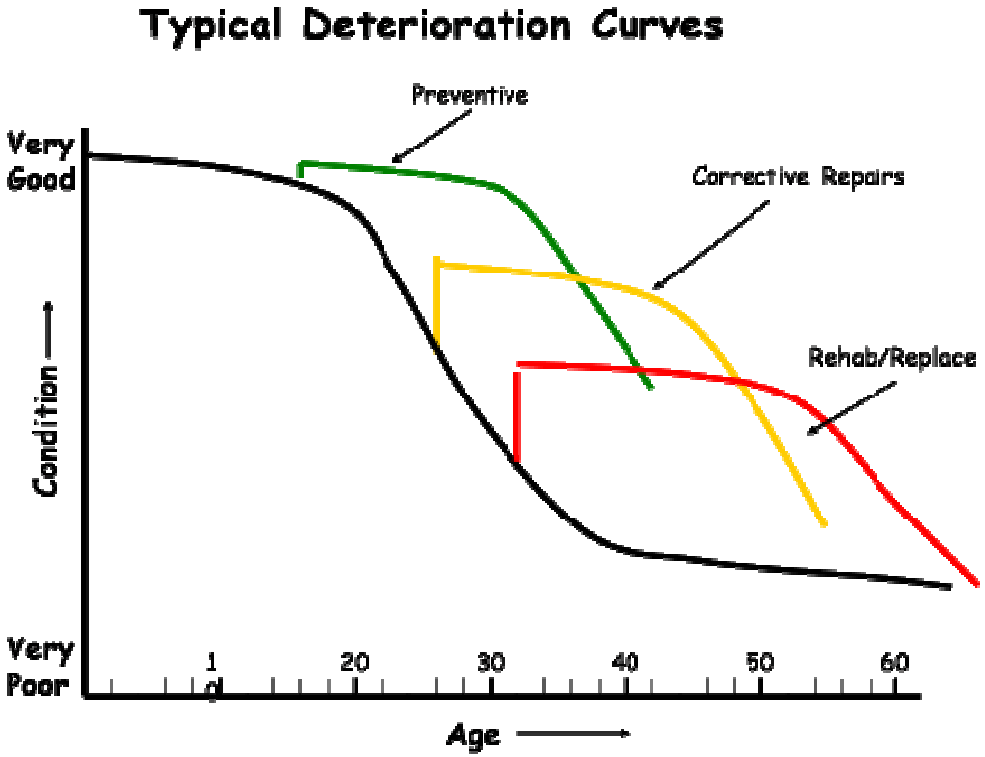
We don't have all the answers, but occasionally we do get things right

What is Bridge Preservation?

A variety of cost effective treatments over the life of a bridge to **economically** extend its life. Bridge Preservation addresses all these.

Preservation Treatments:

- **Routine:** Ongoing maintenance treatments to keep the bridge operational, such as sweeping, cleaning drains, signing, etc
- **Preventive:** Planned (scheduled) treatments before a problem occurs to extend the life of the bridge, such as deck seals, painting, concrete seals, etc.
- **Rehabilitation:** Reactive treatments to correct problems before they get bigger, and to restore condition to to a higher level; such as deck rehab, beam repairs, joint repairs, concrete repairs, etc.
- **Replacement:** Replacement of major components or the entire bridge.



Common Questions

Dave's Top 10 List

Suggestions for Bridge Preservation

- Have a Goal
- Know your Facts
- Capitalize on What you Have
- Share & Involve Others
- Consider the Big Picture
- Measure Performance
- KISS – Keep it Simple Stupid
- Have an Asset Management System
- Have a Prioritization Process
- Market to your Audience & Environment

No. 10: Have a Goal

Without a goal or plan, it's all up to Luck

- How did a nerdy German engineer named Dave get his "Better Half"
- One of us had a goal !
- Any questions ?

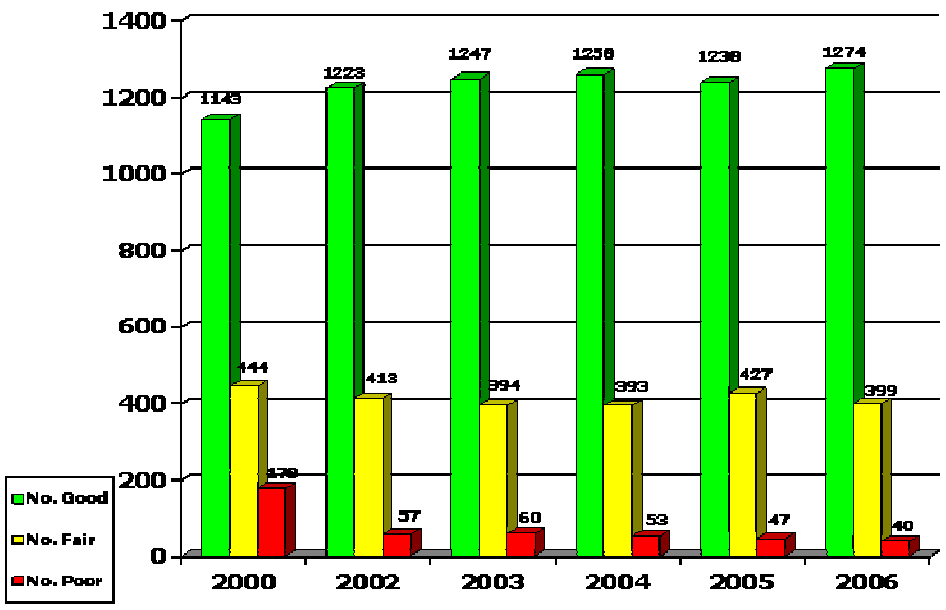
UDOT Strategic Goals

- **"Take Care of What we Have"**
- "Improve Operational Efficiency"
- "Improve Traffic Capacity"
- "Improve Safety"

Our Challenge: Refine Department Goals into Bridge Goals

Utah Bridge Preservation Goals

In 2000, 10% of Utah's bridges had Sufficiency Ratings less than 50. Senior Leaders want measurable goals.



Number of Bridges by Sufficiency Rating

- **Goal: Explain the need, develop a plan, and track results.**
- **Goal: The number of poor bridges would not grow beyond the current 10%.**
- **Goal: The number of poor bridges would be reduced to a manageable level (less than 5 %).**
- **Goal: The number of "Good" bridges will be 70% or greater.**
- **Goal: Have an Action Plan for Every Poor bridge (repair, monitor, etc). "Critical Bridge List"**

No. 9: Know your Bridge Facts

Utah Numbers

- 1900 +/- State Owned Bridges
- 15,000,000 sq. ft of bridge deck
- Ave. Cost to Replace: $175/ft2
- Replacement Value: $ 3-4 Billion
- 1-2 % - average attrition rate based on 75 year life expectancy.
- 2% of bridges are Structurally Deficient. Matches attrition rate.

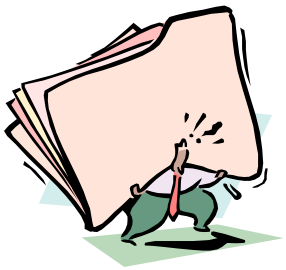
Our Challenge: Safely and Efficiently Manage this Bridge System

No 8: Capitalize on What You Have

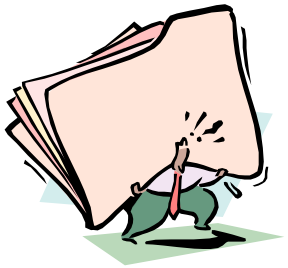
Bridge Inspection Data is a Goldmine

- The National Bridge Inspection Program was established in the 1970's to ensure safety after several bridge collapses.
- Data is gathered using national standards and format (NBIS).
- UDOT collects over 300 fields of data (NBIS, Element, custom) and stores in Bridge database (PONTIS & Oracle).
- Other Asset groups such as pavements and traffic features do NOT have the luxury of nationally standardized meaures.
- ***This is a goldmine of information that is now also being used in asset management, bridge operations, and project management.***

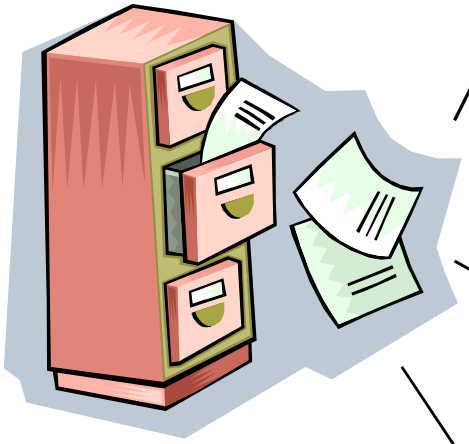
No 7: Share and Involve Others



Bridge Inspection Data (PONTIS)



Other Data: Pavements, Accidents, STIP Program, etc



Storage (Oracle)

Bridge Data Analysis

Asset Mgt. dTims , PONTIS

Planners, Executuve Staff, etc

Maint., POE, & TOC

Share and Involve Others

Think of others who can use your bridgge data

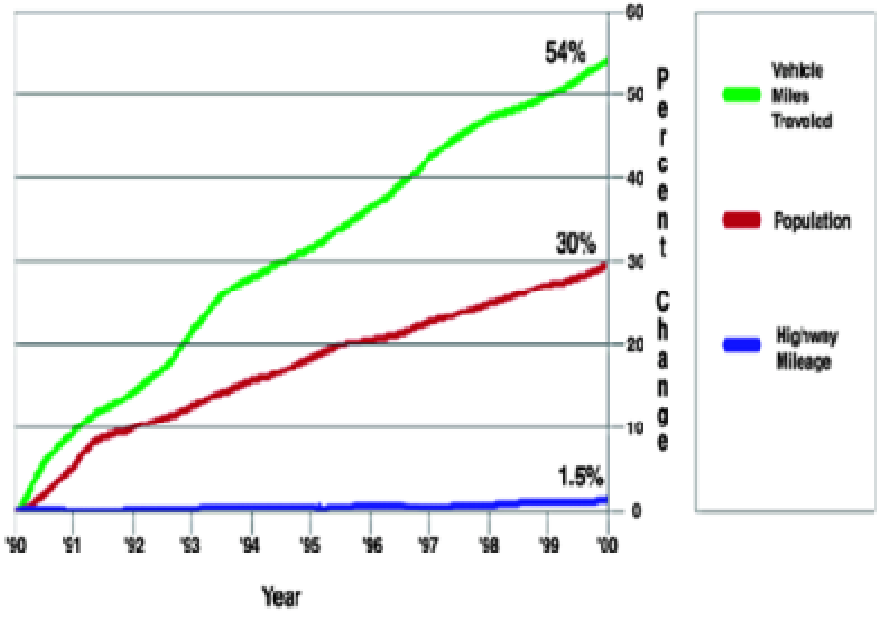
- Work as a Team with other areas such as STIP Planners, Pavements, Traffic, Safety, and Executive Staff.
- Involving others creates ownership, and shares the credit and blame.
- **Example:** UDOT Bridge Data is tied to Traffic Operations Center for Emergency Response and Maintenance.
- **Example:** UDOT Senior Leaders join in annual field reviews of bridge needs and STIP program. Senior leaders also review a "Critical Bridge List" every 3 months.

No 6: Consider the Big Picture

(Must consider other factors in decision process – not every bridge should be maintained).

UDOT Strategic Goals:

- Take Care of What We Have
- Increase System **Capacity**.
- Improve Operational **Efficiency**.
- Improve Operational **Safety**.



Our Challenge: Use Bridge Needs to help sell other efforts such as corridor projects and Safety.

Example of a Big Picture Strategy

Preservation should include a "Target Life"

- The Remaining Life of a Bridge is **NOT** based only on structural condition alone.
- Must also look at Functional Life:
  - Traffic Capacity.
  - Load Capacity
  - Geometric Capacity.
  - Seismic and Flood Capacity
- Every bridge should have a "Target Life" that you match treatments to.
- If a bridge has less than 10 years remaining life, consider reducing preservation efforts.

No. 5: Keep it Simple Stupid (KISS)

Example: Color Coded Condition Rating Scale

Good

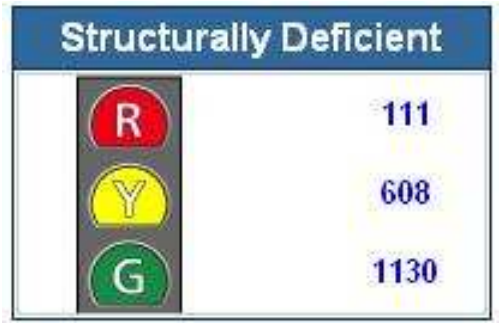
- 9 – Excellent Condition
- 8 - Very Good Condition
- 7 - Good Condition

Fair

- 6 - Satisfactory Condition
- 5 - Fair Condition

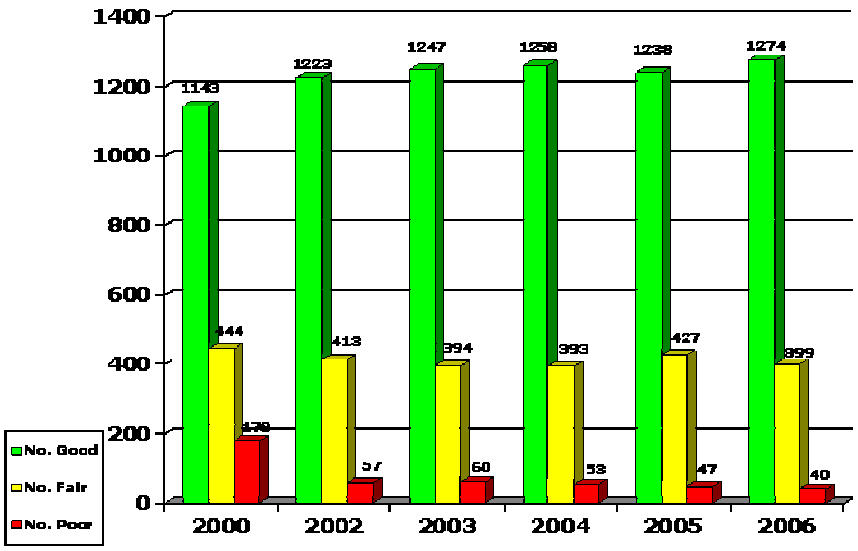
Poor

- 4 – Poor Condition
- 3 - Critical Condition
- 2 - Imminent Failure
- 1 - Failed. - Closed



No. 4: Simple Performance Measures

measure goals and over time

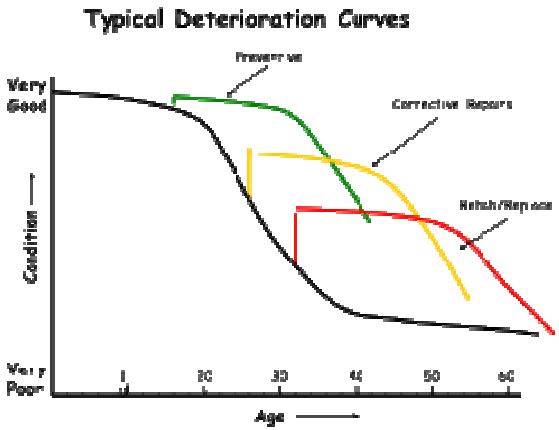


Number of Bridges by Sufficiency Rating

- Ratings > 80 are Good
- Ratings 50-79 are Fair
- Ratings < 50 are Poor

- **Senior Leaders want and respond to Performance Measures that help them to convey big picture needs.**
- **Utah Goal: Structurally Deficient bridges will be less than 5% measured by NBIS condition ratings.**
- **Utah Goal: Functionally Obsolete bridges will be less than 10% measured by Sufficiency Ratings.**
- **Utah Goal: Good Bridges will be 70 % or greater.**
- **Utah Goal: Have an Action Plan for all Poor Bridges (Critical Bridge List).**

No 3: Have an Asset Management Process



- Bridge Preservation should be part of a bigger Asset Management effort.
- UDOT has developed and introduced an "Asset Management" effort, using dTims and Pontis software as tools.
- PONTIS is used to gather, store and retrieve bridge data.
- dTims (pavement management software) is used for cross asset analysis of pavement and bridge data.
- Asset Management uses a system-wide approach, with average assumptions, and comprehensive use of treatment options over the life of a bridge.
- Asset Management software uses a Benefit to Cost approach, to prioritize based on "best value".
- Asset Management software is a starting point, not a final black box answer to your problems.

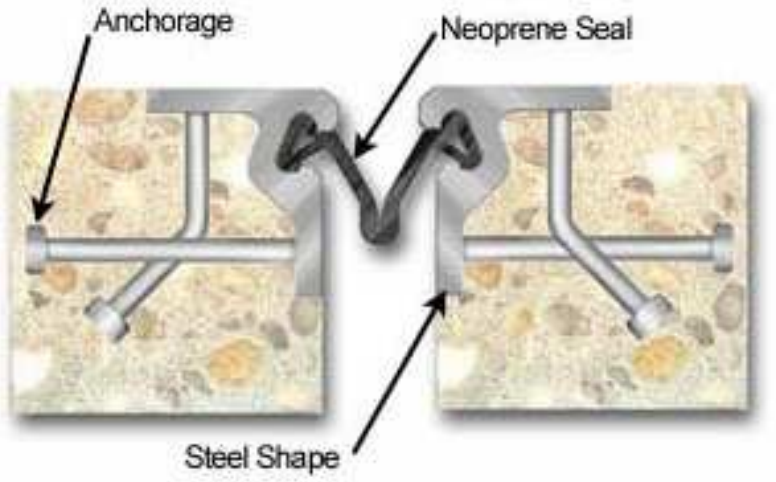
Logic of Asset Management

- Goal to Maximize $$$ using Highest Benefit to Cost ratio:
- Cost/Benefit supports : Preventive before Rehab before Replacement.
- Risk (Critical Bridges) Overrides cost/benefit.
- Budget = Summation of Inventory x frequency x costs.

Simplified Example: $65 Million Program

- 1900 Bridges
- 15,000,000 sq. ft of deck.
- Average bridge life = 75 years = 1.33 % attrition.
- Replacement: 15,000,000 x 0.013 x $175/ft2 = $35 M/yr.
- Rehab: 15,000,000 x 0.013 (once @ yr 40) x $70 = $14 Million.
- Preventive: 15,000,000/ 10 year freq. x $10 = $15 Million/yr.

Preventive Maintenance Treatments



- Deck Overlays and Seals
- Joint Repairs
- Concrete Seals
- Steel Painting
- Settlement Repairs
- Load Capacity Upgrades
- Signing & Safety Repairs
- Scour and Seismic Upgrades

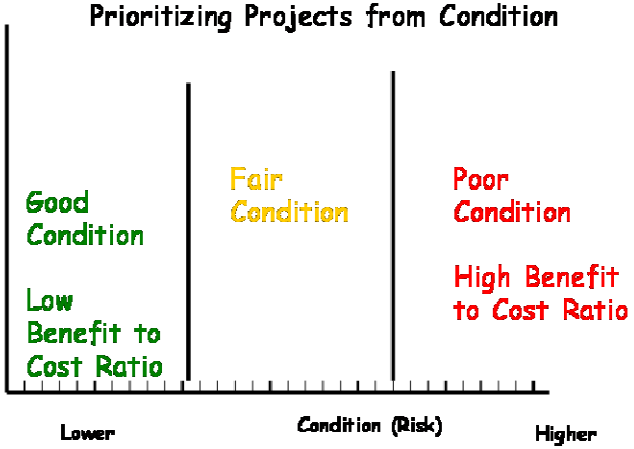
Our Challenge: Do More with Less

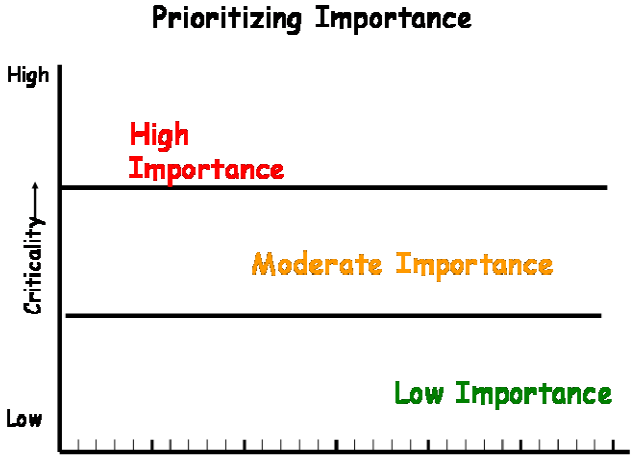
"*In response to the recent economic downturn, UDOT's Structures Division has taken its office space on the road".*

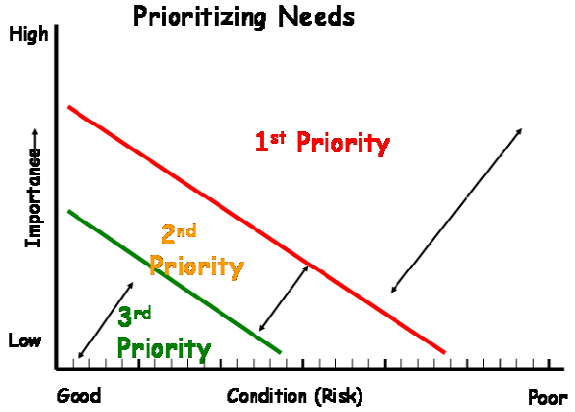
No. 2: Refine your Prioritization Process

(don't rely on Asset Management software alone)

- **Vulnerability (Risk):**
  - Structural
  - Financial dTims (Preventive)
  - Specialty (Scour, Safety, Seismic)
- **Criticality (Importance):**
  - Traffic Volumes (AADT)
  - Functional Classification
  - Economic Significance
  - Time to Replace – Restore
  - Emergency Significance
- **Combination:**
  - Match Asset Mgt. list with considerations for available funding, project complexity, region needs, structures input, capacity projects, etc, and develop final recommendation list.







Criticality Rating
Example

- *Assuming these two bridges have the same cost/benefit value for preventive treatments, which one would fund first?*

No. 1: Have a Marketing Plan

Match marketing to Audience Knowledge

- Awareness
  - Promote Understanding
- Acceptance
  - Promote Benefits
- Preference
  - Promote Choice over alternatives
- Insistence
  - Promote Success - Maintain

Example: New Apple iPad

Marketing Mix

Inter-Dependant Factors

- Product
- Price
- Place (Distribution)
- Promotion (Message)

Thank You

David Eixenberger

T.Y. Lin International

David.Eixenberger@TYLIN.com

801-913-6555

T·Y·LIN INTERNATIONAL

engineers | planners | scientists