Marketing Bridge Preservation
UTAH Perspective

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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 a higher level; such as deck rehab, beam repairs, joint repairs, concrete repairs, etc.

- **Replacement:** Replacement of major components or the entire bridge.

![Typical Deterioration Curves](chart)
Common Questions

How Healthy Should my Bridge System Be?

How Much Money do I need?

What do I do first?

How do I market Preservation?

How do I Measure Results?
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
In 2000, 10% of Utah’s bridges had Sufficiency Ratings less than 50. Senior Leaders want measurable goals.

- 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
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 measures.

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 Data Analysis

Bridge Inspection Data (PONTIS)

Asset Mgt. dTims, PONTIS

Storage (Oracle)

Planners, Executive Staff, etc

Other Data: Pavements, Accidents, STIP Program, etc

Maint., POE, & TOC
Share and Involve Others

Think of others who can use your bridge 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

- 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).

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Number of Bridges by Sufficiency Rating

- Ratings > 80 are **Good**
- Ratings 50-79 are **Fair**
- Ratings < 50 are **Poor**
**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: $35 M/yr.
  \[15,000,000 \times 0.013 \times $175/ft^2 = $35 M/yr.\]
- Rehab: $14 Million.
  \[15,000,000 \times 0.013 \text{ (once @ yr 40)} \times $70 = $14 \text{ Million}.\]
- Preventive: $15 Million/yr.
  \[15,000,000/ 10 \text{ year freq. } \times $10 = $15 \text{ Million/yr.}\]
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.

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**Prioritizing Projects from Condition**

- Good Condition
- Fair Condition
- Poor Condition
- High Benefit to Cost Ratio

**Prioritizing Importance**

- High Importance
- Moderate Importance
- Low Importance

**Prioritizing Needs**

- 1st Priority
- 2nd Priority
- 3rd Priority
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

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