Number of clients: 11

Structures monitored: 28,912

Total number of users: 1,030
Georgia DOT

Contracted Year: 2008

Starting Bridge Population: 76

Current Bridge Population: 5132

Users: 142
Idaho Transportation Department

Contracted Year: 2008

Starting Bridge Population: 230

Current Bridge Population: 336

Users: 34
National Doppler Radar Sites
Select radar location and click.
SNOTEL Sites in Idaho
Idaho Bridges

4,313 Bridges in Idaho

84% bridges are over water
NBI Item 113 = 2
Scour Critical bridges based on observation. (49)

NBI Item 113 = 3
Scour Critical bridges based on calculation. (208)

NBI Item 113 = 6
Bridges pending scour evaluation by consultant. (4)

NBI Item 113 = U
Unknown Foundation Bridges determined to be high risk. (45)
We are one of the only states to use SNOTEL data.
Idaho is not well covered by Doppler Radar stations.
We develop all drainage basins, thresholds, recurrence intervals, and Plan’s of Action in house.
We recently added a small drainage basin for a culvert in a burn area to monitor heavy rains for maintenance purposes.
1. Develop drainage basin for bridge.

2. Locate SNOTEL and USGS sites within drainage basin.

3. Determine recurrence frequencies for SNOTEL, USGS, and Precipitation.

4. Determine recurrence frequency that will generate an alert.
1) Alert is evaluated for validity by cross checking data sources. USGS: most reliable, Doppler Radar: ok, SNOTEL: suspect.
2) If valid, send local maintenance staff out to monitor bridge for settlement during high flow.
3) Cancel alert and produce Supplemental BridgeWatch Report.
4) Move up Underwater Inspection or wait for next one to determine the high flows effect on scour.
5) Re-evaluate recurrence threshold.
Record of conditions that caused alert.
Uploaded to BridgeWatch for historical reference
Used to communicate between Bridge/Maintenance
Unknown Foundation Bridges
Risk Assessment Flow Chart

- Waterway Adequacy (Item 71) < 5 → Yes → High
- Channel Protection (Item 61) < 5 → Yes → High
- Number of Spans (Item 45 + 46) ≥ 3 → Yes → Review by Scour Committee

Number of Spans = 2 or 3
- Waterway Adequacy (Item 71) < 7 → Yes → High
- Channel Protection (Item 61) < 7 → No → Low

Number of Spans = 1
- Waterway Adequacy (Item 71) < 7
  & Channel Protection (Item 61) < 7 → Yes → High
- Detour Length (Item 19) > 10
  & ADT (Item 29) > 100 → No → Low
Thank you
Tennessee DOT

Contracted Year:  2003

Starting Bridge Population:  1100

Current Bridge Population:  1982

Users:  307
Tennessee DOT’s Implementation of BridgeWatch™

A Program for Monitoring Scour Critical and Unknown Foundation Bridges

Jon Zirkle, P.E.
Bridges in Tennessee

- 19,727 bridges in Tennessee
- 17,061 bridges are over water
- 820 scour critical bridges statewide
- 3/4 are located in west Tennessee
- Just under 50 percent are state owned

- 1000 unknown foundation bridges statewide
- Spread evenly throughout the state
- Approx. 85 percent are locally owned
Customizable with TRIMS data
Monitors 24 / 7 / 365
Default thresholds
Scour critical bridges
- 100+ are set to USGS stream gages – 3 criteria for alerts
- 20 are set to 10 year rainfall event
- Rest are set to NEXRAD radar - 25 year
- Analyzed 400 state owned bridges

Unknown foundation bridges – set to NEXRAD

Plans of Action for all scour critical and unknown foundation bridges in place per FHWA requirement
**Plan of Action**

**Highway Bridge Scour Plan of Action Report**

**Bridge ID:** 620667960001

**Tower:** 160-162

**Road Name:** OLO SR 71

**Bridge:** OLO CREEK BRIDGE

**County:** MIDDLE COUNTY

**Special Case:** 0

**County Sequence:** 1

**Usage:** 1.2

**Length:** 1040

**Year Built:** 1970

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**Type of Superstructure:**
- **Concrete:** Stringer/Multi-Steel or Cord

**Type of Substructure:**
- Concrete Full Height Abutment on Concrete Pedestal/Foundation

**Grade:** Not Applicable

**Type:** Not Applicable

**Erosion Evaluation:**
- Scour Evaluation

**Bridge is prone to critical scour potential due to the nature of the site conditions.**

**Superstructure:**

**What initiated the Call-out Inspection?**
- [ ] Minor cracks or draft
- [ ] TDOT District or Local Maintenance Personnel
- [ ] TPW or Local Law Enforcement Personnel
- [ ] Other:

**Specific Actions:**

**Bridge Inspections:**
- [ ] Spans movement - horizontally and vertically
- [ ] Check for deflection along center line, both bridge rails and other edges of bridge deck
- [ ] Check for pumice or pieces of debris
- [ ] Check for embankment erosion
- [ ] Check for drift build-up on pier or bridge
- [ ] Check if possible, and compare to previous inspection
- [ ] Review latest bridge inspection report versus current field condition

**Closure is recommended:**

- [ ] Stay at bridge with vehicle pulled across road until bridge is secured and properly closed by District, County or City Maintenance Personnel. Use Barricade Tape, traffic cones and/or traffic signals as temporary measures to warn motorists to stay off of the bridge until such time as the bridge may be safely utilized.
- [ ] Contact: 1) District Maintenance Supervisor (if bridge is state maintained) 2) City or County Highway Maintenance Official (if bridge is not state maintained)
- [ ] Ensure that the bridge is closed in accordance with local and state laws as appropriate.
- [ ] TDOT Regional Bridge Engineer

**Publication Date:** 30-Mar-10

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**Highway Bridge Scour Plan of Action Report**

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**Summary and submit findings from the inspection to BridgeWatch scour monitoring system.**

**Contact:**
- [ ] County Sheriff's Office
- [ ] TDOT Chief Administrator's Office

**Supplemental List of Equipment to Conduct the Inspection:**
- [ ] Bridge Inspection Report
- [ ] Scour PDA Report with the above Checklist
- [ ] Bridge Design Plans, if available
- [ ] Traffic cone with weight
- [ ] Pomp box
- [ ] Range box
- [ ] A 300 Foot Roll of yellow Polyethylene Barricade Tape printed with the following message: SAFETY HAZARD KEEP AWAY

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**Barricade Tape Dispenser with weighted outer**

**A Roll of Steel Tape**

Traffic Cone - Minimum of four (4)

Traffic Safety Flags - Minimum of four (4) or roll of white warning tape

TDOT Two-Way Radio (State Personnel only) and/or cellular telephone

TDOT radio directory (State Personnel only)
Unknown Foundation Bridges

- **Unknown foundation bridges** have an NBIS item 113 rating of U according to FHWA guidelines.
- Majority have been in place 40 plus years.
- No scour observed at these bridges and not deemed scour critical by calculation.
- Have default threshold initially of 100 year flood frequency for monitoring.
- Added to the system 2010.
Owner Responsibility

- Receive BridgeWatch™ alert by email, fax, and/or cell phone text message.
- Dispatch personnel within 24 hours to inspect bridge following items in Plan of Action.
- Notify TDOT Region Bridge Inspection of bridge status so alert can be terminated and notes entered.
- If bridge is closed then must have approval of TDOT Bridge Inspection prior to reopening.
Next Steps

• Add Emergency Services Routes (ESRs) in west TN for New Madrid seismic zone
  – Add almost 1800 bridges and overpasses
  – Utilize USGS products projecting PGA values to bridge site and compare with design values on file
  – Run simulations to identify weaker routes and/or bridge locations for repair or replacement

• Add approximately 1580 overhead signs
  – Add overhead and cantilever signs across the state
  – Utilize NWS wind products to see if design loads are exceeded or adverse directions occur at site
Iowa DOT

Contracted Year: 2005

Starting Bridge Population: 172

Current Bridge Population: 325

Users: 33
Using BridgeWatch to Monitor Road Overtopping
Iowa’s Statewide LiDAR

- LiDAR – Light Detection and Ranging
  - Creates a ground surface
- Cooperative Effort Between Iowa DNR, Iowa DOT & Iowa Dept. of Agriculture
  - USGS contract for statewide acquisition
    - Sanborn Map Company
    - LiDAR Accuracy
      - +/- 8” vertical
- Cost = 8.5 Cents per Acre or $3.1 Million
- Total Cost = $5.8 Million (inc. high resolution photography, processing, web access, etc)
INFRASTRUCTURE DATABASE

• Develop/Correlate Rating Curve at Vulnerable Highway Sites
• Capture Low Road and Low Beam Elevations
• Utilize BridgeWatch to Proactively Protect Traveling Public from Roadway Overtopping
It wasn’t raining when Noah built the ark!

Dave Claman, P.E.
Office of Bridges & Structures
Iowa DOT

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