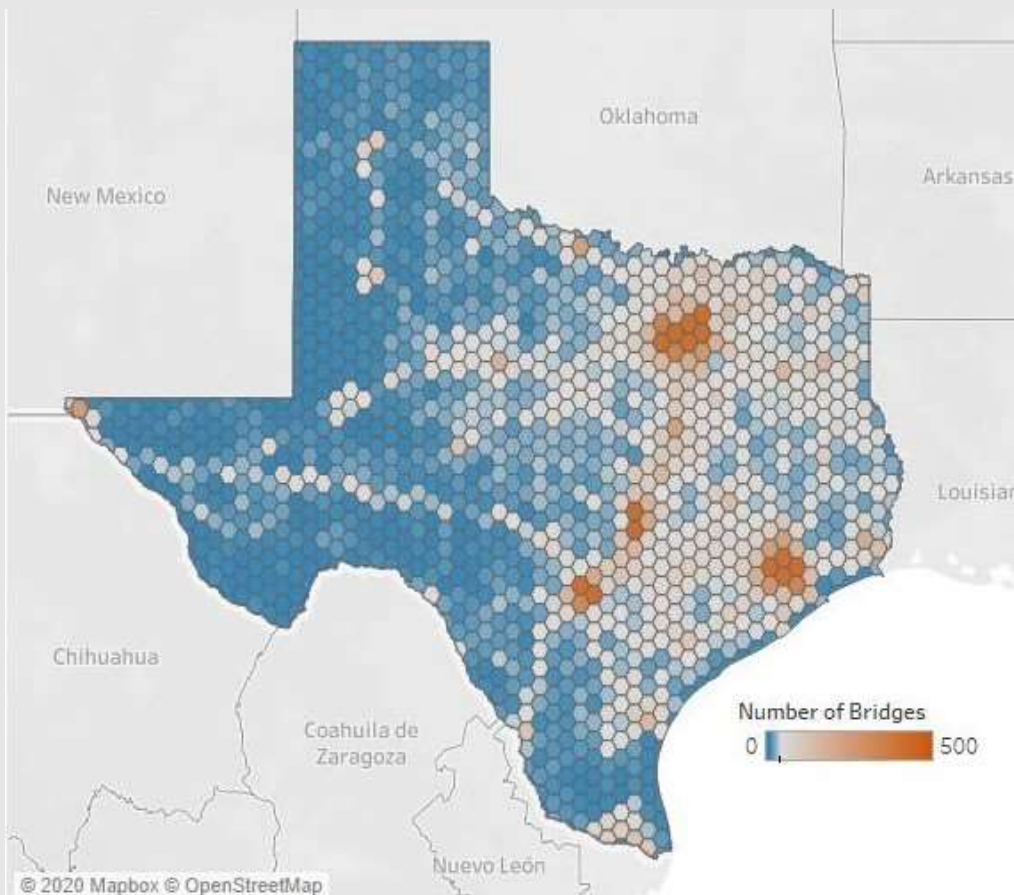


Bridge Building & Bridge Funding

Building and Maintaining Texas Bridges

June 14, 2022

Highway Bridge Program

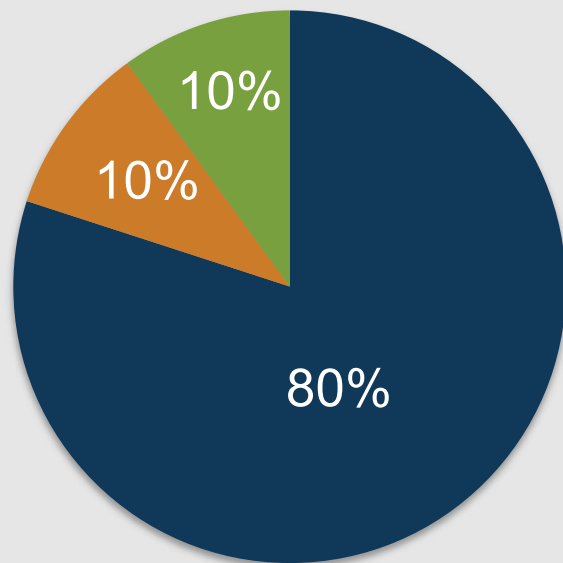


- Highway Bridge Program (HBP)
 - Established in 1978
 - Goal to increase safety
 - Maintain Inventory (On & Off System)
- Project Programming – 4 Year Cycle
 - September New Call
- Group Effort
 - FHWA
 - TxDOT
 - County & City



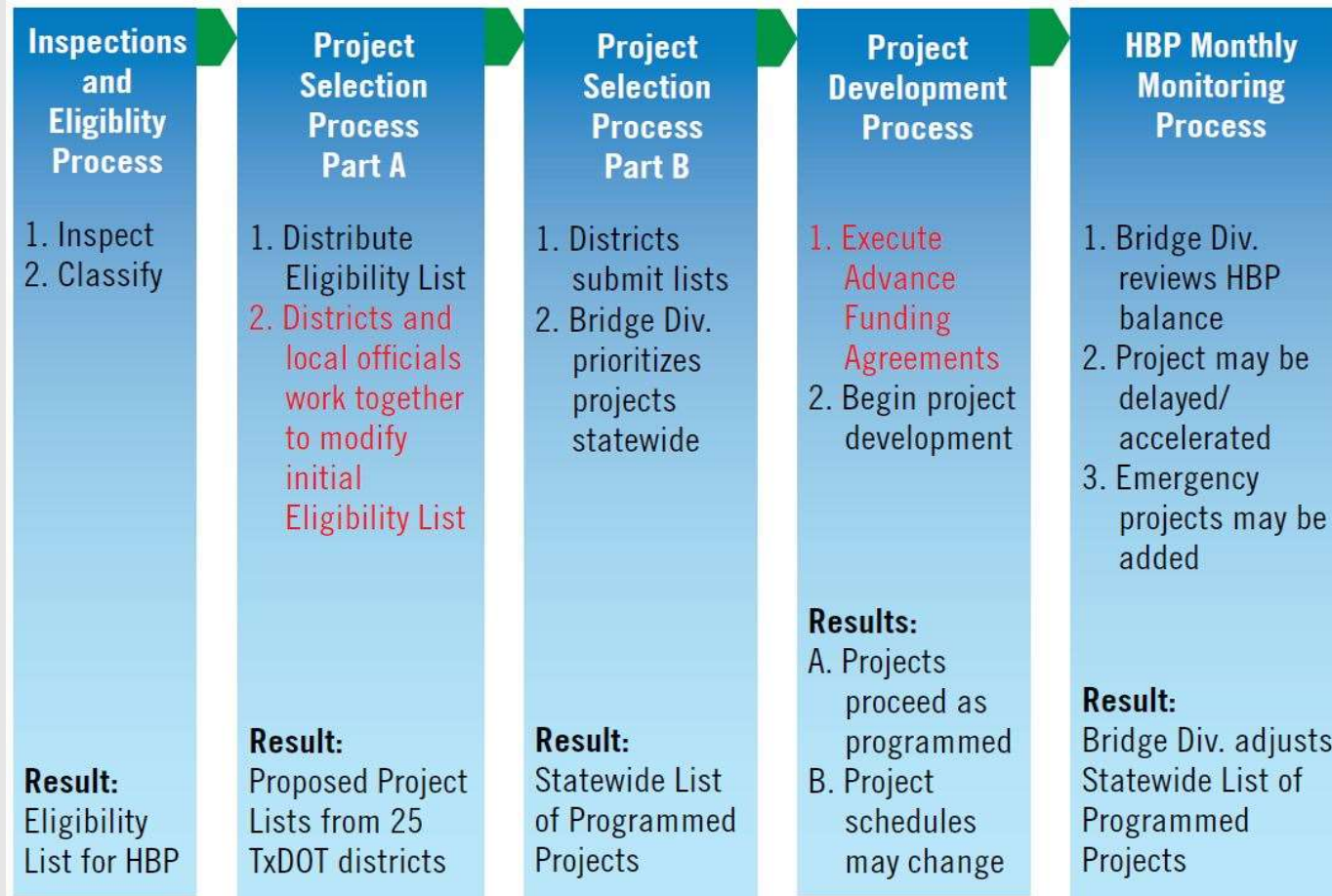
Funding Sources

■ FHWA ■ TxDOT ■ Local



- Highway Bridge Program - Category 6
 - Maintain existing bridge conditions
 - Bridge must be on inventory 10 years
- Funding Sources
 - 80% Federal, 10% State, 10% Local
 - Or
 - 80% Federal, up to 20% State
- Assistance Programs

Overview Inspection & Selection Process



- TxDOT Partner
- Handouts
- Ongoing Process

Inspection



- Build a new bridge
- Report to TxDOT District
 - Submit plans
 - Engineering documents
- TxDOT adds to National Bridge Inventory (NBI)

Considerations

Bridge construction considerations:

- Concrete deck – distributes wheel loads
- Steel deck will corrode



Considerations



Do not use steel caps or steel piling without corrosion protection.

Considerations



Inspection costs

- Fracture critical inspection:
 - \$3,500 for rope access inspection (every 2 years)
 - Routine inspection cost:
 - \$900





TxDOT Bridge Division web page:

- Funding Program, EMP details
- Standards - bridge standard drawings
- Resources:
 - Bridge Dataset – Inspection Data
 - Bridge Unit Costs
 - Load Restricted Bridge Map

Bridge

[Texas Department of Transportation](#) > [Inside TxDOT](#) > [Divisions](#)

The Bridge Division supports the structural planning, design, review, construction and inspection of over 55,000 state bridges. The division also develops policies, design standards, manuals and guidelines for the design, maintenance and construction of a safe and comprehensive state bridge system.

[Graham A. Bettis, P.E.](#), serves as director. Contact us with questions or comments.

General

- [Specifications](#)
- [Standards](#)
- [Pipe Design and Durability](#)
- [Shop Drawings](#)
- [Corrosion Protection Measures](#)
- [Publications](#)

Geotechnical

- [Field Testing](#)
- [Retaining Walls](#)
- [Soil and Bedrock](#)

Construction

- [Concrete Repair Manual](#)
- [Deck Texture Requirements](#)
- [Welder Certifications](#)

Approved Systems

- [Concrete Block Retaining Walls](#)
- [Mechanically Stabilized Earth](#)
- [Expansion Joints](#)

Funding Programs

- [Highway Bridge Program Brochure](#)
- [Highway Bridge Program Video](#)
- [Participation Waived/Equivalent Match Project Program](#)

Resources

- [Bridge Dataset](#)
- [Bridge Unit Costs](#)
- [Extended Span Precast Girders](#)
- [Load Restricted Bridge Map](#)
- [Statewide Planning Map](#)
- [Texas Steel Quality Council](#)
- [Webinars](#)



Back to Inspections

- TxDOT adds to National Bridge Inventory (NBI)
- Schedule for inspection

Inspection



- Two Year Cycle
- Certified Inspectors
- TxDOT reports to FHWA
- NBI Ratings (0-9):
 - Good, Fair, Poor Conditions

Bridge Performance



Bridges:

- a. Deck
- b. Superstructure - Beam/Girder

Substructure

- c. Cap
- d. Colum
- e. Foundation
- f. Drilled shaft

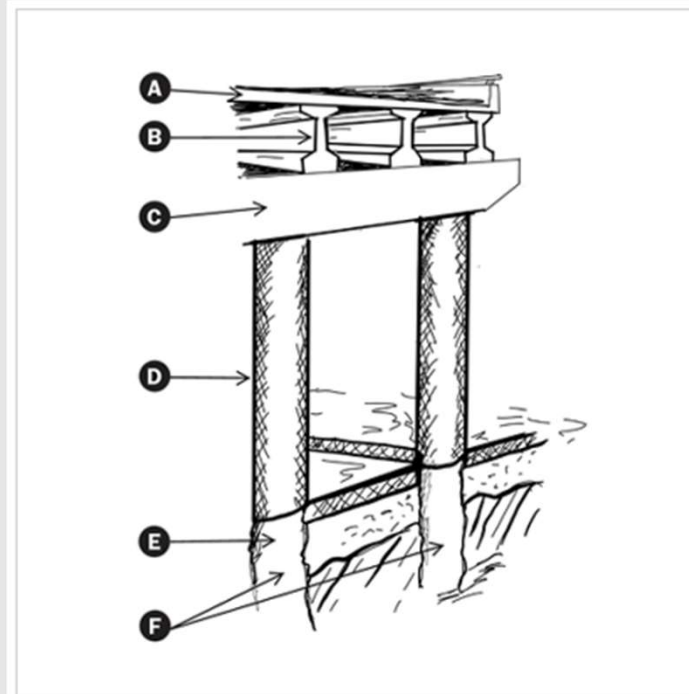
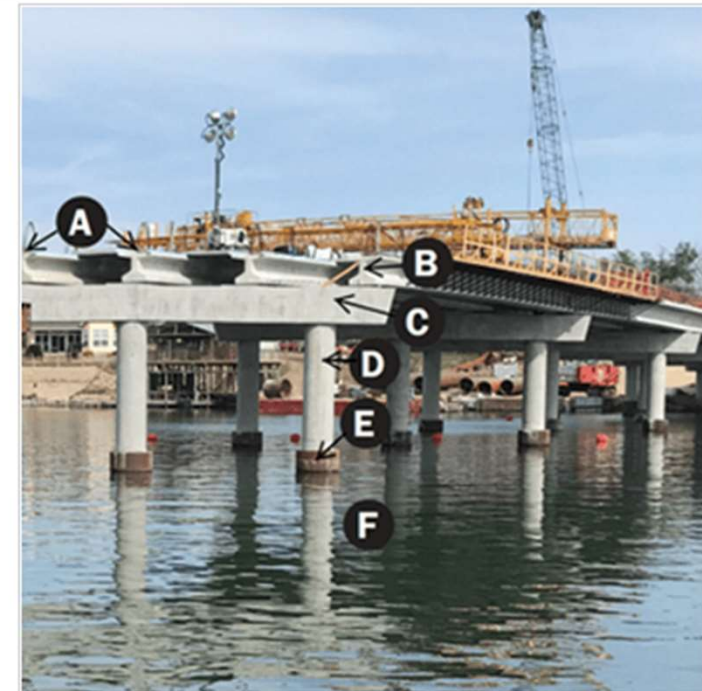


Illustration: Bridge components



Photograph: Visual representation of Bridge components

Bridge Performance



Good, Fair, Poor?

NBI Rating Scale
(from 0 – 9)

| | | | | | | | | | |
|------|---|---|------|---|------|---|---|---|---|
| 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
| Good | | | Fair | | Poor | | | | |

| | | | |
|-----------------------------|----------|--------|----------|
| Deck (Item 58) | ≥ 7 | 5 or 6 | ≤ 4 |
| Superstructure (Item 59) | ≥ 7 | 5 or 6 | ≤ 4 |
| Substructure (Item 60) | ≥ 7 | 5 or 6 | ≤ 4 |
| Culvert (Item 62) | ≥ 7 | 5 or 6 | ≤ 4 |

Bridge Performance



Example:

- Deck = 4
- Superstructure = 7
- Substructure = 6

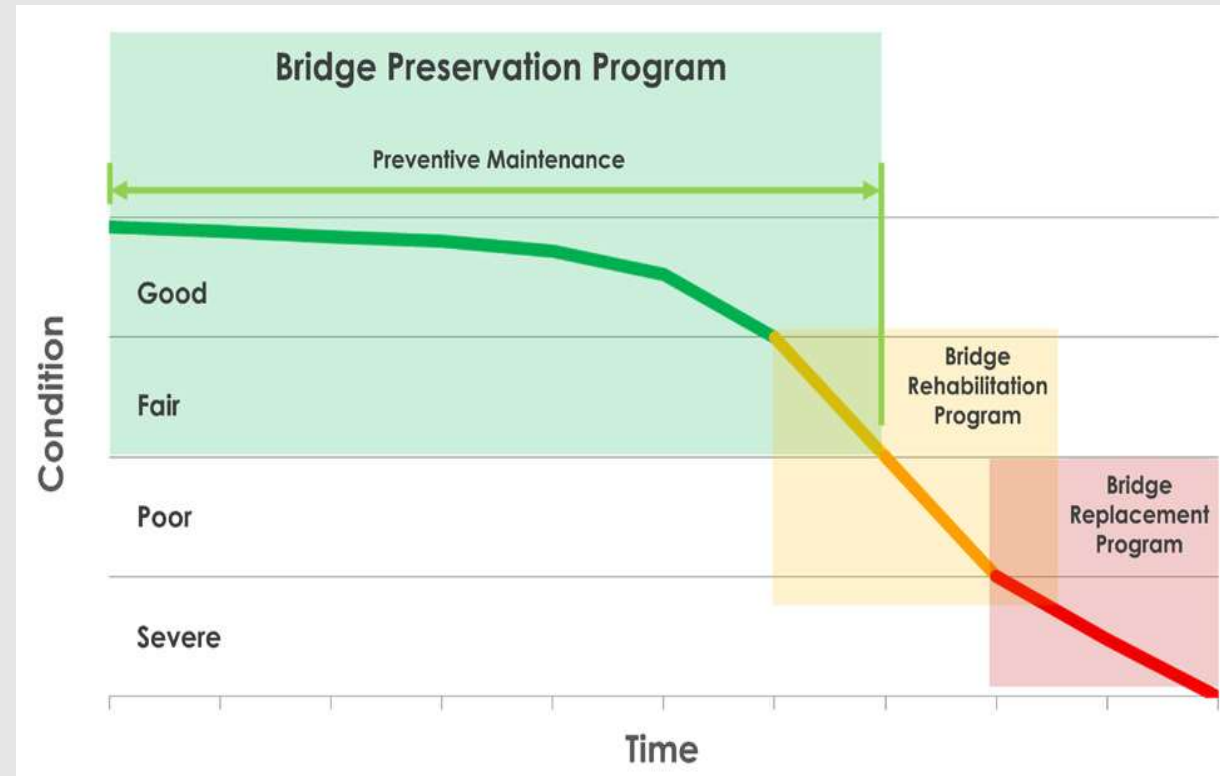
Structure = Poor

| NBI Rating Scale (from 0 – 9) | 9 | 8 | 7 | 6 | 5 | 4 | 3 | 2 | 1 | 0 |
|----------------------------------|----------|---|---|--------|---|----------|---|---|---|---|
| | Good | | | Fair | | Poor | | | | |
| Deck (Item 58) | ≥ 7 | | | 5 or 6 | | ≤ 4 | | | | |
| Superstructure (Item 59) | ≥ 7 | | | 5 or 6 | | ≤ 4 | | | | |
| Substructure (Item 60) | ≥ 7 | | | 5 or 6 | | ≤ 4 | | | | |
| Culvert (Item 62) | ≥ 7 | | | 5 or 6 | | ≤ 4 | | | | |



Bridge Management:

- Bridge Preventative
 - Drain cleaning
 - Debris removal
 - Paint



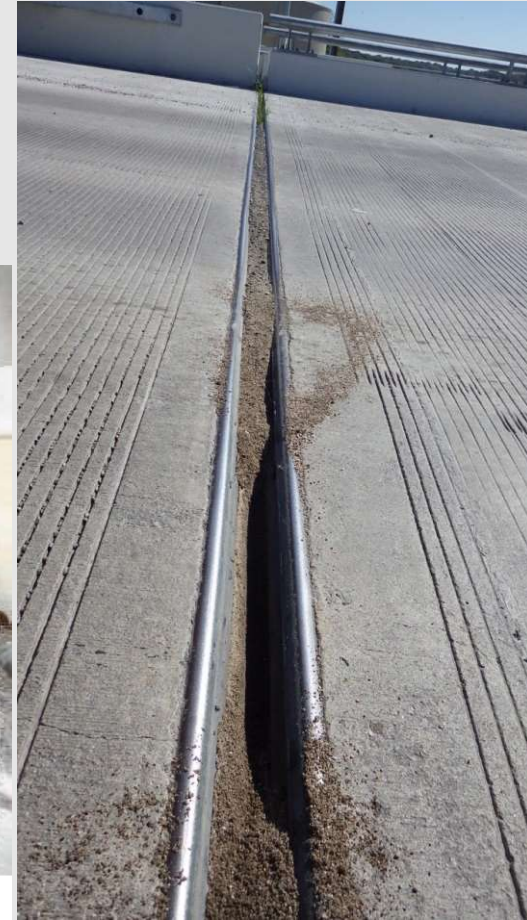


Preventative Maintenance (cyclic)

- Cleaning bearings
- Clean abutment and bent caps
- Clean and seal joints
- Clean deck drains
- Remove debris



SW ABUTMENT BEARINGS BURIED IN DIRT AND DEBRIS LOOKING SOUTH





Debris Removal

- Retains moisture
- Faster decay





Debris Removal

- May be catastrophic
- Cause approach damage





Debris Removal

- Undermined Approach roadway



Bridge Asset Management



Inspection identified debris

NOTE: There is an extremely large amount of drift caught at upstream side & under bridge.

Bridge Asset Management



NOTE: There is an e



1 - Bridge closed
barricaded with
dirt mound and
drift wood

Two Years Later – closed to traffic



Debris Removal

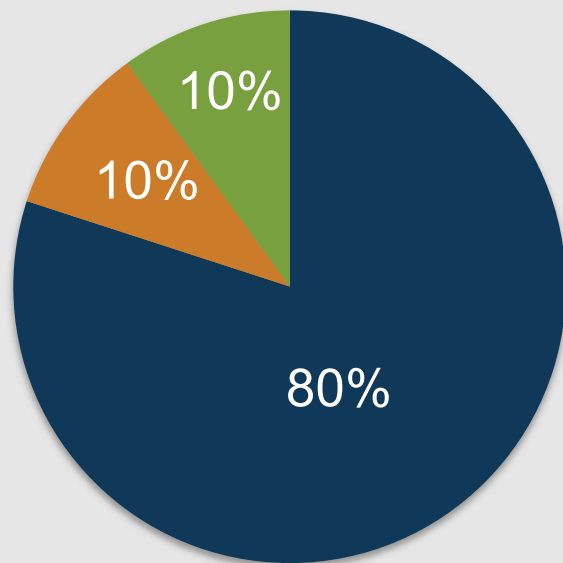
- Not like this





Funding Sources

■ FHWA ■ TxDOT ■ Local



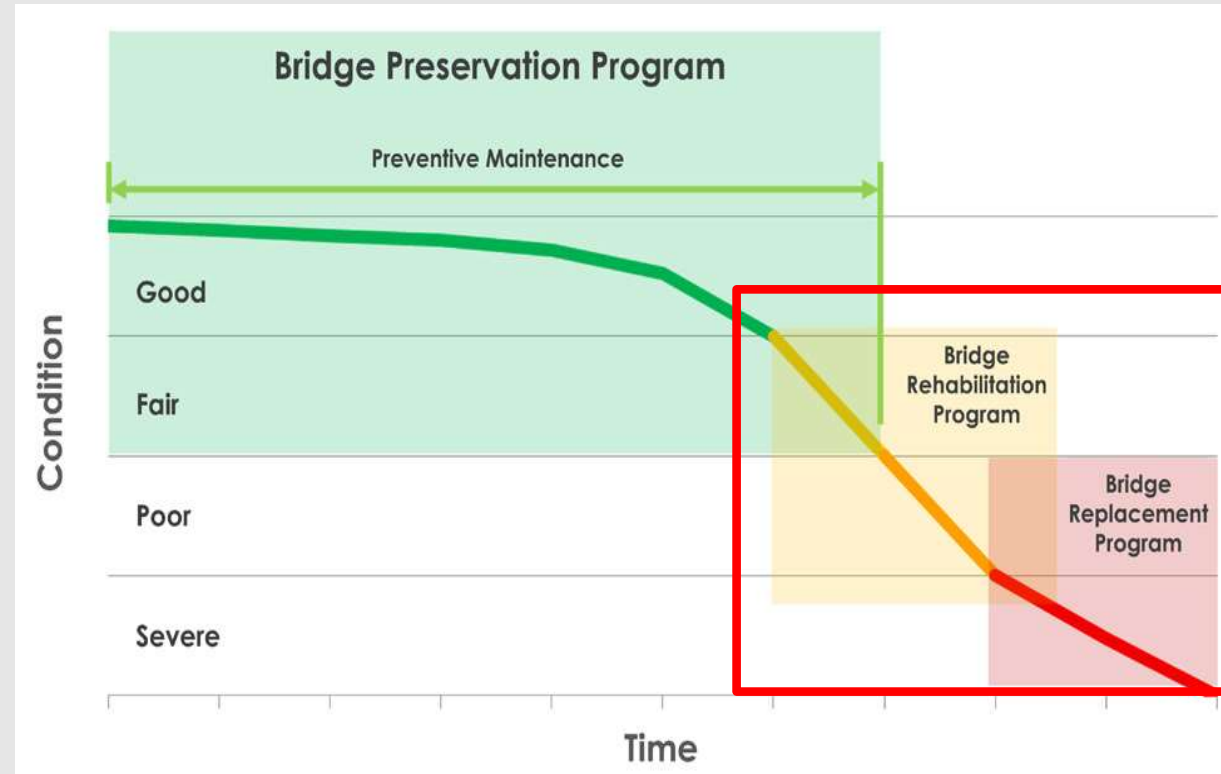
- Highway Bridge Program - Category 6
 - Maintain existing bridge conditions
 - 10 years on Inventory
- Funding Sources
 - 80% Federal, 10% State, 10% Local
 - Or
 - 80% Federal, up to 20% State
- Assistance Programs

Bridge Funding



Need a replacement?

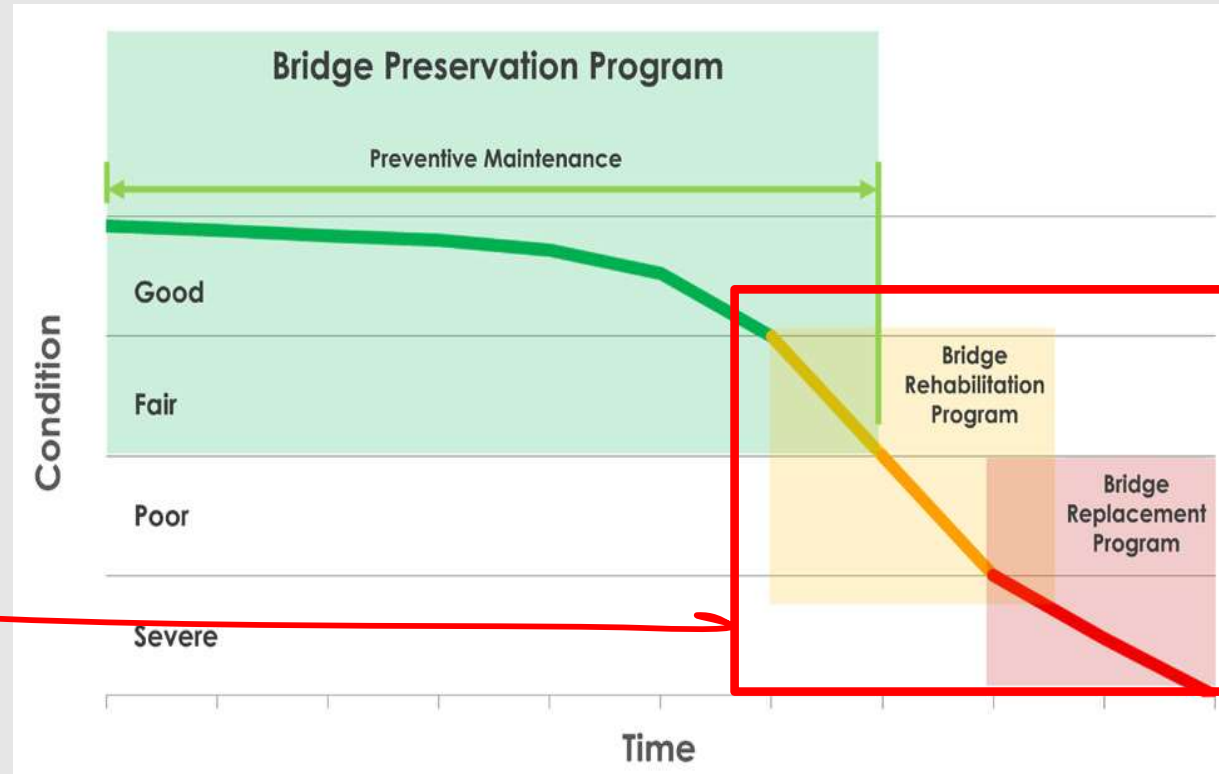
- Work with TxDOT District
- Identify Candidate bridges
- Start thinking about scope





Selected for Highway Bridge Program

- Rehab or Replacement



- Highway Bridge Program Considerations:
 - Cost of rehab vs. replace?
 - How long will the rehab last?
 - Traffic control
 - Phasing is VERY expensive
 - Consider detours (even temporary)
 - Bundle similar projects



Assistance Programs



- Equivalent Match Project Program (EMP)
 - FHWA 80%, State 20%,
 - Advanced Funding Agreement before work
 - Repair other deteriorated bridges
- Economically Disadvantaged Counties Program
 - List of counties online
 - Updated Yearly
- State Infrastructure Bank
 - Loan

Assistance Programs



- Local Government enters Advanced Funding Agreement (AFA)
 - How will LG cover 10% of cost?
 - Pay cash?
 - Equivalent Match Project?
 - Other bridge on inventory
 - Strengthen or repair

Assistance Programs



Equivalent Match Project:

- Welded repair
- Paint protective system



- Load Posting Signs
 - 30 Days
 - TxDOT provided
 - LG installs
- Out of Compliance?
 - AFA will not be executed
- Texas Administrative Code
 - Title 43, Part 1, Chapter 15
 - Cost participation

Assistance Programs





Scour Problems:

Need scour calculations or foundation depths.

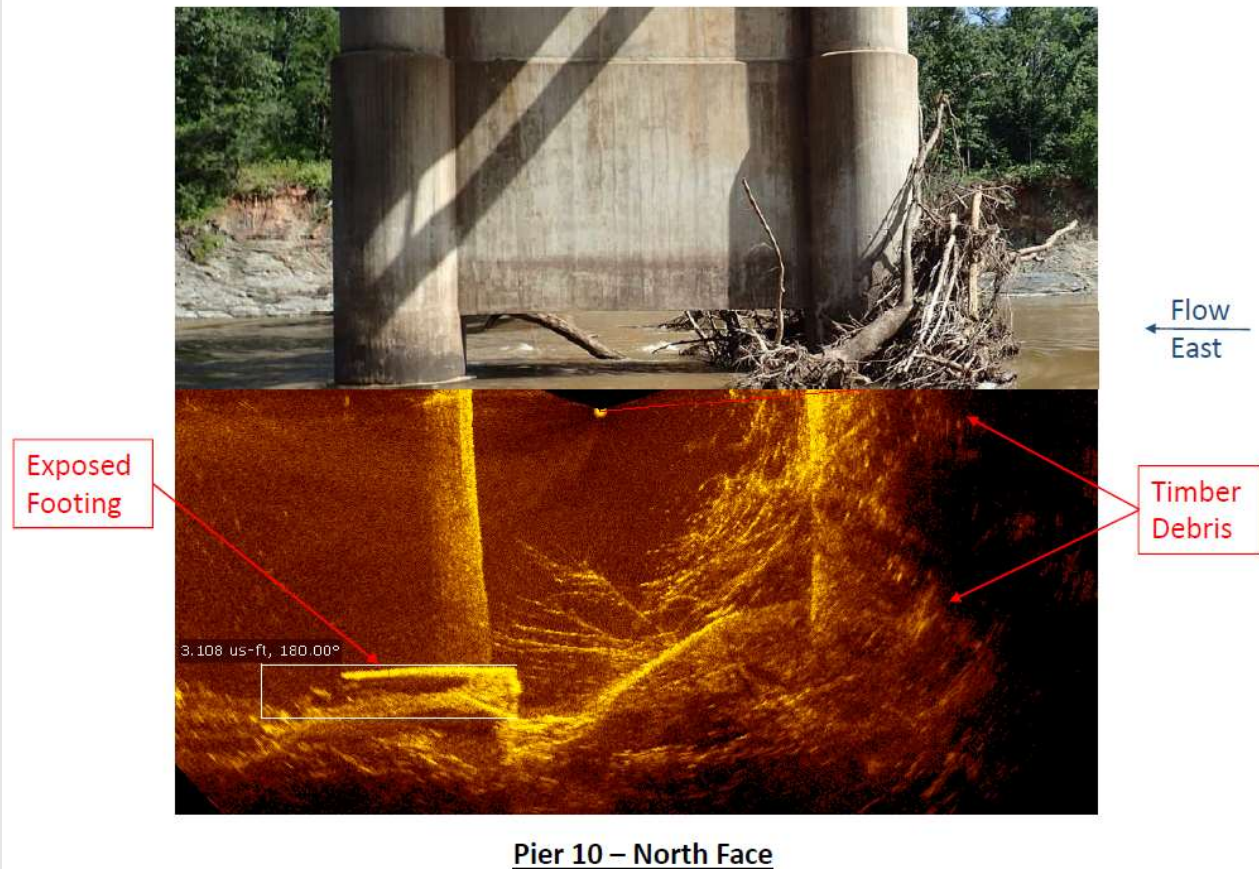
Depth gauges are effective with fast-flowing current.



Assistance Program



- Side-scan sonar
- Underwater imaging/side scan sonar.
- FHWA - Every bridge over a waterway, whether existing or proposed, should be evaluated as to its vulnerability to scour in order to determine the prudent measures to be taken for its protection.



Pier 10 – North Face

Bridge Funding



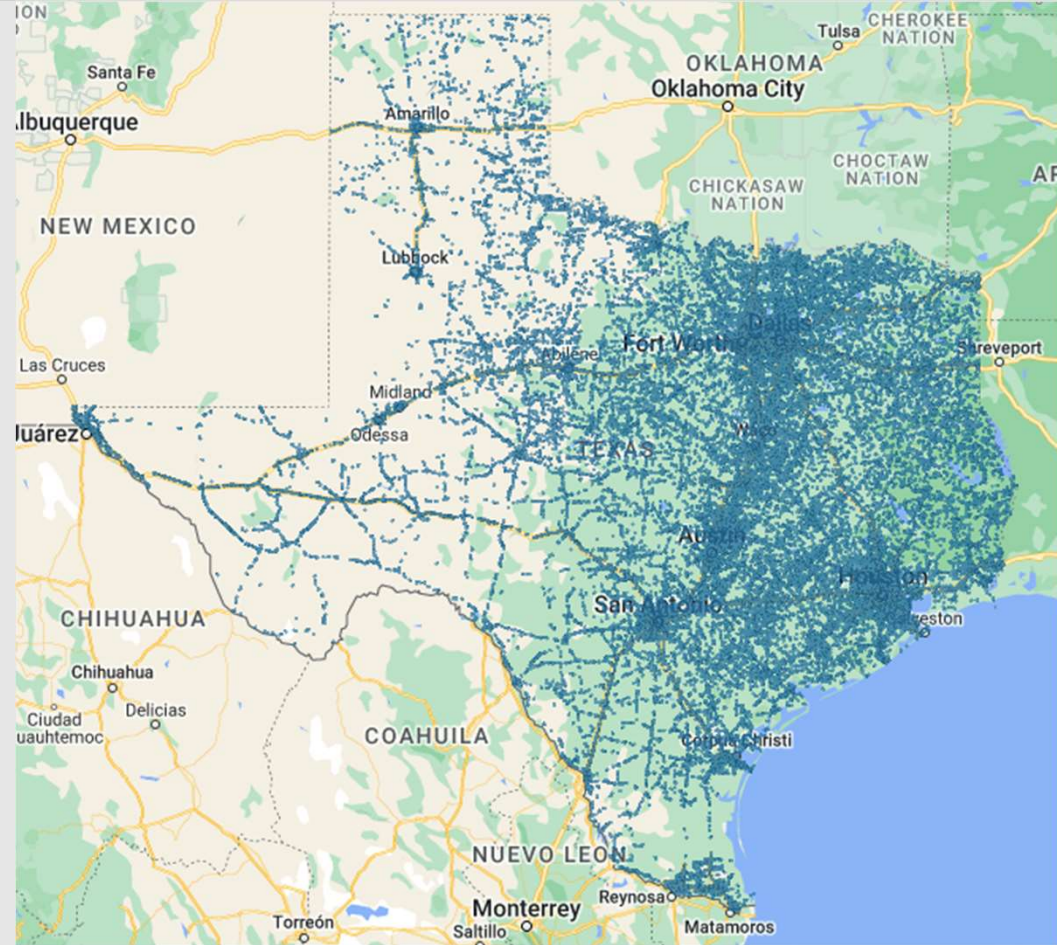
- Replacement – Engineered, resilient, documented, lower maintenance needs



Bridge Funding

Texas Expected Population Growth:

- New Bridges – report to TxDOT
 - Provide plans
 - Any engineering documents
- Specifications in place?
 - Point to TxDOT Design Manuals
 - AASHTO Manuals
- TxDOT Standard Drawings

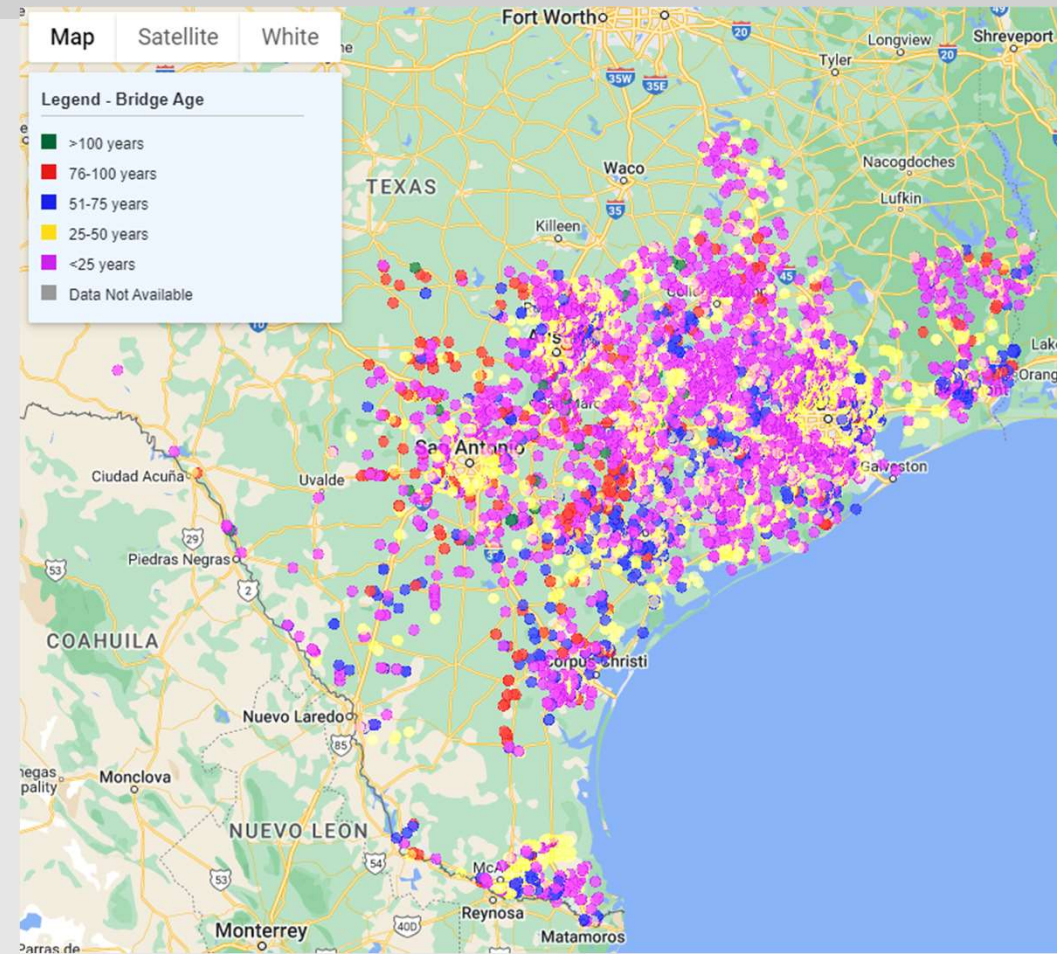


Bridge Resources/Tips

FHWA Bridge Data

- InfoBridge:

<https://infobridge.fhwa.dot.gov/Home>



Questions

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Bridge Management
Section Director

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