January 7, 2025

Welcome to Bridge Briefings

We will begin at 11:30 AM

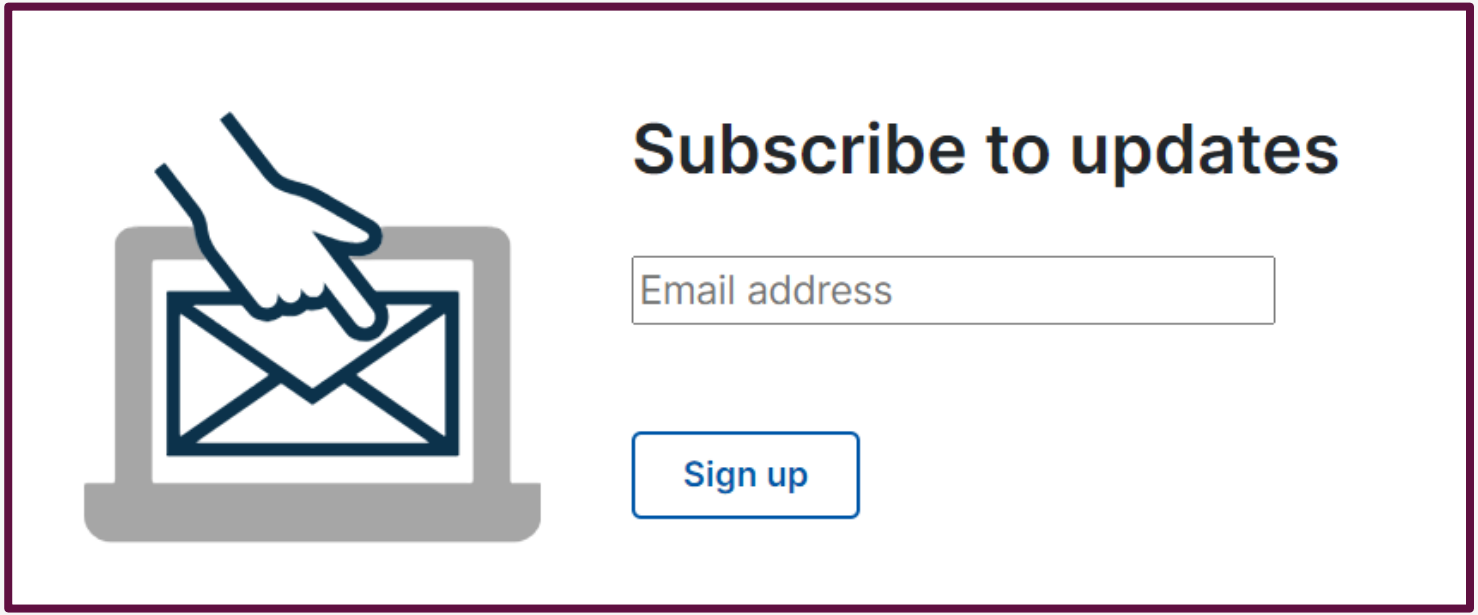
Reminders

- Chat is turned off, please use the Q&A box
- Slides will be posted on the Bridge Website:

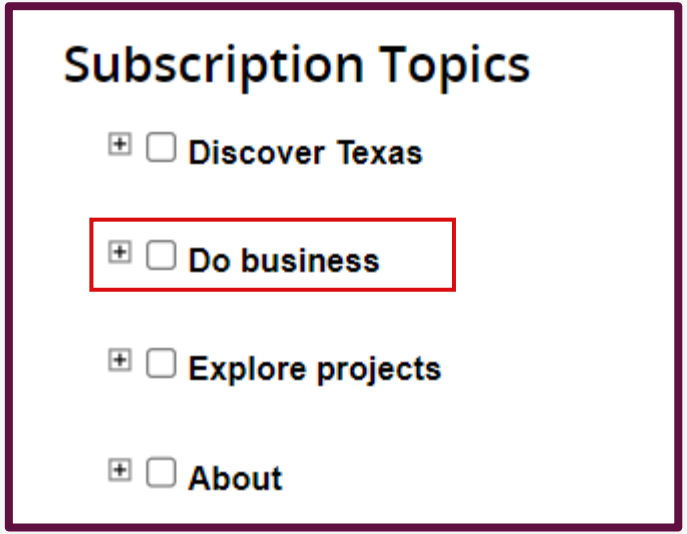
  https://www.txdot.gov/business/resources/highway/bridge/webinar-presentations/bridge-briefings.html

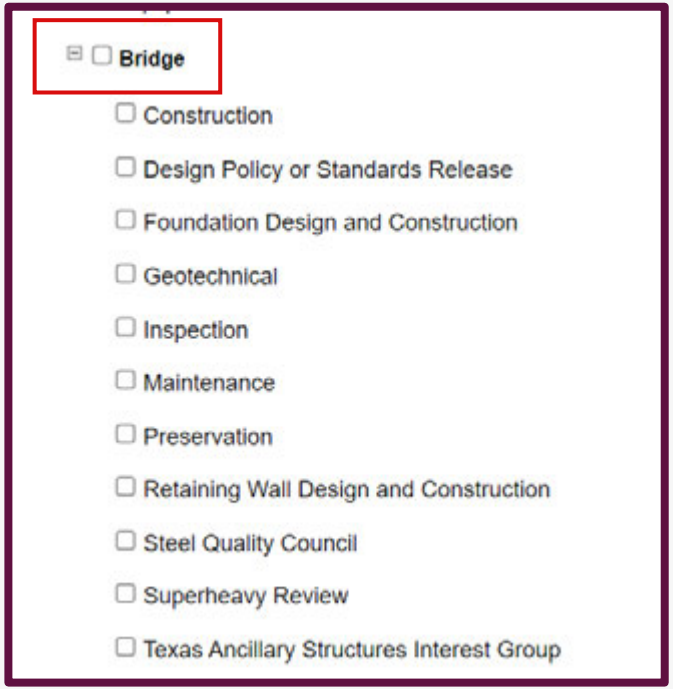
Don’t miss out on other updates!

https://www.txdot.gov/about/divisions/bridge-division.html



Don’t miss out on other updates!





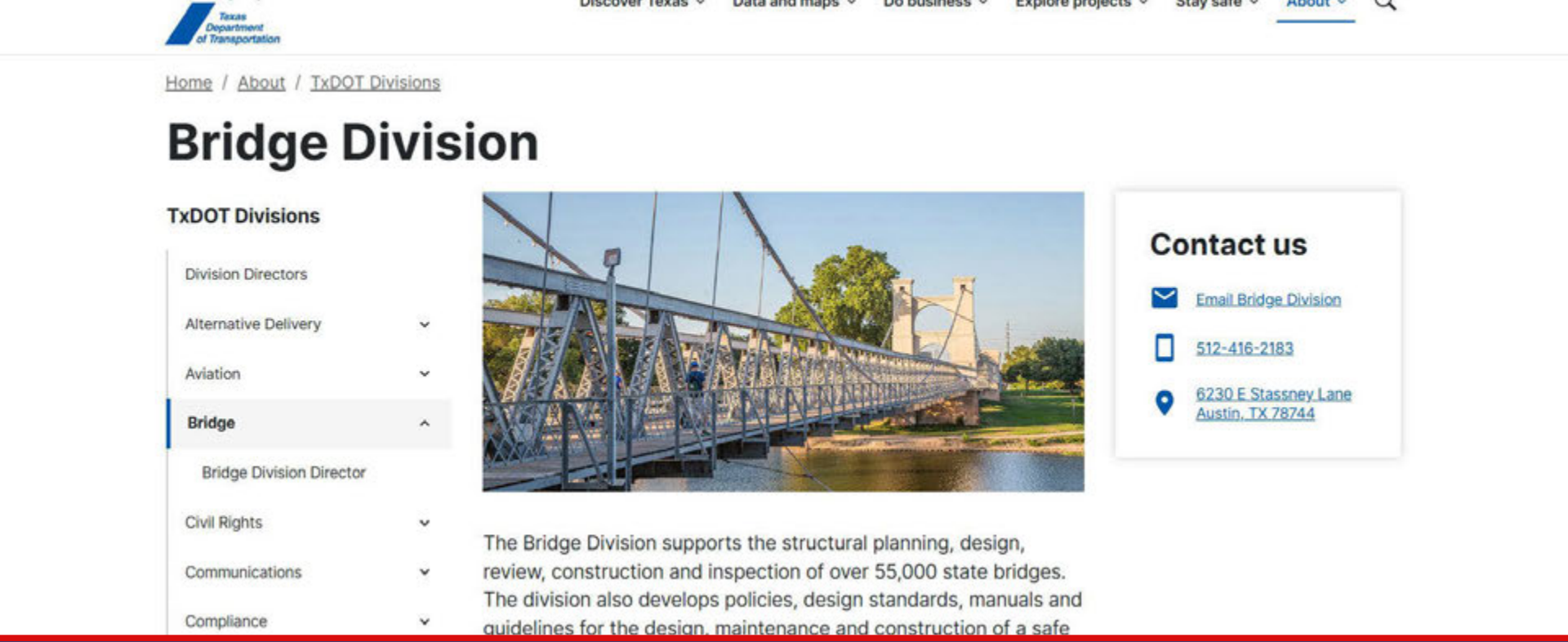
PDH

- Please remember Bridge Division does not provide documentation for TX Board PDH approval. Each engineer should exercise personal judgement when counting webinar topics for their professional development hours. For more info on what qualifies for Continuing Education, please visit https://pels.texas.gov/CEPInfo.htm

2025 Roadway Design and Bridge Conference

- Registration is now open!

https://roadway-design-and-bridge-conference.webflow.io/



Bridge Division Resources

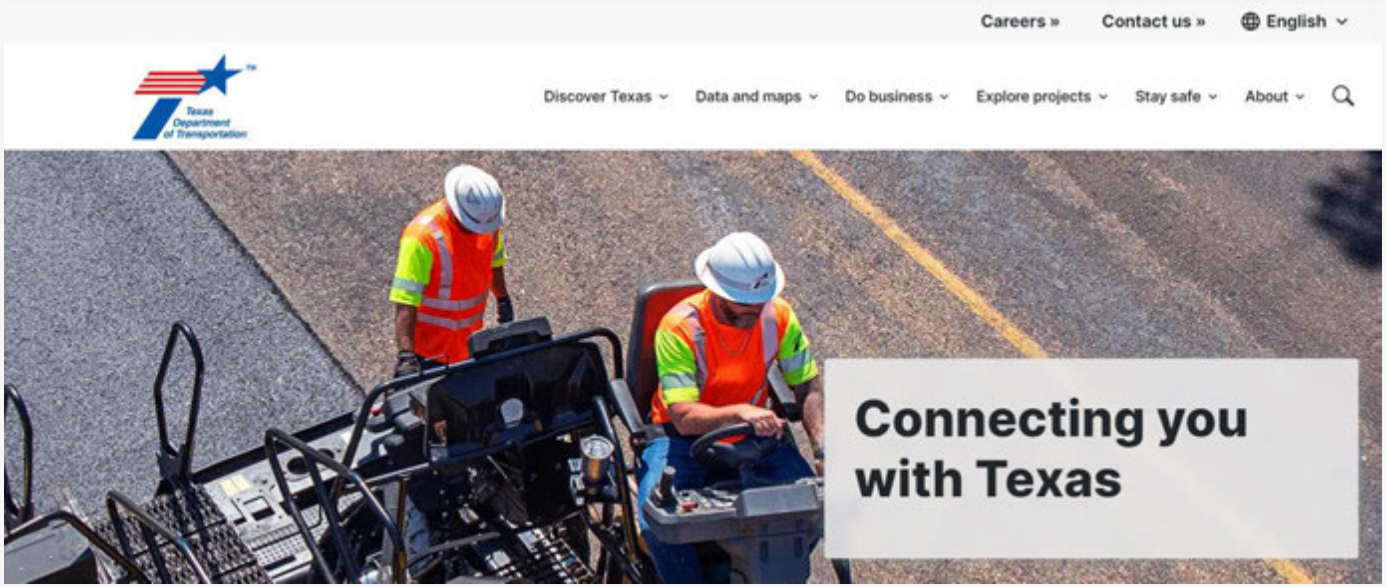
Sara Watts, P.E. & Niyi Arowojolu, P.E.

Texas Department of Transportation

January 7, 2025

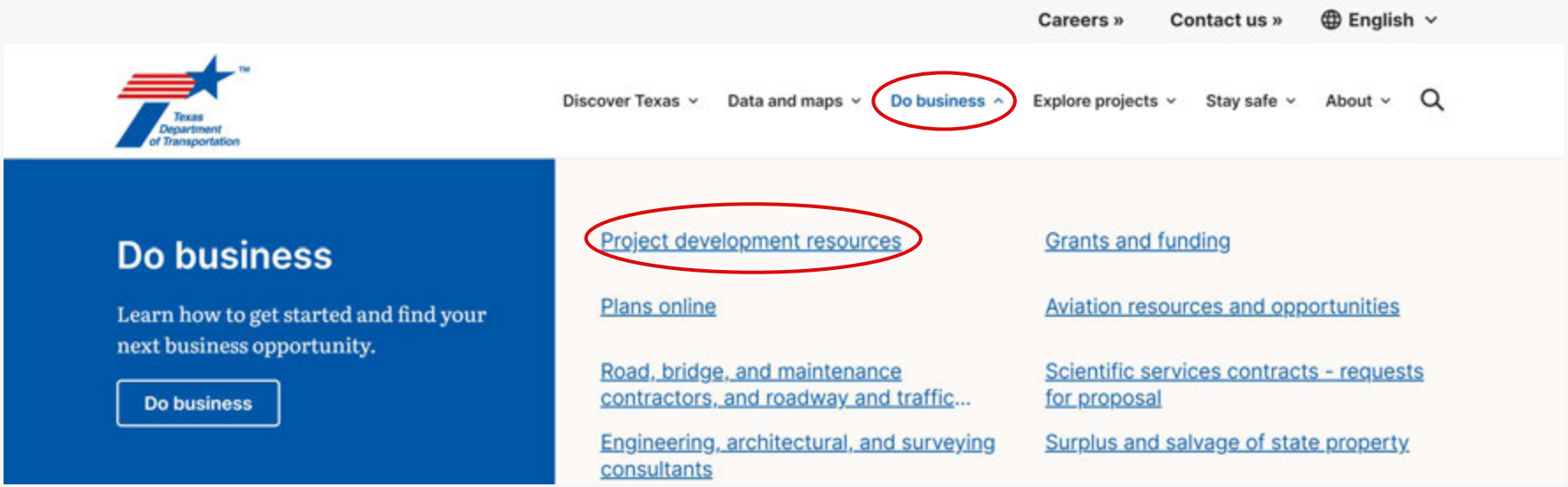
TxDOT Resources – How to Navigate

- https://www.txdot.gov



TxDOT Resources – How to Navigate

- From the txdot.gov home page banner select Project development resources from the Do business drop down.

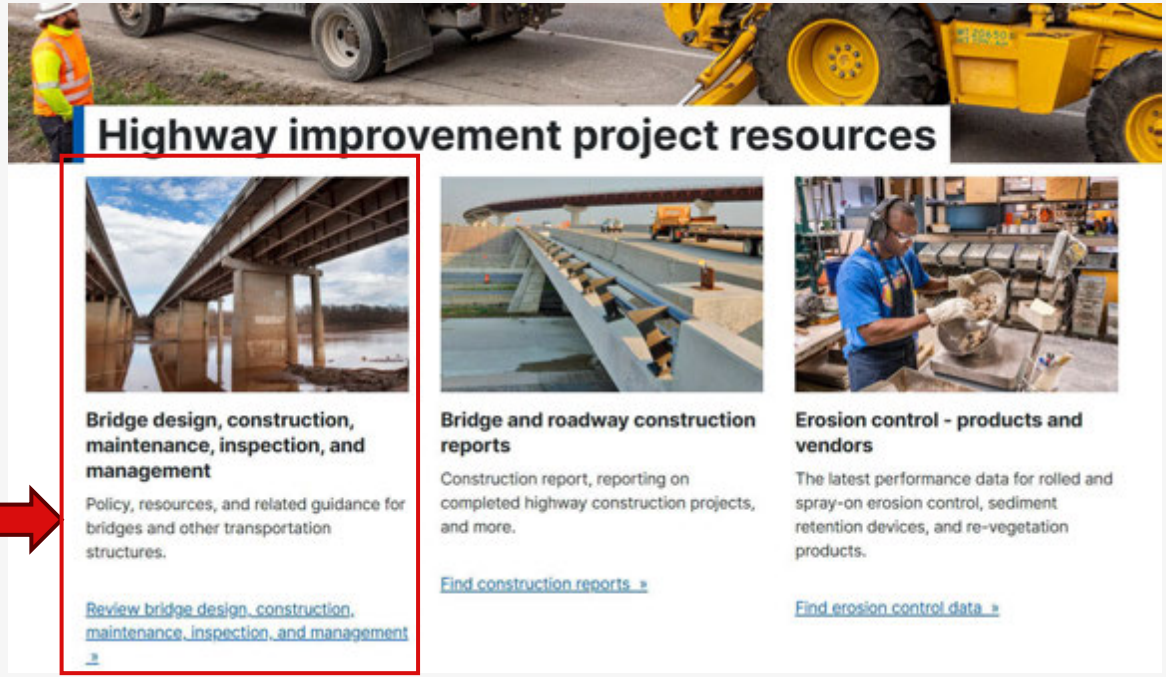


TxDOT Resources – How to Navigate

- From Project development resources, scroll down and select the Guidance for bridge and roadway construction

TxDOT Resources – How to Navigate

- From Guidance for bridge and roadway construction, select the Review bridge design, construction, maintenance, inspection and management



TxDOT Resources – How to Navigate

TxDOT Design Resources

Here you will find **design** resources on the items below:

- Pipe Design
- Approval Systems
- Geotechnical Design
- Bridge Publications
- 3D Modeling

Approval systems

Bridge publications

Pipe design and durability

Geotechnical

3D bridge modeling

TxDOT Design Resources

Here you will find **design** resources on the items below:

- **Pipe Design**
- Approval Systems
- Geotechnical Design
- Bridge Publications
- 3D Modeling


Approval systems


Bridge publications


Pipe design and durability


Geotechnical


3D bridge modeling

Pipe design and durability

- TxDOT pipe information
  - Bridge Standards
  - Material Requirements
  - Hydraulic Design Manual
  - Standard Specifications
  - Material Producer List

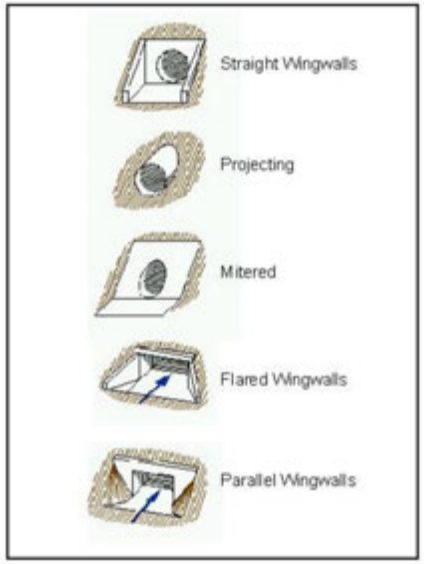
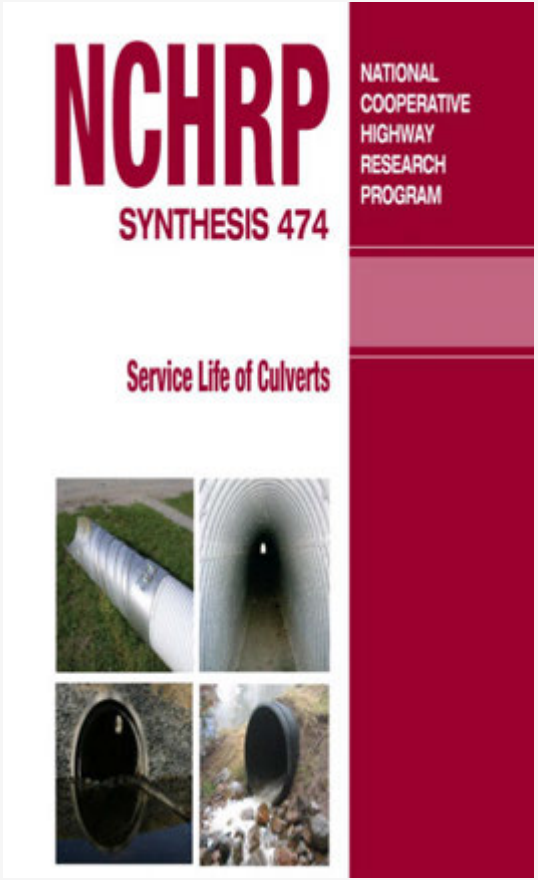


Figure 8-2. Typical Culvert End Treatments

From the TxDOT Hydraulic Design Manual

Pipe design and durability

- Service life of culverts
- Link to NCHRP 474
  - Most common culverts
  - Factors that influence corrosion in metal and concrete pipes
  - How to stop corrosion
  - Service life predictions



Pipe design and durability

- Reinforced concrete pipes
  - American Concrete Pipe Association Website and Fill-Height Tables
  - Concrete Pipe Design Manual
    - Provides design data and specifications
    - Provides concrete facts
  - Precast concrete pipe life cycle and durability

Photo credit: American Concrete Pipe Association

Pipe design and durability

- Corrugated metal pipe and steel
- National Corrugated Steel Pipe Association (NCSPA) Website
  - CSP LRFD HOC calculator
  - Corrugated Steel Pipe Design Manual
- Durability Analysis of Aluminized Type 2 Corrugated Metal Pipe Document

Photo credit: NCSPA

Pipe design and durability

- Plastic Pipes
  - Design Considerations for Specifying Thermoplastic Pipes on TxDOT Projects
  - Thermoplastic Pipe Installation Working Drawing
  - Plastic Pipe Institute

Photo credit: Plastic Pipe Institute

TxDOT Design Resources

Here you will find **design** resources on the items below:

- Pipe Design
- **Approval Systems**
- Geotechnical Design
- Bridge Publications
- 3D Modeling


Approval systems


Bridge publications


Pipe design and durability


Geotechnical


3D bridge modeling

Approved systems

- Systems approved for use on TxDOT Bridge Projects
  - Expansion Joints
  - Concrete block retaining walls
  - MSE Wall Panels
- Manufacturers
- Contact Information

Approved asphalt plug joint systems

The following asphaltic plug expansion joint systems are approved for use on TxDOT projects:

Product name	Manufacturer	Contact
Matrix 501, Matrix 502	Crafco, Inc. 420 N. Roosevelt Ave. Chandler, AZ 85226	Gus Leal 469-520-4622
Matrix 502 Asphalt Plug	D.S. Brown Co. 300 E. Cherry St. North Baltimore, OH 45872	419-257-3561
Wabo-Expandex	BASF 3011 Heatherpark Drive Kingwood, TX 77345	Robert Walker 281-414-3114
Fibrejoint Asphaltic Plug Joint	FPT Infrastructure, Division of Fibrecrete Preservation Technologies, Inc. 401 Old US 52 South Mount Airy, NC 27030	Mike McGuire 346-318-7663 info@fptinfrastructure.com

TxDOT Design Resources

Here you will find **design** resources on the items below:

- Pipe Design
- Approval Systems
- **Geotechnical Design**
- Bridge Publications
- 3D Modeling


Approval systems


Bridge publications


Pipe design and durability


Geotechnical


3D bridge modeling

Geotechnical

- Retaining Walls
  - Cut or fill determination
  - Constructability
  - Aesthetics
  - Alternate walls
  - Wall layout considerations
  - Stability considerations
  - Design procedures
  - Recommended construction and maintenance system selection
  - Recommended construction practices
  - Recommended maintenance
  - Approved systems

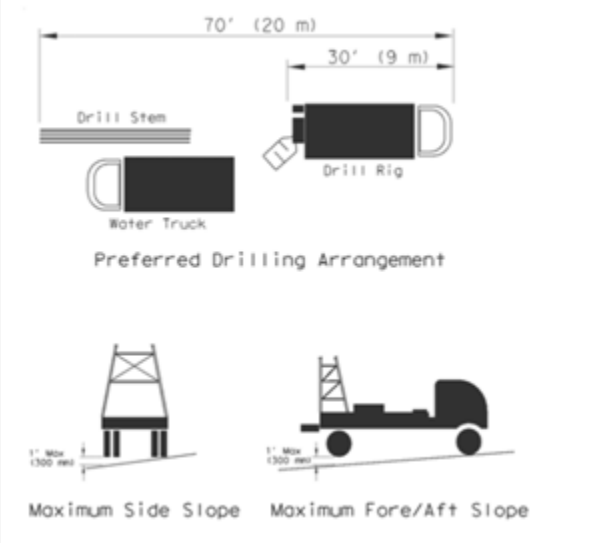
Retaining walls

Retaining wall criteria.

Learn more about retaining walls »

Geotechnical

- Geotechnical field testing
  - Site preparation
  - Sampling
  - Field testing
  - Classification



Geotechnical field testing

Site preparation, sampling, and more.

Find geotechnical field testing »

Geotechnical

- Soil and bedrock
  - Find information on classification and variations
  - Logging Method

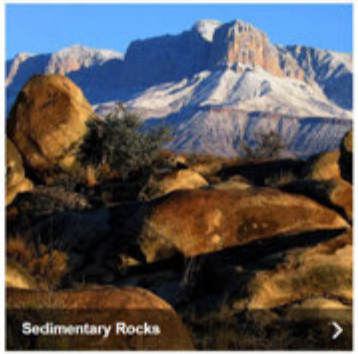


Photo credit: nps.gov

Soil and bedrock

Classifications, variations, and logging.

Discover soil and bedrock info »

TxDOT Design Resources

Here you will find **design** resources on the items below:

- Pipe Design
- Approval Systems
- Geotechnical Design
- **Bridge Publications**
- 3D Modeling


Approval systems

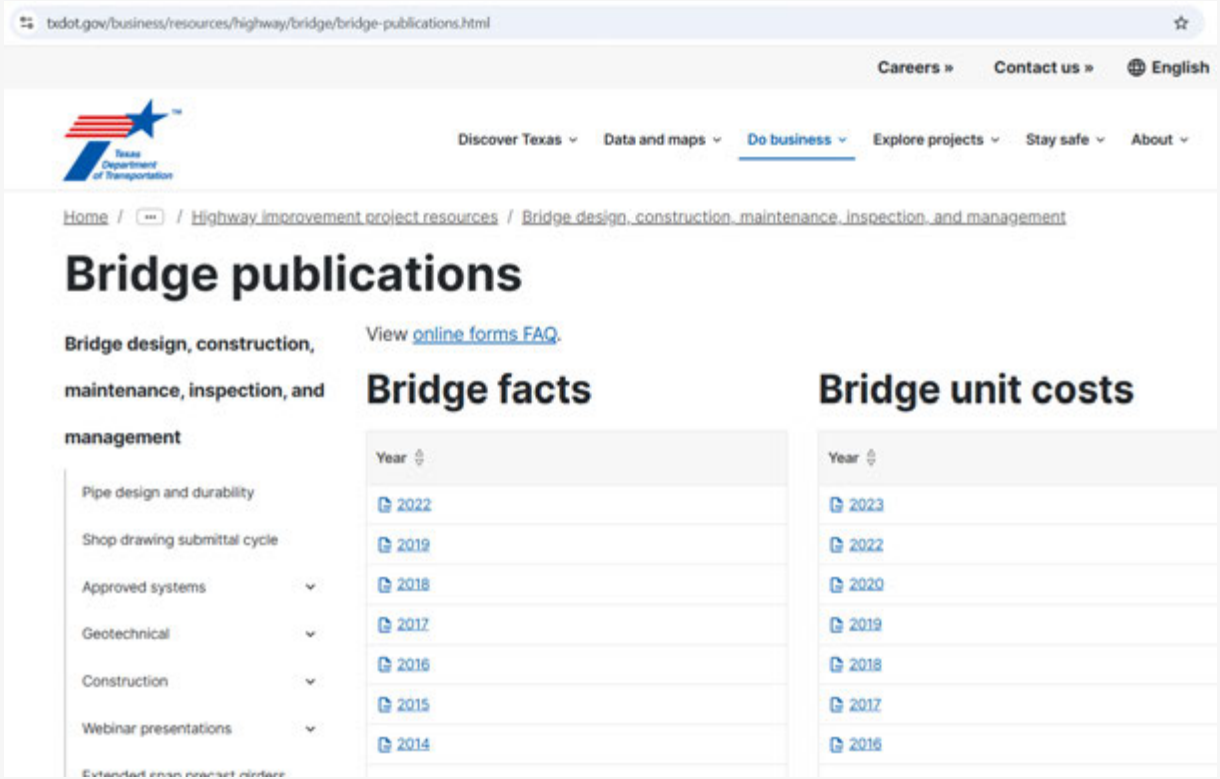
Bridge publications


Pipe design and durability


Geotechnical


3D bridge modeling

Bridge publications



Bridge publications

- Bridge unit costs

State FY 2023 Low Bid Average for New and Replaced Bridges

Length, LF	20-50		51-100		101-200		201-400		401-1000		>1000		2023 Average	2023 Total Number
Bridge Type	#	$/SF	#	$/SF	#	$/SF	#	$/SF	#	$/SF	#	$/SF	$/SF	#
CLV	51	$ 134.09	19	$ 123.59	2	$ 154.11	0	-	1	$ 112.73	0	-	$ 130.76	73
GPITX	1	$ 137.37	49	$ 160.48	47	$ 142.10	113	$ 107.34	42	$ 100.79	17	$ 91.64	$ 101.95	269
GP - BX	1	$ 291.85	16	$ 218.41	1	$ 148.84	0	-	0	-	0	-	$ 210.27	18
SLAB	2	$ 194.77	0	-	0	-	0	-	0	-	0	-	$ 194.77	2
GPDSB	1	$ 211.53	1	$ 185.58	1	$ 139.97	0	-	0	-	0	-	$ 165.40	3
GP-IB	0	-	0	-	0	-	0	-	0	-	0	-	$ -	0
PAN	0	-	0	-	0	-	0	-	0	-	0	-	$ -	0
PCSB	24	$ 171.28	20	$ 178.35	24	$ 153.00	5	$ 108.95	1	$ 99.01	0	-	$ 143.87	74
GS-I *	0	-	0	-	0	-	2	$ 109.66 *	1	$ 244.27*	0	-	$ 161.08*	3
GS-TR	0	-	0	-	0	-	0	-	0	-	0	-	$ -	0
GS-Truss	0	-	0	-	0	-	0	-	0	-	0	-	$ -	0
GPTB	0	-	0	-	0	-	0	-	0	-	0	-	$ -	0
GST	0	-	0	-	0	-	0	-	0	-	0	-	$ -	0
GPCXB	0	-	1	$ 170.14	2	$ 151.64	1	$ 178.75	0	-	0	-	$ 163.46	4
GPUB	0	-	0	-	0	-	2	$ 99.11	2	$ 115.42	2	$ 95.45	$ 99.72	6
All Types Total													$ 106.22	452
Span Bridges (All Types excluding culverts)													$ 105.28	379

*The $/SF for GS-I beams are for the entire bridge, which are comprised of prestressed concrete beam approach spans and steel beam spans. For the 201-400 Length bridge, the unit costs for the steel portion was $140/SF (span length = 175.5'). The 401-1000 Length bridge, the unit costs for the steel portion was $384/SF (span length = 200').

Legend

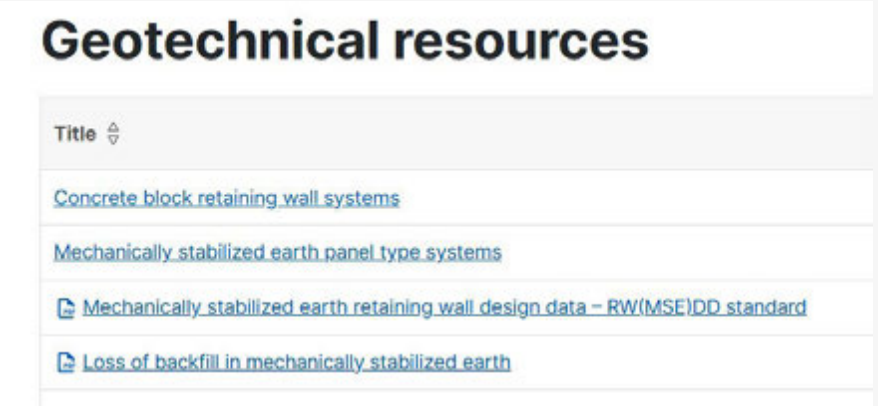
CLV	Culvert	GP-IB	I Beam Prestr Conc	GS-Truss	Steel Truss
GPITX	TX I Beam Prestr Conc	PAN	PAN Concrete Girder	GPTB	T Beam Prestr Conc
GP - BX	Box Beam Prestr Conc	PCSB	Slab Beam Prestressed Concrete	GST	T Concrete Girder
SLAB	Concrete Slab	GS-I	Steel I Beam	GPCXB	X Box Beam Prestr Conc
GPDSB	Decked Slab Bm Prestr Conc	GS-TR	Steel Trapezoidal Beam	GPUB	U Beam Prestr Conc

Bridge publications

- Construction and maintenance
  - Bridge Preservation Guide
  - Precast concrete stay-in-place forms for bridge decks
  - Shop plan contacts
  - Underwater drilled shaft construction - geotech
  - Welding certifications

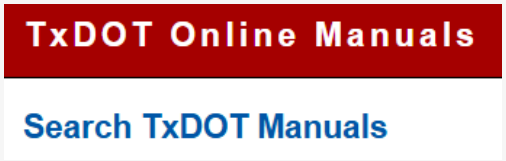
Bridge publications

- Other resources available
  - Geotechnical
  - Highway Bridge Program
  - Inspection
  - Report on Texas bridges
  - Construction reports
  - Online Manuals



TxDOT Online Manuals

- Bridge Design Manual – LRFD
  - Design Criteria, Material Requirements and Geometric Constraints
- Bridge Project Development Manual
  - Preliminary Design Features, Coordination and BRG Division Role
- Bridge Railing Manual
  - Rail Type Selection
- Concrete Repair Manual
  - Repair procedures by Structural Element and Damage Type
- Geotechnical Manual LRFD
  - Incorporates LRFD into Geotechnical Evaluation, Design and Quality Control

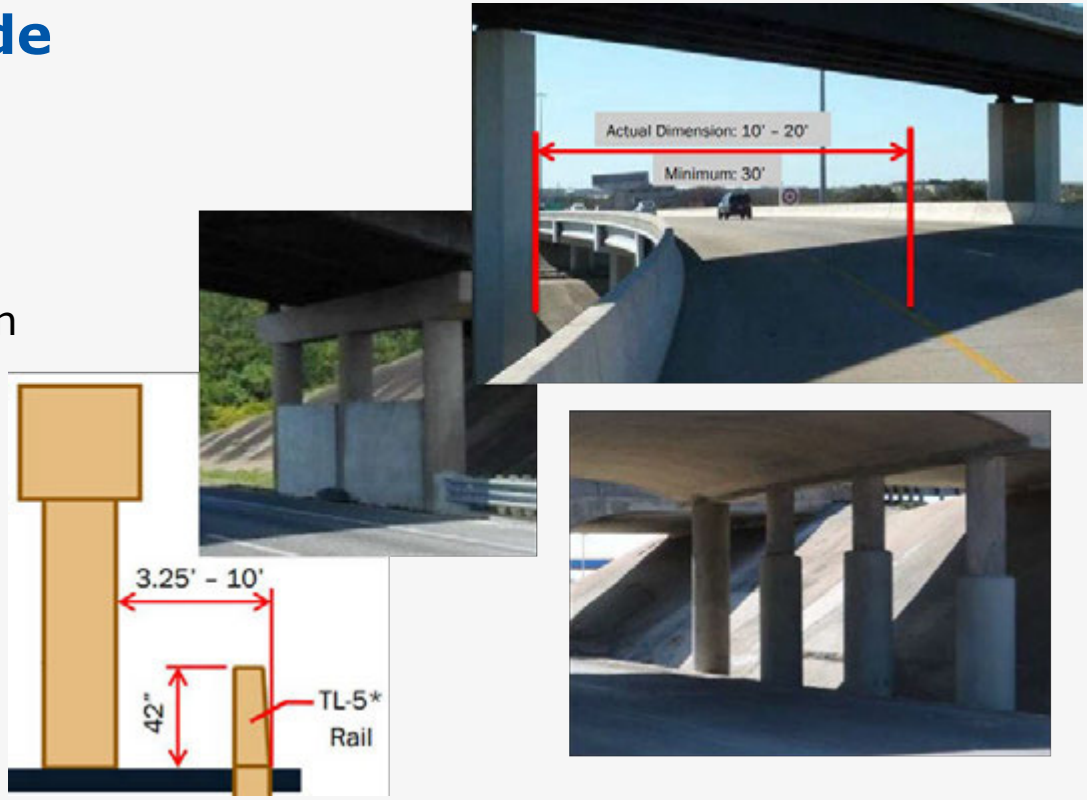


Bridge publications

- Design
  - Bent pier protection guide
  - Bridge detailing guide
  - Bridge design guide
  - Corrosion protection guide
  - Pile type selection guidance
  - Quality control and quality assurance guide
  - Steel bridge design preferred practices
  - Design software programs

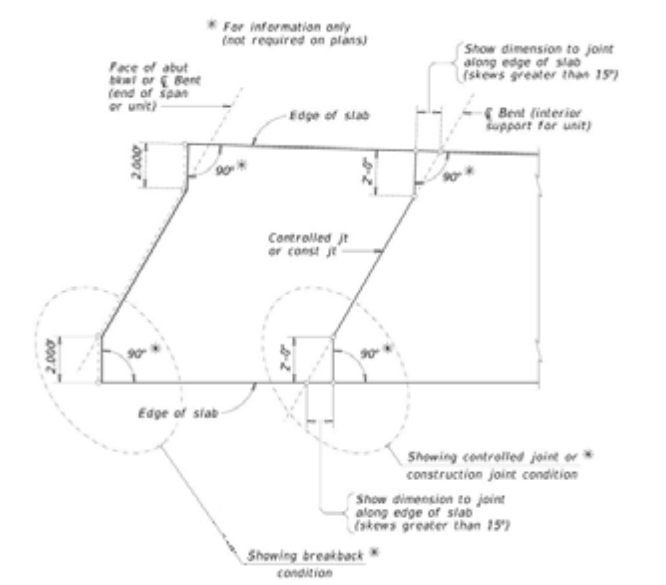
Bent Protection Guide

- Design Considerations
- Load Redirection Design
- Structural Resistance Design
- Engineering Decision Flowchart
- Examples
- Possible Failure Modes



Bridge Detailing Guide

- Contains typical display, geometry and parameters for bridges
- Line weight/Line styles
- Scale/Text information
- Bar Sizes, Cover and Dimension
- Superstructure and Substructure Appendices beam type
- Foundation Detailing
- Checklists



Bridge Design Guide

- Contains commentary for the Design Manual
- Superstructure Contents:
  - Design preferences/considerations by beam type
  - Precast Girder strand limits
  - Vertical Curve Effects on Haunch
  - Twin Tub Redundancy Guidance
- Substructure Contents:
  - Design preferences/considerations by bent type
  - Reinforcement Preferences

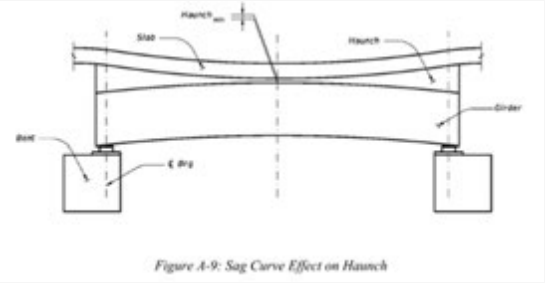


Figure A-9: Sag Curve Effect on Haunch

Steel Preferred Practices

- Preferred Practices for Steel Bridge Design, Fabrication, and Erection
- This document provides guidance to help steel bridge designers working TxDOT projects to achieve optimal quality and value in steel bridges.
- Considerations for Design, Fabrication and Erection/Construction
- Painting Practices

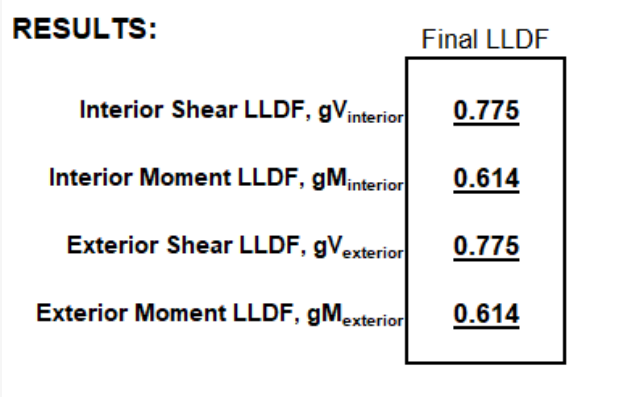
Click here for more
Texas Steel Quality Council

Bridge publications

- Design
- LL Distribution Factor Spreadsheets
  - Prestressed concrete i-beams
  - Prestressed concrete u-beams and x-beams
  - Prestressed concrete box beams
  - Prestressed concrete slab beams
  - Prestressed concrete spread slab beams
- Rectangular reinforced concrete caps, shear design spreadsheet
- Recommendations for
  - Beam spacings
  - Span lengths for i-girders
  - Span lengths for slab beams
  - Span lengths for LRFD, box beams

Live Load Distribution Factor (LLDF) Spreadsheets

- Per AASHTO Article 4.6.2.2.2 and Article 4.6.2.2.3, LLDF are applied to transform models from Beam Line Analysis to 3D. These equations are complex, so TxDOT developed spreadsheets by beam type to correctly apply complex AASHTO requirements
- These can be generated by PGSuper but need to be calculated and inputted manually when the program errors due to Range of Applicability



TxDOT Design Resources

Here you will find **design** resources on the items below:

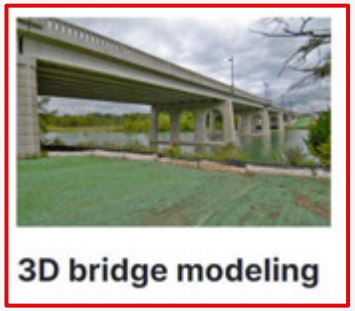
- Pipe Design
- Approval Systems
- Geotechnical Design
- Bridge Publications
- **3D Modeling**


Approval systems


Bridge publications

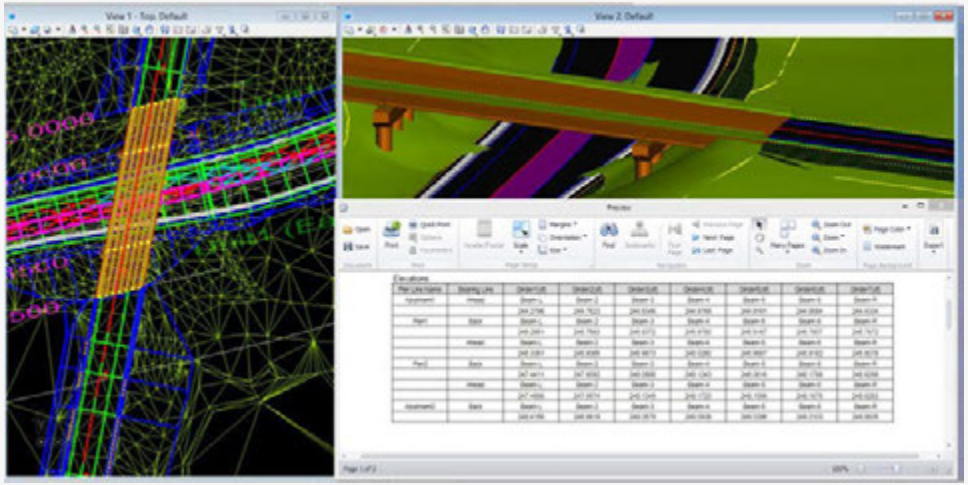

Pipe design and durability


Geotechnical


3D bridge modeling

3D Bridge Modeling

- Resources for Open Bridge Modeler
  - Expectation of Use
  - Workspace Files
  - Model Completion Checklist
  - Comparison Report Templates
  - OBM Training Manual and Videos



TxDOT Resources

Other resources available:

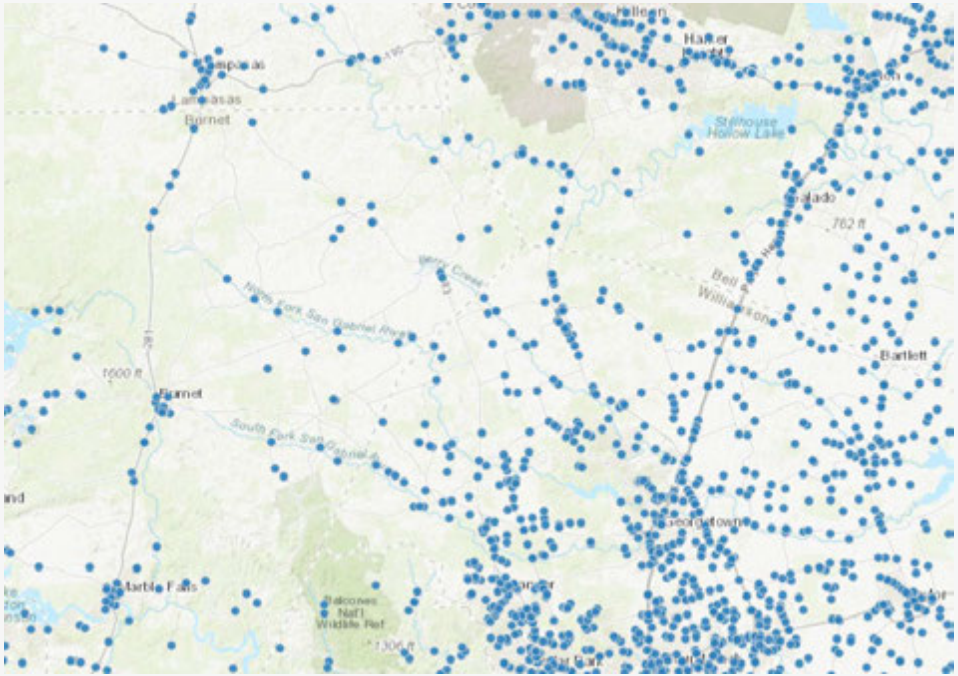
- **GIS App**

TxDOT bridges (GIS APP)

A statewide point dataset of bridge locations maintained by the Bridge Division of TxDOT.

GIS application

TxDOT Bridges GIS



Shop Drawing Submittal Resources

- Electronic submission of shop drawings
- 2024 items reviewed table
- Optional or alternate designs
- Pre-submittal checks
- Shop drawing submittal
- Distributing final shop drawings
- Statewide shop drawing review contacts
- Submitting optional and non-standard illumination pole designs
- Questions and answers
- Terminology

Shop drawing submittal cycle

Typical shop drawing submittal cycle, electronic submission of shop drawings, and more.

Find the shop drawing submittal cycle »

Construction Resources

- Concrete Repair Manual
- Welder Certifications

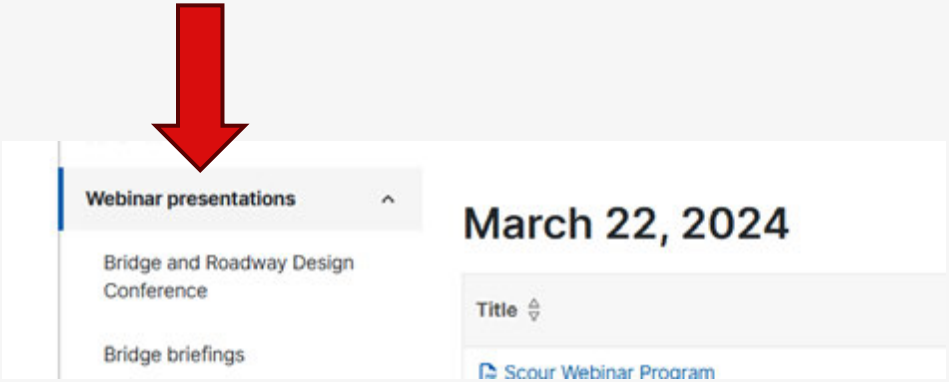
Construction

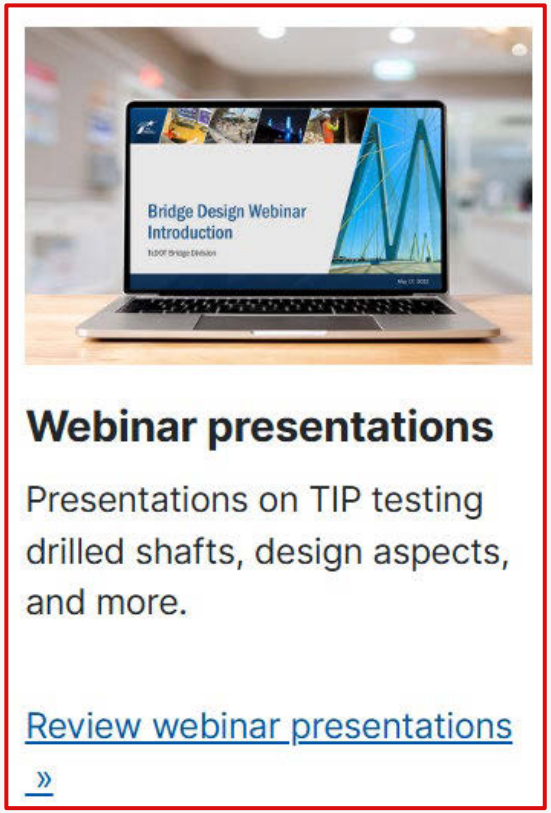
Welding certifications.

Learn about welding certifications »

Webinar Presentations

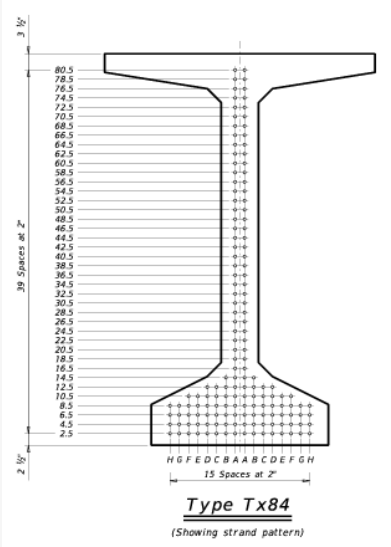
- Vast library of previous Bridge Division Webinars and presentations

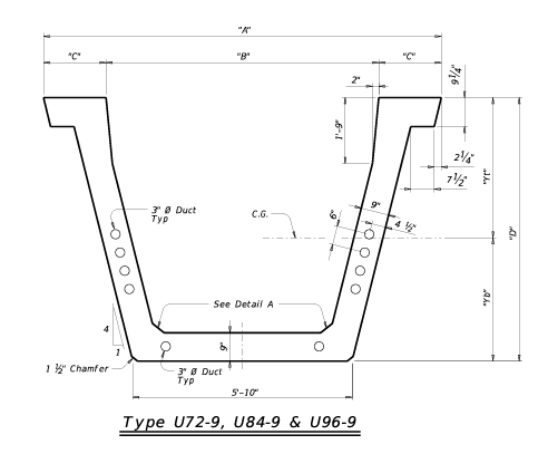




Extended span precast girders

- I-girder and U-girder information available





Extended span precast girders

Cross-sections for extended span lengths.

Read about precast girder »

Deck texture requirements

- Concrete superstructures
- PCC pavements and bridge decks
- Bridge plan notes

Deck texture requirements

Proper roadway surface texture, hydroplane prevention.

Review deck texture requirements »

Standard Plan Sheets

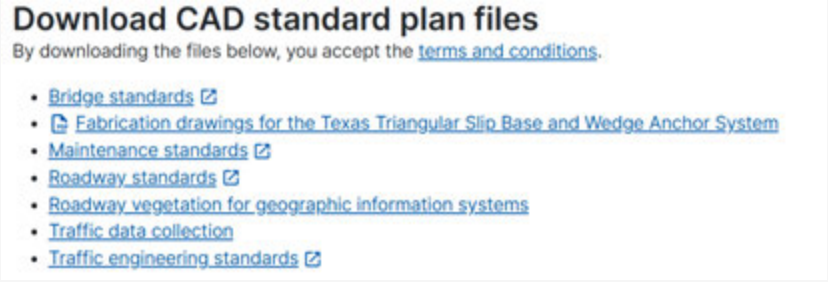
- https://www.txdot.gov/business/resources.html
- TxDOT provides computer aided drawing (CAD) Standard Plan files. Good quality printed versions of the files may be used in plan sets without being signed and sealed by a licensed engineer.

TxDOT standard plan sheets - computer aided design (CAD)

Bridge, roadway, & maintenance standards »

Bridge Standards

- Open Bridge Modeler Standard Bridge Templates
- Memorandums of Issued/Revised Standards
- Guide and Standard Bearing Design Spreadsheet
- Approx 800 Standard Designs by Structure Type
- Working Drawings



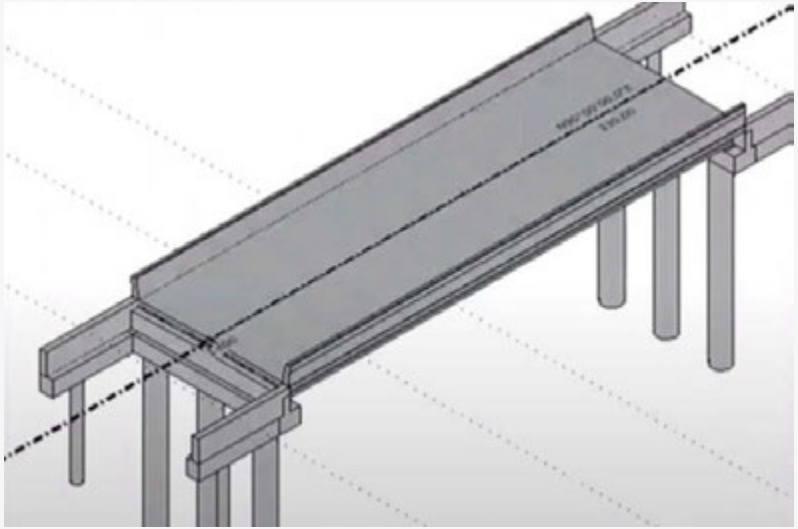
Download CAD standard plan files

By downloading the files below, you accept the terms and conditions.

- Bridge standards
- Fabrication drawings for the Texas Triangular Slip Base and Wedge Anchor System
- Maintenance standards
- Roadway standards
- Roadway vegetation for geographic information systems
- Traffic data collection
- Traffic engineering standards

OBM Bridge Templates

- Bridge Templates for the below beam types in Open Bridge Modeler. From the template, apply the roadway alignment, adjust roadway width and adjust the span length to be bridge specific.
- Prestr. Spread Box Beams
- Prestr. U-Beams
- Prestr. Tx Girders
- Prestr. Slab Beams
- Prestr. Adjacent Box Beams



Bridge Standard – Change Memos

- Memorandums and Revisions are documented on the Bridge Standards Website.

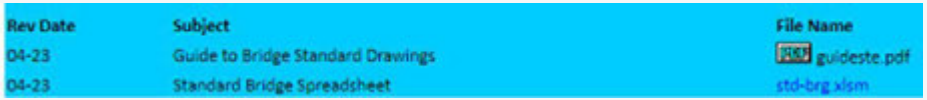
Memorandums of Issued/Revised Standards
From September 2000 to Present

Rev Date	Subject	File Name
02/23/2024	New and Revised Working Drawings	memo78.pdf
10/23/2023	Revised Prestressed Concrete I-Girder Standard Drawings	memor77.pdf
07/31/2023	All Standard Drawings Update for Sheet Models and File Names	memoi76.pdf
06/26/2023	Revised Culvert Standard Drawings	memoi75.pdf
04/17/2023	New OBM Templates	memoi74.pdf
03/09/2023	New and Revised Miscellaneous, Bridge Railing, Culvert, I-Girder and U-beam Standard Drawings	memoi73.pdf
01/18/2023	New and Revised Concrete I-Girder Standard Drawings	memoi72.pdf
08/23/2022	Revised Prestressed Concrete X Beam Standard Drawings	memor71.pdf
08/23/2022	Revised Retaining Wall Standard Drawings	memor70.pdf
08/08/2022	New Working Drawings	memoi69.pdf
06/15/2022	New and Revised Retaining Wall Standard Drawings	memoi68.pdf
03/17/2022	Revised TxGirder, X beam, Slab beam, and U beam ND Standard Drawings	memor67.pdf
12/17/2021	Revised Culvert, Miscellaneous and Retaining Wall Standard Drawings	memor66e.pdf
11/17/2021	Revised Steel Beam Standard Drawings	memor65e.pdf
07/22/2021	Revised Cast-In-Place Concrete Slab Spans Standard Drawings	memor64e.pdf
04/26/2021	Revised Single Box Cast-in-Place Culvert Standard Drawings	memor63e.pdf
01/11/2021	Revised Prestressed Concrete I-Girder and Slab Beam Standard Drawings	memor62e.pdf
08/13/2020	Revised Miscellaneous Standard Drawing	memor61e.pdf
08/04/2020	Revised Prestressed Concrete Decked Slab Beam Standard Drawings	memor60e.pdf
07/09/2020	New and Revised Bridge Railing Standard Drawings	memor59e.pdf
02/13/2020	Revised Miscellaneous and Retaining Wall Standard Drawings	memor58e.pdf
02/05/2020	New and Revised Culvert and Drainage Standard Drawings	memoi60e.pdf

Show Previous Memos | Hide Previous Memos

Guide to Bridge Standard Drawings

- Advantages/Usefulness of the Beam Type
- Standard Drawing Location
- Standard Drawing Usefulness
- Standard Drawing Features
- Standard Drawings Needed for Bridge Details
- Additional Drawings Needed to Complete Bridge Details
- Restrictions of Use of Standard Drawings
- Special Considerations
- Specific Bridge Layout Requirements
- Use the Bridge Spreadsheet to Calculate Bearing Elevations, cap step elevations and list of applicable standards



Rev Date	Subject	File Name
04-23	Guide to Bridge Standard Drawings	guideste.pdf
04-23	Standard Bridge Spreadsheet	std-brg.xlsm

TxDOT has over 800 Bridge Standards

- Miscellaneous Standards
- Bridge Railing Standards
- Retaining Walls
- Culvert and Drainage
- Prestressed Concrete X-Beams
- Cast-In-Place Slab Spans
- Prestressed U-Beam Details
- Prestressed Concrete I-Girders
- Steel Beams
- Prestressed Box Beams
- Prestressed Decked Slab Beams
- Concrete Slab & Girder
- Working Drawings

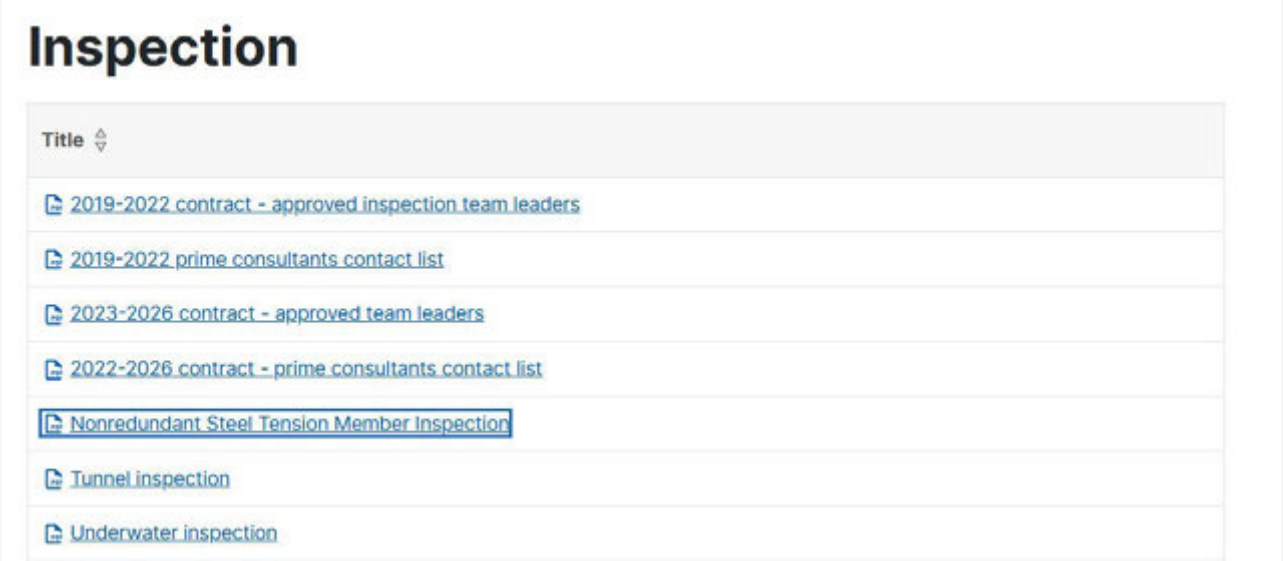
Corrosion Protection Guide

This guide serves to enhance corrosion protection measures on bridge structures.

- De-Icing Considerations
- Roadway/Environmental Classifications
- Corrosion Protection Measures such as:
  - High Performance Concrete/Concrete Coating
  - Increased Clear Cover
  - Epoxy Coated Reinforcing
  - Air Entrainment/Corrosion Inhibiting Admixtures
  - Bridge Deck Overlays
  - Crack Control

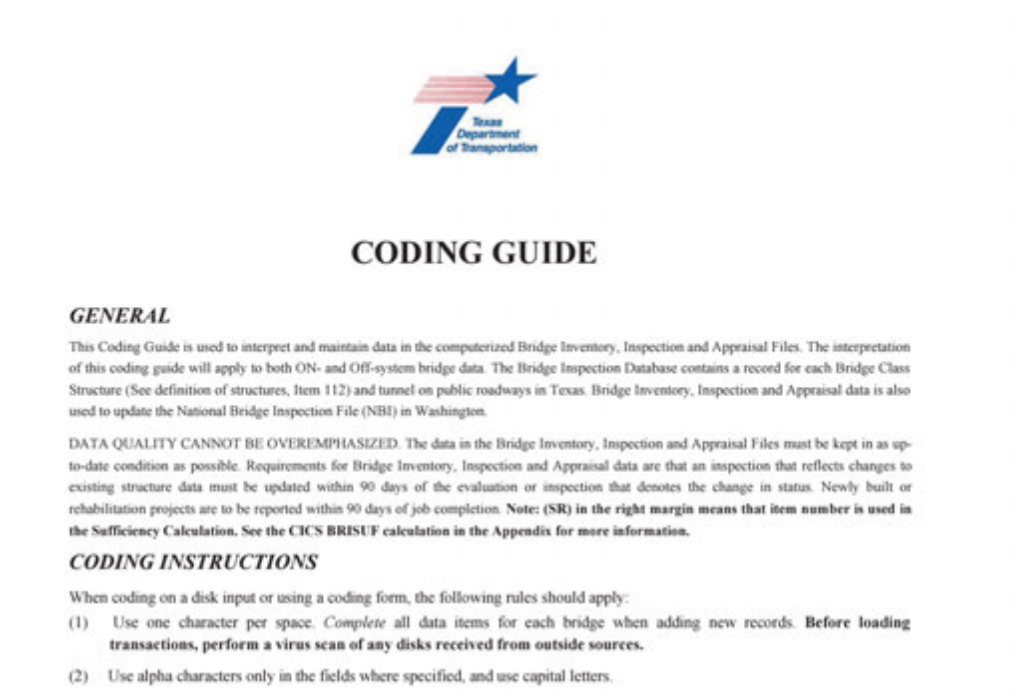
Bridge Inspection Resources

- Approved inspection team leaders
- Prime Consultant Contact list
- NSTM Inspection list
- Tunnel Inspection Contact list



Bridge Inspection Resources

- Coding Guide (NBIS)



Texas Department of Transportation

CODING GUIDE

GENERAL

This Coding Guide is used to interpret and maintain data in the computerized Bridge Inventory, Inspection and Appraisal Files. The interpretation of this coding guide will apply to both ON- and Off-system bridge data. The Bridge Inspection Database contains a record for each Bridge Class Structure (See definition of structures, Item 112) and tunnel on public roadways in Texas. Bridge Inventory, Inspection and Appraisal data is also used to update the National Bridge Inspection File (NBI) in Washington.

DATA QUALITY CANNOT BE OVEREMPHASIZED. The data in the Bridge Inventory, Inspection and Appraisal Files must be kept in as up-to-date condition as possible. Requirements for Bridge Inventory, Inspection and Appraisal data are that an inspection that reflects changes to existing structure data must be updated within 90 days of the evaluation or inspection that denotes the change in status. Newly built or rehabilitation projects are to be reported within 90 days of job completion. **Note: (SR) in the right margin means that item number is used in the Sufficiency Calculation. See the CICS BRISUF calculation in the Appendix for more information.**

CODING INSTRUCTIONS

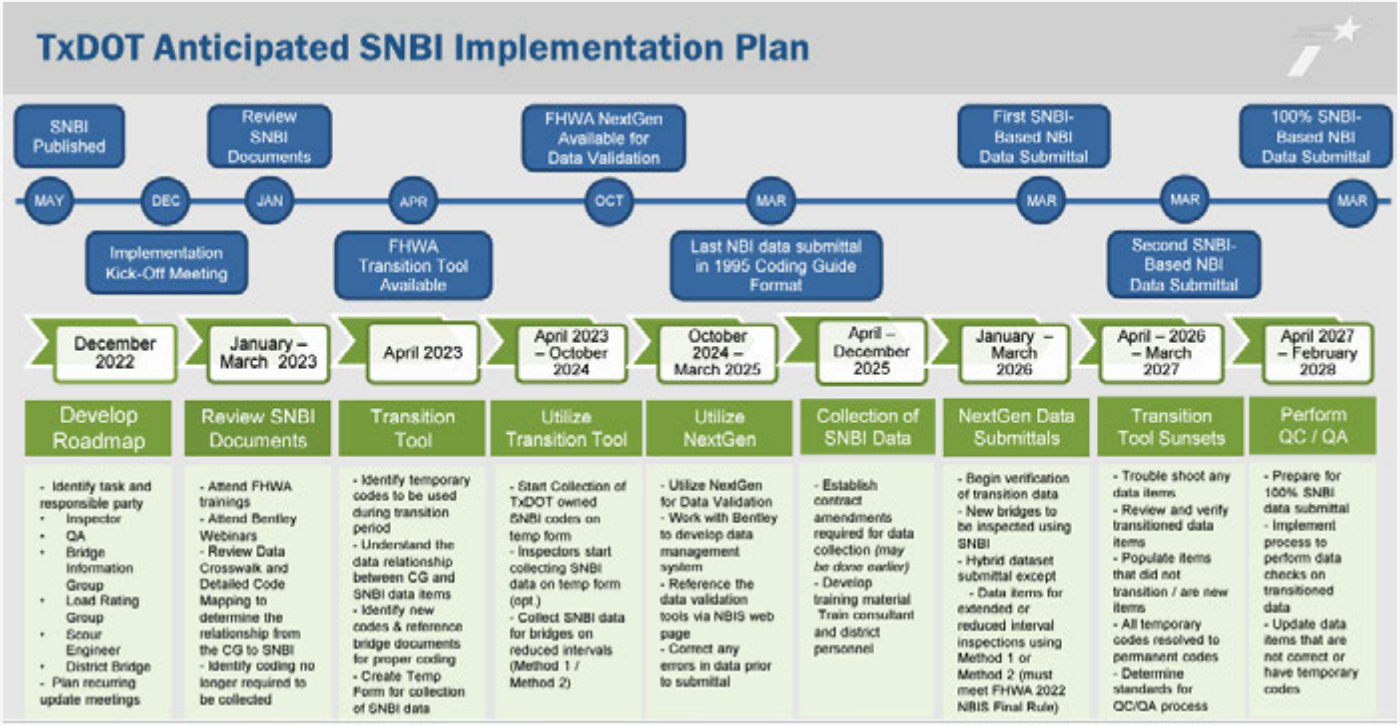
When coding on a disk input or using a coding form, the following rules should apply:

(1) Use one character per space. *Complete* all data items for each bridge when adding new records. **Before loading transactions, perform a virus scan of any disks received from outside sources.**

(2) Use alpha characters only in the fields where specified, and use capital letters.

Bridge Inspection Resources

- SNBI Implementation- Contact State Bridge Inspection Manager: Mark Wallace



Bridge Inspection Resources

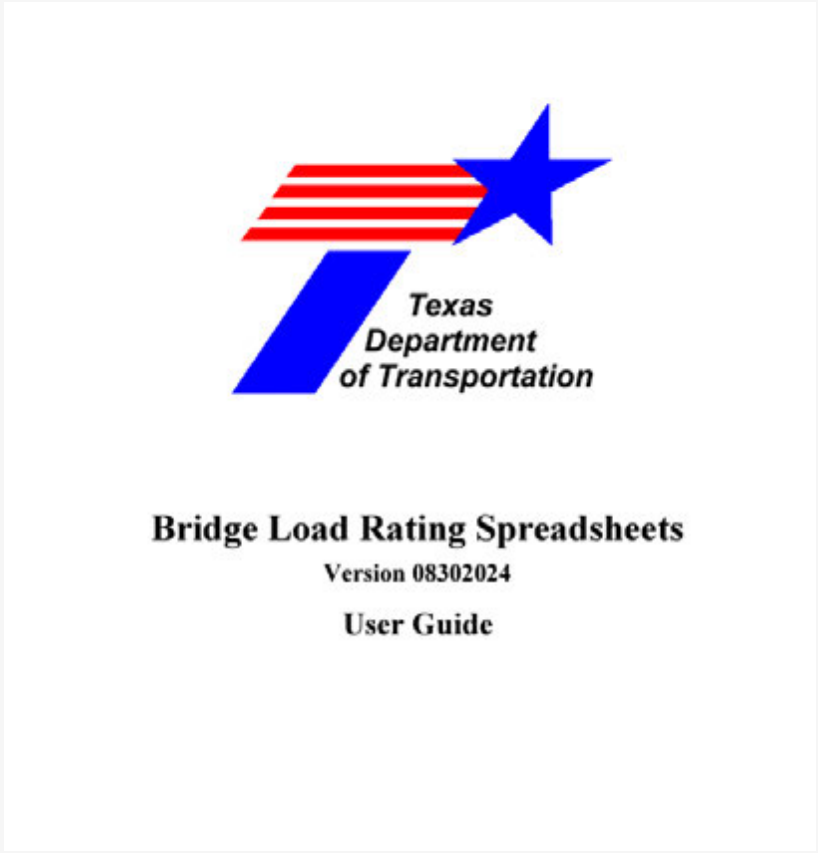
- Bridge Inspection Manual

Inspection Resources

- Bridge Railing Identification Guide
- Metal Beam Guard Fence Identification Guide

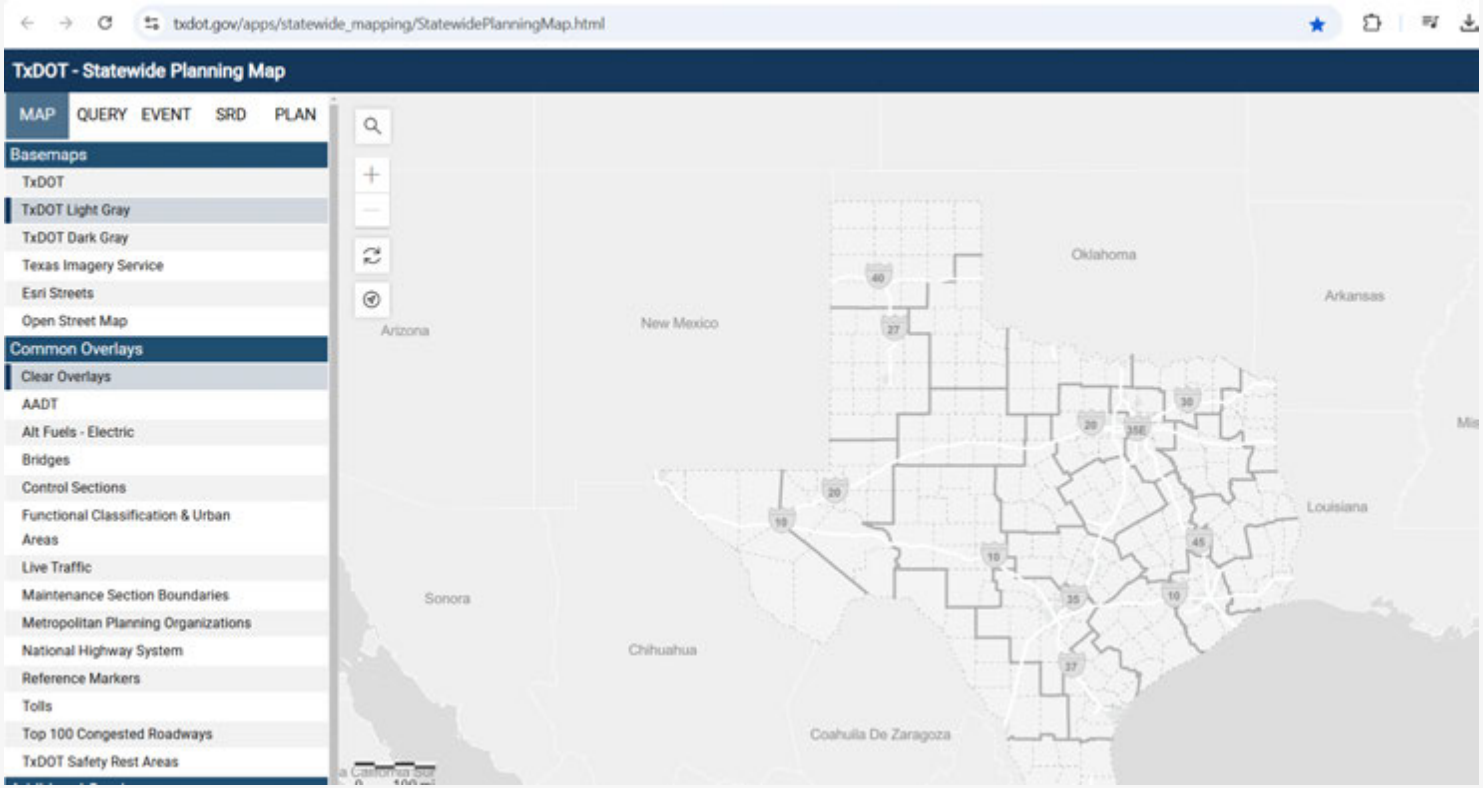
Load Rating Resources

- Rate Spreadsheet
- Load Rating Flowchart
- Material Information for Rating Bridges
- Prestressed Beam Quick Reference



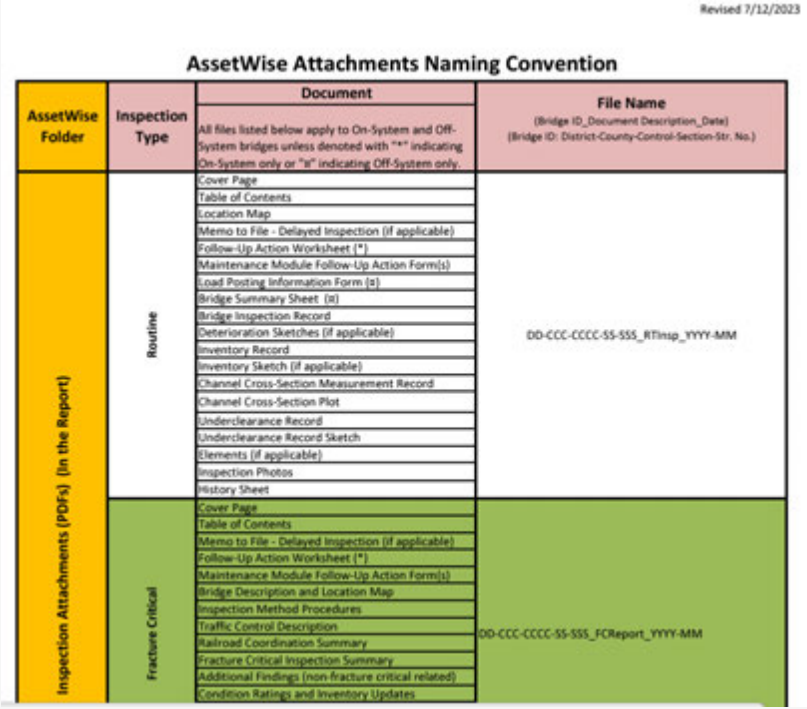
TxDOT Superheavy Bridge Requirement

TxDOT Statewide Planning Map



https://www.youtube.com/watch?v=R7JAVPfOcls

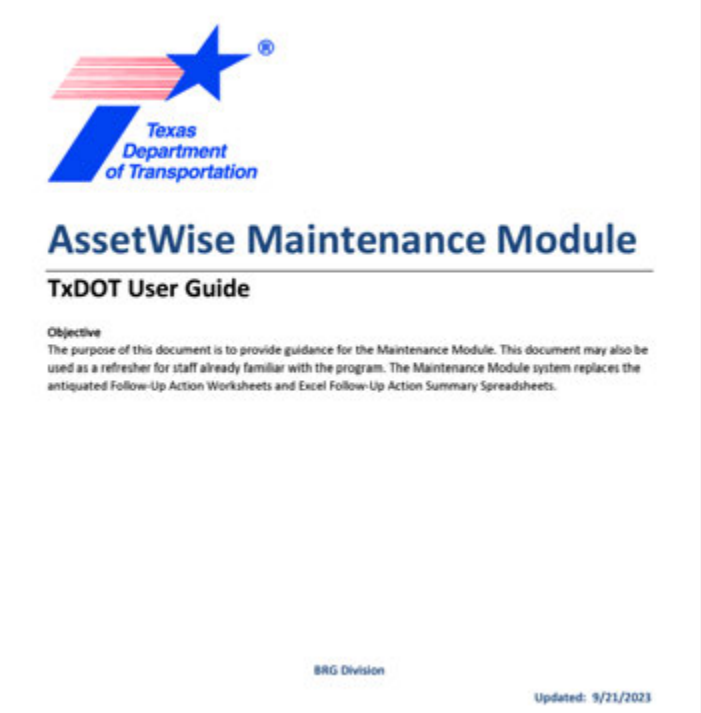
AssetWise Resources



Revised 7/12/2023

AssetWise Attachments Naming Convention

AssetWise Folder	Inspection Type	Document All files listed below apply to On-System and Off-System bridges unless denoted with "*" indicating On-System only or "ii" indicating Off-System only.	File Name (Bridge ID_Document Description_Date) (Bridge ID: District-County-Control-Section-Str. No.)
Inspection Attachments (PDFs) (In the Report)	Routine	Cover Page Table of Contents Location Map Memo to File - Delayed Inspection (if applicable) Follow-Up Action Worksheet (*) Maintenance Module Follow-Up Action Form(s) Load Posting Information Form (ii) Bridge Summary Sheet (ii) Bridge Inspection Record Deterioration Sketches (if applicable) Inventory Record Inventory Sketch (if applicable) Channel Cross-Section Measurement Record Channel Cross-Section Plot Underclearance Record Underclearance Record Sketch Elements (if applicable) Inspection Photos History Sheet	DD-CCC-CCCC-SS-SSS_RTInsp_YYYY-MM
	Fracture Critical	Cover Page Table of Contents Memo to File - Delayed Inspection (if applicable) Follow-Up Action Worksheet (*) Maintenance Module Follow-Up Action Form(s) Bridge Description and Location Map Inspection Method Procedures Traffic Control Description Railroad Coordination Summary Fracture Critical Inspection Summary Additional Findings (non-fracture critical related) Condition Ratings and Inventory Updates	DD-CCC-CCCC-SS-SSS_FCReport_YYYY-MM



Texas Department of Transportation

AssetWise Maintenance Module

TxDOT User Guide

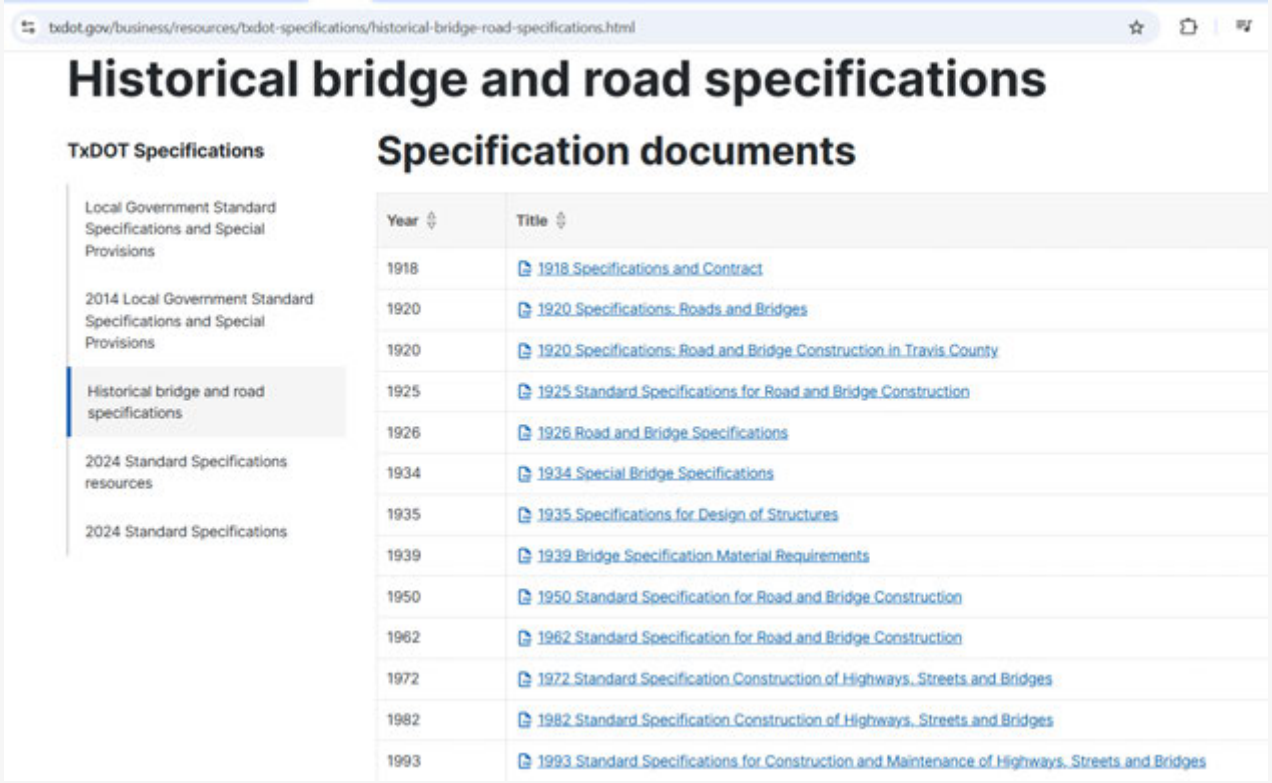
Objective

The purpose of this document is to provide guidance for the Maintenance Module. This document may also be used as a refresher for staff already familiar with the program. The Maintenance Module system replaces the antiquated Follow-Up Action Worksheets and Excel Follow-Up Action Summary Spreadsheets.

BRG Division

Updated: 9/21/2023

Historical TxDOT Bridge and Roadway Specification



txdot.gov/business/resources/txdot-specifications/historical-bridge-road-specifications.html

Historical bridge and road specifications

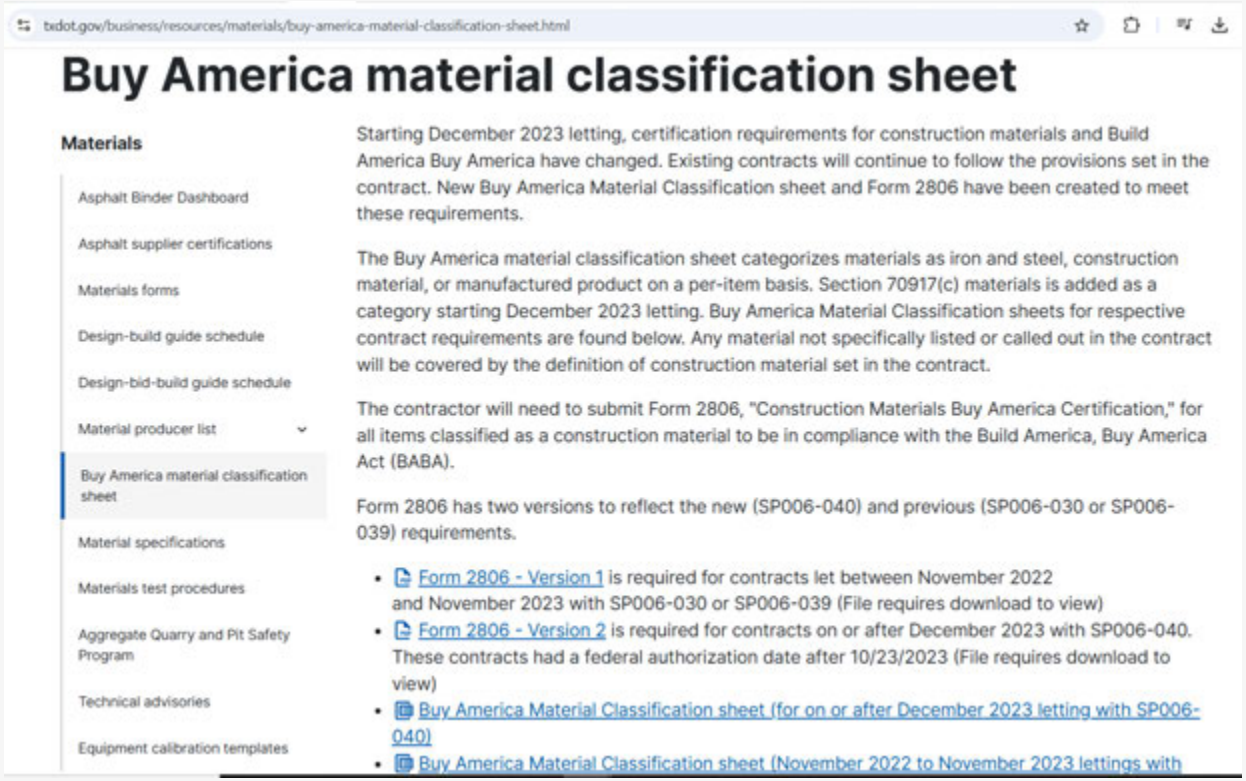
TxDOT Specifications

- Local Government Standard Specifications and Special Provisions
- 2014 Local Government Standard Specifications and Special Provisions
- Historical bridge and road specifications
- 2024 Standard Specifications resources
- 2024 Standard Specifications

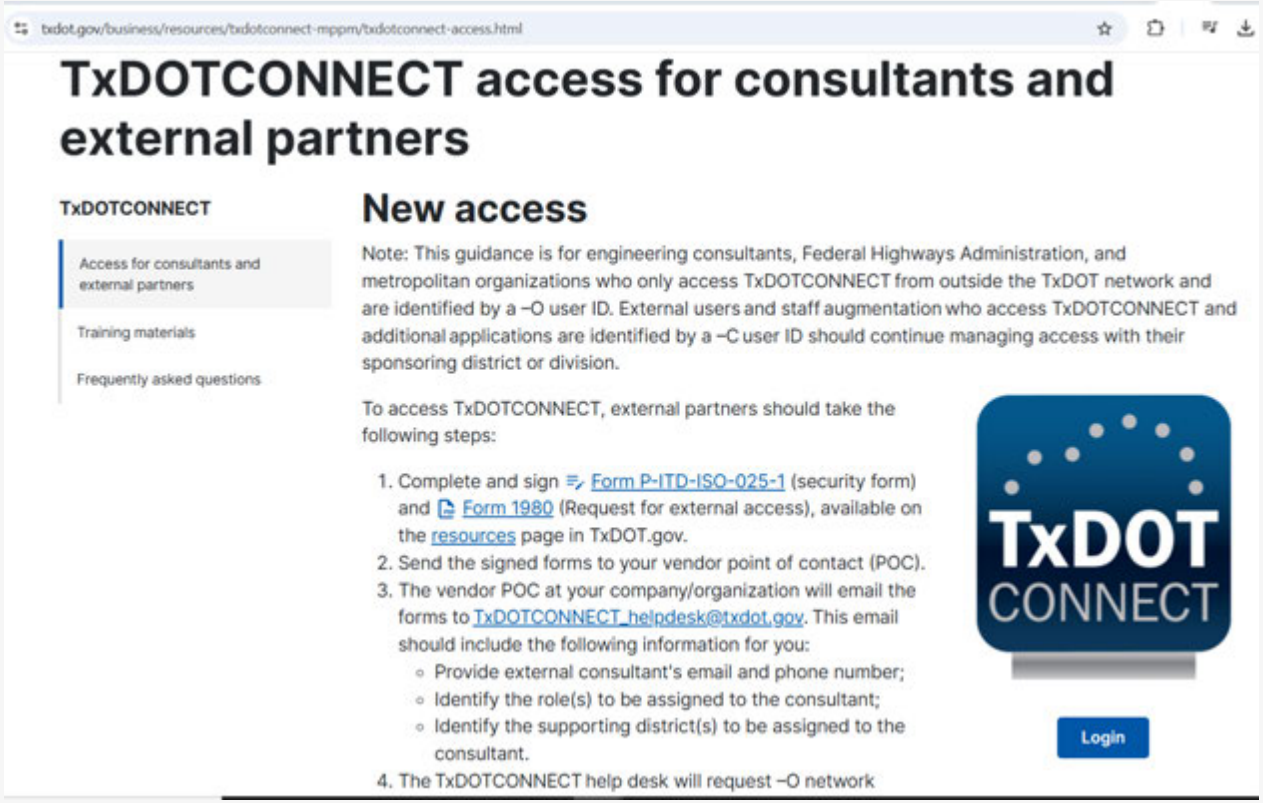
Specification documents

Year	Title
1918	1918 Specifications and Contract
1920	1920 Specifications: Roads and Bridges
1920	1920 Specifications: Road and Bridge Construction in Travis County
1925	1925 Standard Specifications for Road and Bridge Construction
1926	1926 Road and Bridge Specifications
1934	1934 Special Bridge Specifications
1935	1935 Specifications for Design of Structures
1939	1939 Bridge Specification Material Requirements
1950	1950 Standard Specification for Road and Bridge Construction
1962	1962 Standard Specification for Road and Bridge Construction
1972	1972 Standard Specification Construction of Highways, Streets and Bridges
1982	1982 Standard Specification Construction of Highways, Streets and Bridges
1993	1993 Standard Specifications for Construction and Maintenance of Highways, Streets and Bridges

Buy America Material Classification

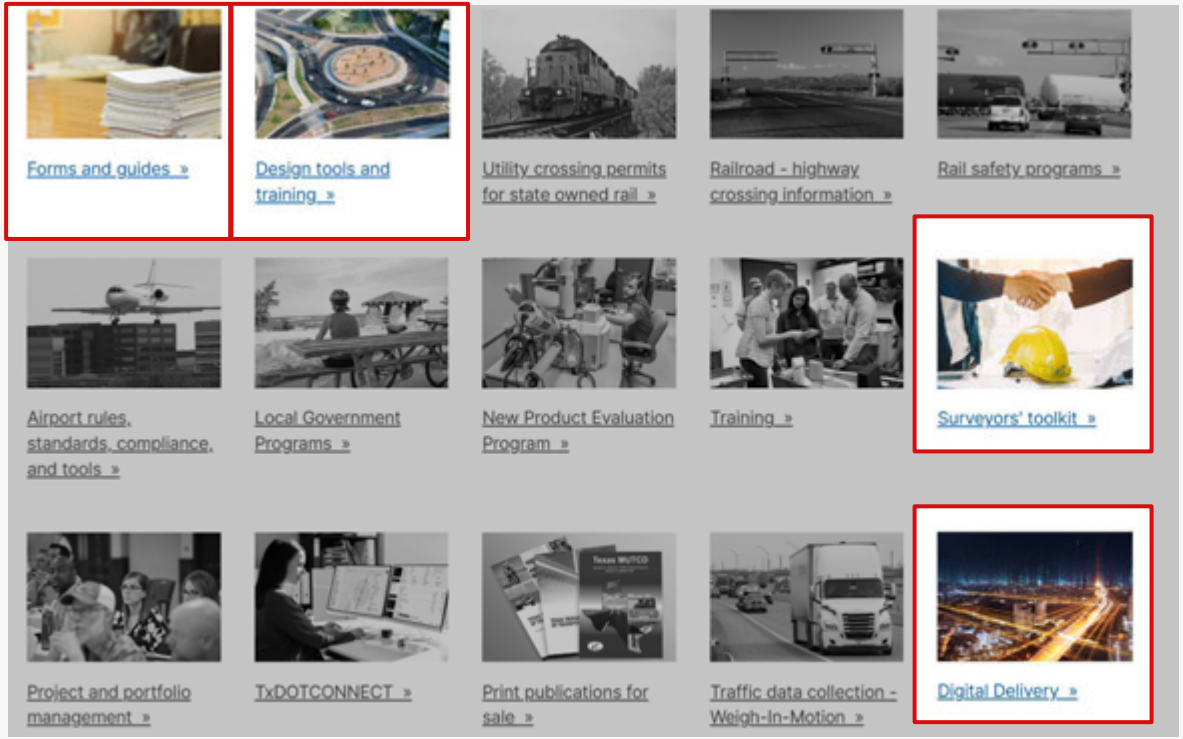


TxDOT Connect Resources



Other Resources

- Forms and guides
- Design Tools and Training
- Surveyors' toolkit
- Digital Delivery




HELP
#EndTheStreakTX
End the streak of daily deaths on Texas roadways.
TxDOT.gov
#EndTheStreakTX Toolkit