Large Diameter Utility Tunneling

Nancy Nuttbrock, P.E.
Outline

- Common Tunneling Methods
- Common Tunnel Support Methods
- Common Tunnel Support Details
- Questions
Tunnels are Different

- Entirely within the ground.
- Very simple structure.
- Highly complex construction scenario.
- Work from inside/out
- Lots of third party impacts.
- Serial construction schedule
- Construction means and methods/safety
- “Differing Site Conditions”
Who Participates

- The Geotechnical Engineer
- The Tunnel Engineer
- The Designer
- The Contractor
- The Owner
- Third Parties – Most Common for TxDOT
Tunneling Methods Commonly Used in Texas

- Hand Mining
- Shield Tunneling
- TBM (Main Beam/Shield/EPB/Slurry)
- Roadheader
- Microtunneling
- Auger Bore
- HDD
Hand Mining
Shield Tunneling
TBM – Single Shield
TBM – Earth Pressure Balance

$EP = \text{Earth Pressure}$
$CP = \text{Chamber Pressure}$

Cutting Head  Chamber  Screw  Conveyors  Segments

2019 TxDOT Utility Partnering Conference  December 3, 2019
TBM – Slurry

Slurry Shield

- Compressed Air Reservoir
- Air Lock
- Cutter Head
- Stone Crusher
- Shield Jack
- Feeding Pipe
- Suction Pipe
- Grout or Extruded Concrete
- Segments
Roadheader
Microtunneling

AKKERMANN
MICROTUNNELING SYSTEM
Auger Bore
Horizontal Direction Drilling

Directional Drilling is the way to avoid natural and man-made objects, like sidewalks and roadways when connecting main utilities.

1) Directional Drill machine
2) Rotating and pressing pipes
3) Pilot drill begins ground penetration
4) Technician with locator receiver box
5) Pilot head drilling and pressing for direction
6) Enlargement and pull-back with Reamer
7) Swivel attached to Reamer and Pipe
8) Utility Pipe being Pulled Back
<table>
<thead>
<tr>
<th>Tunneling Method</th>
<th>Hard Rock</th>
<th>Soft Ground</th>
<th>Groundwater</th>
<th>Curved Alignment</th>
<th>Small Diameter &lt; 48 In</th>
<th>Cost</th>
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<tbody>
<tr>
<td>Hand Mining</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Digger Shield</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Open Face TBM</td>
<td>✓</td>
<td>✓</td>
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<tr>
<td>Pressurized Face TBM (EPB/Slurry)</td>
<td>✓</td>
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<tr>
<td>Roadheader</td>
<td>✓</td>
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<td>Microtunneling</td>
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<td>✓</td>
<td>Rare</td>
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<tr>
<td>Auger Bore</td>
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<td>HDD</td>
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Tunneling Support Methods Common in Texas

- Rock bolts
- Shotcrete
- Ribs and lagging
- Steel liner plate
- Steel casing
- Jacked FRP
- Pre-cast segments
Rock Bolts
Shotcrete
Ribs and Lagging
Steel Liner Plate
Steel Casing
Jacked FRP
Pre-Cast Segments
## So What Works Where?

<table>
<thead>
<tr>
<th>Tunnel Support</th>
<th>Hard Rock</th>
<th>Soft Ground</th>
<th>Groundwater (pressurized face)</th>
<th>Curved Alignment</th>
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<tr>
<td>Rockbolts</td>
<td>✓</td>
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<tr>
<td>Shotcrete</td>
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<tr>
<td>Ribs and Lagging</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Steel Liner Plate</td>
<td>✓</td>
<td>✓</td>
<td>✓ (Gasketed)</td>
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<tr>
<td>Steel Casing</td>
<td>✓</td>
<td>✓</td>
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<td>✓</td>
<td>✓</td>
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<tr>
<td>Jacked FRP</td>
<td>✓</td>
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<td>✓</td>
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<tr>
<td>Pre-Cast Segments</td>
<td>✓</td>
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<td>✓</td>
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</table>
What are most common in Texas for Utility Tunnels?

- **Ground Conditions** Typically Shale, Stiff Clay, and Soft Limestone without Groundwater
- **Tunnel Excavation**
  - Hand Mining
  - Open Face TBM
  - Auger Bore (<600 ft Typically)
- **Tunnel Support**
  - Ribs and Lagging
  - Steel Liner Plate
  - Steel Casing (<600 ft with Auger Bore Typically)
Ribs and Lagging - Details
Ribs and Lagging - Details

- Typically 3-6 foot spacing
- Cold formed rolled steel sets
- Tie-rods between sets
Ribs and Lagging - Details

**PROS**
- Cost and Time Efficient Support
- Various Types of Lagging (Timber, Steel, Shotcrete, Liner Plate)
- Can be installed in a shield or against competent ground
- Various Geometries
- Can be jacked off of

**CONS**
- Exposes Ground to Air
- Requires filter fabric where erodible soils are present
Steel Liner Plate - Details
# Steel Liner Plate

<table>
<thead>
<tr>
<th>2-Flange Tunnel Liner Plate from Contech provides corrugations extending through the lapped longitudinal joint. When assembled, this liner functions as a corrugated pipe with continuous circumferential corrugations. The result is more effective corrugation performance for the highest stiffness and strength in the industry. It has the strength to handle the loads encountered during construction, providing a safer working environment.</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Flange Liner Plate feature shallow, partial corrugations that do not extend fully to the joint. When assembled, ring stiffness is limited by both the joint strength and lack of a continuous corrugation. The result is less stiffness and a hinge action joint.</td>
</tr>
</tbody>
</table>

Deep, full length corrugations and lapped joints for more effective stiffness and ring compression.

Shallow corrugations and hinged joint.
Steel Liner Plate
Steel Liner Plate
Steel Liner Plate- Details

PROS
• Can be installed in a shield or against competent ground
• Various Geometries
• 4 Flange can be jacked off of without additional structural support
• Galvanized or bituminous coating for corrosion protection
• Steel Ribs can be used for additional ground support

CONS
• Typically more Expensive than Ribs and Timber Lagging
• Requires time to bolt in place
• 2 Flange requires additional structural support to jack off of
Steel Casing - Details
Steel Casing - Details

<table>
<thead>
<tr>
<th>24&quot; Permalok Casing Pipe</th>
<th>vs.</th>
<th>24&quot; Permalok Welded Steel Casing Pipe</th>
</tr>
</thead>
<tbody>
<tr>
<td>A 24&quot; Permalok connection is made in 6 minutes or less, allowing a crew to install up to 10 pieces of casing 20 feet long in one 8 hour shift.</td>
<td>vs.</td>
<td>The best field welders take 90 minutes to fit and butt weld one joint of 24&quot; x .500&quot; Inch casing. At that rate the same crew can install only 3-4 pieces of casing 20 feet long in an 8 hour shift.</td>
</tr>
<tr>
<td><strong>End Result:</strong> 200 linear feet per day</td>
<td>vs.</td>
<td><strong>End Result:</strong> 60 to 80 linear feet per day</td>
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</table>

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<tr>
<td>A 60&quot; Permalok connection is made in 6 minutes or less, allowing a crew to install up to 10 pieces of casing 20 feet long in one 8 hour shift.</td>
<td>vs.</td>
<td>The best field welders take 180 minutes to fit and butt weld one joint of 60&quot; x .750&quot; Inch casing. At that rate the same crew can install only 2-3 pieces of casing 20 feet long in an 8 hour shift.</td>
</tr>
<tr>
<td><strong>End Result:</strong> 200 linear feet per day</td>
<td>vs.</td>
<td><strong>End Result:</strong> 40 to 60 linear feet per day</td>
</tr>
</tbody>
</table>
Steel Casing Details

**PROS**
- Cheap and readily available
- Various thicknesses
- Can be welded or permalok
- Cannot leak at joints

**CONS**
- Difficult to handle
- Require larger shafts
- Difficult to drive long distances (> 600 ft) and in swelling ground
- Straight drives
QUESTIONS?
Networking Break
Next session starts at 2:30pm
A-M-Aizing Utility Protections

Max Layne, PE
Utility Engineer
HDR

O 512-498-4719 M 512-927-7461
Max.Layne@HDRinc.com
STRUCTURALLY SUPPORTED UTILITY PROTECTIONS

Structural Engineering
Water Pipeline Engineering
Geotechnical and Drainage Elements of Highway Design

December 3, 2019
What was at Stake

the critical path

- Conflict: **39” WATER LINE** in **60” STEEL CASING**
- Discovered **IN CONFLICT WITH THE** highway project bridge expansion schedule’s **CRITICAL PATH**
- WL relocation would take 18 months for completion
  
  \[= \$3.4M \text{ in costs to project}\]

RESOLVED for **$180k** with protect in place structure

- $150k construction + $30k design
- \[180k \div 4.3M = 4\% \text{ or } 1/25^{th} \text{ the cost of full relocation}\]
Conflict Background

Utility Layout
- Bridge column **DRILLED SHAFT**
- **WEIGHT** of bridge embankment **BACKFILL** (30 ft of fill)
- Storm sewer **CULVERTS**
- Lateral **SOIL PRESSURES**
- Multiple stakeholder party interests
- WL relocation - est. **18 months for completion**
  - Could only be shut off relocated in **low water demand winter period**
    - Estimated $6k per day in delay claim costs
    - Est. 12 mo. of direct delay costs 12 mo. x 6k/day = 1.9M in delay costs
    - $1.5M WL relocation cost
  - $1.5M + $2.8M = **$3.4M utility conflict**
Coordination
Letter of concurrence

Coordinated **concurrence** of the protect-in-place design between:

- Water line owner & engineers
- State DOT
- HDR Engineers (structural, pipeline, geotechnical)
- City representatives
- Construction groups

- All agreed for TxDOT consultant (HDR) to design a protect-in-place

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LETTER OF CONCURRENCE FOR PROPOSED UTILITIES PROTECTION

DATE: August 22, 2017

PROJECT: IH-45 from 0.452 M.S. South of FM 518 to North of FM 517
Galveston County
CSU 0500-04-096 RCL 0500-04-123

The Texas Department of Transportation (TxDOT) has finalized plans for the subject project on IH-45 in Galveston County. The adjustment, relocation or protection of conflicting utilities on these projects is fully reimbursable with Federal funds. Gulf Coast Water Authority (Utility Owner) has a conflicting utility line which needs to be protected in place. The Utility Owner has indicated that they would like the State to use a TxDOT approved engineering consultant to design the utility protection, and to include the construction work in the roadway project plans. Per September 15, 2010, revisions to the Texas Administrative Code (TAC) Rule 621.87, TxDOT is required to seek the official concurrence from the Utility Owner to pursue this course of action. We propose to handle the utility protection in place per the following procedure:

1. The State will utilize an engineering consultant, approved by the Utility Owner, to design the utility facility protection. An employee of the State will not be used to provide engineering services under the agreement. The Utility Owner proposes HDR Engineering, Inc. to design the utility facility protection in place for CSU 0500-04-096. The State will be responsible for hiring the consultant, entering into a contract with the consultant, paying the consultant, and reviewing the consultant’s work.

2. The Utility Owner agrees to review and approve before inclusion of the plan in the construction contract, reviews and comments to the Utility Adjustment Program. The Utility Owner will be responsible for ensuring the design and environmental compliance requirements, to the extent feasible.

3. The Utility Owner agrees to provide concurrent construction of the utility protect in place design. The consultant will receive the contract for construction of the project from the Utility Company.

4. The Utility Owner agrees to provide final acceptance of the construction is completed.

5. During the construction work under contract, the State is not responsible for any cost for any issues related to the design and construction of the utility facilities after final acceptance by the Utility

[Signature]
James M. Bass
Executive Director, TxDOT

[Stamp]
Gulf Coast Water Authority
Protect in place Design concept

- Protect in place design:
  - Supported by 17 drilled shaft columns
  - Slab designed to hold soil and protect water line

- Also redesigned:
  - Bridge column design
  - Drainage designs
  - Retaining wall vertical slip joints added

‘A BRIDGE UNDER A BRIDGE’
- **Conflict:** Lateral soil pressures from new backfill could disturb pipe and burst over time
  - Shifting clay soils
- **Resolution:**
  designed additional drilled shafts and opted for large diameter 36” drilled shafts to limit lateral earth movement
1.5 FT thick concrete slab
- #6 & #9 rebar
17 drilled shafts

SLAB PLAN & PROFILE AND DETAILS
Summary

Selected Option: Protect in-place design and construction completed in 4 months for ~$180k

Other Option: WL relocation completion in 18 months with ~$4.3M in costs

- Slab/supports constructed 1 year before previous estimated relocation date
- Project continued immediately on bridge work
- No added safety risk or extended delay issues to traveling public
- DOT client and Utility Owner were extremely satisfied with the outcome
Repeatable Solution

Similar Design Concept Over High Pressure O₂, N₂ Pipelines on IH-45

Protect in place structural design + retaining wall re-design + pond re-design in 3 months for ~$400k

> ~$6M in direct relocation costs
> ~2 years of project relocation schedule delays
> ~$3M in easement acquisitions for re-route
> ~$12M total potential costs

December 3, 2019
**Conflicts:**
- Detention Pond
- Retaining Walls/Stone Columns
Protect in Place Drill Shaft and Box Beam Structure Design Over High Pressure Pipelines

Box beams are easier to construct

~$12M in savings

a 3 for 1!
SH 146
Bridge Re-Design

Gas facility relocation completion in 4-5 years with ~$12M in costs

<

Re-design bridge in 4 months for ~$275k
Conflicts:
- Bridge overlap over Maintenance Facility
- Bridge bent foundation with pipes
Initial Design with Conflicts
Initial Design with Conflicts
~$12M in savings

Redesign- No Conflicts
UTILITIES! Our lives really do depend on them

It’s not always about money and time savings

Utilities serve PEOPLE (and hospitals)
IH 69 Expansion
Rosenberg, Tx

- Hospital’s ROW was being Acquired
- Utility service connections were in conflict
- But could NOT be shut off for ANY period of time
  - Major Water Meter Facility Avoidance
  - Electric Meter Facility Relocation
Existing conditions
Conflict with Proposed Open Drainage
Underground view

Re-designed Closed Drainage
Electric Meter Protection
Questions?
Networking Break
Next session starts at 3:30pm
Basics of the Telecommunications Network: The Life of a TXDOT Relocation Project

JEFFREY BROOCKS
AT&T – Director Construction & Engineering

TXDOT UTILITY PARTNERING CONFERENCE
Austin, Texas
December 3, 2019
AT&T Texas Wireline Service Areas - Texas
TELECOMMUNICATIONS WIRELINE NETWORK
Various Underground Facilities
TELECOMMUNICATIONS WIRELINE NETWORK OVERVIEW - RELOCATION
Relocation: A Matter of Time and Cost

The “Big” Steps:

1. Obtain “cleared” Rights-of-Way (i.e., other facilities)
2. Trench and place new fiber or copper and/or
3. Place new poles and attach fiber or copper
4. Prepare for “cutover” (customer notification and negotiation)
   This step is time consuming!
5. Conduct the *splicing* work to cut lines over as quickly/smoothly as possible.
Relocation Realities: Issues to Manage

- Telecom lines must be spliced one by one. There are no shortcuts to this!
- The number of splicers is limited by space considerations.
- Telecom lines normally are placed lowest on utility poles and, if underground, farthest from center line of highway/road. This means AT&T and other telecoms are the LAST to move!
The Relocation Process - External

- Receive TXDOT Notification of project and Schematic or 30% Plans
- Review 30% Plans and provide TXDOT As-built/Redlines to begin SUE coordination
- Work with TXDOT consultant to develop SUE prior to 60% Plans
- Receive 60% Plans
- Review 60% Plans and Confirm or eliminate conflicts
- Develop Relocations Plans
- Receive 90/95% Plans and compare 90% plans to relocation plans
- Submit UIR / Reimbursable Agreement
- Confirm ROW acquisition is Complete
The Relocation Process - Internal

- Determine Funding
- AT&T Engineering Submits Project to Construction
- Construction review and bid to hire contactor
- Once Permit is approved order structure material and mobilize contractor
- Build Structure
- Hire placing contractor structure build
- Once Structure footages can be proved order cable
- Order and Place electronics
- Place Cable
- Splice Cable (TXDOT projects can have thousands of hours of splicing)
CENTRAL OFFICE VAULT
DUCT BANK INSTALLATION
CABINETS
AT&T COPPER PEDESTAL
Splicing & Time

- Time associated with splicing varies from job to job:
  - **Copper** – We still utilize the Copper Network. Copper is more time consuming to splice on a “pair by pair” basis.
  - **Fiber** – We need to schedule downtime and notify customers (including businesses), as we maintain service. For example, need to coordinate “cut over” time with banks.
- An overall plan for splicing schedules/timeline must be established.
- FAA, 911 circuits need to be coordinated and must be cleared by the customers.
- This notification and coordination process could take 30-90 days to receive the clearance to cut.
Copper Splice
Copper Pulp Splice

"...and we've been doing this for a very long time...."
FIBER SPLICE
Relocation Challenges/Successes

- Biggest challenge is the time it takes to build
- TxDOT LET dates
- Timing of ROW actual acquired dates and project LET dates
- Matching up TxDOT schedule to our project duration
- Meeting TxDOT schedule when sizes and scope of our projects vary from job to job
- Frequent communication is the key!
Questions?
QUESTIONS?
Networking Break
Next session starts at 2:30pm
A Different View of Utility Coordination: Billboards

Wendy Knox, Commercial Signs Regulatory Program Director
TxDOT ROW Division
Examples
CONFLICTS & BILLBOARDS

Proactively avoid Billboards

- Always identify them during design phase regardless if in the acquisition area

- Billboards identified in the schematics will be included in the property descriptions

- Billboards can be impacted by utilities needing to move

- Billboards impacted by utilities moving can be mitigated
CONFLICTS & BILLBOARDS

Mitigate Billboards Impacted in Project Design

- Overhead power can “adjust” the arm on the pole to avoid the billboard
- Billboards need a 10’ clearance from primary line
- Billboards missed during the schematic phase negatively impact project success
- Billboards missed significantly impact clearly the right of way and can delay construction
CONFLICTS & BILLBOARDS

What do you do with when you find a Billboard in conflict with Utilities?

❖ Contact the TxDOT Right of Way Project Manager (PM) asap!

❖ The PM can coordinate the process of the Impacted Sign
  ➢ Contact the Commercial Signs Regulatory Program for Information on the Sign
  ➢ PM will coordinate the payment of any damages due to the sign owner if any
  ➢ PM will coordinate the movement of the impacted sign with the sign owner
Commercial Signs Regulatory Program Contact

Wendy Knox, MPA, CTCM
Director, Commercial Signs Regulatory Program
TxDOT, ROW Division
Wendy.Knox@txdot.gov
(512) 416-2915

Help Desk Hours: (0800 – 1700 M-F)
ROW_OutdoorAdvertising@txdot.gov
(512) 416-3030
QUESTIONS?
Networking Break
Next session starts at 3:30pm
Acquisition and Utility Coordination the “Right Way”

Lezlie Kirby, Right of Way Project Delivery Director
TxDOT ROW Division
What happens when you do not communicate?
Having a difficult time communicating?
Difficult balancing act....
Closing the gap to success
If we work together we can accomplish great things!
Contact Information

Lezlie Kirby
Director, Right of Way Project Delivery
TxDOT, ROW Division
Lezlie.Kirby@txdot.gov
Office (512) 416-2868
Mobile (469) 387-9993
QUESTIONS?
TxDOT Utility Partnering Conference

Track 3
A-M-Azing Cost & Time Savings

Partnering Today to Build a Better Texas Tomorrow

Susan Clanton, YKM District

December 3, 2019
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<td>Define A-M-A</td>
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<td>2</td>
<td>SH 72 - Avoid</td>
<td>4-5</td>
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<td>3</td>
<td>I 10 - Minimize</td>
<td>6-7</td>
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<td>US 59 - Minimize</td>
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<td>US 59 - Accommodate</td>
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<td>Take Aways</td>
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A-M-A

- Avoid – Design roadway around existing utility infrastructure.
- Minimize – Lessen the impact on utility infrastructure by modifying the design plans.
- Accommodate – Utility infrastructure must be relocated or an exception to policy granted to allow for the specific rule violation.
SH 72, Dewitt County - AVOID

4 Alternatives Developed in Schematics to Add 2 lanes for 4 Lane Undivided

- Alternative 1 - $10,538,800
- Alternative 2 - $10,559,100
- Alternative 3 – Not Viable
- Alternative 4 - $11,555,800
SH 72, Dewitt County – Results of Avoidance

- Conducted Public Meeting
- Chosen Alignment is Hybrid of Alternative 1 & 2
- Projected Expenses for Pipeline Relocations now $7,276,975.
- Cost savings of $3,000,000
- Time savings of 120 days
IH-10, Austin County - Minimize

Add Lanes for 6-lane Facility, includes addition of frontage roads

At 90% design, estimate to lower line was $4,067,130.
Areas of conflict were NOT under pavement.

Added embankment/pipe for driveway and protection slab for $231,722.

Cost savings of $3,835,408.
Time savings of 30 days.
US 59, Wharton County - Minimize

Upgrade Rural Freeway to Interstate Standards

28” Pipeline Crossing Predates Roadway

AT 60% Design the Estimate to lower the PL was $2,641,208.

Reworked ditches, will now extend the casing for $646,245.
Cost savings of nearly $2,000,000.
Time savings of 5 days.
Pipeline requested accommodation to avoid $350,000 in reimbursable costs to relocate.

Official estimate submitted for $900,000.

Intangible Benefits: Avoiding construction delays when litigation seems inevitable.
TAKE AWAYS – You can never start TOO EARLY!

AVOID
- Know location of pipelines before ROW Acquisition begins.
- Know pipeline depths before 30% PS&E. Shift ditches to avoid conflicts wherever possible.

MINIMIZE
- If the pipeline is NOT in conflict with existing pavement, you can likely find a way to Minimize the need for full adjustment.

ACCOMMODATE
- Know the cost and schedules of alternatives before requesting an accommodation to the rules or a utility relocate.

Gather Data, Ask Questions, Gather MORE Data
QUESTIONS?
Networking Break
Next session starts at 2:30pm
Track 3: TxDOT Utility Agreements

Wayne Robinson, TxDOT, ROW Division

December 3, 2019
Managing Utilities during Acquisition

Managing Utilities during Acquisition

- ROW PM works with district utility staff to ensure measurements of costs, if replacement assessment is necessary.
- District and utility owner execute Standard Utility Agreement.
- Utility owner adjusts facility to eliminate conflict.
- District and utility owner execute Standard Utility Agreement.
- ROW PM works with ROW attorney and district utility staff to execute a Utility Joint Use Acknowledgment Agreement (UJUA) for abandoning the existing easement or Quicken’s release of easement for acquired easement. Ensure receipt of acceptable documents for “ROW permanent file.”
- District utility and ROW owner execute Standard Utility Agreement.
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Why do we need Agreements?
Why Do We Need Agreements?

Code of Federal Regulations (CFR)
§ 645.113 Agreements and authorizations.
(b) When applicable, the **written agreement** shall specify the terms and amounts of any contribution or repayments made or to be made by the utility to the TD in connection with payments by the TD to the utility under the provisions of §645.107 of this regulation.

Texas Constitution and Statute: Transportation Code
Sec. 203.0935: Timely Agreement
If the department and the affected utility enter into an agreement after negotiations under Subsection (a), **the terms and conditions of the agreement shall govern the relocation of the utility's facility covered by the agreement.**
Why Do We Need Agreements?

Texas Administrative Code (TAC)
Title 43, Part 1, Chapter 21, Subchapter B, § Rule 21.22: Agreements
(b) The utility shall negotiate with the department in good faith to reach an agreement on the terms of the relocation.
Why do we need Attachments?
Development of Standard Utility Agreement

- Attachment “A”
  - Cost Estimate
  - *Buy America*
- Attachment “B”
  - Plans & Specifications
- Attachment “C”
  - Accounting Method
- Attachment “D”
  - Schedule of Work
  - Joint Use or Permit
  - Statement Covering Contract Work
  - *Highway Contract*
- Attachment “E”
  - Eligibility Ratio
- Attachment “F”
  - Betterment
- Attachment “G”
  - Property Interest
- Attachment “H”
  - Joint Use or Permit
  - Eligibility Ratio
Attachment “A”

Plans – TAC: 21.22
(2) plans and specifications sufficient to determine the proposed location of the facility;

CFR: 645.113
(c) The agreement shall be supported by plans, specifications when required, and itemized cost estimates of the work agreed upon, including appropriate credits to the project, and shall be sufficiently informative and complete to provide the TD and the FHWA with a clear description of the work required.

Attachment “A”
Plans, Specifications, and Estimated Costs

All material items that must meet Buy America or Steel and Iron Preference Provision requirements must be indicated with an asterisk (*).
Attachment “A” - Buy America

- 23 USC 313
- 23 CFR 635.410
- Transportation Code 223.045
- Senate Bill 1289
- Buy America Guidelines
CFR- 645.113
The preferred method for the development of relocation costs by a utility is on the basis of actual direct and related indirect costs accumulated in accordance with a work order accounting procedure prescribed by the applicable Federal or State regulatory body
CFR – 645.113
furnished a schedule for accomplishing the work
TAC – 21.22
(5) a date by which the utility will begin and an estimated date of completion of the adjustment, modification, relocation, or removal.
Attachment “D”

Statement Covering Contract Work

CFR – 645.115 Construction
When the utility is not adequately staffed and equipped to perform such work with its own forces and equipment at a time convenient to and in coordination with the associated highway construction, such work may be done by:
(1) A contract awarded by the TD or utility to the lowest qualified bidder based on appropriate solicitation,
(2) Inclusion as part of the TD’s highway construction contract let by the TD as agreed to by the utility,
(3) An existing continuing contract, provided the costs are reasonable, or
(4) A contract for low-cost incidental work, such as tree trimming and the like, awarded by the TD or utility without competitive bidding, provided the costs are reasonable.
TAC – 21.53
(a) Joint use agreement forms are to be used when a utility has a prior property interest which is being retained within the highway right of way, and:
(1) when in connection with active highway projects an adjusted or relocated utility facility occupies that part of the highway right of way; or
(2) when a utility facility is retained within that part of the highway right of way without adjustment unless the utility has a previously approved department joint use agreement covering the right of way limits and which includes provisions for control of access when applicable.
Transportation Code – 203.092: REIMBURSEMENT FOR RELOCATION OF UTILITY FACILITIES.

(a) A utility shall make a relocation of a utility facility at the expense of this state if relocation of the utility facility is required by improvement of:

(1) a highway in this state established by appropriate authority as part of the National System of Interstate and Defense Highways and the relocation is eligible for federal participation;

(2) any segment of the state highway system and the utility has a compensable property interest in the land occupied by the facility to be relocated; or

(3) a segment of the state highway system that was designated by the commission as a turnpike project or toll project before September 1, 2005.
CFR 645.117
Elected Betterments
(h) Credits. (1) Credit to the highway project will be required for the cost of any betterments to the facility being replaced or adjusted, and for the salvage value of the materials removed

CFR 645.117
Forced Betterments
(3) No betterment credit is required for additions or improvements which are: (i) Required by the highway project, (ii) Replacement devices or materials that are of equivalent standards although not identical, (iii) Replacement of devices or materials no longer regularly manufactured with next highest grade or size, (iv) Required by law under governmental and appropriate regulatory commission code, or (v) Required by current design practices regularly followed by the company in its own work, and there is a direct benefit to the highway project.
Transportation Code – 203.092: REIMBURSEMENT FOR RELOCATION OF UTILITY FACILITIES.

(a) A utility shall make a relocation of a utility facility at the expense of this state if relocation of the utility facility is required by improvement of:

(2) any segment of the state highway system and the utility has a compensable property interest in the land occupied by the facility to be relocated; or
Tip # 1
Standard Utility Agreement = Contract
#1 This is a Contract

- Modifications to standard forms requires approval from legal.
- Once the Utility signs the Agreement, the District cannot make changes to the package.
  - This includes: adding notes, extra sheets, markings to maps, or modifying/adding information.
  - Any change will need the Utility’s sign off
    - Can initial changes.
Tip #2

Helpful Tips #2
# 2 Know Your Project

- Do you understand the agreement?
  - If you don’t understand it, who can?
- The Agreement Package should be clear and comprehensible.
#2 Know Your Project

- The agreement should outline:
  - **Who**
    - Who is paying for the adjustment?
      - Eligibility Ratio
      - Local Participation (Contribution)
      - Advance Funding Agreement (AFA)
      - LUP Process
      - SP2125
  - Who is doing the work?
    - In-House Engineering
    - In-House Labor
    - Contracted Engineering
    - Contracted Labor
    - TxDOT Engineer Consultant
    - TxDOT – Highway Contract (Joint Bid)
#2 Know Your Project

- **What**
  - What is the property interest?
- **Interstate Highway**
- **Deeds (Utility own the land)**
- **Easement Documentation**
- **Affidavits**

- What is the date that the utility needs to be cleared?
- **Ready to Let Date**
- **Construction Phasing**
- **Management Plan**
#2 Know Your Project

- **Where**
  - Where is the existing and proposed ROW?
  - Is the existing facility in a easement?
  - Is the proposed facility inside or outside the proposed ROW?
  - Where is the conflict?
  - Is it a direct or indirect conflict?
  - Is the relocation/adjustment justified?
#2 Know Your Project

- **How**
  - How is the conflict being resolved?  
  - How much will it cost?
  
- Relocation
- Abandonment of the facility
- Adjustment – such as lowering in place
- Exception to Policy
- Steel Encasement
- Any action to minimize the adjustment

- Allocation of Funds
- Budgeting
- Collecting contributing funds from local participating agency (LPA)
- Collecting funds the utility is responsible for (Outlined in AFA)
#2 Know Your Project

**Why**
- Why does all this matters?

- Comply with Federal and State Laws and Regulations
- Steward of Tax Payers’ money
- Protecting the Rights of the Utility
- Protecting the traveling public
#3 Ask Questions

- Don’t be afraid to ask questions!
- Use all resources
  - Teammates
  - Design Project Manager
  - ROW Project Manager
  - Utility Company Coordinator
  - Utility Portfolio Section (UPS) Utility Specialists
  - UPS Program Office
  - UPS Toolkit
  - Anyone that may be able to provide an answer (Example TCEQ or Railroad Commission)
  - ROW Utility Manual
Helpful Resources
Helpful Resources

- **U.S. Code, Title 23 – Highways**
  - 23 USC 313 – Buy America

- **U.S. Code, Title 49 – Transportation**
  - 49 USC – Subtitle VIII – Pipelines
Helpful Resources

- **Code of Federal Regulations, Title 23 – Highways**
  - 635.410 – Buy America Requirements
    - [https://www.ecfr.gov/cgi-bin/text-idx?SID=ce6d8dea25fa7228c170625f88164960&mc=true&node=se23.1.635_1410&rgn=div8](https://www.ecfr.gov/cgi-bin/text-idx?SID=ce6d8dea25fa7228c170625f88164960&mc=true&node=se23.1.635_1410&rgn=div8)
  - Part 645 – Utilities
    - [https://www.ecfr.gov/cgi-bin/text-idx?SID=ce6d8dea25fa7228c170625f88164960&mc=true&node=pt23.1.645&rgn=div5](https://www.ecfr.gov/cgi-bin/text-idx?SID=ce6d8dea25fa7228c170625f88164960&mc=true&node=pt23.1.645&rgn=div5)
Helpful Resources

- **Texas Transportation Code, Title 6, Subtitle A, Chapter 203**
  - Subchapter E – Relocation of Utility Facilities

- **Texas Administrative Code, Title 43, Part 1, Chapter 21**
  - Subchapter B – Utility Adjustment, Relocation, or Removal
  - Subchapter C – Utility Accommodation (UAR)
Questions
Thank you!!
Networking Break
Next session starts at 3:30pm
Table of Contents

1. Buy America Compliance - Foundation: 3-5
2. 2019 Buy America Guidelines - Updates: 6-10
4. Buy America Documentation: 15-24
6. Buy America Summary: 27
Buy America Compliance - Foundation

- Set forth in 23 USC 313

  - The requirements under this section shall apply to all contracts eligible for assistance under this chapter for a project carried out within the scope of the applicable finding, determination, or decision under the National Environmental Policy Act of 1969 (42 U.S.C. 4321 et seq.), regardless of the funding source of such contracts, if at least 1 contract for the project is funded with amounts made available to carry out this title.

Buy America Compliance - Foundation

- Set forth in 23 CFR 635.410
  - The project either:
    - (i) Includes no permanently incorporated steel or iron materials, or
    - (ii) if steel or iron materials are to be used, all manufacturing processes, including application of a coating, for these materials must occur in the United States. Coating includes all processes which protect or enhance the value of the material to which the coating is applied.
  - https://www.ecfr.gov/cgi-bin/retrieveECFR?gp=&SID=df77ae403b235af5e0b8828a01d24de&mc=true&r=SECTION&n=se23.1.635_1410
Buy America Compliance - Foundation

- Set forth in TTC 223.045
  - IRON AND STEEL PREFERENCE PROVISIONS IN IMPROVEMENT CONTRACTS.
    - A contract awarded by the department for the improvement of the state highway system without federal aid must contain the same preference provisions for iron and steel and iron and steel products that are required under federal law for an improvement made with federal aid.
  - Senate Bill 1289 – September 1, 2017
2019 Buy America Guidelines

- Removed 90% and 100% iron and steel composition requirements – replaced with predominately
- Language addressing the need to verify compliance prior to installation of materials
- Language addressing the acceptance of written certifications when Mill Test Reports are not available
- Language addressing betterment utility facilities must comply with Buy America Requirements
2019 Buy America Guidelines - Updates

Guidelines

On federal-aid projects, utility facility owners will use domestically manufactured products that are composed predominately of steel and/or iron to incorporate into the permanent installation of the utility facility. In compliance with the Buy America provisions of 23 CFR 355.410 as amended. Examples of such products may include poles, cross arms, and structural support members; towers and girders used to comprise transmission towers and stand-alone structures; conductors, support cables; high-strength bolts used as anchor bolts and anchor rods; iron or steel baseplates; encasement pipes, pipes and valves; rebar and other reinforcing involved for all cast-in-place and prestressed installations; conduit and ducting; fire hydrants; manhole covers, rings, and drop-inlet grates.

Prior to the installation of products subject to Buy America compliance, the utility facility owner will submit an executed TxDOT Form 1818 with attached Mill Test Reports, issued and signed by the initial fabricator, supplier of materials, or utility owner. Mill Test Reports should state that the materials were manufactured domestically. In certain instances, the utility facility owner may demonstrate Buy America compliance by providing a written certification signed by the vendor or manufacturer on company letterhead or other acceptable documentation signed by an authorized representative declaring that all supplied materials subject to the Buy America provisions are fully compliant. The written certification will include the specific project information pertaining to the Standard Utility Agreement and state that all products that are composed predominately of steel and/or iron were manufactured domestically and in compliance with the Buy America provisions of 23 CFR 355.410 as amended.

Certain utility agreements, executed before Dec. 31, 2013, that do not have federal funding for utility materials or relocation are not subject to Buy America (even if other contracts associated with the project were reimbursed with federal funds). The date of the original utility agreement will be used as the date to determine Buy America compliance if the utility agreement is amended after December 31, 2013 unless the agreement includes major changes in the scope of work.

Betterments as part of a reimbursable Utility Agreement must be Buy America compliant.

Buy America does not apply to assembly materials, attachment materials, housing encasements, or miscellaneous electronics, as defined below.

Buy America does not apply to any associated materials (including spare materials) required for maintenance.

Added language – verify compliance prior to installation

Added language – acceptance of written certification – in certain instances

Removed percentages

Provide example of materials that may be subject to Buy America Requirements

Added language – betterments
2019 Buy America Guidelines - Updates

- Added the definitions from the 2017 guidelines
- Miscellaneous items do NOT have to be Buy America compliant
- Included option for utility owner to sign Form 1818
- Added language on what to include on written certification letter
Buy America: Utility Accommodations

Definitions:

TxDOT intends to use the following definitions to provide clarity and to assist utility-service providers as they develop internal processes to ensure compliance with Buy America.

TxDOT and the utility will identify the proposed utility structures and their components that will be monitored in the Utility Agreement Estimate.

- Conductor: A material (specifically wires and cables) that allows the flow of energy including electricity, heat, data, audio/video transmission, etc.
- Conductor Support Cables: Iron or steel cables that support conductor lines between towers or poles.
- Fittings: Individual parts used to join, adjust, or adapt a system of pipes including but not limited to elbows, tees, wyes, crosses, nipples, reducers.
2019 Buy America Guidelines - Updates

Guidelines

On federal-aid projects, utility facility owners will use domestically manufactured products that are composed predominately of steel and/or iron to incorporate into the permanent installation of the utility facility – in compliance with the Buy America provisions of 23 C.F.R. 635.410 as amended. Examples of such products may include poles, cross arms, and structural support members; towers and girders used to comprise transmission towers and stand-alone structures; conductor support cables; high-strength bolts used as anchor bolts and anchor rods; iron or steel baseplates; encasement pipes, pipes and valves; rebars and other reinforcing iron used for all cast-in-place and precast installations; conduit and ducting; fire hydrants; manhole covers, risers, and drop-inlet grate.

Prior to the installation of products subject to Buy America compliance, the utility facility owner will submit an executed TxDOT Form 1818 with attached Mill Test Reports, issued and signed by the initial fabricator, supplier of materials, or utility owner. Mill Test Reports should state that the materials were manufactured domestically. In certain instances, the utility facility owner may demonstrate Buy America compliance by providing a written certification signed by the vendor or manufacturer on company letterhead or other acceptable documentation signed by an authorized representative declaring that all supplied materials subject to the Buy America provisions are fully compliant. The written certification will include the specific project information pertaining to the Standard Utility Agreement and state that all products that are composed predominantly of steel and/or iron were manufactured domestically and in compliance with the Buy America provisions of 23 C.F.R. 635.410 as amended.

Certain utility agreements, executed before Dec. 31, 2013, that do not have federal funding for utility materials or relocation are not subject to Buy America (even if other contracts associated with the project were reimbursed with federal funding). The date of the original utility agreement will be used as the date to determine Buy America compliance. If the utility agreement is amended after Dec. 31, 2013, the amendment includes major changes in the scope of work.

Betterments as part of a reimbursable Utility Agreement must be Buy America compliant.

Buy America does not apply to assembly materials, attachment materials, housing encasements, or miscellaneous electronics, as defined below.

Buy America does not apply to any associated materials (including spare materials) required for maintenance.

Included option for utility owner to sign Form 1818

Added language on what to include in written certification

Miscellaneous items
Buy America - Utility Agreement Revisions

STANDARD UTILITY AGREEMENT

NOW, THEREFORE, BE IT AGREED:

The State will pay to the Utility the costs incurred in adjustment, removal, and relocation of the Utility's facilities up to the amount said costs may be eligible for State participation.

All conduct under this agreement, including but not limited to the adjustment, removal, and relocation of the facility, the development and reimbursement of costs, any environmental requirements, and retention of records will be in accordance with all applicable federal and state laws, rules and regulations, including, without limitation, the Federal Uniform Relocation Assistance and Real Property Acquisition Policies Act, 42 U.S.C. §§ 4601, et seq., the National Environmental Policy Act, 42 U.S.C. §§ 4321, et seq., the Buy America provisions of 23 U.S.C. § 313 and 23 CFR 635.410, as amended, Texas Transportation Code § 223.043, the Utility Relocations, Adjustments, and Reimbursements provisions of 23 CFR 645, Subpart A, and the Utility Accommodation provisions of 23 CFR 645, Subpart B.

The Utility shall supply, upon request by the State, proof of compliance with the aforementioned laws, rules, regulations, and guidelines prior to the commencement of the adjustment, removal, and relocation of the facility.
The Utility shall comply with the Buy America provisions of 23 U.S.C. § 313, 23 CFR 635.410, as amended, and the Steel and Iron Preference provisions of Texas Transportation Code § 223.045 and, when products that are composed predominately of steel and/or iron are incorporated into the permanent installation of the utility facility, use domestically manufactured products. TxDOT Form 1818 (Material Statement), along with all required attachments, must be submitted, prior to the commencement of the adjustment, removal, and relocation of the facility, as evidence of compliance with the aforementioned provisions. Failure to submit the required documentation or to comply with the Buy America, and Steel and Iron Preference requirements shall result in: (1) the utility becoming ineligible to receive any contract or subcontract made with funds authorized under the Intermodal Surface Transportation Efficiency Act of 1991; (2) the State withholding reimbursement for the costs incurred by the Utility in the adjustment, removal, and relocation of the Utility’s facilities; and (3) removal and replacement of the non-compliant products.
Buy America - Utility Agreement Revisions

Revised language – reimbursement requests to be submitted within one year of work being completed

The Utility agrees to develop relocation or adjustment costs by accumulating actual direct and related indirect costs in accordance with a work order accounting procedure prescribed by the State, or may, with the State’s approval, accumulate actual direct and related indirect costs in accordance with an established accounting procedure developed by the Utility. Bills for work hereunder are to be submitted to the State not later than one (1) year after completion of the work. Failure to submit the request for final payment, in addition to all supporting documentation, within one (1) year after completion of the work may result in forfeiture of payment for said work.
Utility Agreement Revisions

**UTILITY**

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<th>Name or Title</th>
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**EXECUTION RECOMMENDED**

Director of TxDOT (as authorized, if any)

**THE STATE OF TEXAS**

Executed and approved by the Texas Transportation Commission for the purpose and effect of authorizing and/or carrying out the orders, established policies or work programs herein approved and authorized by the Texas Transportation Commission.

By: ____________________________

Title: ____________________________

Date: ____________________________

**STOP**

PROCEED WITH CAUTION

2019 TxDOT Utility Partnering Conference

December 3, 2019
Buy America Documentation

- What should you document?
  - Notifications to third parties that project is Buy America / Iron and Steel Preference Provision Compliant
  - Cost estimates and plan sheets
  - Verification prior to installation
    - Form 1818
    - Mill Test Reports or Certifications
  - Inspections during installation
## Buy America Documentation

### Material Statement

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This is to certify that the materials listed above and on the attached supplement, if attached, are in conformance with the governing specifications. This is to also certify that all manufacturing processes for steel and iron materials or for the application of coatings, impregnating, painting or any other coating that protects or enhances the value of the steel or iron material to these materials occurred in the United States of America. Manufacturing processes are defined as all processes required to change the raw ore or scrap material to the finished steel or iron product. The test and test reports (MTR) and Certifications (Cert.) are either in proof of Domestic Origin.

Subscribed and sworn to before me this ___ day of ____________.

Notary Public: ____________________________

My Commission expires: ____________________

I declare under penalty of perjury under the laws of the United States of America and the State of Texas that the foregoing is true and correct, and that I am authorized to sign for the Firm listed below.

(Authorized Corporate Officer Signature): ____________________________

(Type Name and Title): ____________________________

(P firma Name): ____________________________

Date: ____________________________
### Material Statement

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This is to certify that the materials listed above and on the attached supplement (if attached) are in conformance with the governing specification(s). This is to also certify that all manufacturing processes for steel and iron materials, for the application of coating, galvanizing, painting, or any other coating that protects or enhances the value of the steel or iron metal by these materials occurred in the United States of America. Manufacturing processes are defined as all processes required to change the raw steel or iron metal into the finished steel or iron product. The attached mill test reports (MTRs) and Certifications (Cert.) are offered as proof of Domestic Origin.

Signed and sworn to before me this 16th day of October, 2019.

Notary Public

My Commission expires: 10-15-2022

Supplier, Vendor, Manufacture, or Utility
# Buy America Documentation

![Material Test Report](image)

**Material:** 16.000x250x40'0'0'(1x1)A2523

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**Material No:** R18002504000-A252

**Made in:** USA

**Melted in:** USA

**Certification:** ASTM A285-19 GR 3

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**Testing:**

- **Yield:** 662000 Psi
- **Tensile:** 071300 Psi
- **Elong:** 35%

**Recycled Content:** 86.00%
**Post Consumer:** 50.00%
**Pre-Consumer (Post Industrial):** 40.00%
### Comments

Arrived on site approximately 11:15 AM

City of Sulphur Springs

Patterson was on site welding the 18” split casing today. The split casing had been verified on site. The 30” steel casing and the 8” T valve were also present on the site and verified as well. The site was still heavily flooded, and Patterson mentioned that they did not expect any further construction this week due to the weather.
Patterson on site welding the 18” split casing
### TEST CERTIFICATE

**Customer Name:** T2OH India Ltd.  
**Customer P.O. No. and Date:** 200017355; Date: 21-05-14  
**Order Acceptance No. and Date:** QA/14-15/12; Date: 23-05-14  
**Invoice No. and Date:** NA

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</tbody>
</table>

**Heat Treatment**

<table>
<thead>
<tr>
<th>Group No.</th>
<th>Material Specification</th>
<th>Supply Qualities</th>
<th>Environment</th>
</tr>
</thead>
<tbody>
<tr>
<td>CN041</td>
<td>AUST/ASCE G2: L2, G1, 2013</td>
<td>Normalized at 950°C, 3000°F, Holding Time 3000 Hrs.</td>
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<td>CN042</td>
<td>AUST/ASCE G2: L2, G1, 2013</td>
<td>Normalized at 950°C, 3000°F, Holding Time 3000 Hrs.</td>
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</tr>
</tbody>
</table>

**Product Marking**

Group No. | PD Item No. | Identification Name  
<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>CN041</td>
<td>S</td>
<td>41605-3 1/2 OD X 7/8 WD THK A320 GR L2 C1.1 N. J. MS. G300442 NACE</td>
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<td>CN042</td>
<td>110</td>
<td>41605-3 1/2 OD X 7/8 WD THK A320 GR L2 C1.1 N. J. MS. G300442 NACE</td>
</tr>
</tbody>
</table>

Page 1 of 2 of TC No. CNWQCC14-15Y131

2019 TxDOT Utility Partnering Conference  
December 3, 2019
Buy America Documentation – Not Acceptable

Actual weight:
Repair by means of welding is to the Country of origin Ukraine.

Melted and manufactured in MEXICO
“Coil Manufacturer: Ternium MC3-Lazaro Cardenas, Mexico”

The products manufactured from this coil will not be Buy America compliant. The creation of the coil from the iron ore is a manufacturing process, and it was accomplished in Mexico. That fact disqualifies all of the products manufactured from the coil, even if all of that later manufacturing was done domestically.
According to FHWA

- All manufacturing processes of the steel material in a project (i.e., smelting, and any subsequent process which alters the steel material's physical form or shape or changes its chemical composition) must occur within the United States to be considered of domestic origin. This includes processes such as rolling, extruding, machining, bending, grinding, and drilling.
Certificate of Compliance Letter

CERTIFICATE OF COMPLIANCE WITH
BUY AMERICA

Date:  
Customer:  
Attention:  
Customer Order:  
(Producer/Fabricator) Order:  
Re: (project name; CS)  
Material:  

The following products, provided by (producer/fabricator) for the above order, are fabricated from steel or iron that is melted and manufactured, and any coating applied, in the United States and meet the requirements of Buy America 23 CFR 635.410:

(Product)  
(Product)  
(Product)...

This certification has been issued for only the products listed above for domestic compliance. Alterations to this document by any agency other than (producer/fabricator) will void the certification.

Please contact me if you have any questions regarding this certification.

Very truly yours,

(name)  
(producer/fabricator)  
(position)  
Phone:  
Email:  
Cc:

Company Letterhead

Buy America 23 CFR 635.410

Project Information

Product description name from approved estimate, invoice and Form 1818

Signed by an authorized representative
Certificate of Compliance Letter - Acceptable

Project Information

Product description name from approved estimate, invoice and Form 1818

Signed by an authorized representative

Company Logo

Address

Company Letterhead

Buy America 23 CFR 635.410

Name and Signature

Company Logo

Address

Company Letterhead

Buy America 23 CFR 635.410

Name and Signature
### Buy America Summary

#### 2019 Buy America Guidelines
- Verify compliance prior to installation of material
- Buy America does not apply to Misc. items
- Option for Utility Owner to sign
- Language on what to include on Certificate of Compliance Letter

#### Buy America Documentation
- Form 1818
  - Mill Test Reports or Certificate of Compliance
- Review prior to sending to ROW Utility inbox
- Form 1818 executed and legible documentation

#### Certificate of Compliance Letter
- Company Letterhead
- Project Information
- 23 CFR 635.410
- Material Description from approved estimate & Form 1818
- Signature

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Prior to the installation of products subject to Buy America compliance, the utility facility owner will submit an executed TxDOT Form 1818.
Mario Mendez – Utility Specialist
Mario.Mendez@txdot.gov
(214) 320-6103