2009 INGAA Foundation Workshop

Building Better Projects
Continuous Improvement

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Houston, Texas

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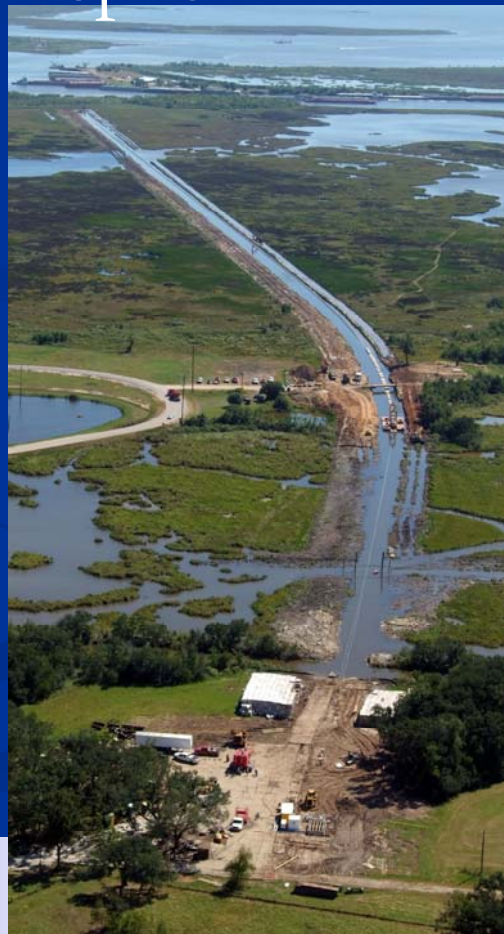
Challenges we have as Construction Contractors

- Typically last person involved in the project
- Route, material, design and extra work space have all been selected and permitted
- Assembly line type construction
- Not a controlled environment
- Unstable work conditions
- Unknown underground obstructions
- Mother nature adds challenges



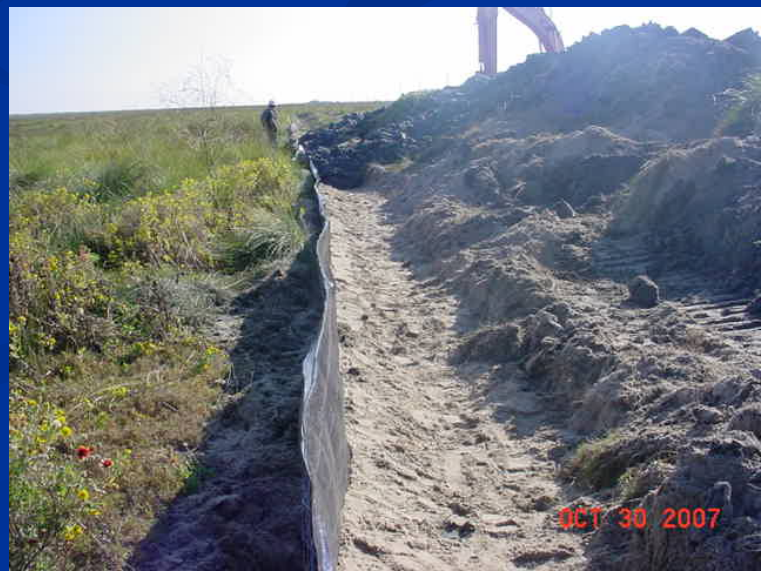
Quality

- What is it?
  - Condition of employment
  - Industry Codes for facility installations

    API 1104, Appendix A, API 5L, ASME, etc.
  - Our Customers have construction specifications
  - Contractors have processes and procedures
  - Develop project specific procedures
  - Its our reputation
- Cost more to do it twice.
- Than to just do it right the first time

Right of Way

- We don't view the right of way in full detail during bidding process – typically we spend 1 to 2 days at the job site looking at the job
  - Right of way widths
  - Extra work space
  - Ground conditions
  - Water bodies
  - Above ground obstructions
  - Under ground obstructions

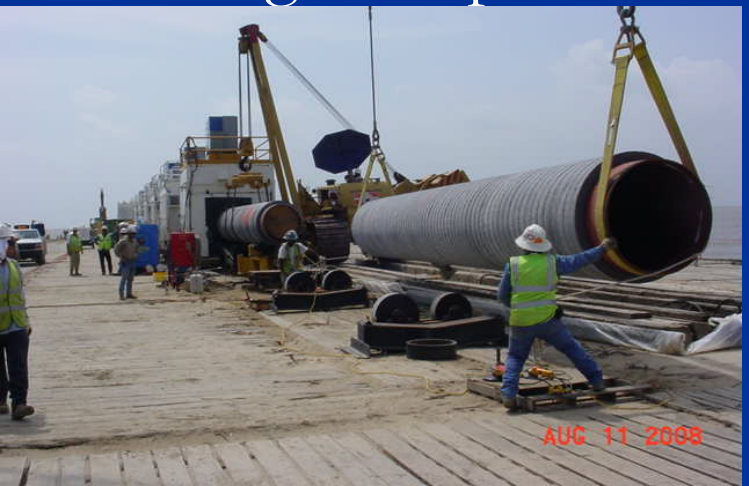


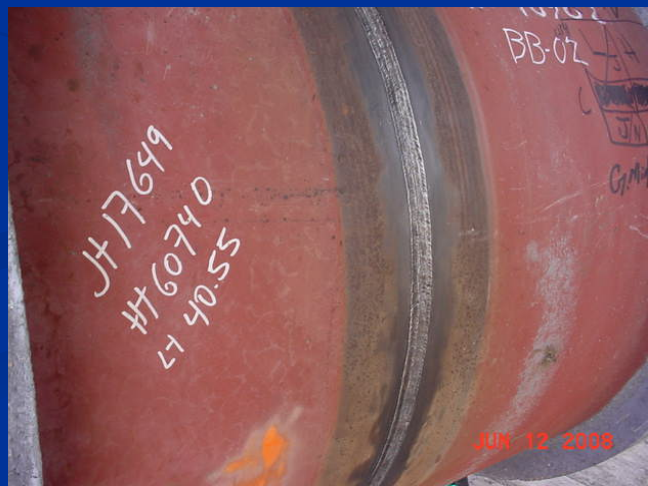
Pipe

- Construction Contractors don't typically inspect the pipe until we receive it on the right of way
  - Out of roundness
  - Ends not square
  - Seams not ground back far enough
  - Bevel consistency and care
  - Gauss (Magnetism)
  - Varying pipe metallurgy (within API 5L)
    - Tensile strength for X-70 (75,000 to 105,000)
    - Multiple plate manufacturers
  - Coating cutback to small or to large

Welding

- Pipe issues cause additional challenges
- May use standard welding procedures
- May use project specific welding procedures (Mechanized – Appendix A or SMAW)
- Issues we have encountered this year
  - Excessive High/Low
  - Higher repair rates



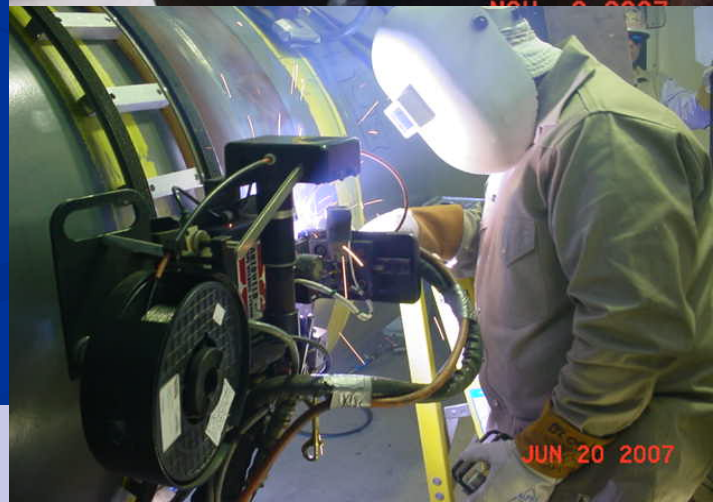


Welding

- Items critical to the welding process
  - Consumable selection and control
  - Bevel preparation
  - Preheating of the pipe
  - Spacing / Gap for root bead
  - Inter pass temperatures
  - Travel speed / amperage / voltage (Heat Input)
  - Training of personnel

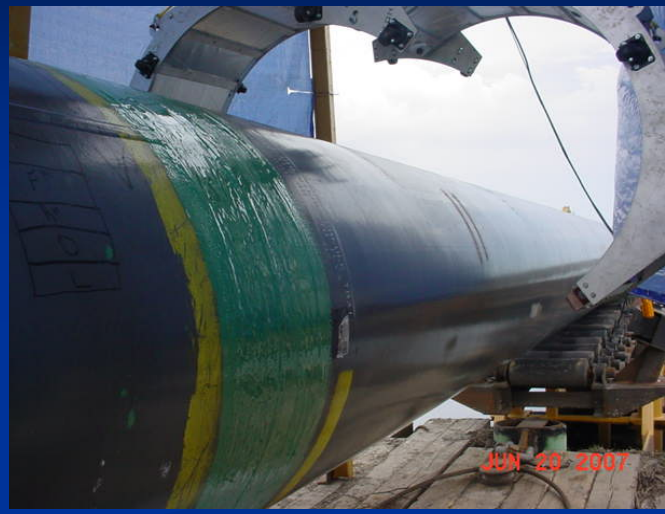
    Pipe mill (QC) / NDT

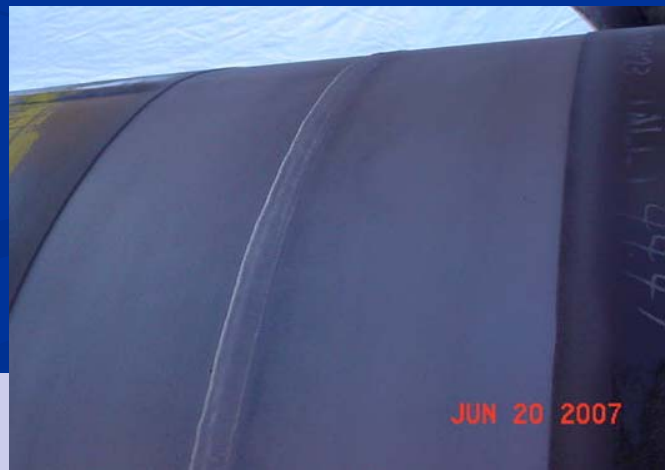
    CWI / Welder



Coating

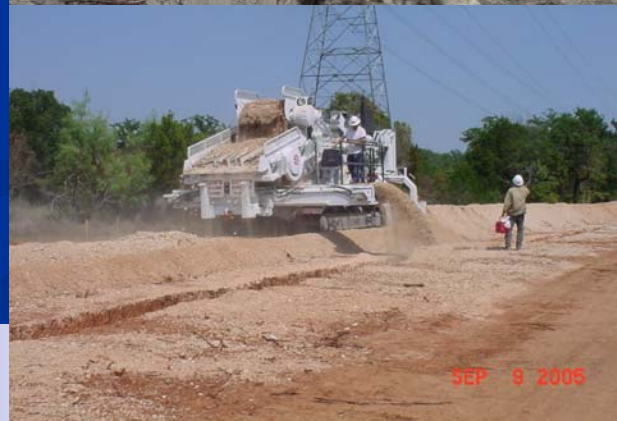
- Field joints
  - Coating cutback to small or to large
  - Surface preparation
    - Sand blasting
    - Preheating
  - Application
  - Verification of correct coating thickness
  - Visual Inspection
  - Jeeping





Backfill

- Ditch preparation
- Pipe support in the ditch
  - Padding
  - Sand bags
- Installation techniques
- Backfill (prevent dents/ovality)
  - Padding
  - Rockshield
  - Overburden (placing cuts back)
- Pipe Design (wall thickness)



How do we achieve Quality

- How did we meet some of these challenges
- Developed better Quality Control / Quality Assurance processes
- Highlighting the items of a critical nature
- Developed ITP's (Inspection and Testing Plans)
- Better Planning
- **Better Communication**

  (Owner/Contractor/Inspector)

Inspection & Testing Plan

ITP's

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ITP-04

QC FIELD INSPECTION AND TEST PLAN

Lay Procedure

Item No.	Activity	Project Procedure	Frequency	Acceptance Criteria	Sunland Responsibility	Representative Responsibility	Action/Record
3	Pipe Inspection	**Section 2.0**	Each joint	Pipe free of debris	Welding Foreman		•Swab each joint •No record
5	Verify Weld Procedure	**Section 2.0 & Weld Procedures**	As needed	Applicable weld procedure	Welding Foreman		•Determine proper weld procedure & notify welders • Welder Foreman Report
6	Verify Qualified Welders	**Section 4.0 thru 7.0**	Prior to welding, at change of Welder and/or Weld Procedure	49 CFR Section 195/Welder Qualification Log	Welding Foreman		•Verify welders qualified to procedure per Welder Qualification Log . •Welder Foreman Report
7	Bevel Prep	**Weld Procedures**	Each joint	Clean bevel per Weld Procedure	Welding Foreman		•Buff bevel •No record
8	Pre heat	**Weld Procedures**	Each joint	Minimum of 250° F Verified by temp stick or equal.	Welding Foreman		•Pre heat bevel •No record
9	Line up	**Weld Procedures**	Each joint	Root opening 1/16” Seams 2”-4” offset High-low 1/8” & Weld Procedure	Welding Foreman		•Use of internal line up clamp, seam roller •No record
10	Weld Acceptance	**Weld Procedures & NDE Procedure**	Each weld	Weld procedures, API 1104 & Welding Specification NDE Procedures	Welding Foreman	X	•Visual and NDE Inspection •NDE report

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ITP-05

QC FIELD INSPECTION AND TEST PLAN

Coating Procedure

Item No.	Activity	Project Procedure	Frequency	Acceptance Criteria	Sunland Responsibility	Representative Responsibility	Action/Record
12	Surface prep, (blasting)	**Section 9.0**	2 per shift	1.5 – 4 mils per CCSI SSC-SP10	Coating Foreman		•Blast and check profile •Daily coating foreman report
13	Surface prep, (heating)	**Section 10.0**	Each joint	460° F (approximately) Verified with temp stick or equal	Coating Foreman		•Pre-Heat Joint •No record
14	Coating thickness	**Section 10.0**	2 per shift	14 – 18 mils, 1" overlap 4 readings/joint	Coating Foreman	X	•Check with Elcometer™ •Daily coating foreman report
15	Holiday detection	**Section 10.0**	Each joint	No jeeps	Coating Foreman	X	•Use holiday detector •Confirm voltage setting •Daily coating foreman report
16	Pipe Coating Inspect	**D.O.T. 49 CFR 195**	Each joint	No damage 49 CFR 195.23 8(b)	Coating Foreman		•Visual Inspect •No record
17	Coating repair	**Section 10.0**	As needed	<1" – patch stick >1" – 2-part epoxy (20-30 mils)	Coating Foreman	X	•Repair with patch stick or 2-part epoxy •No Record

Questions