Water Research Foundation Large Pressure Pipe Structural Rehabilitation Conference

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COLLAPSED-CAN and LOOSE-FIT STEEL LINERS-FABRICATION

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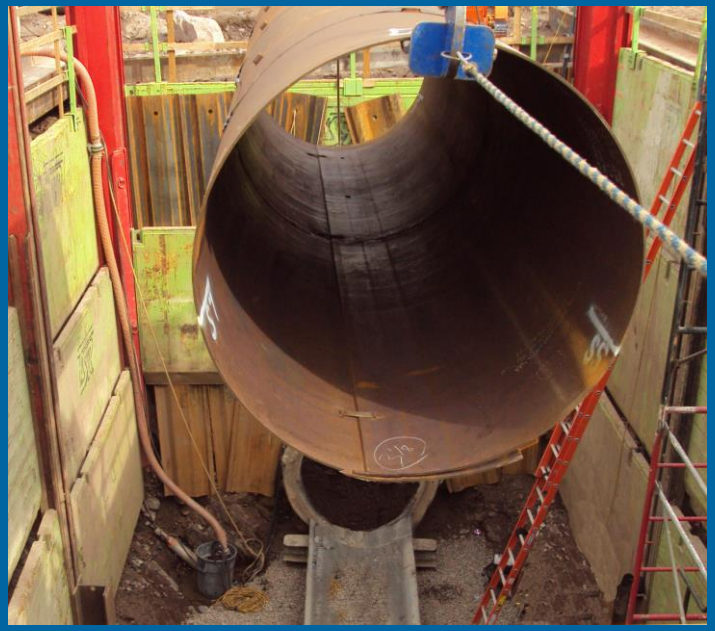
Presentation Topics

- Fabrication of Complete Cylinder Steel Liners
- Fabrication of Collapsible Cylinder Steel Liners
- Comparison of the Two Steel Liner Systems

Collapsed-Can & Loose-Fit Steel Liners

Collapsible Steel Liner



Complete Cylinder Steel Liner

COMPLETE STEEL CYLINDER FABRICATION

Manufactured in conformance with:
AWWA C200 and Owner's Standard Specifications

Two Manufacturing Processes Depending On Required Thicknesses and Equipment Availability

SPIRAL-SEAM PIPE

Fabricated from coiled steel by a continuous forming and welding process for thicknesses up to 0.75 inch.

The steel coil material:
ASTM A1018-SS grade 36-40

STRAIGHT-SEAM PIPE (CAN PIPE)

Fabricated from plate steel

8 to10-foot long segments

Assembled two to four segments with girth seam

Plate steel material -ASTM A36, A 572 grade 42, or ASTM A516 grade 70

Fabrication of Collapsible Steel Liners

After squaring and cutting plate to exact dimensions, roll the 8 to 10 ft. segments

Fit the longitudinal seam of each segment and tack weld.

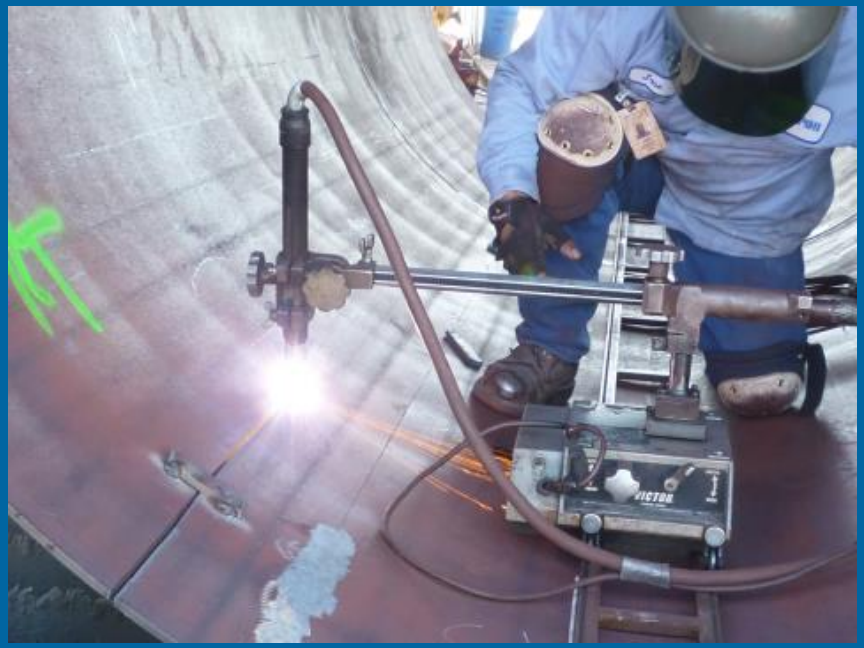
Fabrication of Collapsible Steel Liners

After fitting and tacking two or more segments, weld and test the circumferential joints. Cut holes for couplings can be observed

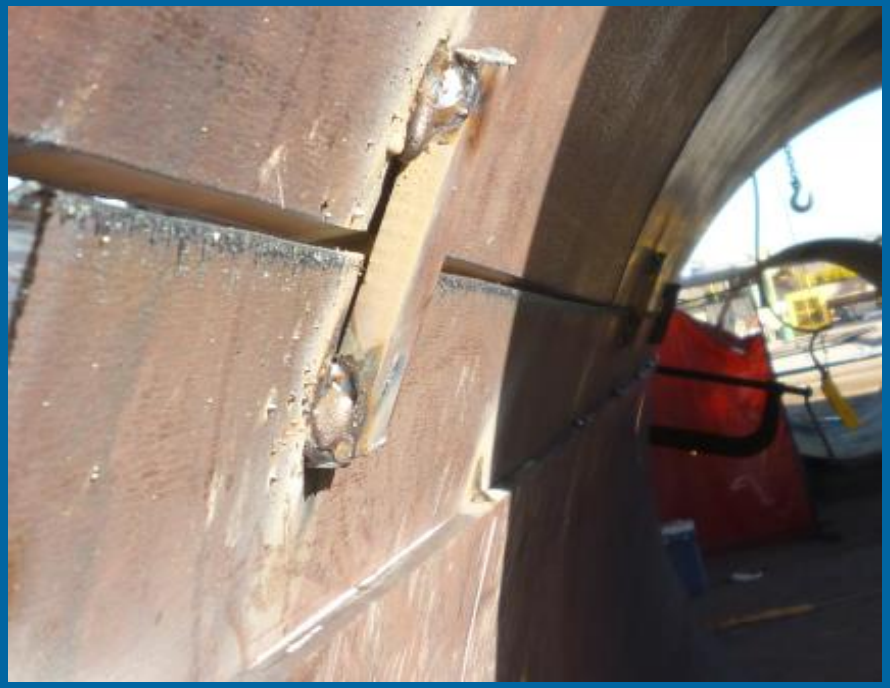
The double-v-groove complete penetration circumferential butt joint can be radiographically tested.

Fabrication of Collapsible Steel Liners

Cutting 6-inch wide strip for the backup bar

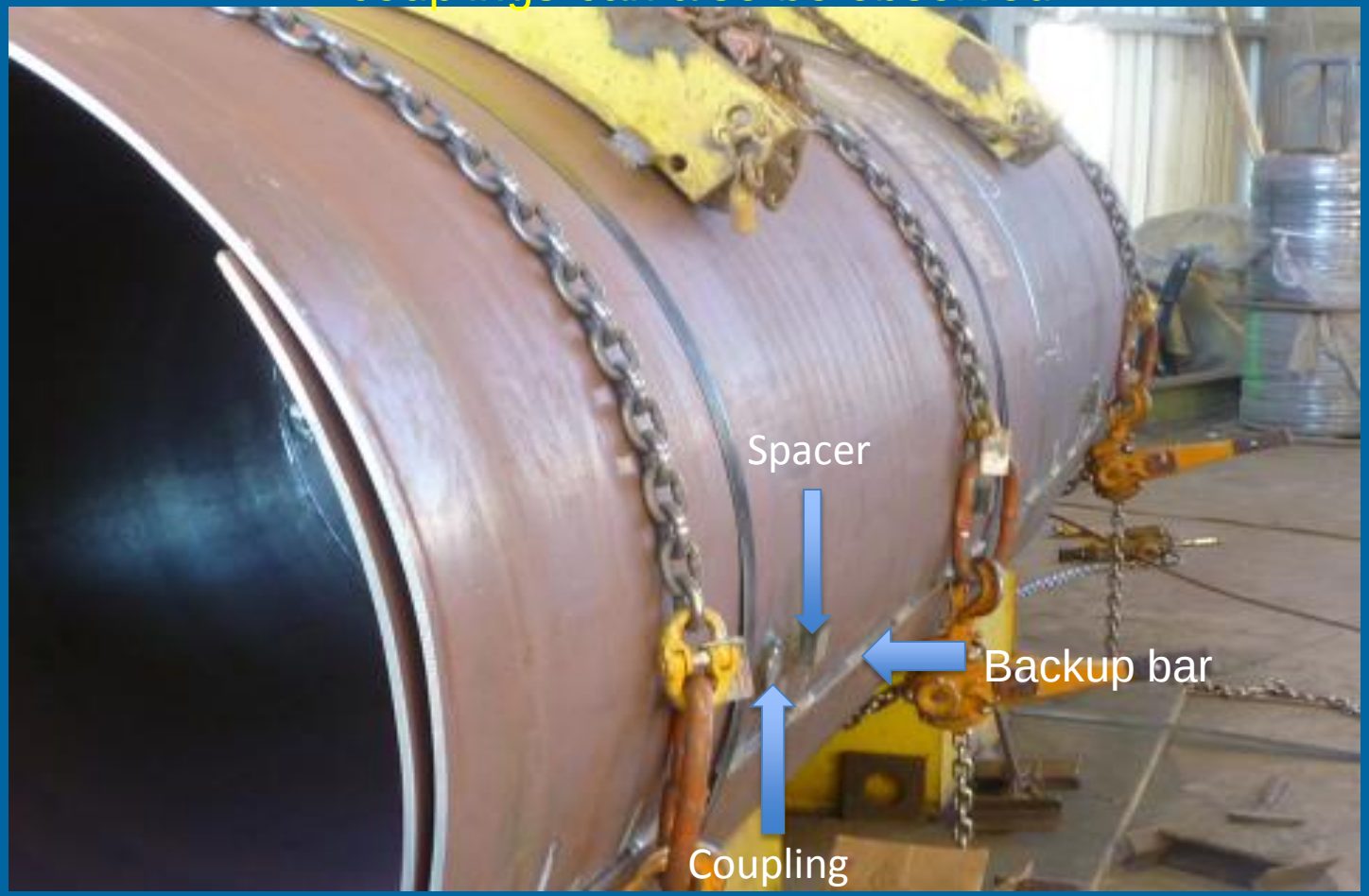


Overlapping the main longitudinal seam 3 inches, the backup bar is held with tack bars until it is skip welded from outside



Fabrication of Collapsible Steel Liners-Collapsing Station

Backup bar the entire length of the longitudinal seam, spacers and couplings can also be observed



Comparison of the Two Liner Systems

Complete Cylinder Steel Liner	Collapsible Steel Liner
Fabricated and tested (both destructive and non destructive) including hydro to AWWA C200 and Owner Specifications. Only the field lap-joint fillet weld has to be tested.	Cannot be hydro tested and requires the non-destructive testing of the girth seams and the field longitudinal full penetration groove weld with backup bar besides the field lap joint.
Requires about 6 inch reduction from the host pipe diameter. The slickline (steel tubing) method can be used for grouting.	Requires approx. 3 inch reduction from the host pipe. Less hydraulic capacity loss.
Cheaper to produce due to automation (lower labor) and lower material cost (coil steel versus plate).	More expensive to produce and install.
Can be plant cement-mortar-lined.	Cannot be plant cement-mortar-lined.
Difficult to maneuver.	The collapsed diameter is approx. 12 inch less than the expanded diameter. The initial installation will be easier.

Collapsible-Can and Loose-Fit Steel Liners-Fabrication

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