CASE STUDY

Paper Pulp Mill & Supplier

Batch Digester Repair

A Canadian pulp and paper mill operates batch digesters built in 1984, producing unbleached sack kraft paper for packaging and shipping. The digester operates at 130 to 165 psi and 350°F. To avoid a replacement 24-month lead time, the customer selected repair.

Project Scope

Code of Construction: ASME Section VIII, Division I

Base Material: SA 285 Grade C Mod (312SS)

Thickness: 1.875 to 1.938 in.

Diameter: 13.3 ft. ID

Repair Requirements:

- Preheat to 200°F using rosebud tips per UCS-56-1
- Weld overlay of ER312SS across two 360-degree bands; Section heights: 8 ft. 7 in. and 14 ft. 1.5 in.
- Removal of two nozzle liners and weld overlay of ER312SS applied to both nozzle IDs

Key Challenges

Manual Component Removal and Reinstallation: The digester contained 66 screen blocks, 99 screen plates, and multiple backing rings requiring removal, surface prep, hand welding, and reinstallation.

Weld Metal Buildup Requirements: After more than 40 years of service, liner degradation and corrosion required additional weld metal buildup beyond the planned overlay. A buttering layer improved metallurgical bonding and durability.

Scope Expansion During Execution: Two base nozzles were added after work began, requiring additional overlay without impacting schedule or quality.

Uniform Preheat Requirements: To prevent added cost and downtime for the customer by removing vessel insulation for preheat, WSI used rosebud tips.

Metallurgical Boat Sample Testing: WSI completed metallurgical analysis on a weld cross-section sample to confirm quality without affecting schedule.

Turnaround Schedule Changes: The outage shifted from October to July before finalizing in September. WSI adapted through flexible planning and clear communication.

Remote Location Constraints: Execution in remote northern Manitoba created logistical, staffing, and material coordination challenges.

The WSI Difference

Workscope Readiness: Despite schedule shifts, WSI mobilized rapidly using four automated machines operating 24/7, completing work on time, under budget, and safely.

Critical Path Analysis: WSI Engineering developed a time-sensitive schedule prioritizing critical activities, aligning resources, eliminating bottlenecks, and accurately forecasting project duration.

WSI Owned/Built/Maintained All Equipment Deployed:

- NG4 GMAW automated weld machines for WOL
- Small ID automated WOL system utilizing GTAW process
- Equipment mobilized to execute both courses simultaneously
- Proprietary PPE utilized by all crew members
- Equipment mobilized to work both drums simultaneously

Results

"Very impressed with the results, the ability to stay on schedule and budget even with delays. There were no safety issues, and the knowledge of the supervisors was unmatched." – Mechanical Engineer

WSI delivered first-time quality results on time and on budget.

Course 1 (Lower Digester)

- 358 sq. ft. of weld overlay.

Course 5 (Upper Digester)

- 588 sq. ft. of weld overlay

Overall Project Results

- 946 total sq. ft. of weld overlay
- Both courses completed in parallel

Organizational Readiness for Schedule Change: WSI anticipated and adapted to unexpected challenges, driving project success and reinforcing industry leadership.

Multiple Machines, Multiple Levels: Field teams executed both courses concurrently, increasing efficiency and shortening the schedule through overlapping activities.

Optimized Schedule with No Budget Impact: WSI optimized resources to improve efficiency and performance without increasing project costs.

Under Budget: The project was completed under budget, delivering measurable cost savings.

Right First Time: First-time quality achieved with no repairs, rework, or corrective actions required.

Goal Zero: WSI's safety practices resulted in zero injuries, zero lost time, and zero downtime.

availinfra.com/wsi

WSI
560 Horizon Drive
Suite 100
Suwanee, GA 30024
T: 678.728.9100