



Zinc Reduction and Paint Room Optimization

Lou-Rich Inc.

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MnTAP Intern 2009

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Lou-Rich Inc. Overview

- Contract Manufacturing
 - John Deere
 - General Electric
 - Scotsman
 - Toro
 - Lennox
- Contract Engineering



Motivations for Change

- Comply with regulations
- Cost savings from process improvements
- Reduce environmental impact
- Use resources more efficiently

Reasons for MnTAP Assistance

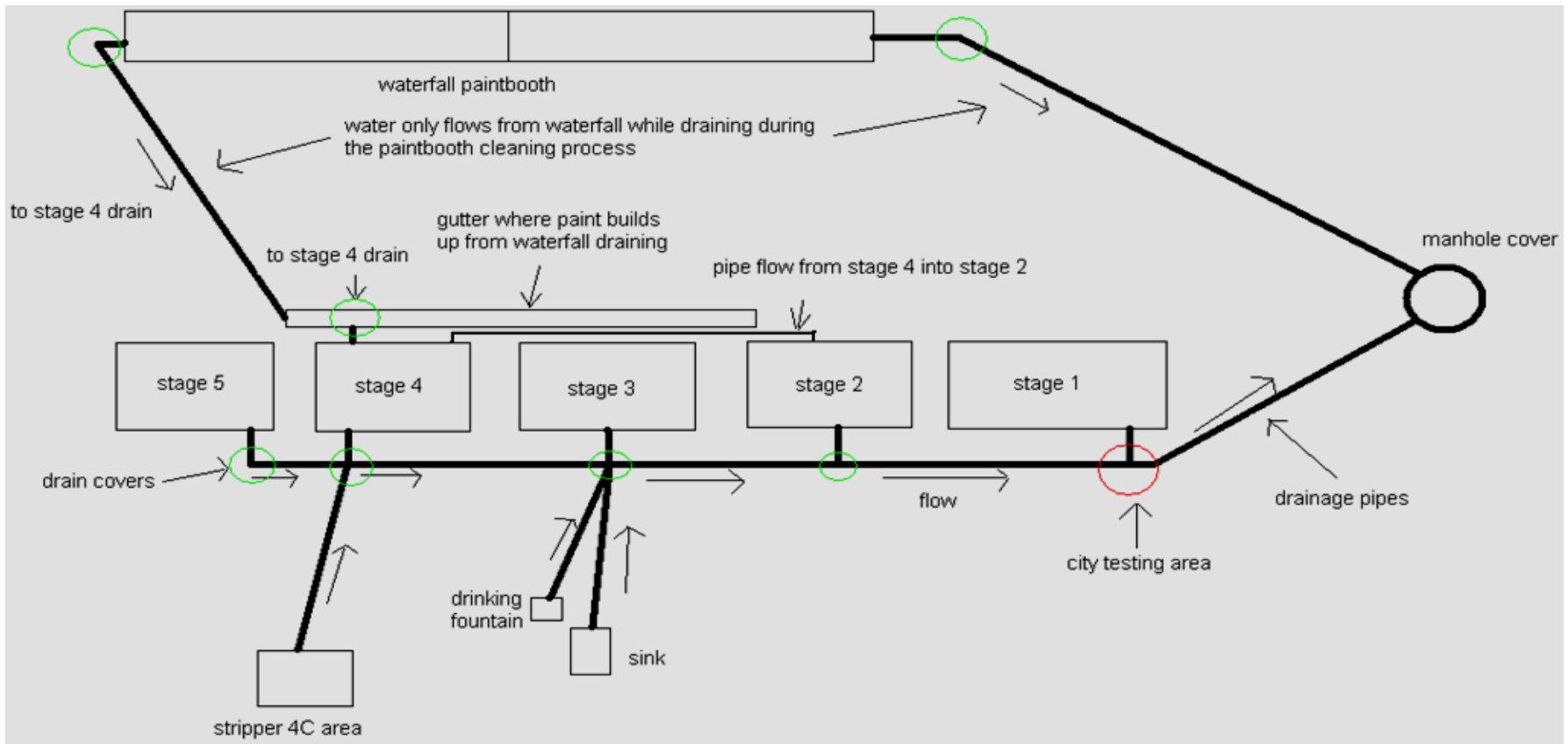
- Failed three straight quarterly tests and one follow up test for zinc in the phosphatizing effluent
- Planning to install a new coating system and were considering waste water treatment system
- Optimize the new coating system

Determining Sources of Zinc

- Determine pipe flow
- Research manufacturing processes and materials that contain zinc
- Simulate the 5-stage washer on a smaller scale
- Investigate City of Albert Lea sampling procedure

Paint Room Pipe Flow

- An effluent audit was done. Each area was identified, researched, and considered



Sources of Zinc

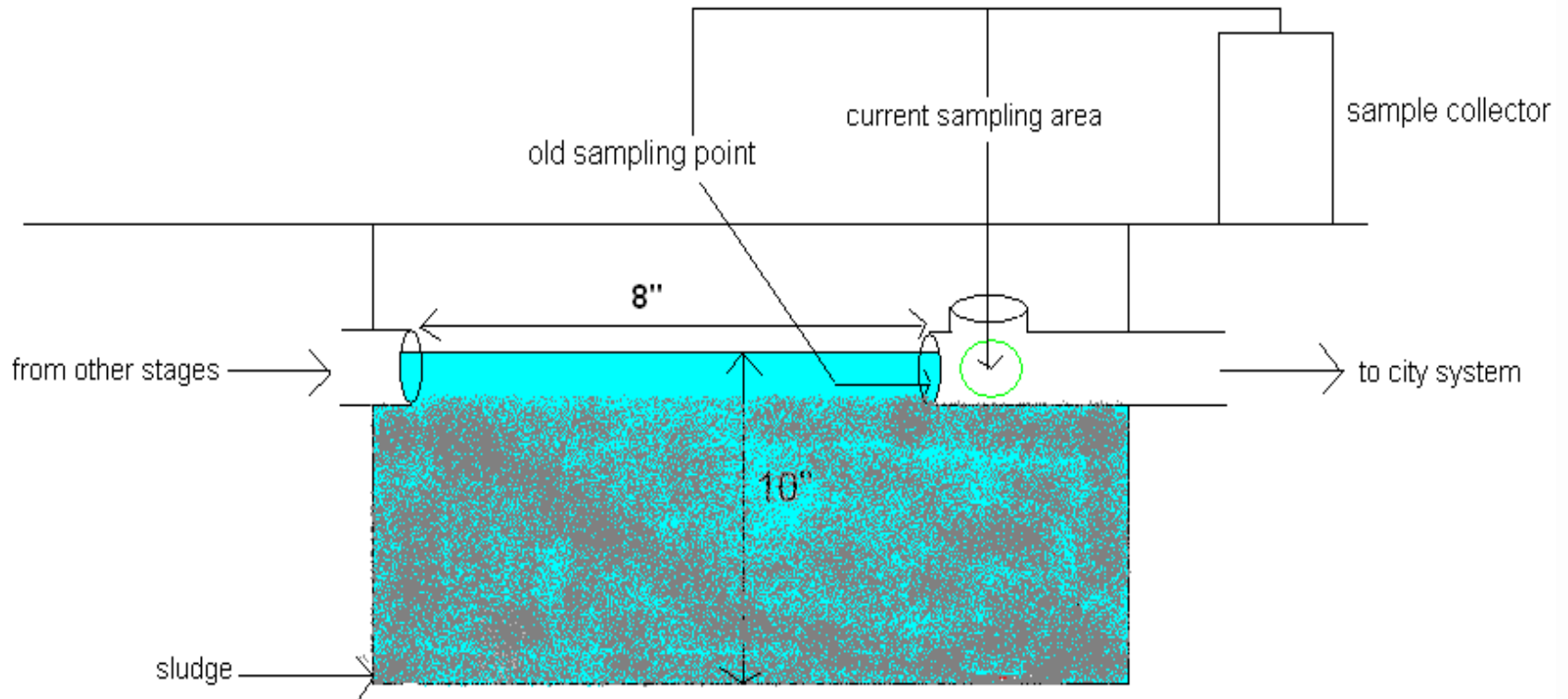
- Scuff Black Paint
- Aluminum Castings
- Galvanized Steel
- Surfactant in Chemicals
- Waterfall Grease



Areas of Paint Room With Above Permit Zinc Concentration

- Paint Stripper Tank
- Paint Sludge Runoff
- Sludge in Bottom of Stage #1 Pit

City of Albert Lea Water Sampling



Solutions/Zinc Reduction

- Reformulate Scuff Black Paint (Zinc Free)
- Evaluate Every New Paint (Liquid or Powder)
- Keep Drain Pits Clear of Sludge

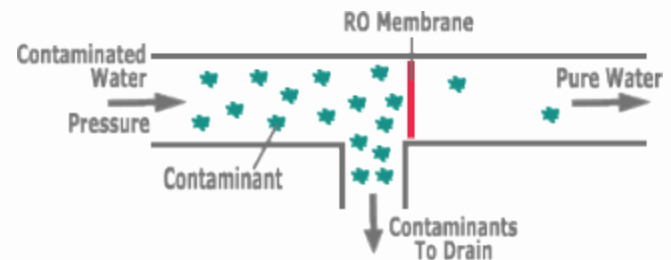
Compressed Air System

- Leaks
- No Regular Inspection
- Argon



New Paint Line Optimization

- Dumping Chemical Stages
- RO Water
- Separate Parts Washer



Documenting Benefits of Phosphate-Free, Low Temp, and Powder Paint

- VOC's
- HAPs
- Natural Gas
- Phosphorus Reduction
- Zinc Elimination



Recommendations: Compressed Air

Waste Reduction Option	Change Type	Annual Reduction	Initial Cost	Annual Savings	Simple Payback Period	Status
<p>Regularly Check Compressed Air System for Leaks</p> <p>Use Shut Off Valves for Work Areas With No Demand</p>	Procedure	*	\$3000	*	*	In Progress
<p>Fix Compressed Air System Leaks</p> <p>Inspect Rest of Building for Leaks</p>	Procedure	99,213 kWh	\$1,585	\$7,125	3 Months	In Progress
Fix Argon Leaks	Procedure	59,600 ft ³ of Argon	\$350	\$1,750	2.4 Months	Implemented

* The savings will vary based upon the amount of leaks in the system.*

Recommendations: Paint Line Optimization

Waste Reduction Option	Change Type	Annual Reduction	Initial Cost	Annual Savings	Simple Payback Period	Status
Use Large Holding Tanks to Self-neutralize Chemical Baths	Procedure/ Equipment	1020 gal. of pH Neutralizing Chemicals	\$3,800	\$17,300	3 months	Recommended
Use RO Water to Fill Chemical Baths and Rinse Water	Procedure	565 gal. Chemicals 179,000 gal. water Better Paint Adhesion	\$40,000	\$5,000***	8 years	Recommended
Use Separate Parts Washer for Parts That are Not Painted	Equipment	15,780 therms 40,680 kWh 15.3 drums of chem. 246,500 gal. of H2O 800 Operational hours	\$65,000	\$71,300**	0.9 years**	In Progress

Includes depreciation of the value of the system and doesn't include savings on reduced overtime pay but it also includes savings on outsourcing parts for painting. Savings without depreciation is \$82,300/yr with a simple payback period of 0.8 years

Estimated results. Accurate estimates of the extended life of the bath have not been verified. Conservative estimation of a longer bath life of 25% is realistic

Recommendations: Paint Line

Waste Reduction Option	Change Type	Annual Reduction	Initial Cost	Annual Savings	Simple Payback Period	Status
Use Chemical Feed Softener Instead of Softener Salt in New RO System	Equipment	N/A	\$0	\$1,800	N/A	Recommended
Have A Conveyor Belt To Allow For One Person To Operate Separate Parts Washer	Equipment	800 hours of labor	\$15,000	\$12,500	1.2 years	Recommended
Use RO Reject Water For Cooling and for Toilets	Procedure	684,600 gal. H2O	\$3,500	\$3,600	1.0 years	Recommended

Includes depreciation of the value of the system and doesn't include savings on reduced overtime pay but it also includes savings on outsourcing parts for painting. Savings without depreciation is \$82,300/yr with a simple payback period of 0.8 years

Estimated results. Accurate estimates of the extended life of the bath have not been verified. Conservative estimation of a longer bath life of 25% is realistic

Personal Benefits

- Gained real world engineering experience
- Helped develop professionally
- Project management experience
- Experience working with other companies, vendors, and other industry experts

Questions?