



Flux Elimination Project on Roundseam #4 – 100# Line

Manchester Tank & Equipment
Elkhart, Indiana





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100# Propane (LP) Cylinders

100# LP Prior to Paint



Painted & Finished

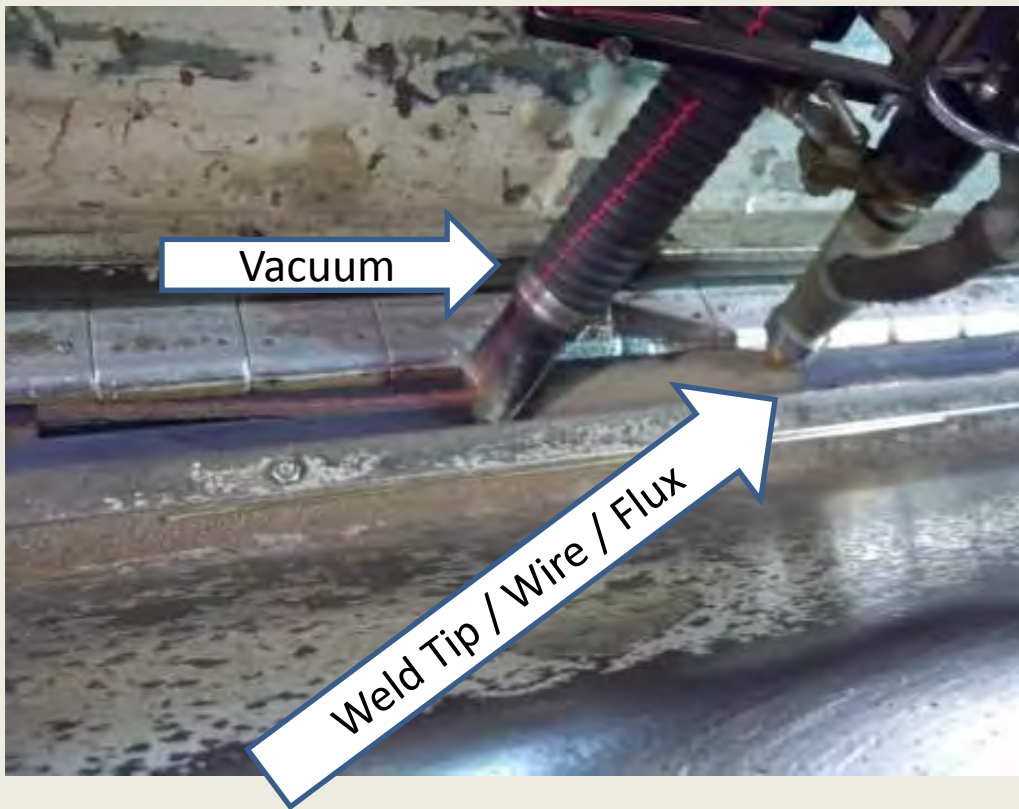


100# LP (cont.)

- Large portable heating cylinder
 - Work sites
 - Food trailers
- “Seasonal” product during Sept. through Feb.
 - 4,660 cylinders in October
 - 7,481 cylinders in November
 - If it’s cold, this line is VERY busy

Submerged Arc Welding 101

Showing Longseam Weld

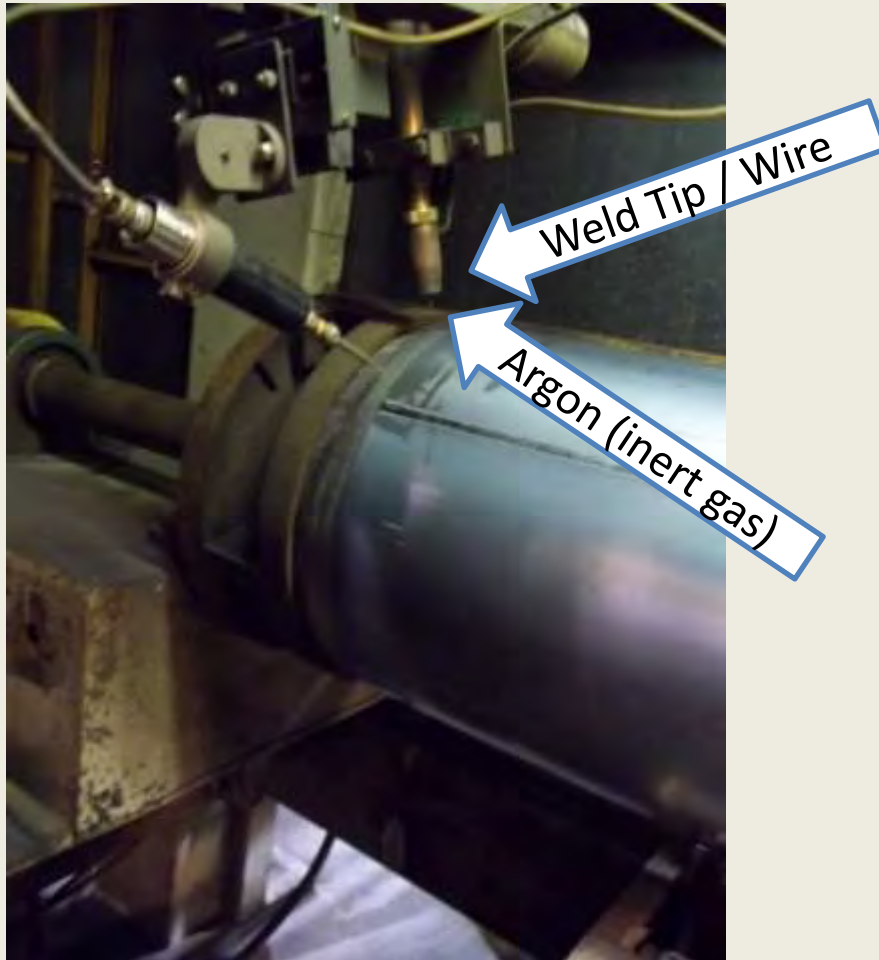


Welding Steps

- Flux is poured over the weld joint
- Electrical current is applied to the electrode under the blanket of flux as the torch tip travels
- Vacuum pulls away extra flux (continual reuse)
- Slag / chunks not reusable
 - Reclaimed through Titus Flux
 - Disposed of in local landfill

Inert Gas Welding 101

Showing Roundseam Weld



Welding Steps

- Inert gas flows over the weld location
- Electrical current is applied to the electrode under the blanket of argon as the torch tip welds (cylinder rotates)
- This occurs on both ends at the same time

Plant 3 Roundseam #4



**Original Submerged Arc
Welding Process**



**New Inert Gas
Welding Process**



Plant 3 Roundseam #4

New Equipment

- Power supplies (2)
- Welding torches (2)
- Wire feeders (2)
- Duct work (vented to Torit)
- Steel enclosure (built around existing fixture)

Powerwave 455 (two units)



Plant 3 Roundseam #4



Pallets of Bagged Flux (left)
Blue Totes Used to Reclaim w/Titus



Used Lincolnweld 980 Flux



Impacts of Roundseam #4

- Majority user (> 75%) of flux at the facility
- High maintenance area due to dust and the overhead vacuum system
 - Access through aerial lift or mezzanine
- Employee exposure to respirable dust (quartz)
- “Otherwise Used” manganese major source of facility TRI Form R reporting (Mn Cmpds.)
- High percentage of cosmetic defects

What Was Accomplished

- Roundseam #4 was converted from a submerged arc welding process to inert gas welding (GMAW).
 - This location used over 75% of the facility's welding flux (Lincolnweld 980)
 - 50% Aluminum Oxide
 - 10% Manganese (alloys & compounds)
 - 5% Silicates
 - 5% Titanium Dioxide
 - 5% Fluorides
 - <5% Quartz

What Was Accomplished (cont.)

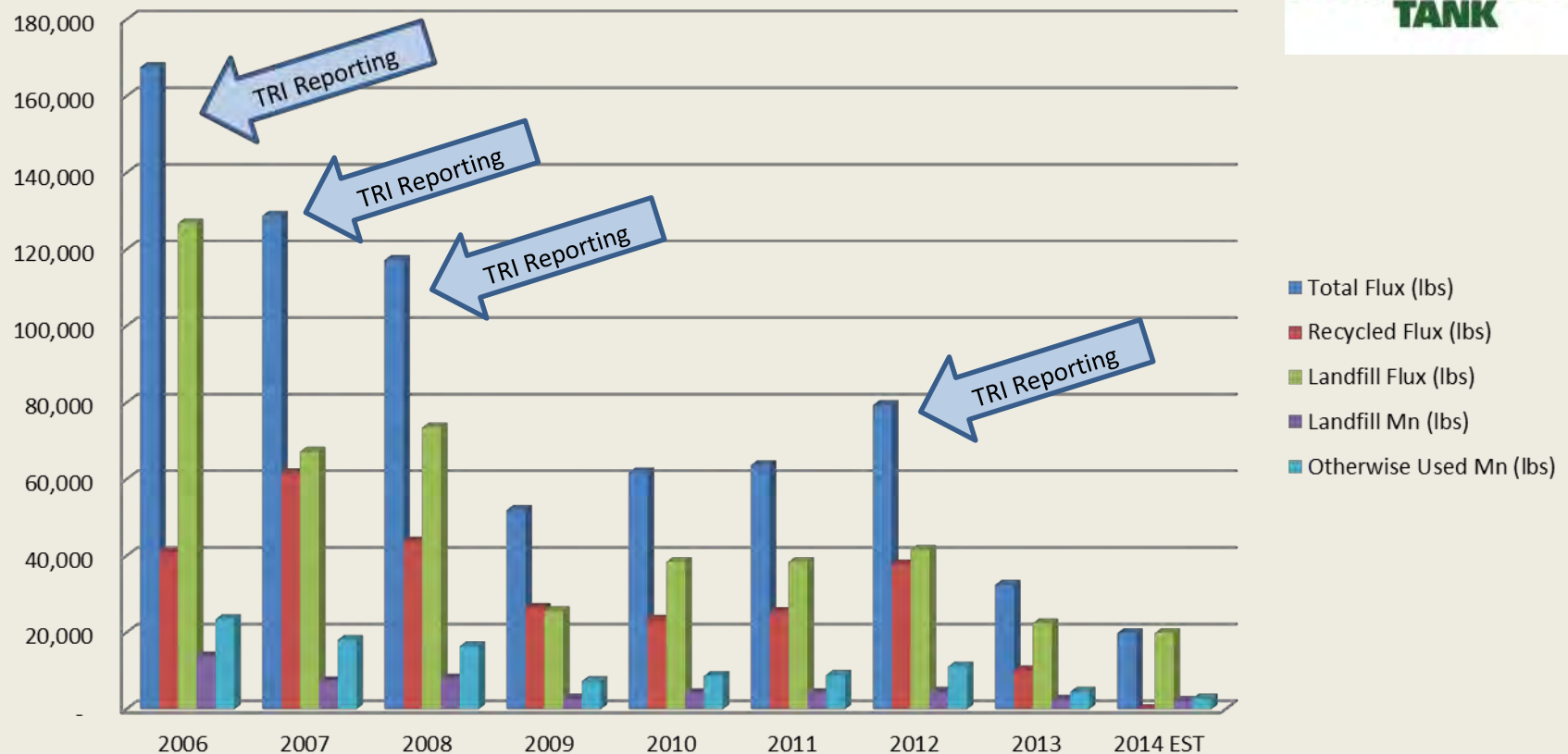
- Reductions in Flux purchases
 - 59% reductions for 2013 (46,907 #s)

Year	Total Flux (lbs)	Recycled Flux (lbs)	Landfill Flux (lbs)	Landfill Mn (lbs)	Otherwise Used Mn (lbs)
2006	167,587	40,787	126,800	13,694	23,462
2007	128,816	61,616	67,200	7,258	18,034
2008	117,257	43,757	73,500	7,938	16,416
2009	51,988	26,388	25,600	2,765	7,278
2010	61,733	23,333	38,400	4,147	8,643
2011	63,699	25,299	38,400	4,147	8,918
2012	79,366	37,766	41,600	4,493	11,111
2013	32,459	10,059	22,400	2,419	4,544
2014 EST	19,842	-	19,842	2,143	2,778

Historical Sub-Arc Flux Activity

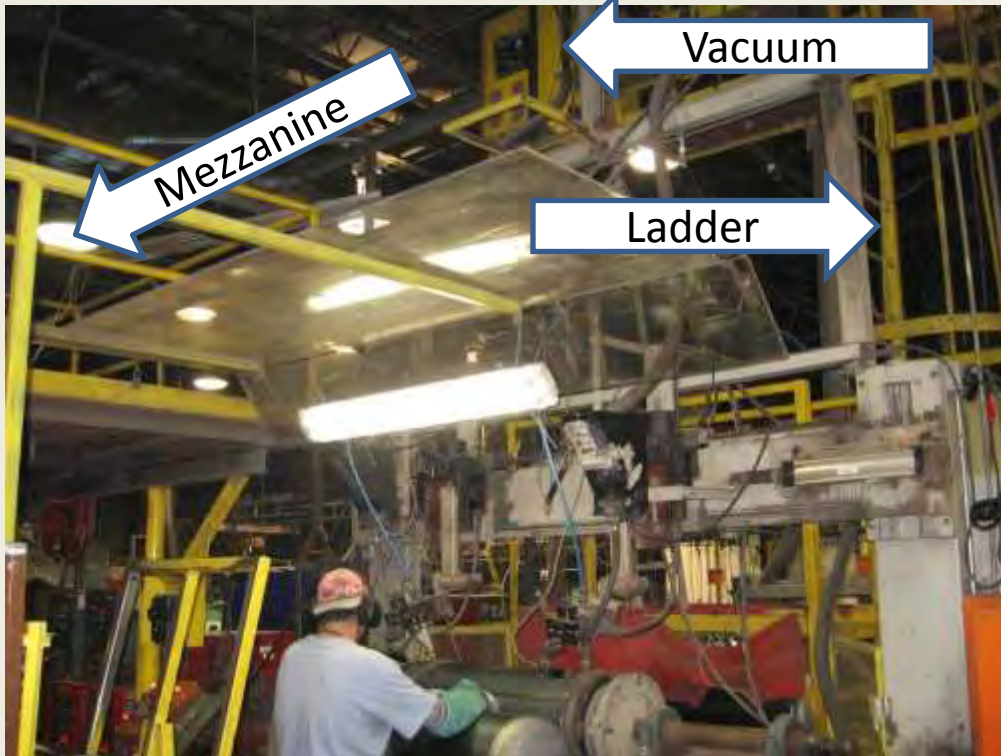


Submerged Arc Flux - Manganese (Mn) Activity



What Was Accomplished (cont.)

**Eliminated the need for elevated
maintenance**



2013 Maintenance =

- \$4,956 (parts & labor)
- 101 hours
 - Motors
 - Filters
 - Related to vacuum system

What Was Accomplished (cont.)

- Eliminated Quartz exposure for the employee at this work station
 - 8/2013 Quartz sampling @ RS#4 = 0.013 (mg/M³)
 - IOSHA PEL = 0.10 (mg/M³)
 - ACGIH TLV = 0.025 (mg/M³)
- While the submerged arc process was less than either the IOSHA PEL or ACGIH TLV, this new workstation eliminates the exposure entirely

Other Benefits

- Housekeeping time for this area reduced from 20 minutes per day to 5 minutes per day
- Employee previously had to lift seven fifty pound bags per day and empty them into the unit

EHS Results Summary

- Source Reduction of **60,000 pounds** per year of Lincolnweld 980 flux in 2014!
 - 46,907 pounds (vs 2012) in 2013 actual reductions
- Facility will no longer need to file TRI Form R reports for Manganese Compounds!
 - 2012 Otherwise Used = 11,111 pounds
 - 2013 Otherwise Used = 4,544 pounds
 - 2014 Otherwise Used = 2,778 pounds (est.)
- Elimination of Quartz and dust exposure
- Elimination of very frequent overhead maintenance
- MTE-AID-348 / Welding Sub-Arc / Resource Consumption
 - A&I total score decreased from 40 to 32

Financial Results Summary

- - \$37,135.30 reductions in flux purchases
- - \$4,956 reductions in maintenance costs
- + \$8,892 additional argon purchases (est.)
- - \$3055.31 reductions in repairs / rework

Total = \$ 36,254.61 / year



Project Summary



- **60,000** pounds Source Reduction – Flux
 - **6,567** pounds TRI otherwise used reductions
- **\$36,254.61** annual savings
- Applicability at other facilities = YES!
- Questions?

