

# Descaling Improvements at Charter Steel Cleveland Ohio



Presented by Chris Speckman IRD Conference April 2018

# CLEVELAND MILL OVERVIEW



Charter Steel Cleveland Mill is a fully integrated, manufacturer of special bar quality (SBQ) bar, rod & wire products.

Production includes SBQ rod and bar ranging in sizes from 7/32 inches (5.5 mm) to 1-9/16 inch (40 mm) in diameter.

Our strict quality and process control standards have made Charter an industry leader in the supply of bar, rod and wire with optimal physical characteristics and minimal variation.

## BACKGROUND - DESCALING PROCESS



Descaling is the process of removing iron oxide scale layers from the hot steel surface by means of high pressure water jets. The jets are formed by special descaling nozzles which are arranged on a spray header/ring in a descaling box through which the billets travel. Working pressures can range from 1200 to 5200 psi depending on the process/application. One of the major parameters besides nozzle design and arrangement is water supply pressure to the nozzles. Prior to the upgrade project, at Charter Steel Cleveland we are at approximately 500 to 600 psi on our pumps

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# DESCALING PROCESS DEFICIENCIES PRIOR TO UPGRADE



- ▶ DESCALING PUMPS
  - ▶ Hammelman pumps
  - ▶ Original install 1996
  - ▶ Max pressure 1600psi
  - ▶ Operated around 500-600psi
  - ▶ Approaching End of Life



# PUMP PRESSURES

## ▶ HAMMELMAN PUMP (OLD)



## HASTEC HYDROWATT (NEW)



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# DESCALING PROCESS DEFICIENCIES PRIOR TO UPGRADE



- ▶ DESCALING BOX AND HEADERS
  - ▶ Current Descaler box installed 2002
  - ▶ Excess Over Spray
  - ▶ Did Not Allow for Diverting Flow Away From Spray Chamber
  - ▶ Potential Cold Billets into Roughing Mill
  - ▶ Also Nearing End of Life



# MERT TABLE UPGRADE



- ▶ Improved Reliability of Billet Discharge Positioning out of Reheat Furnace into Descaling Box.





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# DESCALER BOX WEAR BEFORE MERT CHANGES

Before



AFTER







# GOALS OF DESCALER UPGRADE PROJECT

- 1) To provide an effective and reliable pumping system that can deliver a continuous 125gpm at 3200 psi flow to the descaler chamber.
- 2) Must have a "low cost of ownership" both in terms of yearly maintenance costs and labor
- 3) To provide an effective pump protection system from both low mill water and poor mill water contamination conditions.
- 4) To provide the capability to divert/prevent water from entering the descale chamber during a stuck billet or other special rolling circumstances.
- 5) To provide a more robust descale chamber and header design that prevents "over spray" conditions while billet is not present in descale chamber.



## NEXT STEPS

- ▶ Specifications were given to three vendors for their review and proposals.
- ▶ Quotes received varied by about 50% but each quote had variations in scope of work proposed.
- ▶ Ultimately a vendor was selected as it was felt that the proposed equipment and entire scope of work included in the quote most completely met our needs and desires.



## DETAILS OF SELECTED VENDOR'S QUOTE

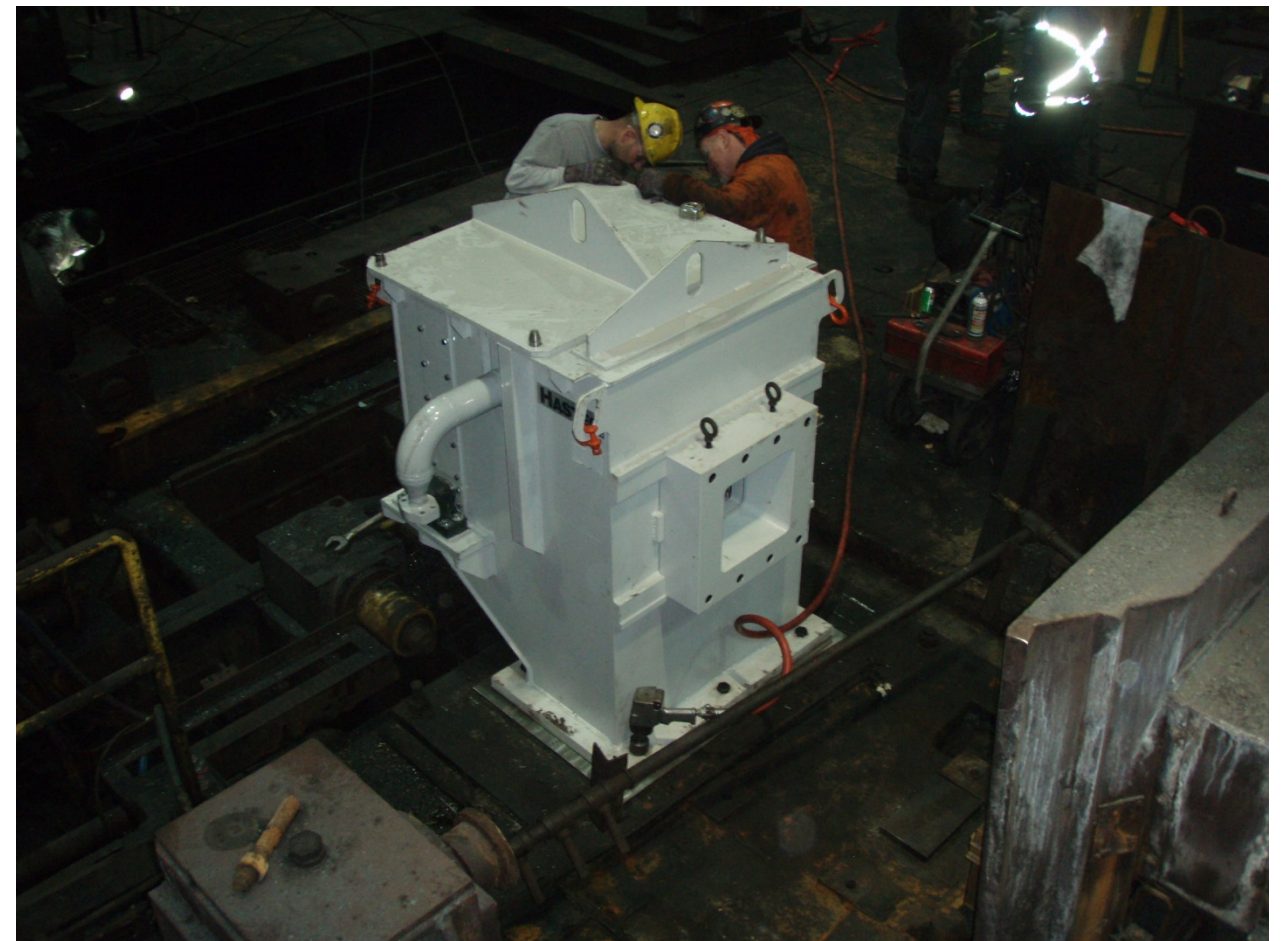
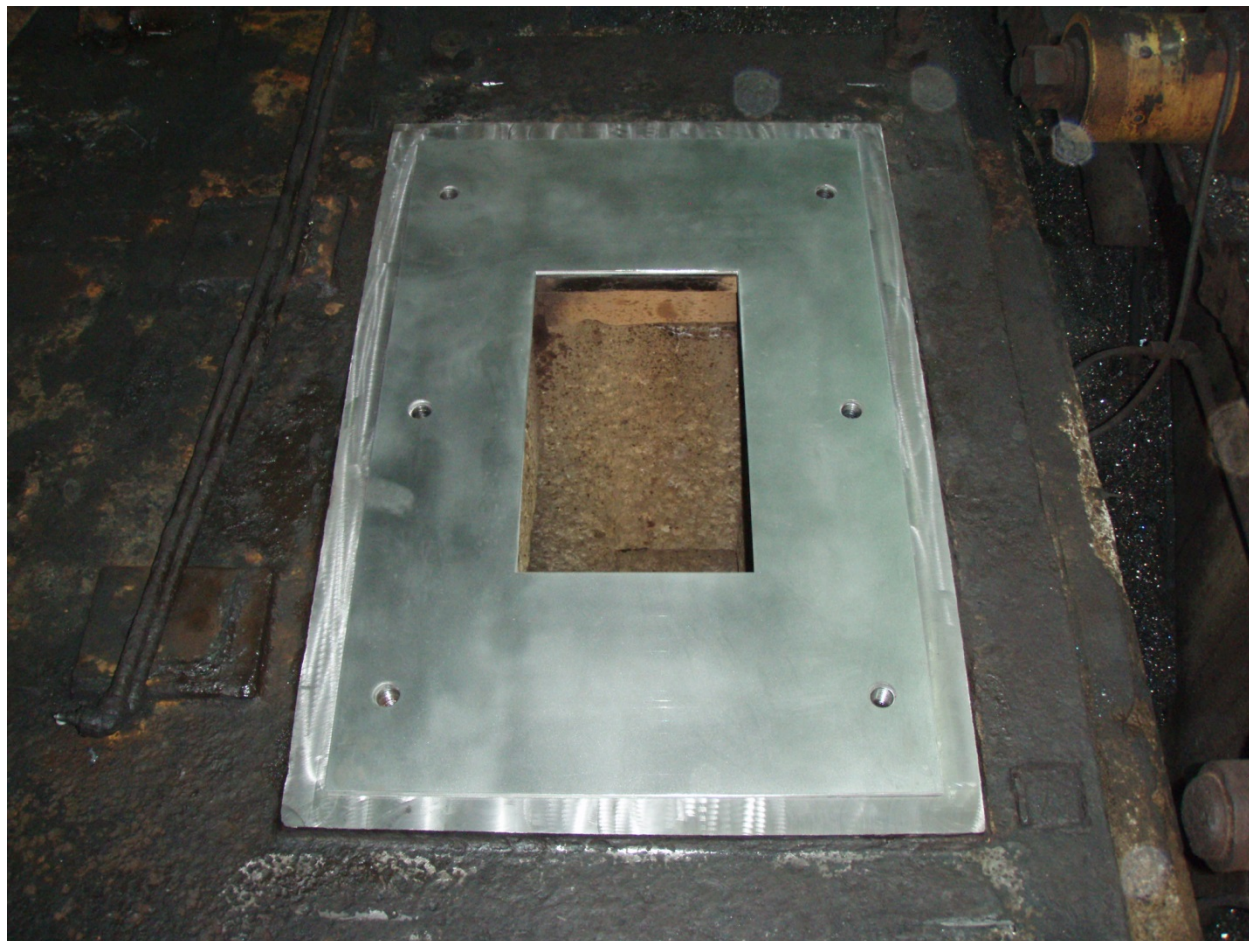


- ▶ Quoted installation had lowest ongoing maintenance in both costs and time. Pumps in particular had a much improved 10 year major rebuild cycle.
- ▶ Included a better designed day tank and pre-charge assembly.
- ▶ Separate divert valve and isolation valve dedicated to stopping and redirecting flow away from descaler header in case of "stuck billet", which could be mounted on mill floor next to descaler for fast reaction time.

## DETAILS OF SELECTED VENDOR'S QUOTE - 2



- ▶ Improved Descaler Chamber matches existing footprint. Chrome carbide lining incorporated on all high wear surfaces. New steel carbon steel header with square configuration to help eliminate spray interference.







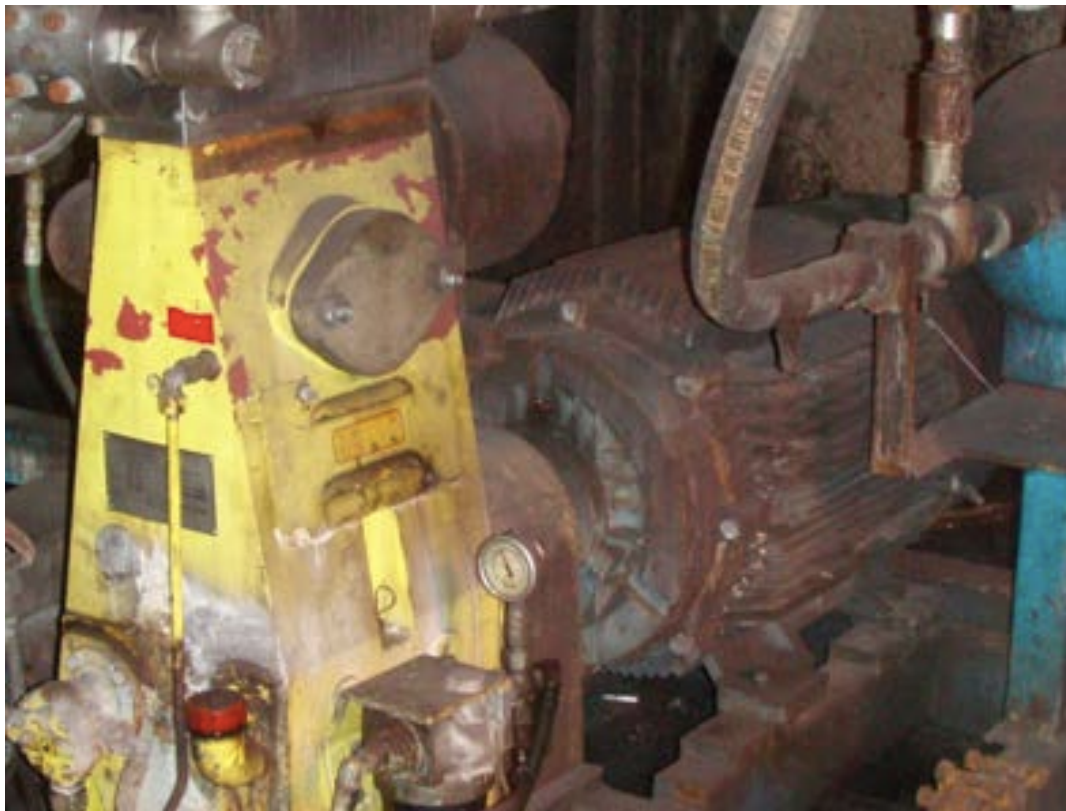
# HIGHLIGHTS OF UPGRADE

- ▶ Upgrade completed within time projected with few complications
- ▶ Quality improvements in finished products clearly noted
- ▶ Reduced maintenance time and costs
- ▶ Reduced mill water usage
- ▶ Reduced energy cost per ton
- ▶ Improved Roll Life in Roughing Mill

# SELECTED COMPONENT PHOTOS OF BEFORE AND AFTER



## ► Descaling Pumps



Previous  
Hammelman Pumps



New  
Hastec Hydrowatt Pumps



# SELECTED COMPONENT PHOTOS OF BEFORE AND AFTER



## ► Descaling Box



Previous Descaler Box



New Hastec descaling Box

# SPRAY CHAMBER CONFIGURATION





# SELECTED COMPONENT PHOTOS OF BEFORE AND AFTER



## ► Day Tank



## Hastec Day Tank

Prior to upgrade, descaler pumps pulled from mill water every cycle. This tank allows roughly 10 cycles before refilling from mill water supply. This maintains more consistent mill water pressure.



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# EQUIPMENT ROOM



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# ELECTRICAL PANELS



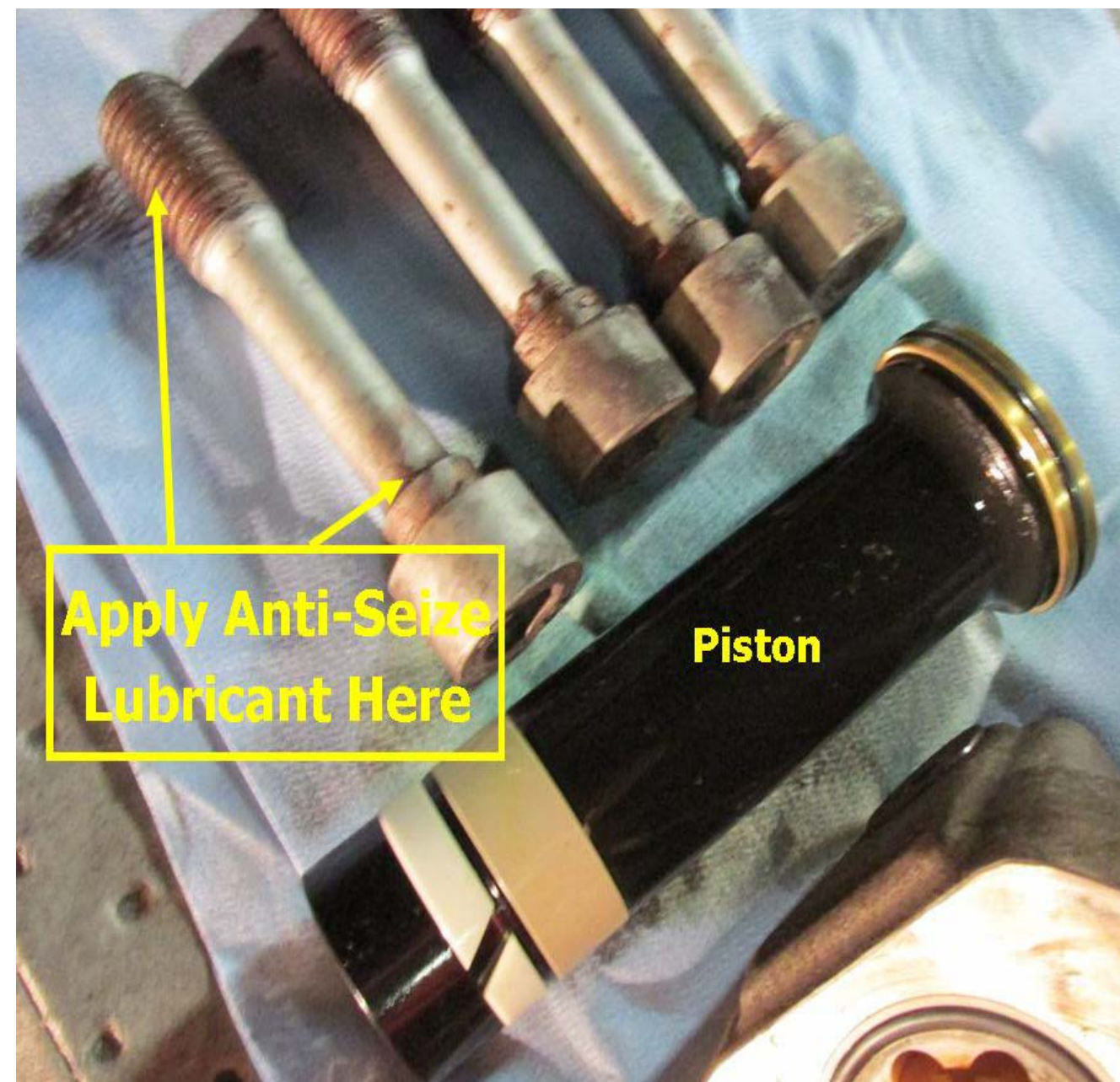


# LIFTING DEVICE FOR SAFE INSTALL/ REMOVAL





# DESCALER PUMP PREVENTIVE MAINTENANCE





▶ Thank You



▶ Questions ???