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ME Elecmetal

Energy Reduction

ME Elecmetal Duluth Facility

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Minnesota Technical Assistance Program



UNIVERSITY OF MINNESOTA

Driven to DiscoverSM

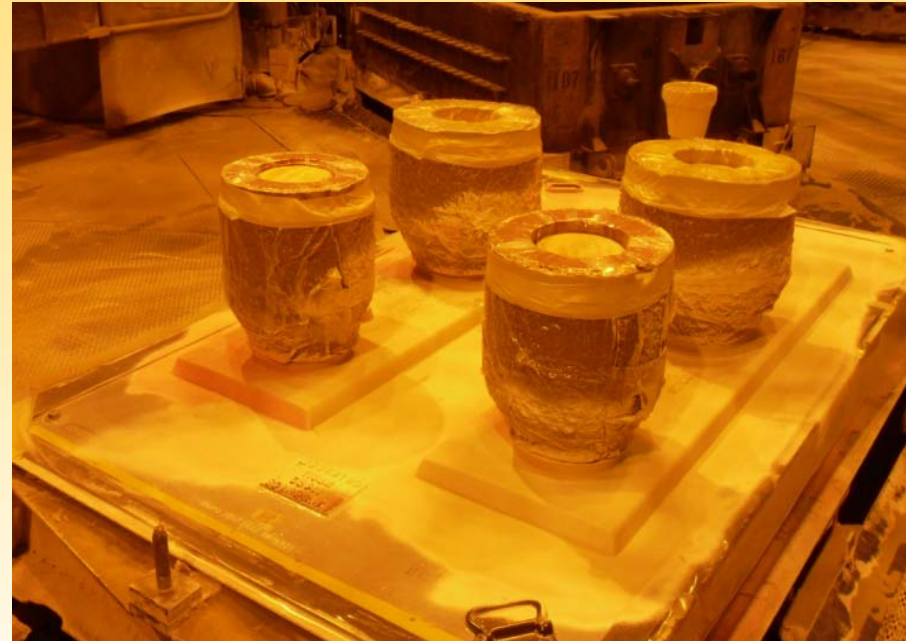
Company Overview

- Large metal alloy castings
 - Grinding Mill Liners
 - Crushing Components
 - Track Pads



Company Overview (con't.)

- V-Process Foundry
 - Cleanliness reputation
 - High tolerance and surface finish
 - Reclaim sand
 - Re-use cope/drag



Motivations for Change

- Rising energy costs (stay competitive)
- World energy awareness
- Energy Star Commitment
 - Ten percent energy reduction in two years



Reasons for MnTAP Assistance

- Assist energy management team
- Benchmarking
- Potential employment opportunity
- Support University of Minnesota and its students

Approach

- Understand processes and attack “low hanging fruit”



Determining Inefficient Processes

- Facility priorities
 - Compressed air/vacuum systems
 - Heat treat ovens
 - Lighting
- Data collection tools
- Team interaction/feedback
- Vendor contacts

Compressed Air/Vacuum

- 500 HP of Air Compressors
 - 2 - 150 HP Main
 - 2 - 100 HP Backup
- 1200 HP of Vacuum Pumps
 - 4 - 100 HP Pumps
 - 4 - 200 HP Pumps



Compressed Air/Vacuum (con't)

- Problems
 - Leaks, misuse, shutdowns, etc.
- Solutions
 - Leak Survey, Acoustic Detector, Blower Improvement, Audit

Natural Gas

- Uses

- Ladle Pre Heaters
- Heat Treat
- Make-up Air Units
- Boilers
- Core Bake

→ = *167,626 MMBTU*



Natural Gas (con't)

- Problems
 - Oven Condition, Heat Treat Procedure, Upgrades
- Solutions
 - Oven Profiles, Heat Treat Iron Loading, Rebuild vs. New Oven



Lighting

- Current System
 - Cost \$142,000 annual
 - Metal Halide and High Pressure Sodium
 - Older style lights (hard to sensor)



Lighting (con't)

- Proposed System
 - T5/T8 upgrade
 - \$75,800 saved annually
 - Lighting quality improvement
 - Light sensor in areas
 - Incentives available



Implemented Changes

Recommendations	Annual energy saved	kg of CO ₂ reduced	Annual savings
Leak survey	227,250 kWh	75,230 kg	\$ 15,900
Acoustic purchase	150,000 kWh	49,657 kg	\$ 10,725
Blower improvement	186,500 kWh	61,740 kg	\$ 11,200
Audit	Available 8/30	Available 8/30	Available 8/30
Total	563,750 kWh	186,627 kg	\$ 37,825

***Assumes Subbituminous Coal*

Recommended Changes

- Recommended
 - Lighting (948,276 kWh reduced)
 - Compressed Air/Vacuum Audit
 - Oven Design (18,453 MMBTU reduced)
 - Heat Treat: more aggressive iron loading



Personal Benefits

- Technical understanding acquired
- Industrial environment exposure
- Data analysis
- Project cost understanding
- Environmental regulation
- Vendor contact
- Working alone as well as in groups