St. Croix Forge

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Minnesota Technical Assistance Program

University of Minnesota
Introduction
Company Overview

- Steel Horseshoes
Company Overview

- Steel Horseshoes
  - Induction Heaters
Company Overview

- Steel Horseshoes
  - Induction Heaters
  - Cooling System
Company Overview

- Steel Horseshoes
  - Induction Heaters
  - Cooling System
  - Forge Press
Company Overview

- Steel Horseshoes
  - Induction Heaters
  - Cooling System
  - Forge Press
  - Warehouse
Incentives for Change

• Reduce energy use
  – 4,600,000 kWh
  – $390,000

• Reduce material use

Energy Consumption

- Process Cooling: 9%
- Pumps: 7%
- Air Compressor: 7%
- Forge Press: 10%
- Motor: 67%
- Induction Heaters: 6%
- Other: 0.5%
Project Overview

• Objectives
Project Overview

• Objectives
  – Process cooling
Project Overview

• Objectives
  – Process cooling
  – Grease application
Project Overview

• Objectives
  – Process cooling
  – Grease application
  – Etc.
Process Cooling Circulation
Process Cooling Circulation

Baseline System

Pump Curve

Flow (GPM)

Head (ft)
Process Cooling Circulation

Configuration Options

- All 4
- Single
- 2 Parallel
- 2 Series
- System

Graph showing head (ft) vs flow (GPM) for different configuration options.
Process Cooling Circulation

- Reduce 2 Pumps
Process Cooling Circulation

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  - $12,300/yr.
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Process Cooling Circulation

- Reduce 2 Pumps
  - $12,300/yr.
- Install VFDs
  - $8,300/yr.

![Graph showing parallel pumps with lines for 4 and 6 lines flow, intercepts, and system performance.](image-url)
## Grease Application

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<td>33% Rate</td>
<td>5,500 lb.</td>
<td>$10,800</td>
<td>$16,600</td>
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Other Projects

Cooling Tower Fans
• Disable two

Air Compressor
• Add tank

Natural Gas
• Unfeasible

Warehouse Fans
• Unfeasible
<table>
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<tr>
<th>Recommendation</th>
<th>Waste/ energy reduced</th>
<th>Cost</th>
<th>Net Savings</th>
<th>Payback Period</th>
<th>Status</th>
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<tr>
<td>Process cooling pumps</td>
<td>242,400 kWh/yr.</td>
<td>$1,490</td>
<td>$20,600/ yr.</td>
<td>&lt;1 month</td>
<td>considering contractor’s proposal</td>
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<tr>
<td>Cooling Tower Fans</td>
<td>6,520 kWh/yr.</td>
<td>N/A</td>
<td>$600/yr.</td>
<td>immediate</td>
<td>implemented</td>
</tr>
<tr>
<td>Grease Rate</td>
<td>5,700 lb.+/yr.</td>
<td>N/A</td>
<td>$11,200+/yr.</td>
<td>immediate</td>
<td>pending test results</td>
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Personal Benefits

- Application of knowledge
- Real-world experience
- New processes and equipment
- Technical communication
Questions?