St. Croix Forge- Energy Conservation and Waste Reduction

Leah Ness

MnTAP Advisors: Michelle Gage

Company Supervisor: Efrain Roa

M

UNIVERSITY OF MINNESOTA

Driven to Discover℠

MnTAP

UNIVERSITY OF MINNESOTA

Company Background

- **Production Building and Warehouse located in Forest Lake, Minnesota**

- **Owned by international company Mustad Hoofcare**

- **St. Croix Forge is the leading manufacturer of horseshoes in North America**

- **Over 500 different varieties of horseshoes**

Motivations

- **Reduce carbon footprint**
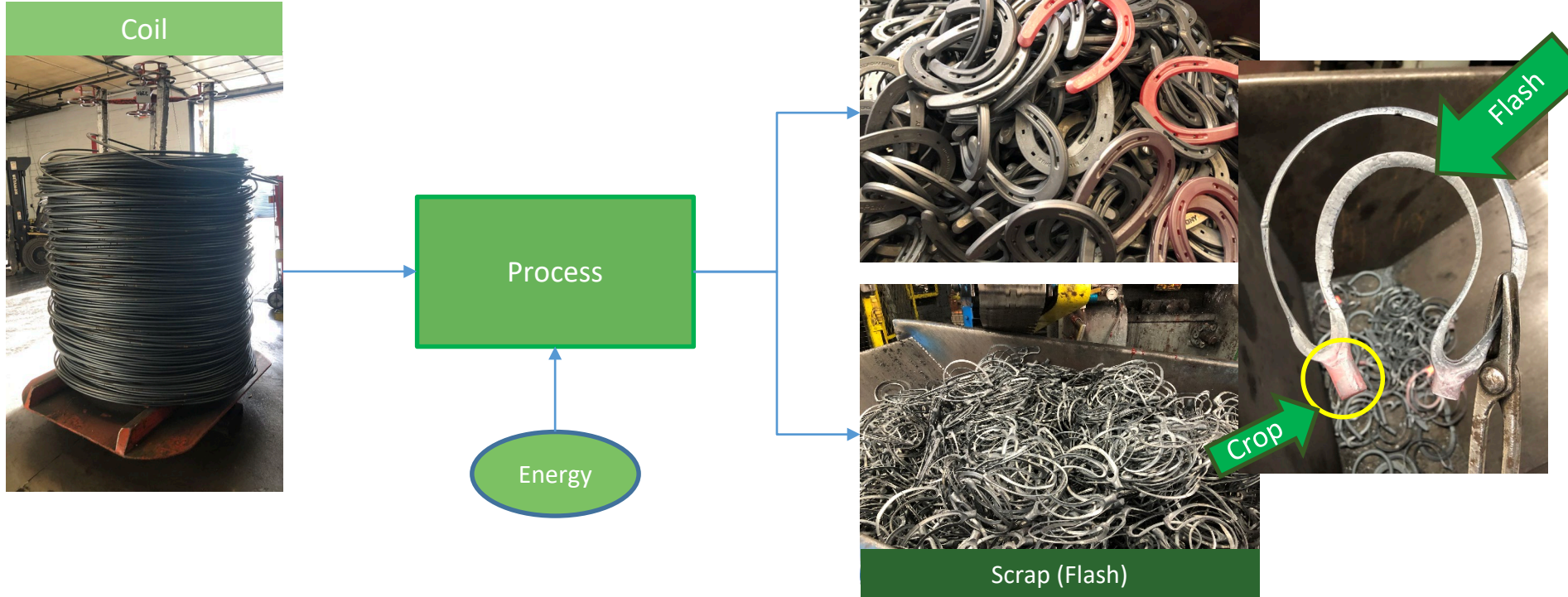
- **Standardize and increase efficiency of process**

Goals

- **Reduce energy consumption**

- **Reduce scrap generation**

- **Determine associated savings**

Manufacturing Process

Coil

Process

Energy

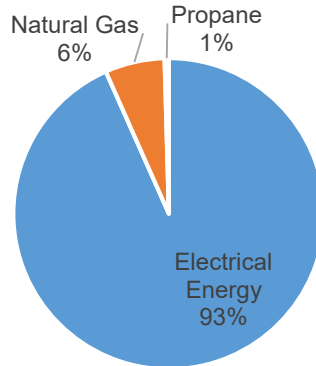Finished Horseshoes

Scrap (Flash)

Flash
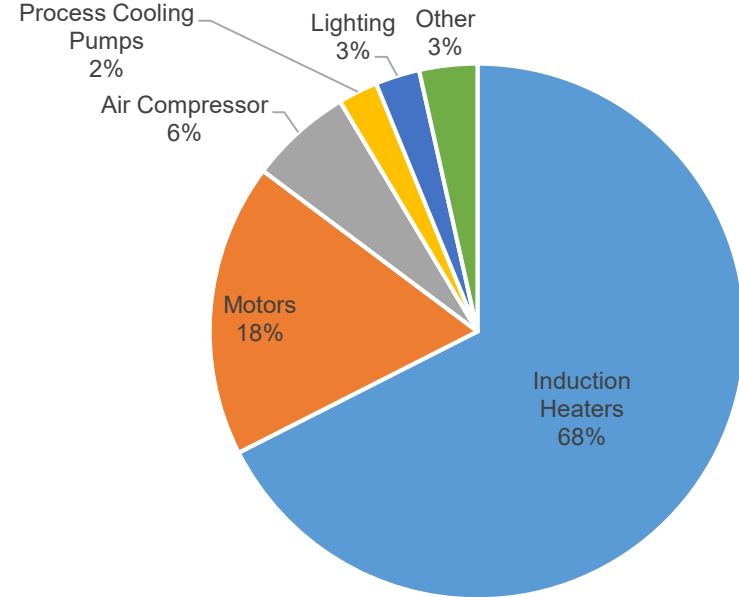
Crop

Analysis- Energy

- **Evaluated energy breakdown of the facility**
  - Took data to analyze energy consumption of each component of the facility
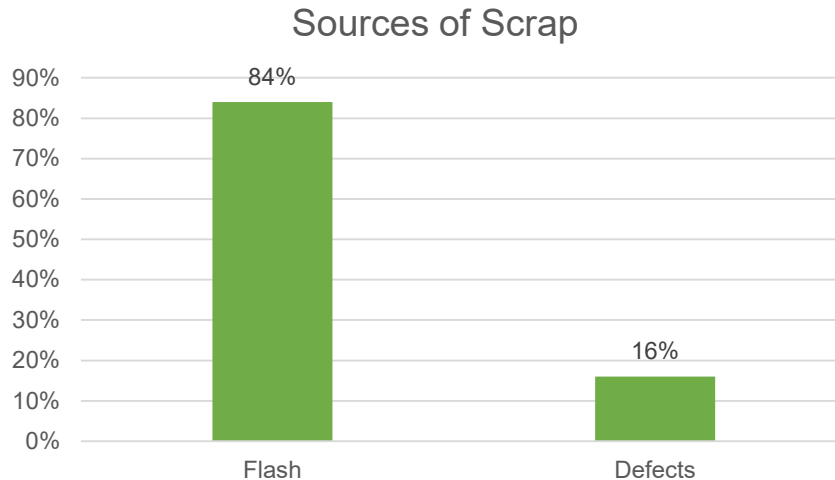 - Focused on electrical energy consumption

Energy Type Breakdown

Natural Gas 6%
Propane 1%
Electrical Energy 93%

Electrical Energy Consumption

Process Cooling Pumps 2%
Lighting 3%
Other 3%
Air Compressor 6%
Motors 18%
Induction Heaters 68%
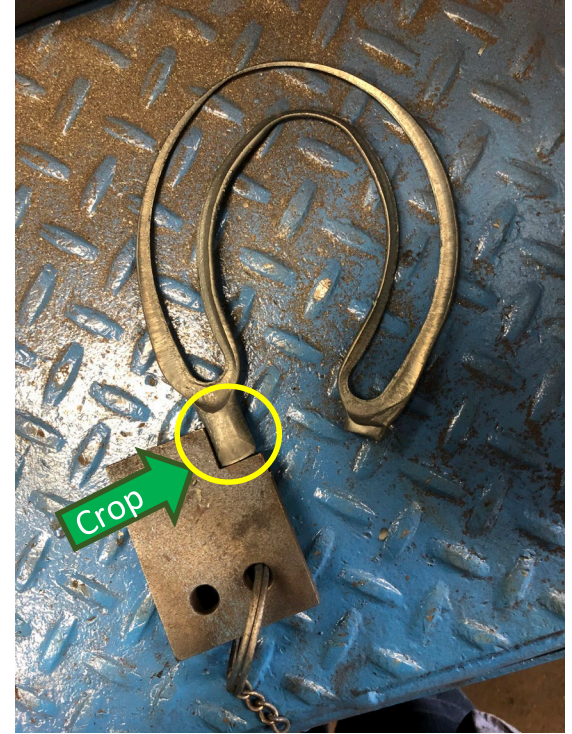
Analysis- Scrap

- **Investigated sources of scrap**
  - Analyzed data taken on scrap/observed scrap production
  - Performed test to see if data collection system was accurate

Sources of Scrap

Bar chart showing Flash at 84% and Defects at 16%.

Standardization of Crop Length

- **Currently, there is no procedure for checking crop length**

- **Standardize crop to 5/8"**
  - altering fixtures
  - standard operating procedure to verify crop length

- **Saves 25,000 lbs. of steel and 5,200 kWh annually**

- **Total annual cost savings of $8,700**

Crop

Solutions

Recommendation	Annual reduction	Total cost	Annual savings	Payback period	Status
Standardize Crop Length	25,000 lbs.	-none-	$8,200	Immediate	Implementing
	5,200 kWh		$520		
Defect Correction	60,000 lbs.	-none-	$15,000	Immediate	Implementing
	19,000 kWh		$1,900		
Upgrade Lighting Fixtures	79,000 kWh	$25,000	$11,000	3.2 years	Implementing
Install Flow Meters for Die Lubricant	320 lbs.	$7,300	$420	17.4 years	Implementing
Reduce Idling Time of Forge Press Motors	44,000 kWh	-none-	$4,400	Immediate	Recommended
Implement New Die Steel	11,000 lbs.	-none-	-none-	-none-	Waiting on test results

What I learned...

- **How to write and perform test procedures**

- **How to perform data/cost benefit analysis**

- **Data is not always readily available**

- **People are a valuable resource**