

# Phillips Forged

Industrial & Systems Engineering Department

Fall 2020 – Spring 2021

Senior Design Project

## Introduction

Phillips Forged is a high-end knife making company.

- Founded in 2015 by UT Graduate, John Phillips
- Won episode of Forged in Fire in 2019
- Featured in 2021 Blackberry Farm Catalog
- Of recent, won Damasteel Chef Invitational with the two knives he entered.
- The increased market visibility has created high demand and a long backlog
- Started as 1-man shop

## Our Mission

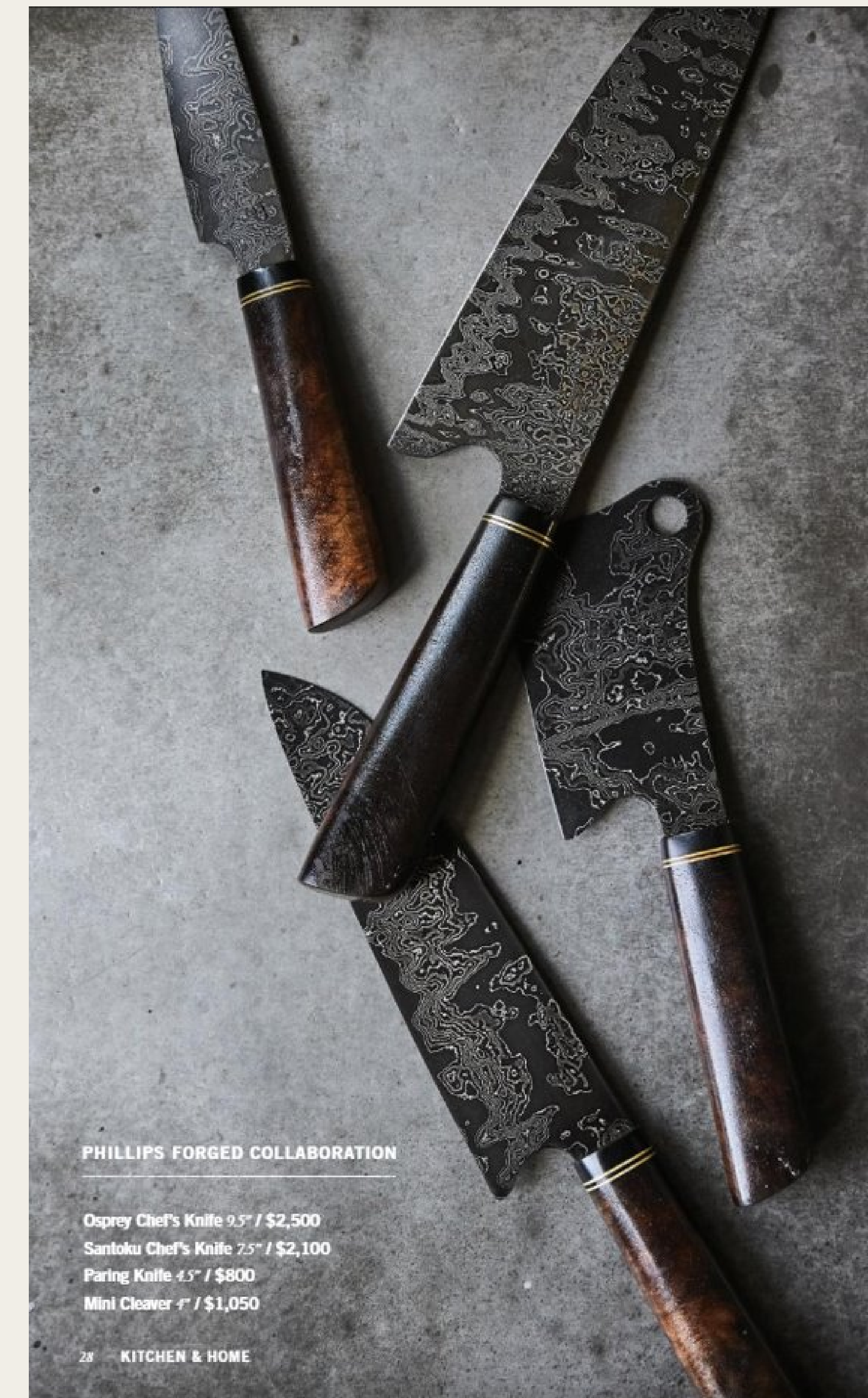
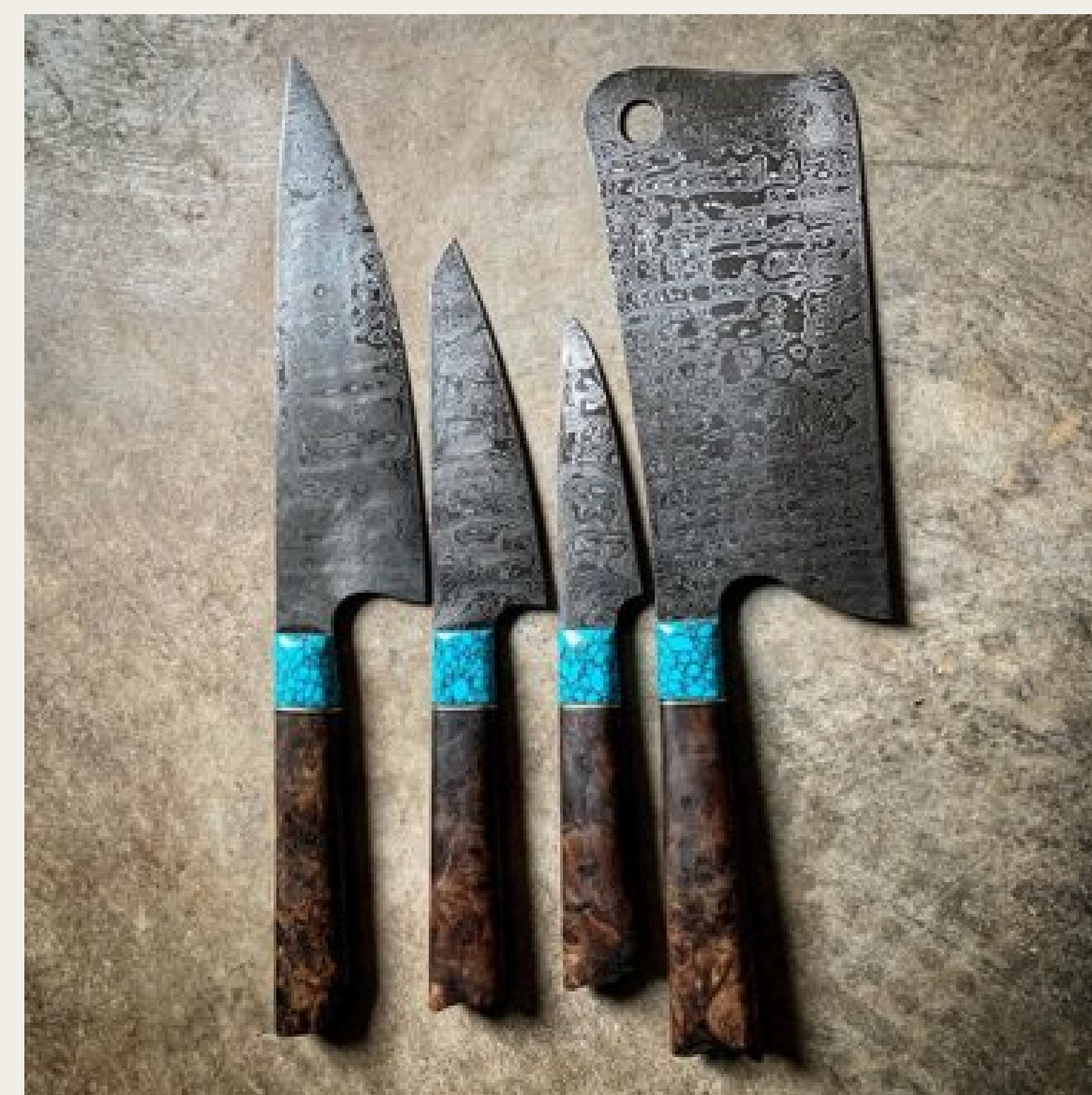
To help complete the backlog of orders and transition from a custom job shop to a larger scale production facility, our team set out to:

- Develop standard work procedures and document quality specifications
- Implement lean process improvements
- Carry out production planning
- Create simulations to represent the evolving production process
- Perform economic analysis to identify investment opportunities.

## Body of Work

Over the course of the past two semesters, our team has worked to optimize the production process.

- SOP documents will be used to train newly hired employees.
- Lean manufacturing was used to identify the critical path, bottlenecks, and increase throughput.
- Simulations were created to quantify the financial impact of process improvements.
- Economic analysis was performed to justify further process improvements.



**Image 1** Phillips, J. [@phillips.forged]. (2020, February 5). *Excited to finally have some new work coming out of the shop!* Instagram. <https://www.instagram.com/p/B8M4Aj7nINc/>  
**Image 2** Blackberry Farm. (2020). *The 2021 Catalog*. Retrieved from <https://www.blackberryfarmshop.com/2021-catalog>

## Deliverables

- SOPs for each Process Step
- Facility Layout Diagram
- Value Stream Mapping
- Line Balancing Calculations
- 8 Simulation Scenarios
- Engineering Economic Analysis
- Machine Maintenance Cards
- Sourcing for Packaging

## Results

- **Backlog reduced by 70%**
- **150% Increase in Throughput**
  - Hiring & Training 2 Workers
  - Process Improvements
- **Average Cycle Time Reduced from 11 hours to 4 hours**
- **Yearly Profitability Increased by over \$200,000**
- **Product Quality & Employee Quality of Life Prioritized**

## Recommendations

- Short-term:** Purchase a new grinding machine to alleviate the current bottleneck.
- Long-term:** Move to a new facility with more space and power.