MOUNT FRANKLIN FOODS

BY: MATTHEW BRAXTON, SERGIO TELLEZ, PAUL HINOJOS, ZACHARY SOSA
TEAM

Matthew Braxton: Project Lead
Sergio Tellez: Data Analyst
Paul Hinojos: Data Analyst
Zachary Sosa: Scrum Master
DEFINE
Background

- Mount Franklin Foods is a local manufacturer and supplier for packaged goods. They import products from across the borderland region, ensuring each product is properly packaged, and stored at their distribution center before finally shipping them out to customers.
- They take pride in using the latest quality control standards to achieve their goals, including Lean Six Sigma, S&OP, etc.
PROBLEM

• The distribution center isn’t shipping enough goods on time to meet their expectations. Based on their internal KPI’s, they only meet around 65-70% of the target goal on average per week. This results in approximately $15,000 lost each week due to late fees.

• We have been tasked to raise the target percentage to 85-95% of the target goal, while also drafting the solution based on Lean 5S Methodology.
PROPOSED SOLUTION

• Create a Flex Sim simulation of an improved process that meets the target metric, follows Lean 5S methodology, and is easily accessible to stakeholders to review and improve.

• Data used will be collected on and analyzed on site using material & methods from the IMSE curriculum.
ASSUMPTIONS

• Project must be implemented without significant disruption to facility output
• Project must meet current company certification standards
• We will have to meet with contact once a week to ensure project iteration meets stakeholder needs
• We need to use software like Flex Sim and AutoCAD to draft designs and model current operations
CONSIDERATIONS

QUALITY

- How will our project affect current company standards?
- How will our project meet current industry standards?
- How will our project efficiently meet desired KPI’s?

SAFETY

- Will our project require the adoption of additional safety procedures?
- Will there be additional PPE required to used upon implementation of our project?
- How will our project meet OHSA standards?
SYSTEM OF SYSTEMS
CONOPS: SEQUENCE OF EVENTS

1. Trucks arrive at facility
2. Security verifies arrival and authorizes passage
3. Trucks unload packaged goods
4. Packages are inspected by staff
5. Packages are stored in building
6. Management documents received goods and prepares other goods for pick up
7. Shipping trucks arrive
8. Security verifies arrival and authorizes passage
9. Loads are loaded onto truck and depart; Step one happens concurrently to repeat the cycle
CONCEPT OF OPERATION: DISTRIBUTION
Facility management uses necessary tools to document delivery of goods.

Management uses necessary tools to calculate important KPI's to keep track of performance.

Management inspects and authorizes goods to be shipped off to customers before loading.

Management interacts with stakeholders to keep track of current partners, scheduled appointments, and changes in company policy.

Trucks are given specific bays to unload to not conflict with goods to be shipped.

Employees interact with truck drivers to verify delivery and unload goods.

Employees unload goods for inspection and storage in the warehouse.
Company management compiles a list of current partners, stakeholders, and employees to determine who needs access to distribution center.

Company management issues necessary documentation for security guards so they are aware of who they should expect.

Personal Identification is required by partners, stakeholders, and employees so security can verify if they were given proper access.

Trucks arrive at specified times to facility for pick up.

Security verifies identity and sends them to loading bay.

Employees communicate with shipping trucks for final verification and loading.

Loading is conducted so goods can be shipped to final customers.

Employees validate are goods are loaded to ensure quality control standards.
STAKEHOLDERS AND THEIR INTERESTS

Gustavo Fierro - Director of Logistics & Warehouse: Oversees daily operations and approves the implementation of projects.

Jorge Valenzuela - Senior Process Engineer; Point of Contact: Ensures students and sponsor are aware of current project deliverables, progress, risks, budget, etc.

Dr. Eric Smith - Professor: Ensure students are using past and current class material to design and present a project that meets sponsor needs.

Alberto Reyes - Continuous Improvement Engineer; Point of Contact: Ensures students and sponsor are aware of current project deliverables, progress, risks, budget, etc.
SYSTEM REQUIREMENTS
ABET CRITERION 2

- The system shall be applicable to all shipping partners
- The system shall follow company Key Performance Indicators
- The system shall conform to LEAN Five methodology
- The system shall be easily accessible to key stakeholders within the company
- The system shall follow applicable laws
STAKEHOLDER REQUIREMENTS

ABET CRITERION 2

- System must conform to company safety standards
- System must conform to company quality standards
- System must be adaptable to future company needs
- System must be constructed using concepts from LEAN Methodology, Work Design, Systems Engineering, and Statistical Quality Control
- System must meet KPI’s by 85-95% on a weekly basis
CONTROLLING SYSTEMS

- Process Control System
- Time Management System
- Feedback System

ENABLING SYSTEMS

- Work Management System
- Information Resource System
- Training System

- Package Tracking System
- Human Resource System
- Equipment Support System
SYSTEM VERIFICATION

Does the system follow safety and quality standards set by Lean 5S?

Are system requirements specific and easy to follow?

Are system requirements relevant to the problem we’re trying to solve?

Does the system consider current and future company needs?
MEASURE
LEAN 5S METHODOLOGY

ABET CRITERION 7

- A systematic approach to workplace organization; emphasizes efficiency, competitiveness, and survival
- Originally developed by Hiroyuki Hirano for manufacturing companies in Japan, the principles of 5S translate well to the laboratory, the repair facility, and even the corporate office
- Implementation of 5S can lead to lower costs, better quality, improved safety, increased productivity, and higher employee satisfaction
PILLARS OF LEAN 5S

Sort: The process of removing all the items not needed for current production from the workspace.

Set in Order: The process of putting everything in a place that is easy to get to.

Shine: Removing all the dirt and grime and keeping the workplace clean on daily basis.

Standardize: Creates a system of tasks and procedures that will ensure the principles of 5S are performed daily.

Sustain: Gives staff the commitment and motivation to follow each step, day in and day out.
TIMWOODS

ABET CRITERION 7

• An acronym to represent the 8 wastes of lean.

• It aims to remove all different types of waste in work processes.

• Lean defines waste as an activity that the customer is not willing to pay for.
FOCUS AREAS OF TIMWOODS

• Transport- Moving the product around unnecessarily is a waste of time, effort, and increases the likelihood that it will be damaged.

• Motion- The “wear and tear” on the equipment or the people involved in the process. If you are transporting the product around unnecessarily, you are also wasting the motion of the trucks, forklifts and warehouse workers.

• Waiting- Time that the product is sitting there – not being transported or processed. Or the time that people are simply waiting for the product to arrive. The largest and most frustrating waste.
### IE CONCEPTS USED

- Direct Time Studies
- Industrial Simulation
- Statistical Quality Control
- Systems Engineering
- Operations Research II

### SOFTWARE USED

- Flexsim
- Spyder (Python)
- Excel
- Stopwatch
- Draw.io
- Work Study+
- Minitab
VARIABLES TO MEASURE

- Load Times (Minutes)
- Cycle Times (Minutes)
- Standard Times
- Types of orders
- Waste of motion analysis per cycle
- Order Volume (by pallet)
- Resource Utilization (%)
- Inventory Location (Feet)
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<td>Average weight of pallet</td>
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<td>Average loads shipped</td>
<td>63 loads per day; <strong>UCL:75 loads</strong>; <strong>LCL: 50 loads</strong></td>
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LOADING PROCESS

1. Loader is assigned bay to load; preps dock for loading
2. Loader locks trailer and verifies order is in correct bay
3. Loader retrieves forklift to load pallets
4. Pallets are scanned and picked; process repeats until load is complete
5. Trailer is unlocked and released

Average time to load: 2 hours for 52 pallets; **UCL: 2.5 hours, LCL: 1.5 hours**
SAMPLE: 03/13/2024 PROCESS TIMES
ANALYZE
## PRELIMINARY RESULTS

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**C&LT:** Confirm and Lock Trailer  **LP:** Load Pallet  **CT:** Connect Trailer  **P&S:** Pick and Scan  **UT:** Unlock Trailer  **PR:** Performance  **TT:** Total Time For Process
INDIVIDUAL CONTROL CHARTS

• Mean Shipping Times are within acceptable limits.
• Noticeable variation due to loading preference, delays, and unforeseen factors.
• Process is in statistical control; Mean Worker performance is approximately 12% above company expectations.
• Unforeseen factors include faulty scanners, unreadable bar codes, and wrong bay selection from truckers.
BARCODE DEFECTS

- At least 20% of order barcodes have some sort of defect.

- 3 out of 25 samples observed were outliers; process is not in statistical control.

- Defects that impacted readability of the code include tears, fading, and improper mounting.
OTHER OBSERVATIONS

• Facility Layout was organized efficiently; no current need to revise
• The same customers would arrive late
• Scanners were outdated or wouldn’t work consistently across the facility
IMPROVE
Lean 5S Proposed Changes

- Update to new scanners.
- Print better barcodes (reference appendix).
- Make order numbers easier to input.
- Force truckers to go to assigned bay.
SORT

SORT ORDERS BASED ON PROBABILITY CUSTOMER ARRIVES ON TIME.

STAGE ORDER PALLET BASED ON PRODUCT COMPLEXITY AND SIZE. LESS COMPLEX ONES GO IN FRONT, OTHERS IN BACK.
SET IN ORDER
SANITIZE

ENSURE AUDITORS ALSO CHECK THE STAGING AREA IS CLEAN AND FREE OF DEBRIS.

INVEST IN MORE DURABLE PALLETS FOR IN-HOUSE OPERATIONS
STANDARDIZE

STANDARDIZE THE LOADING PROCESS; PICK THE METHOD THAT WORKS BEST AND STICK WITH IT.

LISTEN TO EMPLOYEE FEEDBACK
SUSTAIN

- Continue: daily standups
- Refresh: facility with new banners and signs
- Invest: Invest in dynamic lighting systems
- Continue: getting to know employees
EQUIPMENT RECOMMENDED

- Zebra LI3678 1D Industrial Cordless Barcode Scanner
  - Rugged scanner for shipping and warehouse areas
  - For warehouse and industrial applications
  - Reads dirty, damaged barcodes
  - Bluetooth compatible
  - Includes base, battery, cradle adapter cable and USB cable
  - $1,010 Each (x15)

- 6S LEAN WORKPLACE
  - English and Spanish Banners
  - Set of 4 each: $159
  - $999 (x5)

- LabelTac® Pro 2 Industrial Labeling System
  - $1,010 Each (x15)

- Print Ribbon
  - $1680 Per Set (x5)

**Total Estimated Cost:** $28,868
### LEAN 5S ADOPTION DATA

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LEAN 5S ADOPTION

- At least 16.6% reduction in Total Time.
- Little to no Change in Variation.
- 20% increase in Performance Ratings
- Fulfillment Rate increased to 89%; within the acceptable range.
- To be 99% confident, 60 more samples need to be taken.
COST BENEFIT ANALYSIS

• Current Cost Losses Per Week: $15,000
• Maximum Losses after Lean 5S: $7000
• Cost Savings per Week: $8,000
• Standard Payback Period: 3.5 weeks
CONTROL
IDEAS

Conduct random time studies to record data and illicit employee feedback.

Assign Auditors with measuring the total number of defects each barcode sticker has.

Ensure scanner software is up to date on a weekly basis.

Continue updating key KPI's on a weekly basis.

Illicit customer and trucker feedback after several orders.
PARTNERS TO REACH OUT TO

- UTEP IMSE Department
- STTE Foundation (Hackathon)
- UTEP OSCM Department
- Creative Safety Supply
CURRENT AGENDA & MILESTONES

ABET CRITERION 5

19 Mar. First Presentation
20 Mar. Design and Feedback meeting with Stakeholders
22 Mar. Data Collection and finalize base simulation model
25–29 Mar. Data collection and construction of base simulation model
8–12 Apr. Analyze and build improved simulation model; submit poster for print
17 Apr. Stakeholder review and feedback meeting
19 Apr. Revise simulation model; final presentation
23 Apr. Project Wrap-Up

19 Mar.
20 Mar.
22 Mar.
1–5 Apr.
17 Apr.
23 Apr.
30 Apr.
REFERENCES

• https://www.creativesafetysupply.com/content/PPC/5S-poster/index.html

• Ryan, M., & Wheatcraft, L. (2023, June 1). INCOSE Guide to Writing System Requirements. San Diego; INCOSE.


ANY QUESTIONS?
• We satisfied this criterion by taking into consideration current and future standards and goals of the company, as well considering the needs of customers and stakeholders.
ABET CRITERION 3

WE ARE CURRENTLY SATISFYING THIS CRITERION BY DOCUMENTING ALL RELEVANT DATA PROVIDED BY THE COMPANY AND THROUGH INDEPENDENT ANALYSIS.

WE HOPE TO FULLY EXPLAIN THE BENEFITS AND SAFETY MEASURES WHEN WE HAVE FINISHED DESIGNING OUR INITIAL SIMULATION.
We are currently satisfying this criterion through weekly meetings and through communicating via Microsoft Teams, WhatsApp, emails, etc.
We are currently satisfying this criterion by actively listening to project stakeholders, how they complete their work, and soliciting any relevant data to help us complete our data.

We are also researching how to efficiently design and test our system through online documents, papers, and textbooks from previous coursework.
FACILITY LAYOUT
FLOOR MARKING GUIDE

Source: OSHA Standard 1910.22

SAFETY TAC BROCHURE