Department of Industrial and Systems Engineering

Industrial Engineering Research Project (Fall 2025)

KENNESAW STATE UNIVERSITY

Driving Efficient Warehouse Optimization Through Structured Processes and User Adoption

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AUTO SCHEDULER

AutoScheduler.ai is a Warehouse Orchestration System that synthesizes warehouse data into an optimized planning sequence that accounts for resource considerations while eliminating guesswork on the end user's part.

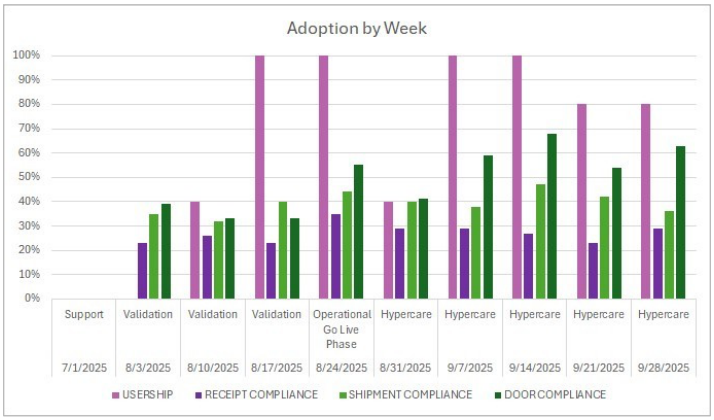
The AS implementation process mapping is underdeveloped and not used to its full effect. This leads to training failures and end-user tension, which causes an inability to benchmark cost-saving opportunities.

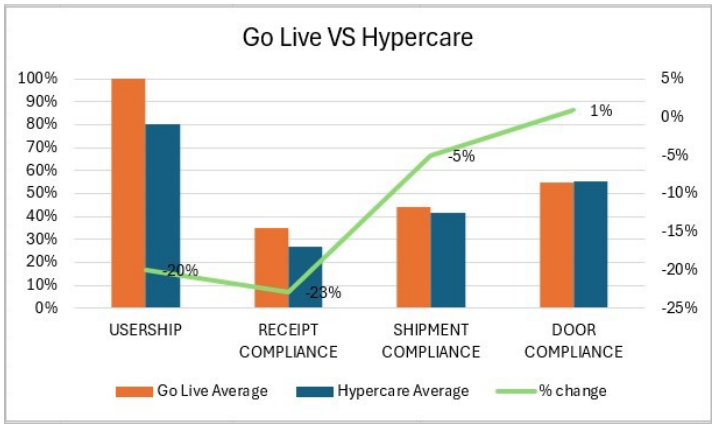
The company's need for a structured and measured process map, as well as training efforts and compliance metric evaluation, was critical to maintain long-term success and growth.

Methodology

- **Value stream map analysis**
  - Determine the source of lengthy lead times in software implementation process
- **Longest lead time**
  - After the kickoff process, the AS customer success team meets with clients to discuss warehousing SOPs
- **Second-longest lead time**
  - After the SaaS environment is set up, clients must define different workers, task types, equipment, door locations, etc.
- **Conclusions**
  - Lack of communication of client processes between commercial sales and the customer success team
  - Create a process flow map template for clients to answer simple warehouse process questions

Results





Sending weekly adoption reports from the Excel model to project leads and clients will allow for monitoring usership/compliance, identifying drops in engagement early, and scheduling targeted follow-ups. Leverage adoption models will be utilized to compare trends before and after changes, benchmark performance across sites and shifts, and quantify the impact of new training materials.

These long-term solutions reduce repeat site visits, increase renewal/resubscription rates, and additional deliverables continue shortening training and rollout time across future clients.

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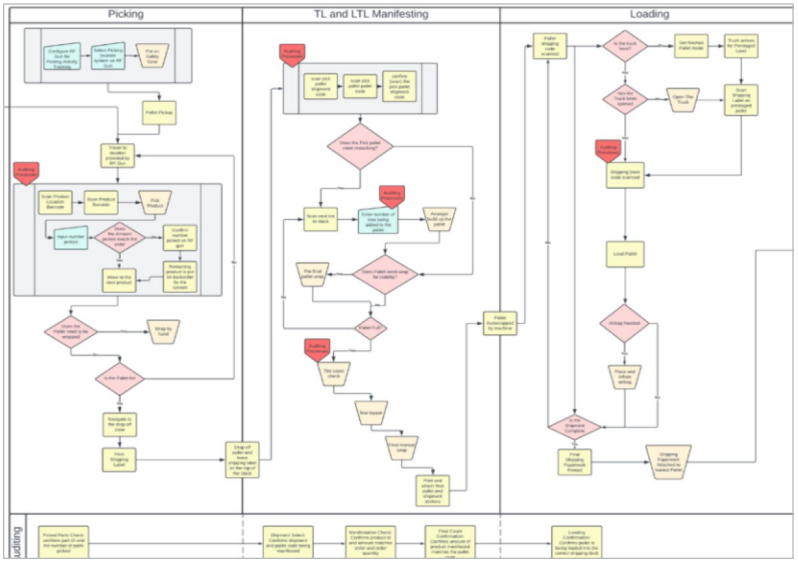
Carlstar Group: LTL & TL Optimization Project

Jacobo Castro | Maia Keith | Charles Smith | Stephen Phillips

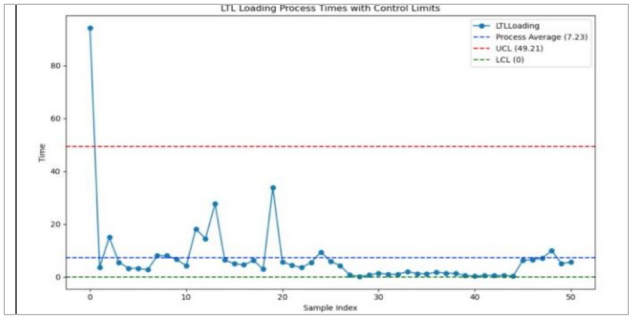
CARLSTAR

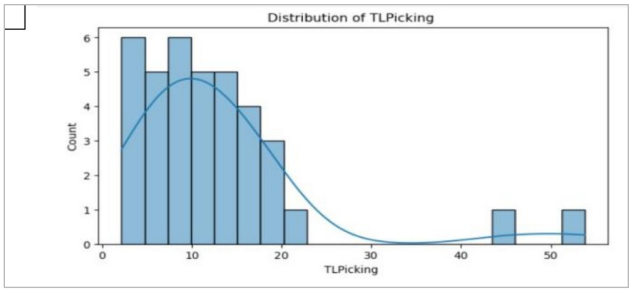
This project aims to enhance efficiency by streamlining these processes. For each process, research was conducted to refine and clarify an existing Standard Operating Procedure (SOP). The goal was to improve the accuracy and usability of the SOP. Additionally, a Process Flow Map Diagram was created to help the on-site operators visualize both the current and improved workflows for their outbound operations. Lastly, Time Studies were conducted for each process. This assisted in identifying delays, inefficiencies, and obstacles that were impacting performance and processing times within the distribution center.

Methodology



Results





PROCESS NAME	ESTIMATED CYCLE TIMES
TL Picking	(9.89, 15.49) minutes
LTL Picking	(15.78, 20.72) minutes
TL Packing	(7.52, 15.58) minutes
LTL Packing	(10.72, 14.48) minutes
TL Loading	(5.68, 9.82) minutes
LTL Loading	(3.45, 11.02) minutes

Recommendations

1. Redistributing auto-wrappers and optimizing manifesting zones reduced workflow delays and improved productivity.

2. Time Studies conducted with WorkStudy7 provided actionable insights into cycle times and inefficiencies, enabling us to recommend realistic, data-driven KPIs that align with operator capabilities and performance goals.

3. Sorting inventory based on product size and order frequency and introducing cycle counting protocols, aim to reduce travel time and prevent backtracking during the picking operations.

4. Software upgrades to enhance inventory tracking and priority picking, as well as scalable solutions for cross training and employee development.

Top 12 in the 2025 IISE Senior Capstone Competition

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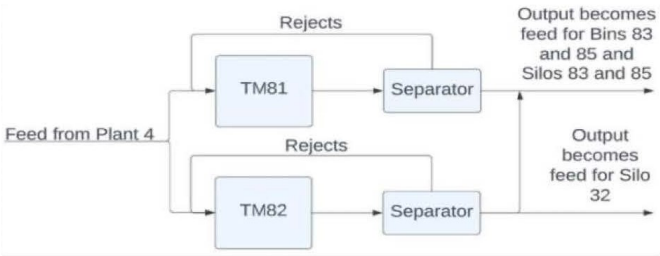
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Imerys: Tube Mill Optimization Project

Dalton Beasley | Dyson Beasley | Tristan McMichael | Ryan Waltman

IMERYS

Tube Mill 81 (TM81) is part of an intermediary process circuit (as seen in Figure 1) that grinds marble into feed used for Plant 3. TM81 grinds and crushes marble, followed by Separator 81 (SM81) separating the fines from the rejects. The entire circuit produces 3.84 tons per hour (TPH) of material as a baseline. Imerys would like an increase in production while maintaining quality and have a consistent product flow to their silo.



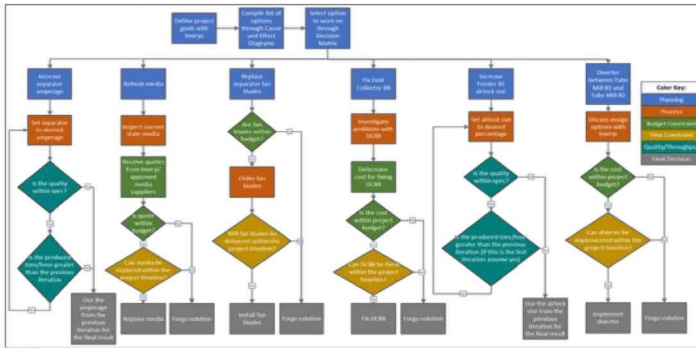
Methodology

Multi-Criteria Decision Matrix			Decisions									
			Increase Amps for Separator 81		Adjust Tube Mill 81 Media		Reconnect Dust Collector 88		Add Classifier Blades for Separator 81		Add Feeder Diverter		Increase Feeder 81 Airlock Size	
#	Criteria	Weight	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted	Score	Weighted
1	Tube Mill Output	8	16%	10	80	8	64	10	80	4	32	5	40	10	80
2	Product Quality	10	20%	5	50	10	100	10	100	10	100	5	50	6	60
3	Cost/Budget	5	10%	10	50	4	20	2	10	7	35	2	10	10	50
4	Changeability	3	6%	10	30	1	3	1	3	5	15	2	6	2	6
5	Long-term Viability	6	12%	10	60	6	36	10	60	9	54	5	30	10	60
6	Time Constraint	7	14%	4	28	3	21	0	0	3	21	3	21	10	70
7	Regulatory Compliance	8	16%	10	80	10	80	6	48	10	80	7	56	10	80
8	Employee Training	3	6%	10	30	10	30	10	30	10	30	10	30	8	24
	Total	50	100%	69	408	52	354	49	331	58	367	39	243	66	430

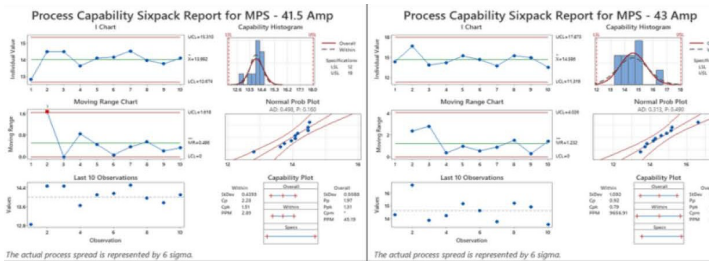
Weight Rating:
10-8 = High Impact
7-4 = Medium Impact
3-1 = Low Impact
0 = No Impact

Score Rating:
10-8 = Very Good
7-4 = Medium Good
3-1 = Not Good
0 = No Impact

Color Rating:
450 = Best Decision
350 = Good Decision
200 = Okay Decision

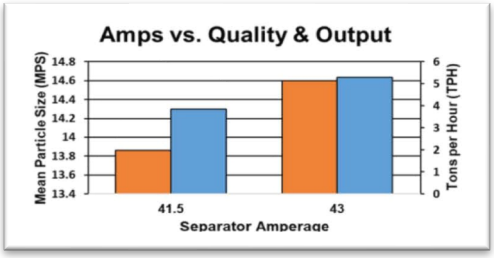


Data Analysis



Results

Amps	MPS	TPH
41.5	13.86	3.84
43	14.59	5.28
% Change	5.26%	37.50%



Conclusion

The project set out to increase production, keep the quality within the specifications, and consistently make product for Plant 3. Production increased from 3.84 TPH to 5.28 TPH (37.5% increase) by increasing the SM81 amps from 41.5 to 43. The silo at Plant 3 also reached capacity quicker since the feed was more consistent. TM82 can now focus on making feed for Calwhite or Gamaco now instead of assisting TM81 since the circuit is making and sending enough product to Plant 3 on its own. A new Classifier blade set was installed to help improve the quality and keep the product within specifications. New grinding media is being ordered to help increase grinding efficiency in TM81. DC88 is in the beginning stages of being reconnected to help reuse waste, lower cleanup costs and limit downtime on maintenance. Overall, the goals of the project have been achieved with three process improvement initiatives currently being implemented from the recommendations of our group.

Won 3rd Place in the 2024 IISE Senior Capstone Competition