

Manufacturing Supermarket Creation and Implementation



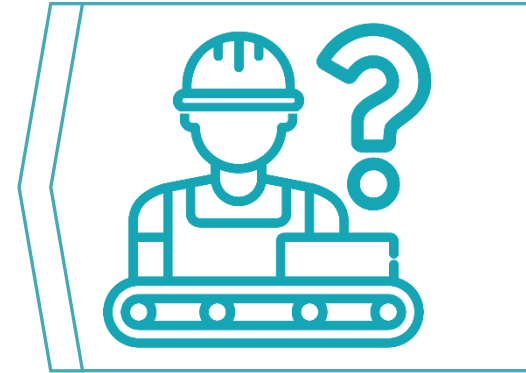
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Creating and Implementing a Lean Supermarket

The following case study exhibits the project as it was designed and executed through the DMAIC (define, measure, analyze, improve, control) principles of Six Sigma.

Backstory: Landrum has a decade-plus relationship with a Fortune 500 client, supporting them through insourcing all logistics-related processes. The client assembles extremely large wind energy products at their location in Pensacola, FL. They have contracted with Landrum for the material handling and storage of raw materials and finished goods as well as for performing complex kitting for assembly production.



Issues / Challenges Identified: One moving assembly line within the plant has historically underperformed compared to the rest of the site when it comes to on-time delivery due to the many complexities and mix of materials. For instance, material coming to the department originates from seven different areas. The product comes in sizes as small as a nut or as large as a minivan. Some of the material needs to be deep cleaned to remove chemicals such as rust prohibitor, while others need to be preassembled and positioned in the correct alignment to aid in the assembly process. Some materials arrive on pallets, some in returnable packaging, and others in wooden crates that need to be broken down and discarded. Lastly, some of the product requires industrial crane lifts and chemical application. All of this is performed by Landrum before the assembly line process begins. Delivery to the line is executed by an 8k forklift, 15k forklift, 55K forklift, tugger system, and push carts.

The assembly line we are feeding downstream has stationary working areas. The line itself “pulses,” moving from station to station every 220 minutes on average, much like an automotive moving line would do.

Goal: The client tasked Landrum with facilitating a kaizen in order to improve the consistency of material being delivered to the line and to ensure product is delivered to the right station, with the exact amount needed, meeting the right quality standards, and “Just in Time” (JIT) for the next pulse.



Key Performance Indicators (KPIs) Tracked: To track performance, we needed to identify takt based on the daily production goal, as well as the cycle times of each operator's process. Takt times changed weekly on average due to demand shifts and client schedule changes. We also needed to understand how many takt misses occurred and what trends were noticed around why takt was missed. "Material misses," which include delivering material late and damaged/missing material to the line, also needed to be tracked and reported. In the eight-month baseline period prior to our kaizen event, the average material misses were approximately 52 per week.



Trend Data: The current process included pre-made, off-site kits, as well as individual component pieces from the warehouse, that were delivered to a staging area in bulk to be kitted or re-kitted for line readiness. It was thought that a major issue was having excess material inventory, which increased chaos and confusion since the area did not support any bulk storage. Additionally, JIT was not being realized and the delivery priority for each kit was not clear. Before formally facilitating the kaizen, part of the data collection research was to determine how many part numbers, kits, carts, Kanban items, pallets, and returnable containers were currently used in this area:



Trends Identified:

- Kits were being delivered to the site in the improper configuration needed to support the line.
- Flexing labor to this area because of demand increases, absenteeism or turnover was inefficient due to the difficulty in learning what needed to be done and when.
- It was unclear as to when delivery to the line was required.
- Overproduction was occurring constantly at several stations within the assembly operation, amplifying confusion around the delivery schedule.
- Turnover in the area was the highest in the plant due to employee stress levels, unclear expectations, and the difficulty of the job.

Data Collected:

- 28 incoming pallets or crates of raw materials and WIP included 167 unique parts.
- 24 different pre-assembled kits were needed for each line takt.
 - 17 carts were delivered by hand, 7 by "train" (tug cart system).
- 9 Kitting Operators were required in the area, per takt.
 - Verified through Time Studies and Yamazumi.

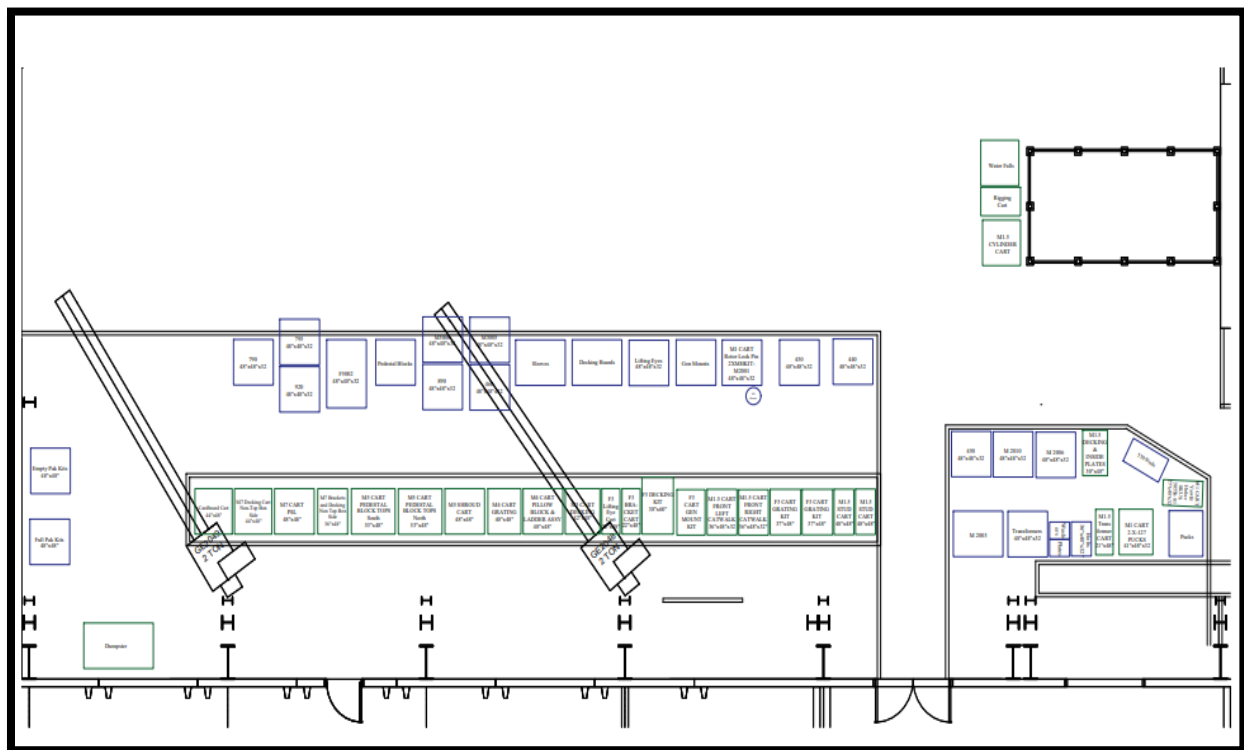


Execution Efforts: Landrum facilitated a 3P (Production, Preparation & Process) design kaizen using an AutoCAD-generated paper doll exercise with a multi-departmental Subject Matter Expert (SME) team. This week-long event successfully yielded a floor layout and scheduling process that was developed and approved by the team and our client’s site leadership.



We followed up the initial kaizen with a second event geared to identify layout changes and create a Tier I board to highlight the daily schedule, process flow and resources available. The Kitting area process now resembles that of a NASCAR pit stop. Instead of building carts based on available material, the department builds only to takt. The intent is to have all 24 carts built 20 minutes before the takt “pulse” times. Then, 10 minutes prior to line pulse, all carts are delivered to the line for the entire unit build. This JIT delivery process is an all-hands-on-deck approach done through a transparent schedule and operator priority checklists.

Paper doll exercise layout results.



Follow-Up Efforts: During the second kaizen, we implemented standard work, 5S, and layered process audits (LPAs) to sustain efforts. Part of the follow-up requirements were:

Daily Gemba Walks:

- Review Safety, Quality, Delivery, and People Key Performance Indicators (KPIs) in the area via the Tier I Boards.
- Provide a platform for two-way communication and identify any help needed in the area.

Supervisor LPA Walkthroughs:

- Check Standard Work execution on each shift to ensure all critical tasks are completed.
- Review 5S checklists to ensure the health of 5S in the area.



Standard Work Docs - After

The collage displays several documents:

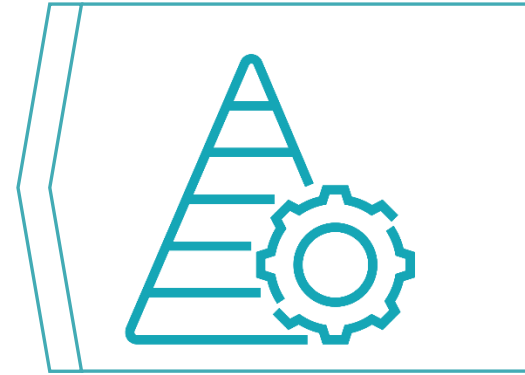
- STANDARD WORK COMBINATION SHEET:** A table with columns for task name, quantity, and time, with a corresponding staircase-style bar chart.
- Task List:** A list of tasks with checkboxes and time allocations.
- Task Time Calculations:** A table with columns for task name, quantity, and time, showing a total time of 113min.
- Availability Calendar:** A grid showing days of the week and months (12th, 13th, 14th, 15th, 16th, 17th, 18th, 19th, 20th, 21st, 22nd, 23rd, 24th, 25th, 26th, 27th, 28th, 29th, 30th, 31st).
- Task Time Calculations Table:**

Task	Quantity	Time
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- Task Time Calculations Table:**

Task	Quantity	Time
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CONCLUSION

Landrum created a complete supermarket process from scratch, making a complex situation simple to execute and easy to follow for new associates. In doing this, all KPIs became visible, material misses decreased on average from 52 per week to 15. Labor cost savings due to not having to wait or rework poor quality were calculated at about \$57K annually. On top of these accomplishments, Landrum was able to install a lean foundation in the Kitting area to support future growth and improve sustainment.



Key Takeaways

- A kitting supermarket was created along with the necessary supporting elements such as a tier I scheduling board, 5S process, leader standard work, and operator standard work
- One complete unit of parts is now kitted and delivered 10 minutes before takt pulse, achieving JIT.
- Introduced a way to quantify material readiness for each unit, setting up predictability to production.
- Employee stress was reduced due to standard work clarification and simplification of the kitting process.
- Layered Process Audits were introduced in order to ensure critical tasks continue to be executed correctly. This helps sustain efforts gained.
- Material misses to the line decreased by 70+%.
- Annual Labor cost savings totaled \$57K from efficiency gains and cost avoidance.
- Eliminated extra staging area, reducing footprint by 1,440 square feet, and minimizing the number of handling touchpoints. This will further minimize quality damage risk.



COMPANY OVERVIEW

Workforce Management Solutions

Landrum's Workforce Management program began with the vision to have our clients operate safer and more efficiently because of our focus on process improvement and employee stabilization. Our mission was to apply lean principles to each stage of the employee lifecycle and to positively impact the attainment of our client's safety, quality, performance, and cost goals.

For over 50 years, Landrum has been solving complex issues for our clients around people, safety, quality, performance, and cost. Today, our gap analysis is used early in the evaluation process to identify inefficiencies, redundancies, and opportunities to create stabilization in the workforce or in an area or department that lacks leadership, bandwidth, or that may be underperforming. After our report out and analysis, a roadmap is created in alignment with our client's core business goals, to improve overall efficiency and drive labor cost per unit down.

Landrum accomplishes this through our team of operational experts who have spent significant time in manufacturing and logistics operations, and who understand how to apply process to people in order to change outcomes.

