



JIT Toyota-Lift

JAMESTOWN INDUSTRIAL TRUCKS



JIT TOYOTA-LIFT SOLUTION PROPOSAL TO SUGISHIMA PETROCHEMICAL CORPORATION

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November 3, 2023

AGENDA

- ▶ Assessment Summary based on SUGISHIMA Requests (3)
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ASSESSMENT SUMMARY BASED ON SUGISHIMA REQUESTS

Toyota Lean Management (TLM) Assessment Summary

Customer: SUGISHIMA Petrochemical Corporation Date: 6/17/2021 Advisor: JIT Toyota-Lift



Objectives

1. Enhancing Safety
2. Cleaning Up Warehouse
3. Optimizing Stock Volume of Product
4. Optimize Number of Forklifts

Recommendations Summary

Safety - Consider adding electric forklifts with lower weight rating, palletizer with stretch wrapping capabilities, blue and red lights for forklift visibility, dock door barriers, pedestrian walkways and intersections, PPE requirements.

5S - Consider Pallet flow racking system so each product has a place with signs to visibly show spaces for product, t-matics to track hours for forklifts, floor scrubber to keep floor clean, Warehouse Management System to incorporate barcodes for live inventory

Stock/Equipment Flow - Consider stretchwrapper, pallet flow racking, elimination of 2nd warehouse, changing forklift type to electric. Potential reduction/reallocation of labor.

Fleet Management - Consider Electric Forklifts and a reduction to 6 forklifts from 39, consider moving to one brand of forklift for ease of service/tracking maintenance, potential reduction/reallocation of labor.

CUSTOMER SURVEY

- ▶ Requests for the Customer
 - Clean up warehouse to enhance safety
 - Optimize Stock Volumes of Product finished goods
 - Optimize the number of forklifts in operation.
- ▶ Fact Finding
 - 25' Clear Height Ceiling
 - 42x48x48 Pallets
 - 3,000 pounds
 - 4 Finished Goods Lines (Basic Production Area)
 - Currently using 39 LP 5,000 lb Pneumatic Trucks
 - 24/6 operation – 3,000 employees
 - Estimated total rewards cost per Forklift Operator: \$28.96
 - Estimated total rewards cost per hand palletizers: \$24.35

SCORE SUMMARY: CURRENT SITUATION

Toyota Lean Management (TLM) Assessment Summary

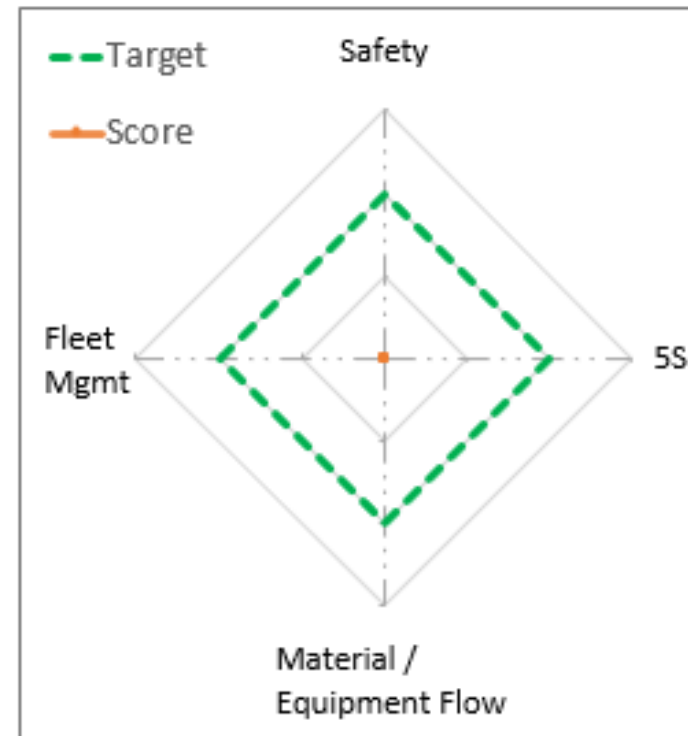
Customer: SUGISHIMA Petrochemical Corporation

Date June 17th, 2021

Advisor: JIT Toyota-Lift



	Topic	Score
1	Safety	0
2	5S	0
3	Material/Equipment Flow	0
4	Fleet Management	0



SAFETY OBSERVATIONS AND OPPORTUNITIES

Safety		Description					Safe working environment with proper PPE, no trip hazards, aisles/ walkways clearly marked and kept clear, separation of people/forklifts, clear ergonomic focus, and Safety KPI's tracked at team and shop levels.						
Observation Score							Observation Scoring Key						
Score	No	Partial	Yes	BM	No	Partial	Working environment not safe, no proper PPE, no walking aisles, and no ergonomics						
Baseline	X					Yes	Proper PPE in place and KPI's for safety tracked at team and shop levels						
Current						Benchmark	Proper PPE, aisles/walkways clearly marked, no evident safety risk, & KPI's tracked for team & shop PPE, aisles/walkways marked & kept clear, no evident safety risk, KPI's and ergonomic improvement						

Observations

1. Palletized material is not wrapped, allowing pallets to fall apart or potential to break apart

2. Doublestacked pallets on floor and forklifts -

3. Unknown if forklifts have any kinds of lights or backup indicator to notify pedestrians

4. Lines that may have been designated areas for pedestrians at one point are covered or not readable, causing potential for struck by injury.






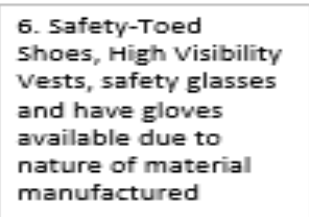
5. Dock doors have no guards to protect from pedestrian or forklift falls.

6. Uncertain of level of PPE currently required

7. Concern with Strain injuries with bending and twisting with hand palletizing

8. Operator unable to see, pushing oversized load for truck rating


Recommendations

- 1 and 7. Addition of a palletizer to prevent injury when hand palletizing and added stretch-wrapping capabilities to prevent pallets from falling apart exposing employees to chemical and potential for struck by injuries

- 2 and 8. Addition of racking to prevent employees from moving 2 pallets at a time and to prevent pallets from being stacked on top of each other.

3. Blue lights that are directional activated and red lights attached to forklifts along with backup sounds.

4. High visibility lines and designated walk ways for pedestrians and intersections, overhead projector and dome mirrors

5. Addition of dock barriers to alleviate potential fall hazards.

6. Safety-Toed Shoes, High Visibility Vests, safety glasses and have gloves available due to nature of material manufactured




5S EVALUATION

5S		Description					Excess parts, tools, equipment, and documentation are not present. Work place arranged with fixed and labeled locations for all parts, tools, and equipment and the location creates flow. Work place is kept clean, has work standards in place and has		
Observation Score							Category	Score	Observation Scoring Key
Score	No	Partial	Yes	BM	1S - Sort	0	Excess parts, tools, equipment, & documentation are not present in the facility		
Baseline	X				2S - Systematize	0	Work place arranged with fixed and labeled locations for all parts, tools, and equipment. Location of each item maximizes flow and efficiency of people.		
Current					3S - Shine	0	Work place is kept clean with the purpose of searching for abnormalities		
Average for all of the 5S's				0	4S - Standardize	0	Work areas in the facility are standardized for safety and operations		
					5S - Sustain	0	5S is clearly sustained with a formalized visual audit process		

Observations

1. Mixed products, no designated areas

2. No Designated Area for Materials like pallets, wrap, etc.

3. No location/signage set in place for product storage to show where product should be.

4. Forklift Fleet underutilized. Some trucks are missing and other trucks have low hour meters

5. unkept floors

6. Loss of product (\$\$) due to where it's placed and product falling over

7. First In, First Out (FIFO) process is not in place.

8. No Warehouse Management System (WMS)

Toyota	32-8FG25	40064							
Toyota	32-8FG25	40273							
Toyota	7FB610	50743							
Toyota	32-8FG25	65535							
Toyota	32-8FG25	41777	2013	11,422	1st S17	11,470	2nd S17		
Toyota	32-8FG25	41731	2013	10,824	1st S17	10,820	2nd S17		
Toyota	32-8FG25	41743	2013	9,380	1st S17	10,001	2nd S17		
Toyota	32-8FG25	41736	2013	9,334	1st S17	9,366	2nd S17		

Recommendations

1, 7. Pallet Flow Racking System with dedicated lanes for SKU's that is loaded from the back near production and uses gravity to push the pallets through to the other side to shipping so the oldest product is always being pulled to ship first. (FIFO)
6. This also prevents loss of product because it gives each pallet a secure lane to be stored in.

4. Less forklifts will be needed because pallets move through racking and only need to be placed in racking from production and removed from shipping side.

3. Placing Signage at each bay or lane designated which particular product is in that lane.

4. Hour recording on forklifts: My Insights to ensure forklifts are utilized to full potential.

5. Floor Scrubbers to keep warehouse floors clean so aisles can be visually seen and errors stick out more readily.

8. Warehouse Management System will incorporate barcodes that can be scanned to remove product from inventory. This also helps with auditing processes because it keeps track of inventory for SUGISHIMA.

MATERIAL/EQUIPMENT FLOW EVALUATION

Flow	Description	Does the facility promote Just in Time (JIT) and First In First Out (FIFO)? Is overproduction minimized through appropriate processes, space, containers, inventory buffers and schedules? Are raw materials, finished goods, and work in process (WIP) in all areas (fabrication, paint, assembly, shipping/receiving, warehouse, etc) moved efficiently throughout the facility without stagnation?
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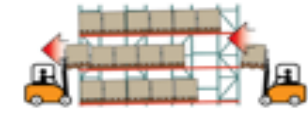




Observation Score							Observation Scoring Key	
Score	No	Partial	Yes	BM	No	Partial	Yes	BM
0.0	X							No control of WIP inventory, large amounts of stagnation causing multiple touches/excessive searching
1.0		X						Some WIP inventories are controlled, still some overproduction/stagnation/multiple touches
1.5			X					Minimal overproduction/stagnation/multiple touches. Most materials not made/moved unless consumed.
2.0				X				Pull System allows for Lead-time reduction activity. Materials not made/moved unless consumed.
2.5					X			
3.0						X		

Observations

- Mixed products, no designated areas
- First In, First Out (FIFO) process is not in place.
- Loss of product (\$\$) due to where it's placed and product falling over
- Current forklifts are rated for more weight than the product weighs
- Based on their flow map, there's specific flow of travel, forklifts are going whichever way.
- Producing more products than shipping.
- Forklift Fleet underutilized. Some trucks are missing and other trucks have low hour meters
- No current ability for visual management of product and no warehouse management system in place
- Have enough in stock of each product that they could go multiple weeks without running production:
 Product A: 670 in stock - 50 pallets per day = 13.4 days of product
 Product B: 245 in stock - 55 pallets per week = 4.5 weeks of product
 Product C: 150 in stock - 55 pallets per month - 2.72 months of product
 Product D: 60 in stock - 55 pallets per month - 1 month of product

Recommendations

2. Pallet flow racking with dedicated lanes for SKU's will also allow for elimination of multiple forklifts.
4. Change forklift type from LP to Electric - Less weight rating and more efficient/less maintenance 8FEU25 to 8FBE20U
7. Stretchwrapper helps reduce waste and allows it to get from Point A to Point B efficiently
8. WMS with SKU's for product location and identification on end of racking so inventory is live when employee scans barcode. Inventory counter can also allow production and shipping to know at a glance how much is left to do with Target and Actual amounts. This will allow them to change their processes to Just in Time (JIT) where they are only producing what needs to be shipped.
- 1,3,6,7,9. Elimination of 2nd Warehouse due to Racking providing more space and better flow. Prevents stocking much more product than necessary based on shipments

Starting Date	Product	Lot number	Location
Jan 20, 2017	A	814	MS
Jan 24, 2017	A	812	MS
Feb 28, 2017	A	812	MS
Apr 20, 2017	A	813	MS
Dec 20, 2016	A	578	MS
Jan 20, 2017	A	407	MS
Jan 20, 2017	A	613	MS
Aug 20, 2016	A	524	MS
Jan 20, 2017	A	389	MS
Jan 20, 2017	A	871	MS

Trucks	ID#	Model	Year	Hour	Hour	Hour	Hour	Hour	Hour
Trucks	10-49120	49120	2010	10,422	10,517	10,470	10,470	10,470	10,470
Trucks	10-49120	49120	2010	10,514	10,517	10,520	10,520	10,520	10,520
Trucks	10-49120	49120	2010	10,513	10,517	10,520	10,520	10,520	10,520
Trucks	10-49120	49120	2010	10,514	10,517	10,520	10,520	10,520	10,520

Production	Shipment
65	50

FLEET MANAGEMENT EVALUATION

Fleet Management		Description					Good understanding of fleet data (number of pieces, age, location, utilization). Equipment specifications are optimal for each process requirement. Utilization of equipment is high. Equipment is serviced regularly and maintained for safe and productive operation.				
Observation Score							Observation Scoring Key				
Score	No	Partial		Yes		BM	No				
0.0	1.0	1.5	2.0	2.5	3.0	Partial	No understanding of fleet, equipment specs not optimal, poor utilization, equipment commonly down				
Baseline	X					Yes	Some fleet data known, some equipment spec'd optimally, utilization is fair, equipment down sometimes				
Current						Benchmark	Fleet data known, most equipment is spec'd optimally, good utilization, equipment maintained				
							Fleet data known/monitored, all equip spec'd optimally, excellent utilization, maintained and visual schedule				

Observations

1. Forklift Fleet underutilized. Some trucks are missing and other trucks have low hour meters.

2. Current forklifts are rated for more weight than the product weighs. Wrong type of forklift.

3. Forklifts don't appear to be designated for a specific area or use.

4. Multiple brands of forklifts. (34 x Toyota, 5 x TCM)

8. More forklifts means more operators which could be wasted labor.

9. Operators discuss issues with parts associated with LP trucks and tires: "tire no grip, radiator drained, tires need replaced." etc.

5. Current Shipping Levels doesn't justify number of trucks

6. 39 trucks currently leads to more PM's, more maintenance cost, etc: Overservicing.

7. Not rotating out their current fleet: some trucks have more hours than others even though they're the same

Toyota	32-8FG25	41777	2013	11,422	1st 5/17	11,470	2nd 5/21
Toyota	32-8FG25	41731	2013	10,624	1st 5/17	10,626	2nd 5/21
Toyota	32-8FG25	41743	2013	9,993	1st 5/17	10,031	2nd 5/21
Toyota	32-8FG25	41736	2013	9,334	1st 5/17	9,388	2nd 5/21
Toyota	32-8FG25	40064					
Toyota	32-8FG25	40273					
Toyota	7FBR10	50743					
Toyota	32-8FG25	65535					

Recommendations

1, 2, 9. Change forklift type from LP to Electric - Less weight rating and more efficient/less maintenance 8FEU25 to 8FBE20U - eliminating parts that have been wearing (radiators) and different Solid Pneumatic for outdoor for smooth non-marking - more comfortable ride

3, 7. Forklifts designated to shipping or producing so they're specifically used.

4,6. One brand with one service provider allows for better understanding of what PM agreements and when service is occurring.

5. Reduction in fleet from 39 to 6 due to shipping levels:

8. Less forklifts could mean less labor.

SOLUTIONS PROPOSAL: SUMMARY

- ▶ 8FBE20U Forklift
 - Employees will no longer be able to carry two pallets at a time due lower weight limit on forklift, preventing a safety hazard with blocked view and pushing pallets.
 - Electric forklifts do not have the parts that seem to be wearing on the LP's – radiators, oil, etc.
 - Smooth non-marking indoor tires on these forklifts will prevent floor wear, tire wear and make for a more comfortable ride for operators.
 - New Forklifts renew the life of the fleet and allows for new PM contracts. One brand/service provider makes tracking maintenance easier for SUGISHIMA.
 - Reduction in size of fleet also means less maintenance and ensures that all forklifts are being utilized to fullest potential

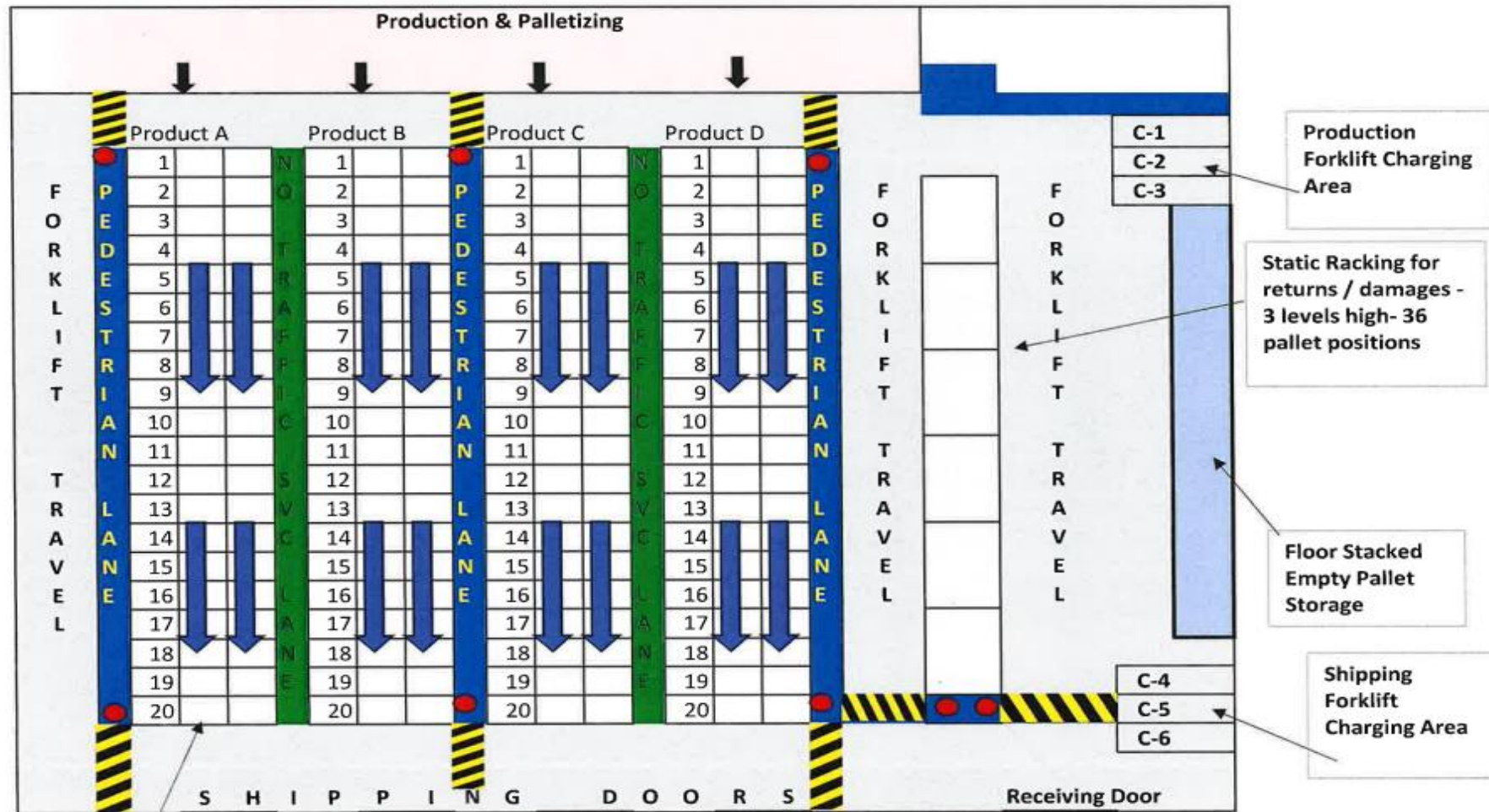
- ▶ Pallet Flow Racking System
 - Achieves FIFO by the back of the racking facing Production and the front of the racking facing Shipping.
 - Pallets are added to the racking from Production and gravity moves them through the racking to the shipping side, ensuring the first pallet in is always the first pallet out.
 - Saves space by each pallet having its own designated space
 - Every lane is three levels high with twenty pallets per row
 - Twelve lanes so each product can have its own section of racking to keep organized.
 - Electronic signs will be added to each section to label for product placement and to allow changes in the future for spacing if needed.
 - Prevents operators from moving two pallets at a time because it will not fit in the racking that way.
 - More space so 2nd warehouse will not be needed – cost savings in fuel, labor, fleet, and utilities. Also allows for materials such as pallets to have a designated space.
 - Limiting space for pallets with elimination of 2nd warehouse also prevents overproduction of product and reduces square foot cost.
 - 180 pallet positions for each type though more than what is needed for current demand will allow a means to handle future expansion or a spike in sales for each type.

- ▶ Warehouse Management System
 - Introduces Live Inventory with barcodes so production and shipping and constantly aware of their daily numbers with a Visual Management System.
 - Production will scan the code when it leaves production, forklift operator on production side will scan when it hits the racking, Forklift operator on shipping side will scan when it hits the truck.
 - Target numbers and actual numbers will also be displayed for Production and Shipping based on these scans and inventory so KPI's are in place.
 - All decisions based for production should be based on the shipping numbers in the warehouse management system turning it into a true pull system.

SOLUTIONS PROPOSAL: SUMMARY CONTINUED

- ▶ **Palletizer with Wrapper**
 - Prevents hand palletizing which optimizes safety and prevents employees from touching product unnecessarily.
 - Wrapping allows product to travel more efficiently without falling or breaking preventing loss in revenue due to damaged product.
- ▶ **Floor Scrubber**
 - Allows for more cleanly environment, keeps walkways and aisles visible for pedestrians.
- ▶ **New Aisleways, Dock Door Barriers, and Projectors**
 - All introduced to optimize safety of pedestrians and forklifts operators.

SOLUTIONS PROPOSAL: WAREHOUSE LAYOUT

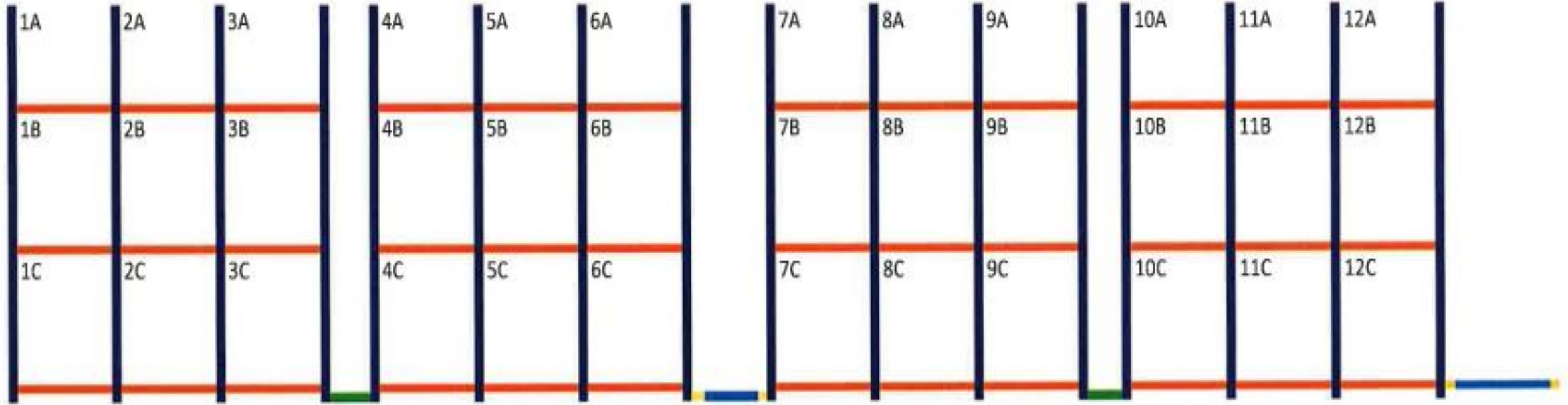


Each lane represents 3 level high pallet flow system, 20 pallet positions per row, 60 PP per row in total



Dock Fabric Gates on all Dock Doors -Prevents pedestrian and forklift drop offs

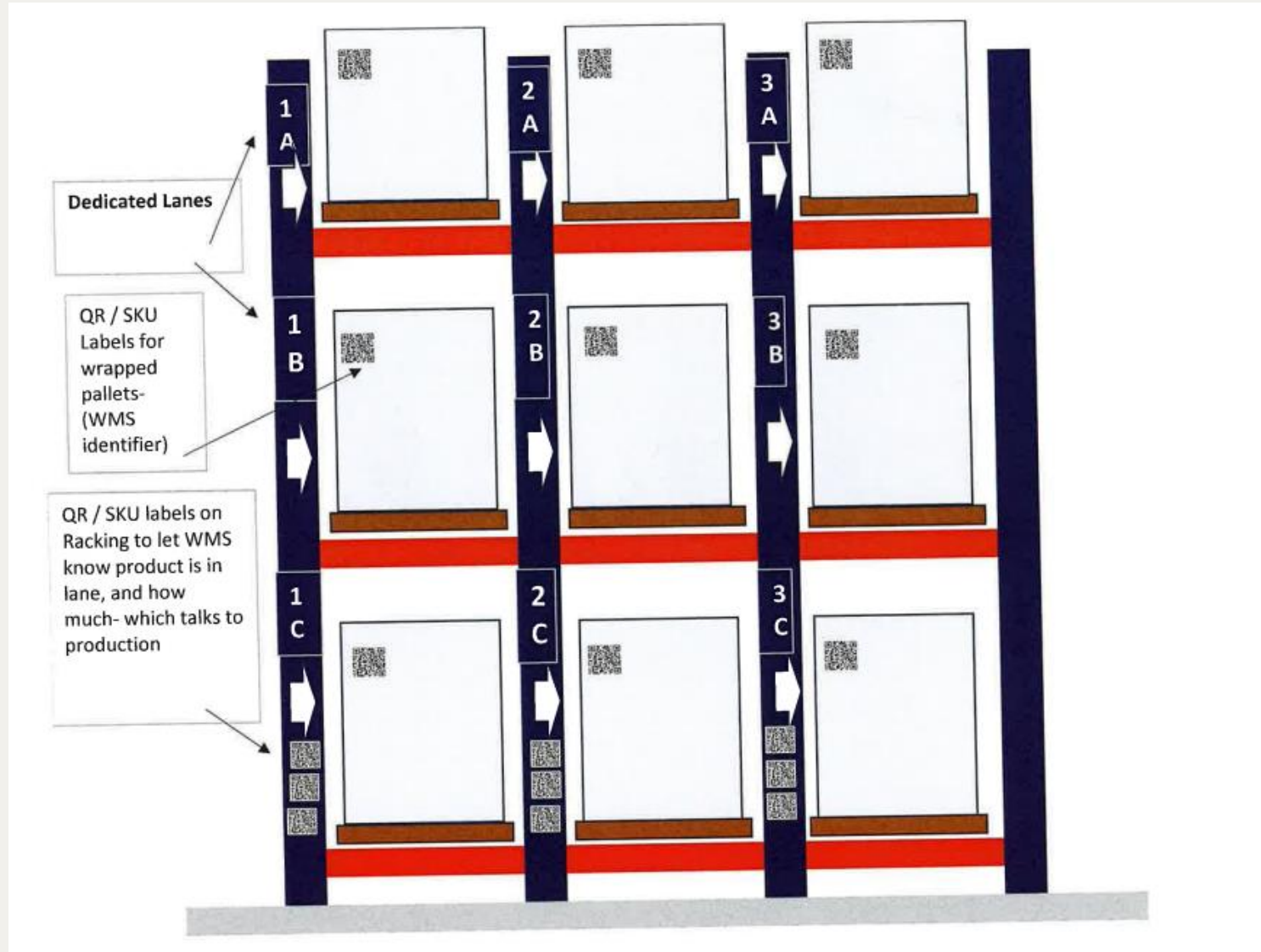
SOLUTIONS PROPOSAL: WAREHOUSE LAYOUT



With pallet flow lanes labeled, the WMS can give a "Live" inventory of what type of product is in each lane, in turn give you a production requirement to suit the shipping goal.

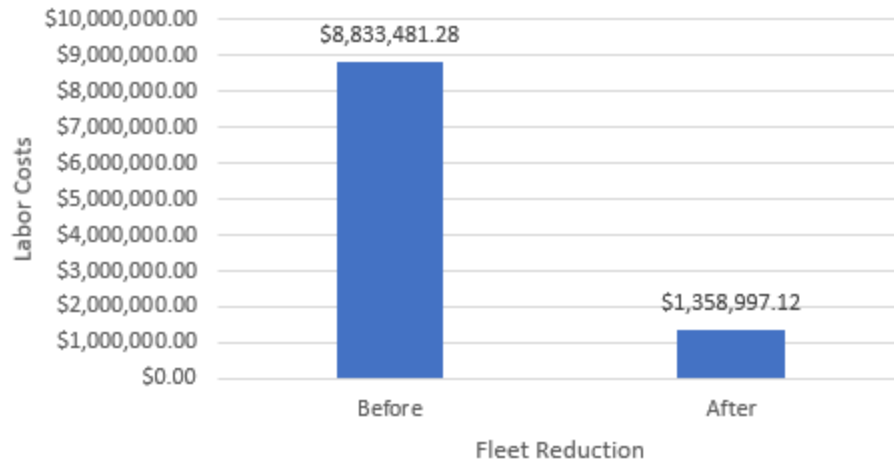
- 1- QR Code given when product is palletized and stretchwrapped with lane instruction.
- 2- Operator scans the lane QR code lane it is going in, then scans QR code on pallet, puts the pallet in the proper lane.
- 3- WMS can give live inventory of product type, and which lane it is in.
- 4 - Shipping operator has list of which lanes and how many from each going on "said truck"
- 5- Operator then scans each Pallet QR code when removed from rack, fulfill order.
- 6- WMS will then give live inventory levels in racking, in turn updates production needs

SOLUTIONS PROPOSAL: WAREHOUSE LAYOUT



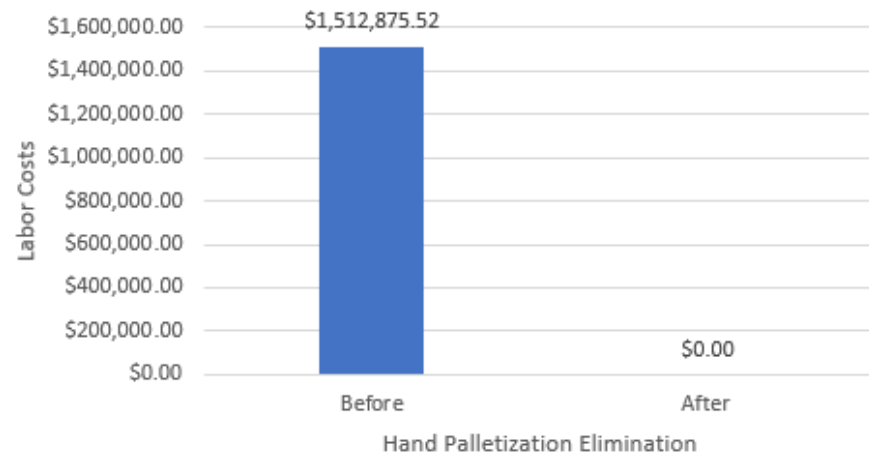
SOLUTIONS PROPOSAL: COST SAVINGS

Cost Savings in Labor Based on Fleet Reduction



- ▶ It is assumed there is 1 operator per forklift per shift. (3 shifts)
- ▶ The Estimated Rate for a Forklift Operator including benefits was placed at \$28.96.
- ▶ Benefits are assumed to add an average of an additional \$4.50 per hour to employee's rate.
- ▶ Overtime rate would be the total labor less the benefit times time and a half. (\$36.69)
- ▶ Working 6 days per week, the 6th day would be all Overtime, giving them 40 standard hours, 8 Overtime hours.
- ▶ Cost Savings: \$7,474,484.16 per year.

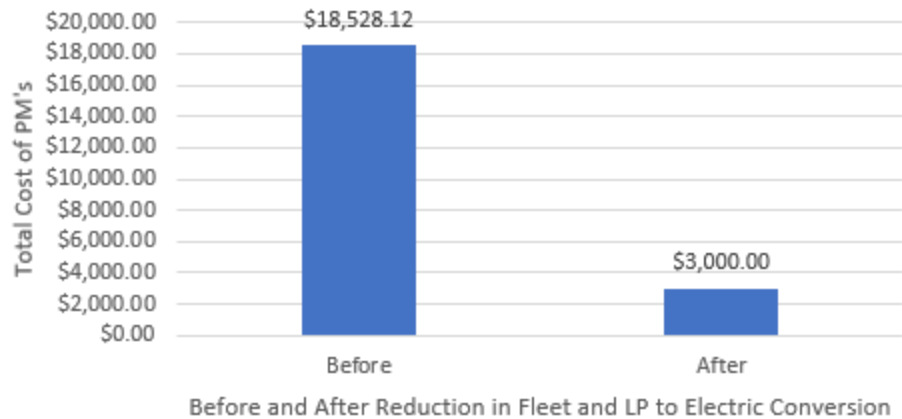
Cost Savings in Elimination of Hand Palletization



- ▶ It is assumed there are 8 hand palletizers per shift. (3 shifts)
- ▶ The Estimated Rate for a Hand Palletizer including benefits was placed at \$24.35.
- ▶ Benefits are assumed to add an average of an additional \$4.50 per hour to employee's rate.
- ▶ Overtime rate would be the total labor less the benefit times time and a half. (\$29.78)
- ▶ Working 6 days per week, the 6th day would be all Overtime, giving them 40 standard hours, 8 Overtime hours.
- ▶ Cost Savings: \$1,512,875.52 per year.

SOLUTIONS PROPOSAL: COST SAVINGS

PM Cost Savings from Reduction in Fleet and Conversion from LP to Electric.



- ▶ 3PM's assumed to be completed yearly on LP Trucks based on current equipment hours at 250-300 hours cycle.
- ▶ Estimated Cost per PM is \$158.36 for LP Trucks.
- ▶ Electric trucks would be on a 500-cycle.
- ▶ An increase in hours would be seen due to better utilization of the fleet. (4 PM's per year)
- ▶ Estimated cost per PM is \$125.00 for Electric.
- ▶ Cost Savings: \$15,528.12.

- ▶ **Switching from LP to Electric also provides a cost savings in LP tanks.**
- ▶ Assume 1 tank per shift with an estimated cost of \$33.52 per tank
- ▶ 3 Shifts, 6 days a week would have a weekly cost of \$23,531.04 in LP tanks that would be saved by going Electric.