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CASE STUDY

Lean Warehouse + Automation

Catania Oils

PROBLEM / CHALLENGE

Catania Oils is an edible oils producer, blending and packaging oils that are sold to grocery, food service and food manufacturers. Their 220K sq ft. warehouse was designed to fit 12K pallets, but planned growth would increase the finished goods inventory to 18K pallets.

They evaluated automating the finished goods warehouse but were not comfortable the solution would work with their high-mix product line and numerous partial pallets due to the end of a production run never rounding up to a full pallet.

They wanted to evaluate non-automated solutions to support their growth in the current footprint and prepare for automation

IMPLEMENTATION DETAILS: Warehouse Layout with Racking Only and/or Automation

- **Created racking-only (no automation) layout, which exceeded storage requirements**
- Did limited time-and-motion studies to calculated expected productivity improvements (next page)
- Worked with Planning Team on 5 year forecast for all finished goods SKUs
- Taught the Planning Team target inventory calculations including safety stock and forecast stock based on production lead-time
- Calculated expected inventory levels by SKU in 2030 based on product categories growing or shrinking
- **Provided warehouse automation providers complete data package to quote a fully automated warehouse**

Current state used floor stock with pallets, stacked no more than two-high

THIS IS AN EXAMPLE TIME-AND-MOTION STUDY WITH NON-VALUE-ADDED STEPS HIGHLIGHTED IN ORANGE

Total Number of Time Studies completed for Time Study #		1	Average		total	total	red	yellow	green
					0	0.0	1248	552.5	0
Date:	19-Aug-25								
Job Function Studied:	Picking					Quantity:	1		
Person Time Studied:	Jose					Product Family:	V1 SKU		
Form completed by:	Colin and Shaun					Part Number	11464		
T/S #:		Run time		Run Time Sec	Secs per Seq	Min per Seq			
A/I #	Activity/Step Description	Min	sec				red	yellow	green
	Goto first location on pick ticket (C55)	1		60	60	1.0		60	
102	Operator off truck to search, not found, went to next location (F61)	2	45	165	105	1.8	105		
102	Found item 8th pallet floor spot from aisle	3	55	235	70	1.2	70		
102	Big dig (moved 7 floor pallet floor spots (~14 pallets)	8	55	535	300	5.0	300		
	Retrieved partial pallet	9	15	555	20	0.3		20	
102	Put back the 7 floor pallet spots (14 pallets)	13	30	810	255	4.3	255		
	Checked pick ticket for next location, then brought partial pallet to staging dock	15	15	915	105	1.8		105	
	Go to next location (G40)	16		960	45	0.8		45	
102	Operator off truck to search, found, moved one pallet floor spot out of the way, retrieved partial pallet	18		1080	120	2.0	120		
	Take to staging	19	10	1150	70	1.2		70	
	Go to next location (stopped to talk with Donny) (A54)	20	20	1220	70	1.2		70	
102	Operator off truck to search, not found	21	15	1275	55	0.9	55		
102	Walked to next location on pickticket (A63), not found	23		1380	105	1.8	105		
102	Go to next location (B47), Operator off truck to search, not found	23	50	1430	50	0.8	50		
	Goto to next location (F55), found product, pulled out two								

This time study of order-picking identified that about 2/3rd of the time to pick is non-value-added and can be eliminated in the new racking-only layout. This was due to a requirement to rotate floor stock to get to the oldest inventory. Improvement idea 102 (left column) was to use flow-thru racking that always presents the oldest item first, enabling easy FIFO picking.

The time study matrix indicates how many time studies are needed to profile all labor tasks

	Receiving	Dock-to-Loc	Pick-to-Stage	Loading
Purchased	1	3	7	9
V1 SKU	2	4	7	9
V2 SKU	2	5	7	9
V3, V4, V5	2	6	8	9

CALCULATION TO CONFIRM 4 LEVEL HIGH FLOW-THRU RACKING WILL FIT FROM FLOOR TO CEILING

	Load to unload pitch	12		Current ceiling	396	inches	33	feet
	beam height	4		New drop ceiling	360	inches	30	feet
				Max height below ceiling	324	inches	27	feet
Level 4	Headspace	0	no beam above?	Total Rack Height	304	inches	25.3	feet
	Total Pallet height	54						
	Space to 4th pallet	16		Surplus	20	inches		
Level 3	Headspace	6						
	Total Pallet height	54						
	Space to 3rd pallet	16		Minimum forklift reach	250	inches	20.83	feet
Level 2	Headspace	6						
	Total pallet height	54						
	Space to 2nd pallet	16						
Level 1	Headspace	6						
	Total pallet height	54	includes pallet + cases					
	Floor to 1st pallet	22	6 inches + pitch + beam					
Floor								

A critical issue in the new layout and use of flow-thru racking (with or without automation) is if 4 levels can fit with a ceiling height of 33 feet and 27 feet maximum racking height. This was achieved with 20 inches of surplus.

INSTEAD OF ABC SKU CLASSIFICATION WE USED VELOCITY CODES BASED ON INVENTORY LEVELS BY SKU

This analysis ensured the updated layout would support the planned growth

V Class	# pallets	% of pallets	# of SKUs	Criteria
V1	7348	51.2%	28	Greater than 99 pallets
V2	4162	29.0%	79	99 - 30 pallets
V3	1908	13.3%	122	29 - 10 pallets
V4	573	4.0%	94	9 - 5 pallets
V5	365	2.5%	247	4 - 0 pallets
Total	14356		570	
80% utilization	17945			

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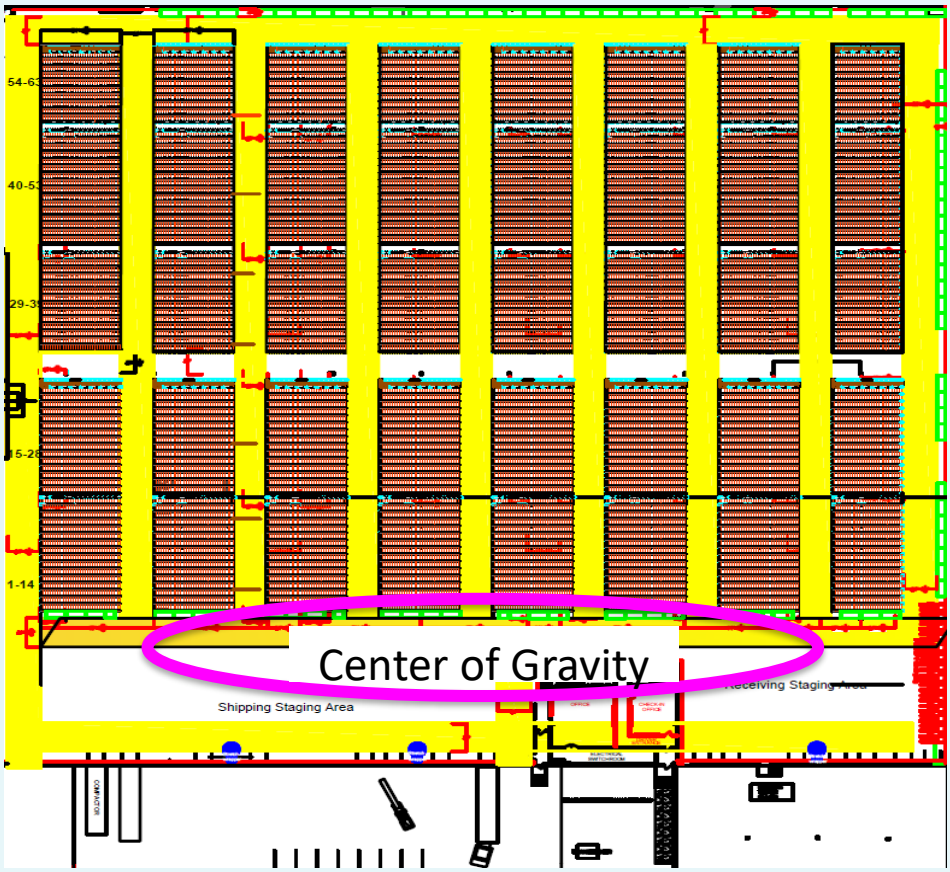
LAYOUT OF FLOW-THRU RACKING WITH STANDARD FORKLIFT AISLES

The 5-year growth requirement was 18,000 pallets. **The new layout of 4 level high, mostly flow-thru racking enabled storage of 19,400 pallets.**

The Center of Gravity is located by the inbound and outbound dock doors.

This became the baseline design for the automated warehouse vendors.

Flow Through Rack			
Rows	73		18688
Sleeve	8		
Levels	4		
Aisles	8		
Front Single Rack			
Single Bay	58		232
Levels	4		
Back and Right Single Rack			
Bays	80		480
Levels	3		
Pallets/level	2		
		Total =	**19400**



THE IMPORTANCE OF DESIGNING FOR PARTIAL PALLETS

- The reason the fully automated design was never adopted is an issue we discovered in our time studies – partial pallets.
- The WMS fills orders FIFO, causing a partial pallet with as little as 1 case to be on a pick-ticket. A 1 case pallet will not work in flow-thru racking or an automated warehouse designed for full pallets.
- Our design separated partial pallets onto standard (single-stack) racking that are consolidated into full pallets.

RESULTS

- Reduced warehouse staff from 22 to 12 with the Lean Warehouse racking-only design.
- Increased storage capacity from 12,000 to 19,500 with the Lean Warehouse racking-only design.
- Created a warehouse automation bid package that provided all data and baseline design that considered partial pallets.

Reference: Steve Davis, Sr. Vice President Ops & SC
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