

Industrial and Systems

Engineering

INCREASING SUPERMARKET PICKING EFFICENCY



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Dayton-Phoenix Group (DPG) is a locomotive manufacturing company that roots back to 1939. The company was recently rebuilt after the 2019 Memorial Day tornado disaster that affected the entire facility. The Dayton facility has 630,000 square feet of manufacturing floor space under the roof that is used to produce a range of quality products.

PROBLEM STATEMENT:



DPG is experiencing high waste during material handling and is striving to be a lean manufacturing facility through: (1) prioritizing picking for the work centers that are currently using materials over the centers that are currently not staffed, and (2) updating the in-house database software to have accurate information on parts, specifically the location of parts.



HOW TO INCREASE SUPPERMARKET PICKING EFFICIENCY?

PFEP • Permanent Inventory

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- Correct Inventory Lane Sizing
- Collecting Supermarket Data • Pick Times

PICKING PROCESS

LEVEL LOADING & SCHEDULING WALL CONSTRAINTS

Level loading, also known as production leveling or product smoothing, refers to a technique for reducing unevenness in operation which aids in waste reduction







TIME STUDY COURSE

Time study is the process of observing and measuring work being performed by another person using a timing device such as a stopwatch. This helps in the determination of how long it should take to complete a specific task. IE Jessica Leslie personally trained the ISE group on how to conduct a time study properly using a program she designed herself to train employees at DPG.

EMPTY DATA

Picked P#	Description	Picked Qty	Location (rack/bay/Shelf)	Hand pick (Y/N)	Full S kid (Y/N)	Hand Count (Y/N)	Forklift Cycle Time 1	Forklift Cycle Time2	Pick Time (per part)	Work Center	Material Handler	Size (S/M/L)
We collected a total of 320 entries which consists of picked part name, location of the part, size, time of pick, and if the pick required use of a forklift, and after data validation we continued with 303 entries. Each entry included 12 components												
that describe the nicking process. All data was collected through observation during January 2022 through March 2023												25lbs

DEPT 30/32													
DEPT 33													
DEPT35													
		DEPT 33											
31A000 Small Motor	31B000 Small Bal	31C000 Blade&Hub	31F000 Fan Ass	31J000 DC Motor	31R000 Stator Packs	31MISC	33A000 Awning/Elect.	33B000 Mirror/Wing	33C000 Toilet	33D000 Visor	33E000 Eng.Prot.Kit	33F000 Valves	33H00 Heate
										_			
		31K000 DB Mods			31RA00 REMAN								



Green Return Hook

Material Staging Lane

HOW WE INCREASED EFFICENCY & MATERIAL HANDLERS PRODUCTIVITY

Total Entries 303 Forklift 67 22.11% Hand Pick 236 77.89% 227 74.92% Hand Count

In total, we found that nearly 75% of the parts picked require counting by hand resulting in increased pick time. This could be reduced by level loading the pick board with consistent quantities and purchasing materials in the corresponding pack quantities

infor SyteLine

In the ERP system, SyteLine, the inventory location of stored material in the purchased supermarket are displayed with a leading "S" followed by the row, bay, shelf number. The team was interested in exploring further the significance of shelf height, as it had been observed to have an impact on picking time. In this Table, the data shows that a total of 66% of parts picked were retrieved from shelf three or below within hand pick height.





The Average Pick Time by Location graph depicts the impact of shelf height on pick time. The figure shows that there is a positive correlation between increasing shelf height and observed pick time. Student collected data proves that the pick time can be affected by up to nearly a minute and a half depending on shelf height. Forklift Full Cycle Time by Shelf, shows very little difference in forklift time between shelf 1, 2, and 3. This is likely because the material is not above the operator's field of view, and he is more confident in moving quicker when operating the forklift.

The graph at right follows the number of pieces moved by a single material handler from October 2022 to early April 2023. It shows that after implementing the Green Card Process the number of material transactions decrease in relation to pieces moved. This indicated that the material handler was making more efficient picks, as they were moving more material in less moves.



25 unique estimated job pick times were compiled from student collected and SyteLine data. DPG has over 3,000 unique products, and while our 25 estimated job pick times are just the beginning, this information can be used to support the team's effort in level loading the scheduling of jobs that begin with picking materials from the Supermarket.

PROJECTSFOR NEXT GROUP-MOVING FORWARD

The information collected will be used by DPG's supply chain specialists to allocate ample time for picking when scheduling new jobs. Including accurate picking time in the scheduling process will reduce time wasted waiting on material. This information may also be used in the process of updating DPG's in-house database software, SyteLine, to populate accurate inventory information, with a focus on parts location.

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References

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