

ICA 19: Activity Profiling

ISE 453: Design of PLS Systems

Fall 2018

Activity profiling involves the systematic analysis of item and order data. This data can be used to determine warehouse design parameters that can be used to select the most appropriate methods and equipment to use for piece picking in a warehouse. Three sets of representative customer order data and an item master file are in the spreadsheet *ItemOrderData* that is available on the course webpage (with length, width, and depth in inches; cube in cubic-inches; weight in pounds; and UOM and EA abbreviations for “unit of measure” and “eaches”). This data can be used to answer the following questions:

1. How is it possible to determine that piece picking should be used for each of the datasets, as opposed to either pallet or case picking?
2. Assuming a different piece picking method will be used for each order dataset, determine the most appropriate method using the parameters total lines and lines per order.

Dataset	Total Lines	Lines per Order	Method
OrderSet1			
OrderSet2			
OrderSet3			

3. Using dataset “OrderSet1” and the item master file, determine the most appropriate type of equipment to use to pick each SKU assuming that at least one of the eight different SKUs in the dataset is assigned to each of the following types of piece picking equipment:

A-frame, bin shelving, carton flow rack, horizontal carousel, storage drawers, and vertical lift module.

SKU	Lines per Item	Cube Movement	Equipment Type
1			
2			
3			
4			
5			
6			
7			
8			

4. Referring to the item master file, explain why the cube (in³) of each item needs to be listed in the file, instead of just calculating its value using the product of the item's dimensions?
5. Determine the demand correlation distribution for the eight SKUs in the dataset "OrderSet1" (in each cell, you should indicate the number of orders instead of calculating a percentage):

SKU	1	2	3	4	5	6	7	8
1	—							
2		—						
3			—					
4				—				
5					—			
6						—		
7							—	
8								—

6. Three different cartons sizes are available to pick-and-pack the orders in "OrderSet1": A ($8 \times 6 \times 6$ in.), B ($12 \times 8 \times 6$ in.), and C ($16 \times 10 \times 8$ in.). Determine which carton that should be used for each orders 1–4:

Order	Carton	Order	Carton	Order	Carton	Order	Carton
1		2		3		4	

7. Two aisles of bin shelving will be used to store all of the eight SKUs in dataset "OrderSet1." At most, four of the SKUs can be stored in each aisle. (a) Assign each SKU to one of two groups of four so that the number of orders that can be completed by using the SKUs from a single group/aisle is maximized. (b) For each group, how many orders can be completed using the SKUs from just that group? (c) Assuming discrete picking, assign each group of SKUs to one of the two aisles so that the distance traveled by the order picker is minimized. (d) "Slot" the items in each aisle based on their "popularity."

