ICA 19: DSAP

ISE 453: Design of PLS Systems

Spring 2020

1. What is the change in the minimum expected total distance traveled along an eight-foot-wide down aisle for single-command S/R operations if four-high dedicated, as compared to randomized, block stacking of 42 × 36 in. two-way pallet loads of products A, B, and C is used? The area used for randomized storage maximizes 2-D cube utilization and the same storage depth is used for dedicated storage. All of the products are stored on one side of the aisle, and the opposite side of the aisle is used to store other products. The maximum inventory levels of the products are 120, 60, and 240, respectively, the levels are uncorrelated and retrievals occur at a constant rate, the products have throughput requirements of 30, 60, and 20, respectively, and the I/O port is located at the end of the aisle. (*Answer*: 540 ft increase (3090 ft dedicated, 3630 ft randomized))

Lane/unit-load width	Х	3	ft						
Unit-load depth	У	3.5	ft						
No. different items	N	3							
Down aisle width	Α	8	ft						
No. levels for stacking	Н	4							
No. of rows (lane depth)	D	6							
SKU		Total	Α	В	С				
Max no. units of SKU i	М ;	420	120	60	240		Randomized		
Dedicated	,				Est	. max no.	total units	М	210
Number of lanes	L(D)	18	5	3	10	Numbe	er of lanes	L(D)	11
	Г	Dedicated		Random					
	A	B	С	ABC					
Slots	5	3	10	11					
f	30	60	20	110					
f/M	6.00	20.00	2.00	10.00					
I/O	0	0	0	0					
	3		8	0					
Offset	-	0		-					
E(SC)	11	3	26	11					
TDi	330	180	520	1210					
TD (slots)			1,030	1,210					
TD (ft)			3,090	3,630					