

Improve warehouse productivity with better layout designs supported by efficient product slotting

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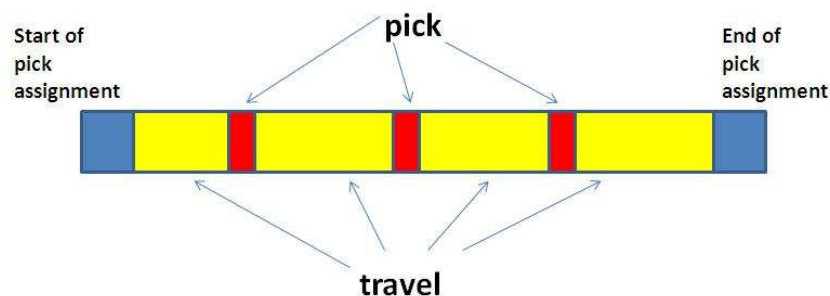
Are you sure that you have the most efficient layout and product slotting?

We hope to surprise you with some unique and proven ways to improve the productivity of your warehouse productivity. We are confident that we can cut down your order picking costs by 30-50%.

Product slotting and key layout design variables

1.0 Reduce picking travel time without creating congestion

During the picking operation, the warehouse staff visits various product locations and picks the required quantities. In the graphic below, the actual pick times are shown in RED and the intervening travel times are shown in YELLOW. At the two ends of the pick cycle, we have certain operations associated with the order, such as getting an empty pallet, stretch wrapping the picked load etc. Depending upon the efficiency of the slotting, the amount of travel time as a portion of the total time may be in the range of 40% – 65%. Our slotting process identifies the excess travel time and radically cuts it down with better slotting.



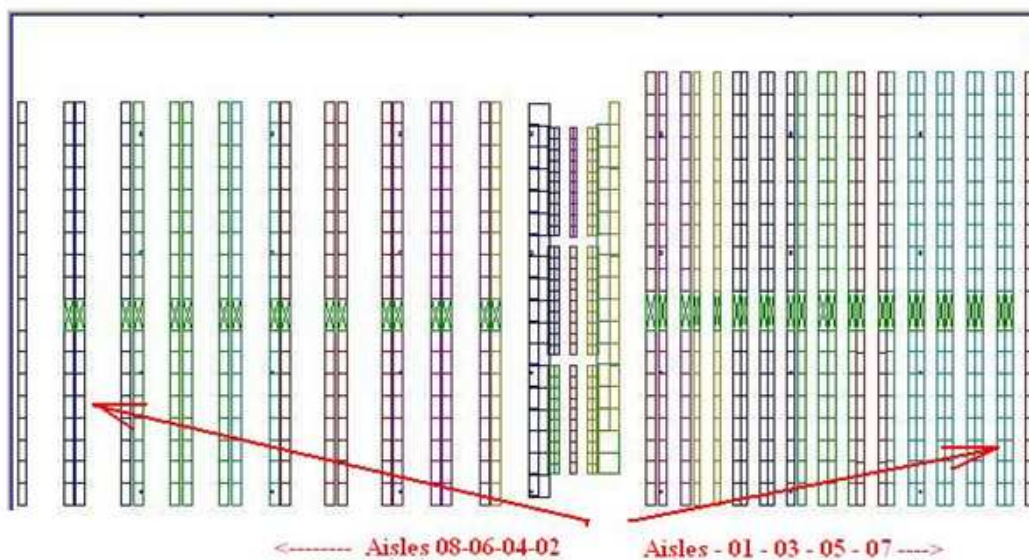
2.0 Walking past slow or dead pallets - One 4 Feet = \$1,596 per year

	<p>At 200 orders/day, 8 lines / order, 4 feet per pallet, Extra distance = 6,400 ft / day, At 200 Feet/Min, 32 mins/day, 133 hrs/yr, \$ 12/hr, \$ 1,596 /yr</p>
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Next time, when you walk in any aisle in your facility, try to determine how many slots contain popular items and how many used to be popular a few months ago. The unpopular items may be an out-of-season item, discontinued item or an item where a newer item of the same kind has replaced it. Each pallet has an approximate facing of 4 feet. Every time an order picker walks by that unpopular item or a forklift drives by that unpopular item, it takes some travel time and hence costs money.

In the table above, we have calculated the annual cost of travelling past 1 pallet containing the unpopular item.

3.0 The Aisle numbering scheme.

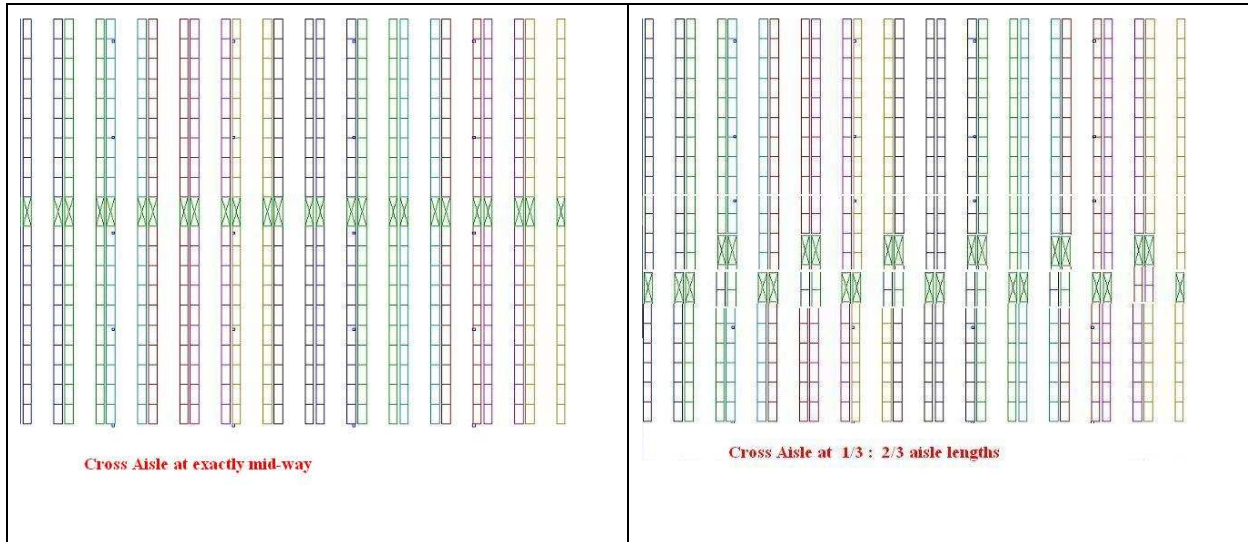


We tend to use a simple aisle numbering scheme. We start in 1 end of the facility with Aisle Number 01. Then we proceed with numbers 02, 03, 04 etc to the other end of the facility. In some facilities, inside their computer system, they re-map it to fit their picking system. We are concerned with 90% of the facilities in the country that have not heard of re-mapping.

We saw in the previous section that walking (or driving) past 1 unpopular pallet costs about \$ 1,500. With the simple but inefficient aisle numbering scheme, we are forcing every order picker to walk past many hundreds of such unpopular pallets.

Our suggestion: Start in the middle. All the ODD numbered aisles go to the right (or left). All the EVEN numbered aisles go the other way. We will slot all the FAST movers in the middle, surrounded by MEDIUM movers. The two ends of the facility will be slotted with SLOW movers. This will immediately cut down the total travel time significantly. And only those orders that call for picking some SLOW items will incur the extra time to get those SLOW items.

4.0 Purpose of cross aisles and tunnels

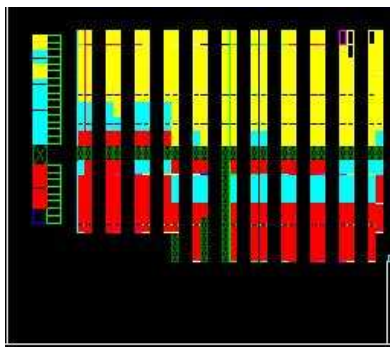


How many facilities have a cross aisle or a tunnel in the exact mid-point of the Aisle? Is there any particular reason to justify this? No.

Think of the cross aisle as a means to escape from one aisle to the next. Given the 80:20 rule, can we try to slot as many of the FAST movers in the lower 1/3 of the aisles. This will require the cross aisle to be located at about 1/3 distance from the beginning.

To ensure safety, we can stagger the cross aisles by 1 bay, from one aisle to the next.

5.0 Layered slotting to avoid congestion in FAST mover sections

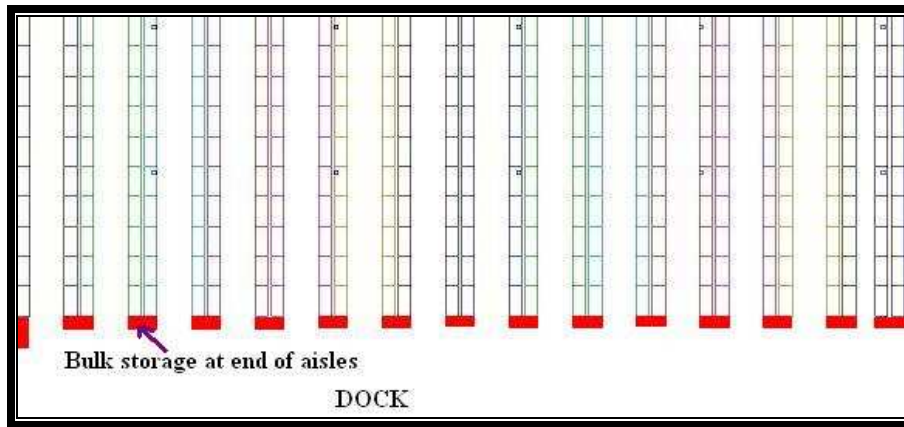


In the previous sections, we have illustrated many ideas to cut-down travel time. But if we have created congestion, then we have achieved nothing. We want the order pickers to enter an aisle, pick the popular items in the very first bay or the second and then leave that aisle. Proceed to the next aisle. And only if a particular order calls for a slower moving item, then travel additional distance in the same aisle.

We need to number all the First bays in every aisle as O1 for Odd side and O2 for the Even side.

Then during the slotting process, we will take all the A items (using their HITS values) we will first slot all the O1 and O2 bays first in all aisles. Then we slot all the O3 and O4 bays in all the aisles etc.

6.0 End-Aisle-Bulk slotting



We slot all the promotional items at the end of all aisles, close to the dock. These are usually 2 deep and 2 high bulk storage. The slot numbering scheme must allow a few bay numbers to accommodate this bulk stocking for promotional items.

7.0 Design of a pick line for less than case picks.

Loose Case Analysis

- **Orders may be shipped in full pallets or cases depending upon the size and nature of customer orders → Based on a week's worth of actual orders, this Loose case analysis shows the proportion of orders in the 2 categories**
- **This information is useful in designing the pick line for case pick items**

ITEM NUM.	DESCRIPTION	ON HAND	ISSUE	HI	TI	STK HT	FULL PAL	LOOSE C	LSE EQV
4466100	FIT & TRIM 1/40#	2,418	65,866	5	5	3	110	2278	91
4906100	BISCUITS LARGE 6/4#	9,458	237,050	3	9	3	30	748	27
5881600	DOG ADULT 001	0	714	10	5	3	194	703	14
30900	COUNTRY 24/5.5 OZ	13,666	486,904	14	14	3	13	2696	13
30600	TENDERBEEF 24/5.5 OZ	19,898	656,628	14	14	3	15	2664	13
30800	TURKEY & GIBLETS 24/	26,277	680,888	14	14	3	16	2562	13
5883200	DOG GROW TH 005	0	0	5	5	3	33	328	13
32800	OCEAN W WHITEFISH 24/5	14,255	428,255	14	14	3	1	2523	12
4633700	KITTEN CHOW 12/3.5#	2,789	89,302	5	5	3	75	286	11
41300	RAINBOW TROUT 24/5.5	8,595	315,375	14	14	3	10	2142	10
30500	CHICKEN 24/5.5 OZ	10,839	338,422	14	14	3	9	2033	10
30200	TUNA & CHICKEN 24/5.	13,274	630,515	14	14	3	14	2025	10
30400	CHICKEN & LIVER 24/5	14,465	407,433	14	14	3	8	1978	10
4299000	BUTCHERS BURGER 6/54	2,228	82,574	4	12	2	70	486	10
5661400	DELI CAT 6/3.5#	1,487	193,861	3	10	3	224	323	10
5912900	AD L CAT PRO 005	3	1,319	5	5	3	11	272	10
5845000	PRO-PL LITE 005	0	320	5	5	3	15	271	10
5882900	DOG ADULT 001	0	1,105	8	3	3	729	249	10
32600	BEEF & BACON 24/5.5	9,502	269,517	14	14	3	3	1948	9
30700	BEEF & LIVER 24/5.5	18,419	299,601	14	14	3	1	1928	9
41900	SALMON & CRAB 24/5.5	8,930	276,146	14	14	3	9	1904	9
41200	PACIFIC SALMON 24/5.	11,322	335,007	14	14	3	4	1819	9
4962100	BEGIN STRP 010	539	46,550	6	16	3	5	905	9
4632400	KITTEN CHOW 12/18 OZ	3,686	96,531	7	8	3	63	556	9

8.0 Storage options

Slot opening	inches	No of Items	Number of slots	
			Pick	Reserve
Smallest				
Slot opening # 1	25	563	563	20
Slot opening # 2	54	211	214	767
Slot opening # 3	72	223	226	1139
Slot opening # 4	0	0	0	0
Slot opening # 5	0	0	0	0
Largest		997	1005	1921

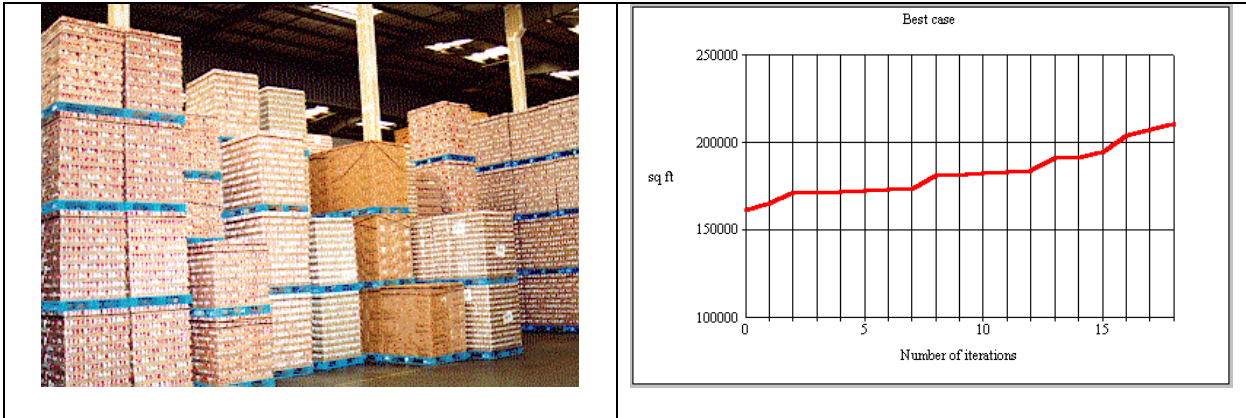
Analysis options

- Extra layer of case over pallet
- Multiple faces for pick slot

Onhand cube in the slot = 4 weeks of case cube

Screen shows how products can be profiled to fit different slot openings. Using the standard GMA pallets in the US, we have found that a combination of 25", 54" and 72" to be a good combination. However, you will find many special industries, where this combination may not work.

9.0 Bulk storage applications



The challenge in slotting bulk storage is in reducing ‘honey-combing’. The deeper the storage, say 6 deep or 9 deep, as we start using the front pallets, we create empty pallet locations that cannot be used. These empty pallet positions are called ‘honey-combing’. The aisle width in most bulk storage facilities tends to be around 12 feet wide or about 3 pallets deep.

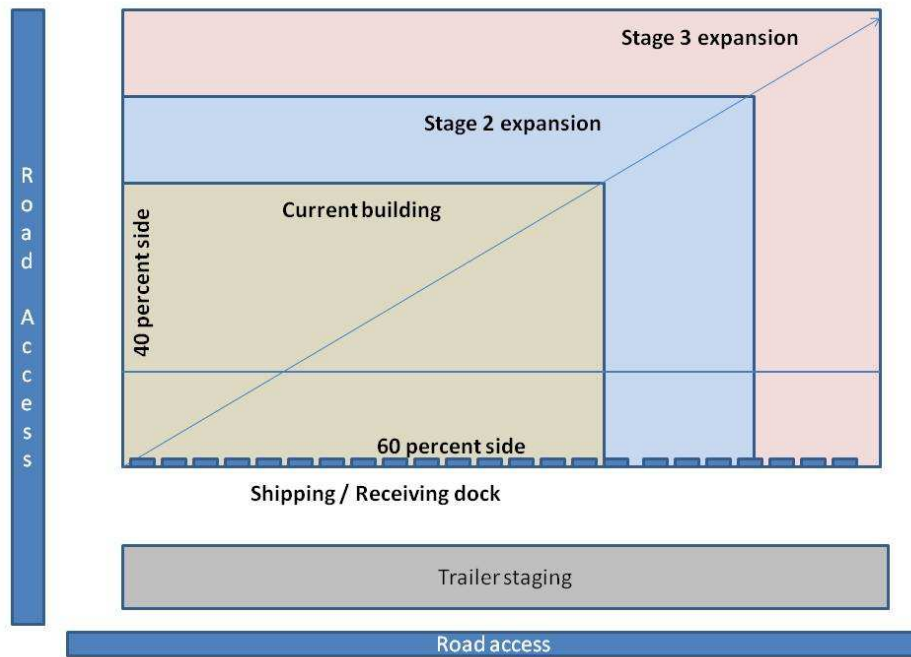
Our slotting process contains a heuristic analysis to find the right combination of pallet depths to maximize the storage. The graph on the right shows 18 iterations (for illustration only) and the total storage area changes from 160,000 sq.ft to 210,000 sq.ft. The full heuristic analysis contains 2,400 iterations.

10. Bulk storage using large rolls.

In many industries like paper manufacture, products are stored directly on the floor. Forklifts with special clamps pick up these rolls.

<p>Rolls are stacked at 90 degrees to the aisle.</p> <p>The aisle is usually around 14 feet</p>	<p>Rolls are stacked at about 60 degrees to the aisle.</p> <p>Slightly narrower aisle of 12 ft. Less product damage</p>

11. Building a new warehouse or remodeling an existing one – 60:40 rule



In the distribution activity, we have 2 kinds of capacities. 1- Storage Capacity. 2- Throughput capacity. For the majority of warehouses located closer to the retail centers, we need to have the right mix of storage capacity and the throughput capacity. Often this is not the case. You may have lots of storage space but not enough receiving and shipping doors. Or vice versa.

The picture above shows the correct use of the 60:40 rule. The 60 side is the width of the building with the shipping dock. The 40 side is the depth of the building. Starting with the current building, as we expand the facility through Stage 2 and Stage 3 expansions, the correct ratio of storage capacity and the throughput capacity must be maintained.

12 How can you benefit from these new and cost-saving methods?

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Or send an email with your request to: karma.logistics.slot3d@gmail.com