



SPECIAL REPORT

Pallet Rack: How to Avoid Costly Errors in Planning & Installing

By Tom Jameson, President
ShelfPlus, Inc.

Expert tips & strategies for making sure your pallet rack project maximizes efficiency by storing more in less space

SHELFPLUS SPECIAL REPORT

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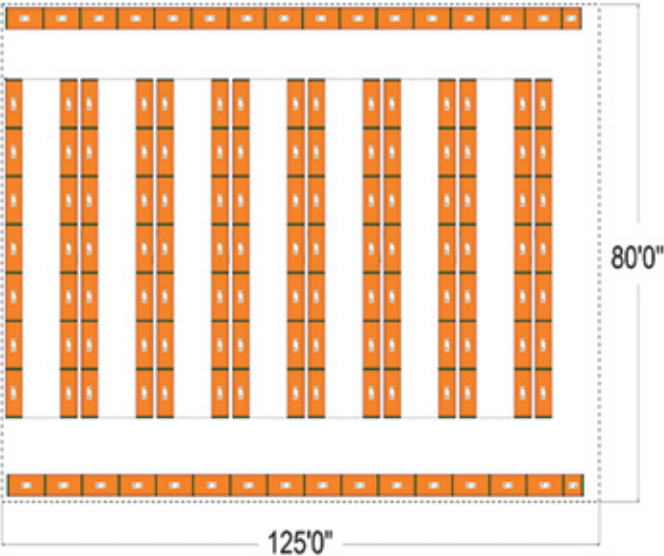
Pallet rack can be an invaluable tool in a manager’s effort to effectively use every available square foot of storage space – both vertical and horizontal.

Or, if installed without careful pre-planning, pallet rack can contribute to a substantial & costly waste of usable floor space.

The purpose of this Special E-Report is to share basic guidelines and insights that’ll help you plan & effectively install pallet rack in your workplace.

To make our report illustrations consistent, I base examples on the most common standard unit load size: The 48” x 40” pallet (48” deep x 40” wide). Our space model is a 10,000 square-foot floor space (80’ wide x 125’ long).

Figure 1



First, a pallet rack layout to avoid at all costs

Let’s start by analyzing a pallet rack utilization pattern we see far too often in warehouses and distribution centers. It’s clean and simple. However, the deceptive layout illustrated in **Figure 1** is actually one of the most unproductive layouts you could consider for our workspace.

Why is this seemingly logical plan one I recommend you avoid? Consider each of the four standard rules for efficient layout of pallet rack this layout breaks:

- 1) **NEVER lay out pallet rack rows** across the short dimension of your workspace. Doing so will cost you at least 5% of your building's storage capacity.
- 2) **NEVER create a perimeter aisle with racks single deep around the walls.** Again, this error will cost you 5% or more in available square feet, and limit your options in other ways as well.
- 3) **NEVER position rack in the same area oriented in two directions,** i.e., some rack oriented north/south, others going east/west. This error creates another floorspace penalty of approximately 5%.
- 4) **NEVER lay out an aisle at a wall.** Every aisle should give access from two sides. It takes the same width aisle to serve two sides of an aisle as one side. So, if you use only one side, you're wasting floorspace.

Thus, the layout illustrated in Figure 1 violates all four of these rules...and, as a result, stores only 272 pallets per level in 10,000 square feet.

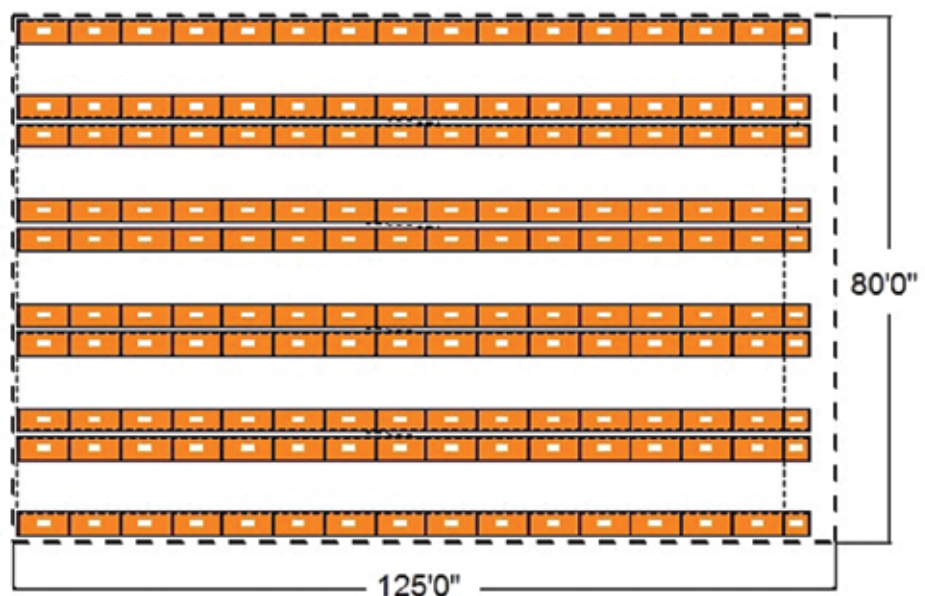
In the real world, we sometimes find we may have to bend some rules, and rack layout is no exception. But, you should absolutely know that if you ignore any of those four cardinal rules, you are costing yourself part of your area storage potential. And if you violate all four, and then allow obstructions to confuse your thinking, you could lose up to 25% of the real usability potential of your building.

If you ignore any of those four rules, you limit storage potential.

A better plan that stores 14% more materials

Figure 2 illustrates an improved pallet rack layout that stores **310 pallets per level**, a **14% improvement** over our Figure 1 plan.

Figure 2



Specialized Rack delivers even greater space-savings

Different kinds of lift equipment call for different layouts, so I'll run through some examples of variations in laying out our 10,000 square feet of model space. For comparison purposes, I'll only count the pallets at floor level.

Different types of lifting equipment and different types of buildings allow many variations in the number of units high. Our model area is 80' wide by 125' long, 10,000 square feet.

Figure 2B — Moveable Pallet Rack

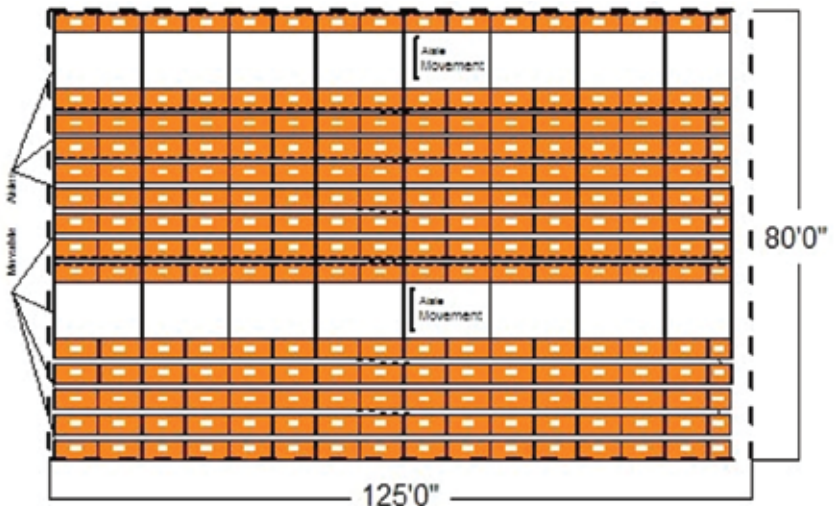


Figure 2B uses Moveable Pallet Rack, or “Activerack,” to convert aisle space into usable storage space...and boost storage capacity 40% to a whopping 434 pallet positions per level.

Moveable pallet rack systems operate on mobile carriages that eliminate unused aisle space and can nearly double your storage capacity. There are virtually no limits to the size, bulk, weight or shape of items that can be stored on moveable pallet racking. This includes almost anything that can be moved by forklift, truck, or crane. Flexible and adaptable, moveable systems work within almost any building support or ceiling restrictions and can be reconfigured easily if needs change. They work particularly well for the 80% of inventory which is slow-moving or seasonal.

Figure 3 uses counter balanced trucks and shows 12' wide aisles, but even with a small truck, you could still employ 10-1/2' aisles and get 248 pallets on one level. Moveable shelving systems operate on mobile carriages that eliminate unused aisle space. There are virtually no limits to the size, bulk, weight or shape of items they can store.

Figure 3 — Counter Balance Truck

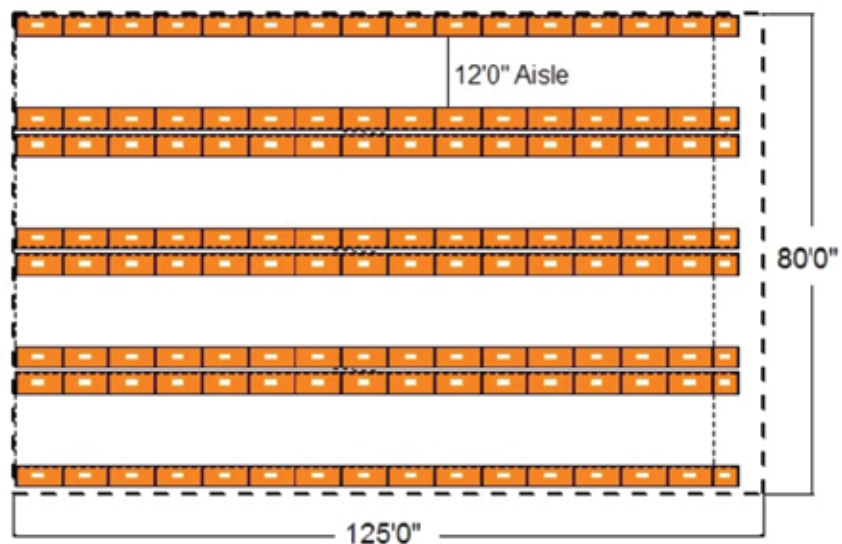


Figure 4 — Reach Truck

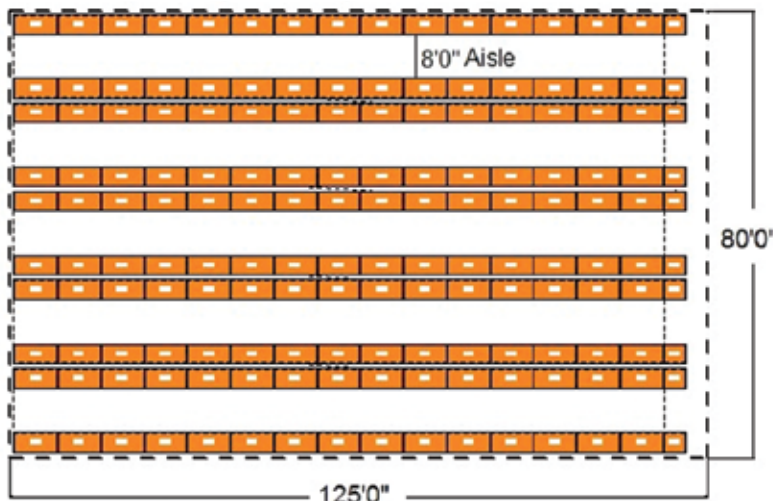


Figure 5 — Swing Reach Truck

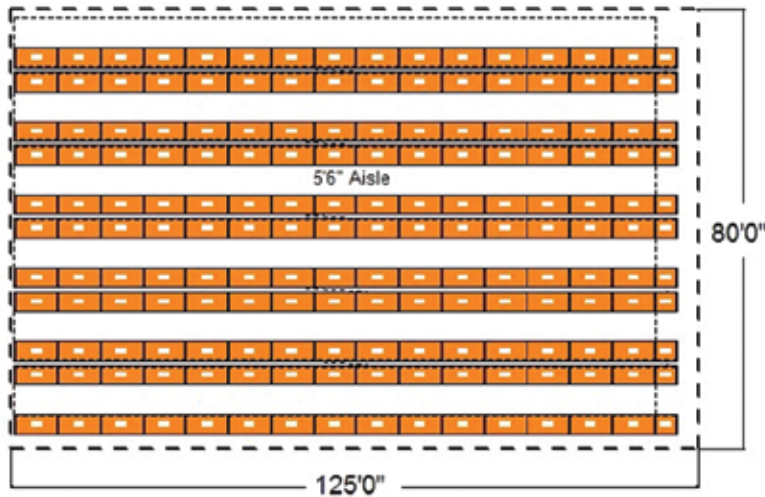


Figure 6 — Stacker System

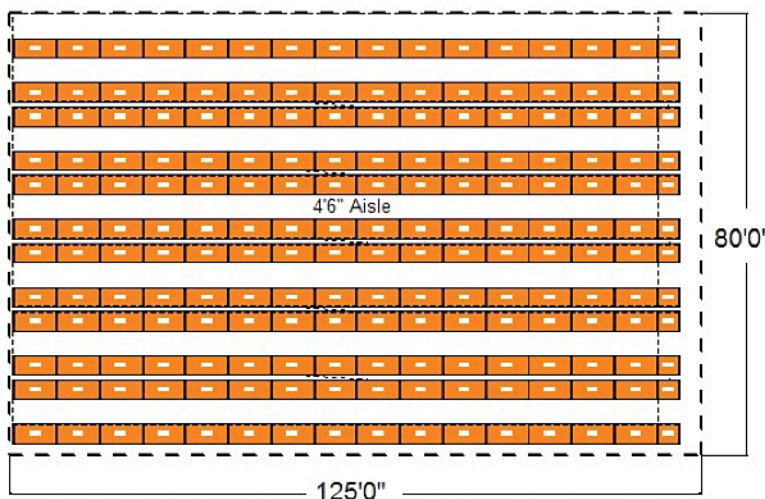


Figure 4 uses narrow aisle trucks in 8' aisles and provides 310 pallets on one level. Again, reach and straddle trucks can work a little tighter than in 8' aisles, but in a 10,000' space, no additional storage would be created by using 7-1/2' aisles. And, 8' aisles allow two trucks to pass in the aisle, an important convenience and time-saver.

Storing more in less space is the key to creating efficiency. Careful pre-planning & professional help avoids costly errors in pallet rack installation.

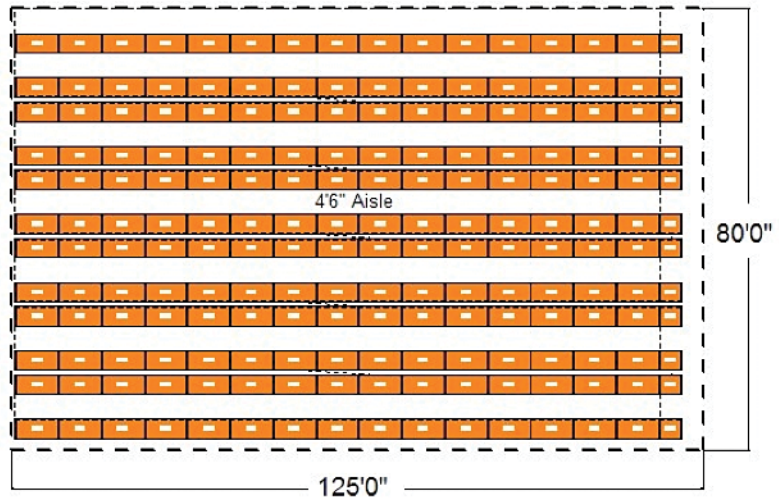
Figure 5 illustrates using swing reach or side reach trucks to reduce aisle width to 5-1/2' and store 341 pallets per level.

Figure 6 –With captive aisle stacker systems, such as high-rise and other guided vehicle systems, a 54" aisle provides storage for 372 pallets per level.

Figure 7, with 10' aisles for a double reach type truck, provides space for 372 pallets in our model 10,000 square feet.

If you use a double reach side loader, you can operate with 6' aisles and get 434 pallets per level. And, of course, if you go to drive-in, drive-thru racks going deeper than 2 pallets, you can get even more pallets stored.

Figure 7 — Deep Reach Truck

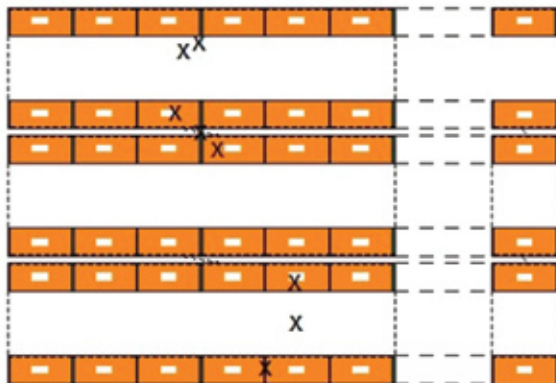


Here's another important planning rule

To make pallet rack planning as easy as possible, first draw pallet rack layout into a wall-to-wall empty building, and draw it as the ideal layout. . . as if there were no columns or other obstructions interrupting the floor surface.

Then, **after you have designed the best possible layout for the space, draw in the columns and obstructions and change the ideal layout as little as possible to accommodate those obstructions.**

Figure 8



In **Figure 8**, I illustrate some recommendations on how to accommodate building columns in your layout.

In the left half of this drawing, there are six Xs representing columns, none of which are a serious hindrance to a good system served by fork trucks.

However, the top two Xs show columns in the aisle which, with captive aisle systems, high-rise stacker systems or side loader systems, would be unacceptable. This drawing shows a typical

layout for 48" x 40" pallets served by reach type trucks and 8' aisles.

Again, addressing the six columns at the top of **Figure 8**, three of the columns positively obstruct one pallet opening from floor to ceiling, but the two in the flue space – and the top one in front of the upright – do not interfere with fully loading the racks.

Now, let's look at the bottom three column Xs in **Figure 8**. The bottom-most X is trying to occupy the same space as an upright and, although not impossible to deal with, is awkward.

The second X from the bottom column is directly in the center of the aisle, which leaves less than enough space on either side of the column to get a truck and pallet past safely. The third X is in the center of the rack shelf and will probably prevent storage on either side of the shelf.

How to deal with columns obstructing aisles

Figure 9 is an example of how to deal with columns centered in aisles. Using the same 80' x 125', 10,000 square-foot model as in previous examples, I have added 20' x 25' columns on center to illustrate the problem.

Aisle 3 has columns centered in the aisle, and the cross-aisle situation is impossible.

These examples were postulated on reach type trucks in 8-foot aisles, and, as I mentioned earlier, most are designed to work in 7'6" aisles.

Figure 10 illustrates one way to "move" obstructive columns out of the way. Narrow aisles 1 and 2 to 7'6" and widen aisle 3 to 9'. Presto...column is out of the aisle center. Then, move your cross-aisle over one bay and you are set to go. Some safety engineers make arbitrary rules prohibiting columns in the aisles. In my opinion, such rules are unrealistic and indefensible.

Figure 9



Figure 10



More ideas, no-cost professional help

Remember these ideas when planning your shelving layout project:

- 1) Keep all shelving rows going in one direction, in the direction of product flow
- 2) Manage the obstructions to good layout. Don't let them manage you.
- 3) Allow enough clearance for smooth traffic flow under varying conditions.
- 4) Design your system with your NEXT storage expansion in mind.

Finally, with all the traps and pitfalls involved in setting up an efficient pallet rack system, it often makes sense to get professional advice on the best, most cost-effective layout for your operation. That's why my company, ShelfPlus Inc., offers professional space surveys and product recommendations. If you'd like the benefit of our expert input – **free and with no obligation whatsoever** – call us **Toll-FREE** at **1-800-838-0473** for a free space survey and product recommendations.