

Benefits of and Savings from Using Cube Data in a WMS

Many warehouse management systems (WMS) offer features that can utilize product dimensions and weight to improve the storage and fulfillment processes within a distribution center. We're often asked by WMS users whether these features should be required when seeking a new WMS, or activated in an existing WMS.

The simple answer might seem to be *yes*—more features are good, right? But capturing and tracking product attributes—elements like length, width, height, cube, weight, and carton cube—can be a time-consuming and never-ending task for your warehouse team. Let's look at how accuracy, space utilization and operational processes are affected by WMS functionality that uses product dimensional attributes, then explore the effort to gather such information.

The Benefits

Improved Accuracy - Dimensional data can help verify that a process was completed correctly. For instance, weight can be used to verify order accuracy by comparing the theoretical packed carton weight to an actual carton weight. But this is useful only for distributors with widely varying item weights such as hardgoods. Distributors of apparel, media (books, CDs, DVDs,) and other similarly sized items cannot fully benefit from this because many items share the same physical attributes, and a weight check will not uncover picking/packing discrepancies. *Savings: variable.*

Better Space Utilization - Among the biggest misconceptions about a WMS is that it can save warehouse space. As we'll see later, dimensional data can drive WMS features that efficiently

suggest available and ideal locations to place goods, but this benefit is mostly in labor savings, not space savings. Cramped, poorly utilized warehouses are mostly a symptom of (1) too little space for overall business volumes, (2) inventory levels that far exceed what's needed to support sales, (3) the wrong equipment (say, using carton flow when small shelves are a better choice), and/or (4) a poor facility layout, not a lack of WMS functionality. *Savings: none.*

More Efficient Operational Methods -

Cube/weight can help here. Any process that involves fitting a unit/carton/pallet into a physical space may benefit from WMS-guided functions that utilize cube/weight. Here are some common ones:

a. Faster inventory check-in: Items packaged in bulk but sold as an "each," such as nuts and bolts, are often too numerous to count when verifying a receipt. But a simple weight measurement of the carton or shipment, as compared to a known item weight maintained in the WMS, can easily yield the quantity received. Similarly, weight can aid in picking large quantities of small, low-cost items. *Savings: up to 10% of receiving/picking labor.*

b. Faster pallet-building in receiving: This is usually driven by tie-high attributes of the item, not by a cube setting. *Savings: none.*

c. Faster putaway to reserve: The WMS can suggest a putaway location that has space available for the case or pallet, based on cube,

which can reduce an operator's travel time to find an open location. For particularly heavy items, the WMS can suggest a rack location that's rated for that weight. Most commonly, however, WMS users set location capacities not by cube, but by quantity of cases or pallets that will fit. They find this is a much simpler approach that yields the same benefit. Besides, it's only during peak inventory periods that finding a suitable putaway location becomes an issue, assuming the reserve area is properly sized, and this only occurs a few weeks of the year. *Savings: 5% of putaway labor.*

d. Faster replenishment: Operators usually configure a WMS to direct replenishments based on a *min/max* approach, and cube can be the driver. Most commonly, though, users set min/max in terms of units because it's simpler and isn't significantly less accurate than cube. The max is usually set at the item's standard case quantity, to ensure that only full cases are replenished. A cube-based replenishment determination could inadvertently force stockers to replenish loose units, which are hard to handle as they travel from the reserve to active areas. *Savings: none.*

e. Faster picking: Using dimensional data to optimally assign items into pick locations can improve space utilization somewhat, but its bigger effect is in speeding the picking process by reducing travel time and shortening reach distances. This assignment process—often called slotting—is typically a one-time activity performed using spreadsheets that combine sales unit history, forecast unit sales and product dimensional data. A WMS may provide automated slotting functionality using dimensional data, but few distribution operations use such features on a continual basis, so think hard before purchasing this feature which is often an add-on module. In our experience, a better WMS feature to leverage for improving active pick location utilization is *dynamic* or *temporary* SKU assignment functionality, which allows for rotation of many SKUs through fewer locations and does not require product cube data. *Savings: up to 5% of picking labor.*

f. Faster packing: Cube/weight can drive the WMS to suggest the optimal carton size to contain

a customer's order. This is most beneficial for multi-carton orders, and/or items that are bulky and not easily packed with each other. (Fewer cartons usually mean reduced shipping costs in a parcel shipping environment.) A WMS-determined carton size is essential if orders are picked directly into the shipping carton, which essentially eliminates a separate packing area. This approach is also beneficial when customers want to understand the shipping attributes of their order at the time of ordering, such as number of cartons, shipping charges, etc. There is much less benefit, however, for batch picking environments of single-carton orders where items are delivered to the packer. Here, the packer can visually determine the best size carton without the help of the WMS. *Savings: up to 50% of packing labor, depending upon picking/packing concept, and 10% of parcel shipping cost.*

g. More efficient trailer loading: As with carton packing, cube/weight can aid in filling trailers to minimize cost. Functionally, the WMS selects orders during the waving process whose aggregate cube fits into the container or trailer. This usually benefits wholesalers/manufacturers of large items who fill entire shipping containers for overseas shipment, where the transportation cost is driven by the quantity of containers. Distributors with private fleets and pre-determined routes, such as for a regional retailer, may also benefit from these capabilities. Distributors who rely on parcel carriers for shipping rarely benefit from optimizing trailer loading, however. *Savings: 10% of transportation cost.*

The Costs

The above savings should be weighed against the one-time cost of capturing cube and weight data, as well as the long-term maintenance of the data. Every new SKU must be measured, weighed and entered into the WMS, and this job almost always falls on warehouse personnel. In our experience, buyers and vendors rarely capture or provide

complete and accurate data, if at all. For some of the functionality described above, an item's carton attributes must be separately captured to account for air or fill inside the box. Be sure to understand the labor commitment over time.

Special equipment like weigh scales or automatic measuring devices are often needed. And don't forget about the costs associated with bad data; it takes time to relocate a carton that the WMS thought would fit into its originally suggested location.

On the other hand, shortcuts often help in gathering the dimensional data, like classifying all SKUs into a handful of categories and

assigning the same attributes within a category. The first-time and long-term effort is manageable if the SKU population is in the hundred or thousands of SKUs, but becomes more difficult for ten of thousands of SKUs.

We often suggest to our clients that they defer cube/weight WMS functionality for a later implementation phase, after the core, *must-have* WMS functionality is implemented. This gives operators time to understand and benefit from their new WMS, and then make a more informed decision regarding the additional benefits of cube/weight-driven functionality.

Cost Savings from Each Benefit of Employing Product Attributes Data in a Warehouse Management System

Benefit	Cost Savings
Improved Accuracy	Variable
Better Space Utilization	None
More Efficient Inventory Check-In	Up to 10% of labor
Faster Pallet-Building in Receiving	None
Faster Putaway to Reserve	5% of labor
Faster Replenishment	None
Faster Picking	Up to 5% of labor
Faster Packing	Up to 50% of labor and 10% of transportation expenses
More Efficient Trailer Loading	10% of transportation expenses



About the author:

Michael T. Emmerth, Sedlak manager, joined the firm in 1997. His expertise is in managing facility design and information systems projects, especially for clients with unique multi-channel supply chains. Mike obtained a B.S. in applied mathematics from Carnegie Mellon University and M.S. in operations research from Georgia Institute of Technology.