

# BWH News Letter

Volume 4 Number 2

## Managing Supermarket Inventories

For the self-distributing supermarket retailer, it is necessary to manage both Warehouse and Store inventories. The management of these two inventories is completely different.

Warehouse inventories involve economic order quantities based on product cost, PO handling cost, inventory carrying cost, and forecast demand. The objective is to maximize total return by minimizing costs and maximizing service. For store inventories, the objective is to “keep the shelves full”. This assumes that the shelf space has been allocated to minimize handling costs and maximize revenue.

Inventory management is a three step process: Planning, Execution, and Evaluation. Planning involves forecasting your inventory requirements and setting your replenishment schedule. Execution is based on actual inventory positions and short term requirements. Evaluation is done to improve forecasts and adjust the planning parameters for the next cycle. In warehouse inventory management when to order is determined during the execution phase. In store inventory management it is determined during the planning phase.

### Warehouse Inventory Management

Warehouse inventory planning involves the classic Economic Order Quantity (EOQ) that calculates how often orders should be generated for a particular source. We factor in the cost to acquire the inventory (product cost, delivery cost, put away cost) against the carrying cost (cost of money, damage, obsolescence) to determine what order sizes are most economical. These calculations are usually based on a forecast for average movement. EOQ must be recalculated anytime there are major changes in any of the cost factors or the forecast movement. The initial result determines the total size (truck, LTL, etc.) These need to be adjusted seasonally.

Next we use EOQ for individual items. This determines individual rounding factors (pallets, layers, or cases). Warehouse capacity and utilization factors should be taken into consideration as seasonal factors. In some

instances there may be significant cost savings for rounding to pallets and backhauling items from the plant instead of sourcing from a manufacturer's distribution center.

The execution phase for warehouse replenishment must answer two questions: “When to order?” and “How much to order?” Orders occur when the expected stock out exceeds the specified stock out. This decision must take in-transit (open) orders into consideration. The basic objective is to keep a balanced time supply of all the items. A balanced time supply prevents the need for less than optimal orders of depleted items. The execution phase uses actual inventory levels and short term forecasts. Short term forecasts cover the lead time plus the Average Order Interval (AOI). There may be special consideration for sale items. The execution phase factors in variability and desired service levels to determine the safety stock.

The evaluation phase involves adjusting the parameters used during the planning phase. At the item level, Mean Absolute Deviation (MAD) measures the variability between the average movement and the actual movement. Seasonality quantifies sales fluctuations based on the calendar. Finally, “trend” measures where an item is in the long term product cycle and whether it is in the growth, steady, or declining phase of the cycle. All these factors go into developing a forecast which afterward will be evaluated against the actual movement. Variability in delivery lead times impact safety stock. Retailers understand how closely deliveries meet their specified delivery dates and understand that variations can be self inflicted by having too few warehouse receiving doors.

Changes in cost factors will impact planning. As warehouse utilization increases, full pallet orders may make more sense. As fuel costs increase fewer deliveries make more sense.

Desired service levels have a big impact on inventory and must be adjusted seasonally to reflect consumer need.

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## Store Inventory Management

Inventory planning for most items at store level begins with the determination of the warehouse outbound delivery schedule and allocation of shelf space. "Presentation Stock" is the major difference between warehouse and store inventories and is the basis for store inventory planning.

The store plan-o-gram process allocates the available shelf space to items. Shelf allocation determines the replenishment cycles as the store replenishment objective becomes "keep the shelves full". What is often thought of as a merchandising tool really becomes the basis for inventory replenishment.

Item shelf allocation determines how often an item will require replenishment and how often the store will have to handle it. Many retailers have followed very simple rules by allocating "One week's supply plus case pack" for dry grocery items. This obviates the impact of daily sales fluctuations with minimums based on weekly sales and minimizes store handling costs by reducing "cut cases". The challenge has been that excessive case packs combined with the proliferation of item variations to exhaust the available shelf space.

Planning for high movement items like milk or eggs, highly perishable items that are produced in the store like meat, and dry grocery items that are on featured in the sales program, is similar to warehouse replenishment. These items cannot have enough shelf space allocated to hold a multi day inventory. They require intermittent replenishment from the "backroom" of the store. This is why the perishable sections tend to lie along the sides of the store, where replenishment workers have easy access to backroom storage areas.

Number of deliveries are determined by the classic EOQ model during transportation planning. Projected dollar sales are converted to weight and cube estimates based on category averages. Sometimes special sale items such as a "paper sale" will distort the requirements and need supplemental deliveries from the vendor or warehouse. The planned delivery

schedule is published so the warehouse and stores can schedule labor.

The execution phase for store replenishment strives to maximize the utilization of the planned delivery schedule. It makes a final determination of what to put on each delivery. Slow moving items are compared to inventory minimums ([Kanban](#)) and item orders are triggered if needed. Fast moving items are compared to forecasted requirements and delivery schedules. Store requirements typically follow a "U" pattern, peaking on Friday and Monday. The replenishment process can minimize this effect by raising minimums for mid-week orders (thus ordering items that would otherwise have waited till the end of the week). The warehouse may also have different order types that limit what items can be ordered. A "Fast Movers Only" order type would restrict the store to ordering only those items on Friday and Monday.

Store replenishment does not end with the arrival of items at the store. The backroom inventory is a "just in time inventory" for the high movement items. The store must schedule reviews of these items during the day and replenish the shelves. A feedback mechanism tied to POS that lets the store personnel know how much has sold since the last restock will keep fast moving items in-stock at the shelf. Backroom storage provides flexibility for inventory management. The longer the lead time, the greater the uncertainty and the more backroom storage needed.

"In and Outs" and Markdowns are special inventory situations for the store. "In and Outs" are items that are never replenished. They are typically holiday items that are "pushed" to the store based on merchandising projections. Markdowns can be used to get rid of holiday items, discontinued items, or sale items when the store has left over inventory.

Evaluation for store inventories should include reviewing manufacturer case packs and assortments. Evaluation also involves monitoring sales and adjusting delivery schedules. Sales projection parameters should be adjusted to improve forecasts.