

A Helpful Perspective on Inventory Management

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Your ERP is not taking you where you want to go. Total investment in inventory is creeping upward and the footprint required to house that inventory continues to encroach on valuable production space. Paradoxically, the more inventory you have, the less likely you are to have the correct items. That doesn't bode well for stakeholders monitoring their investments or for customers looking for their items.

The popular 60s TV cop show 'Dragnet' opened with dramatic music and the lead-in, 'There are a million stories in the naked city'. Unfortunately, the same can be said for your inventory. The story for each item is written through the planning parameters that are attached to it. These parameters might be implemented in a wide variety of ways, but in some fashion they will impact a safety stock level, an order quantity, a reorder trigger, and the lead time required to replenish the item. It is very easy to get lost in the din of those 'million stories'. The detail is overwhelming and, consequently, it is difficult to determine the items on which to focus improvement efforts. The plot unravels when these million stories do not add up to a single coherent tale. It is that tale which needs to be coordinated in order to manage inventory for a happy ending.

Root Causes

Inventory serves a wide and varied constituency with often conflicting needs. Operations sees inventory as a buffer against erratic demand. Running more than is immediately needed allows for longer run quantities, delaying machine hours lost to product changeovers. Because this group is typically measured by the amount of product produced in a given period of time, minimizing time lost to changeovers is highly motivating. From this perspective, the narrower the product line, and the larger the run quantity, the less pain will be required to hit the objectives.

Sales believes in the common wisdom that you "Can't sell apples out of an empty applecart." In stark contrast to Operations, this perspective actively lobbies for a very broad product line, all of which should be ready to ship from stock at a moment's notice. Sales quotas are more easily met by immediate response at low prices. Issues of inventory investment, warehouse space, and production efficiency are not frequently of great importance to the Sales group.

Finance can be a bit schizophrenic in their view of inventory. For the most part they are looking to reduce inventory in order to free up cash and minimize carrying costs. However, an internal conflict can arise in a couple of different scenarios. The most common conflict arises when using standard costing to absorb overhead. High levels of production, whether they are sold or not, absorb overhead and drive better month-end financial results. Yet, when they are representing the organization in order to borrow money, inventory is seen as an asset to be viewed as collateral.

Since they are measured largely by the financial performance of the organization, Executives tend to focus on managing turns and achieving quarterly corporate objectives in order to appease stakeholders or to move analysts' opinions.

While Finance and Executives view inventory in terms of dollars, Materials personnel tend to think of it in terms of units or batches. The larger the batch size, the lower the unit cost. It is not at all uncommon to find that the Materials group is incented

by year-over-year purchase price variance (PPV). This perspective holds true for both Buyers acquiring new material and for Planners scheduling production. As a side benefit, ordering six month's supply means that an action message will not pop up on that item for quite a while. Although Buyers and Planners do hear a lot of noise when inventory is too high, it is no where near as deafening as when they have stocked-out on an item.

At a fundamental level, inventory decision-makers speak different languages, have different perspectives, and frequently are sending conflicting or unclear messages. As an unintentional result of these differences, these groups can find themselves working at cross purposes. It is not uncommon for there to be a great deal of inventory management effort netting ... minimal results.

ERP Shortfall

Virtually every ERP system has a series of reports designed to help manage inventory.

- There will certainly be total inventory reports that describe current inventory positions in some sort of breakdown by category. Raw materials, work-in-process, and finished goods inventory levels are frequently depicted in these reports as a snapshot in time.
- Also commonly included will be an "ABC" classification and reporting process in which items are listed by order of importance. This mechanism is most commonly used to trigger the frequency of review and to prioritize items within a cycle counting program.
- It would also be typical to find excess inventory reporting. One such report might depict, in descending order, the number of days since last usage. Another common report would illustrate the number of days of inventory on hand.

Reports of this nature help describe:

1. How much inventory we happen to have.
2. How often we review it.
3. Where our past mistakes lie.

While this is useful information, it lacks the ability to project *where we should be* and how we'll get there. They are unable to do that because these types of reports tend to be disconnected from any overall guidelines.

Parameter Proliferation

If you dig into the history of your own system you will likely find that its parameters have been set by one or two of the constituencies described above. In all likelihood the Materials group had the first swing at this *piñata*. They almost certainly had the lead when the parameters were first set during the MRP implementation. That, literally, may have been decades ago, and is often a 'set it and forget it' type of situation. Parameters are too often mapped from the legacy system with minimal review. This is very understandable, because at the end of an 18-month or longer MRP implementation process, the implementers have grown weary of dragging through the details and are on deadline to get the system up and running. Routinely mapping data over without a formal review is expedient and often rationalized with the best intentions of revisiting those parameters as time allows. But the reality of the world around them, which constantly requires their urgent attention elsewhere, makes this difficult to do.

The other constituent that exerts an influence in setting parameters is Operations, although on a bit more surgical basis. For example, when backlogs grow and shipments are missed the Operations group will lobby for longer lead times. If productivity becomes an issue, larger lot sizes become attractive as a means to achieve more run time with fewer changeovers. Over the course of time, those ‘million stories’ take widely divergent directions because the planning parameters for each item are approached independently.

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Since the level of inventory is tied to the items rather than to customer requirements or to the capacity of the processing systems, it is not difficult to imagine that both frequently fall short of corporate objectives. Inventory is approached at a budgetary level when making strategic plans, but has little connection to the realities affecting each item as it winds its way through the supply chain. That’s because typical inventory reporting and management systems tend to answer the wrong questions. There is a need to re-focus the system to pro-actively answer the right questions:

1. What are the rules your buyers and planners use to decide what to order?
2. To what dollar value do these rules drive the organization?
3. Which items are (or soon will be) outside of guidelines?

Approach

The answers to these questions need to draw together the divergent constituencies and create tools to effectively manage the influence those constituencies have on inventory levels.

- **Select a common language**

Task one is to devise a common language with which to define guidelines and management strategies that are understandable and acceptable to all stakeholders. Corner office people tend to think in terms of dollar value or inventory turns, while Buyers, Planners and Operations think in terms of units or run quantities. One million dollars may or may not be a great deal of inventory. A million units of a single item also may or may not be a great deal of inventory. The common language is in days. Ten days of inventory is meaningful to every stakeholder, as is one thousand days.

- **Set clear expectations**

Another key task is defining the criteria by which overall objectives will be set. There is a critical need to reconcile the financial targets with the reality of supply chain capabilities and performance. Initial stretch targets can be defined at the executive level, but those objectives must pass the rationality test when rolled up from that which is possible for the individual items. A mechanism is needed to model our objectives against the current reality to define the magnitude and the timing of reduction opportunities.

With a common language and rational objectives, it is possible to set clear expectations. These expectations can be defined at the strategic level and made to cascade down through the tactical levels such that all stakeholders are working

towards the same ends. Agreement can be reached between the financial, sales, executive, and operational disciplines. It also becomes possible to objectively illustrate both the guidelines and the current performance against those guidelines in order to eliminate misperceptions.

- **Surgically respond to outliers**

With goals correctly and appropriately set, it is possible to respond to those items that are creating the most pain. The pain may be in the form of excess inventory, or in the form of items that are currently in short supply, or soon will be, that are creating customer satisfaction difficulties. This surgical response focuses the resources of the organization, and the resources within the supply chain, toward the areas of highest impact.

- **Build the tools for daily and weekly visibility**

To keep all stakeholders engaged and driving toward the proper overall solution, it is important to have acute visibility to inventory as a part of the daily management review process and weekly executive updates. Detail tools for daily use enable the difficult process of linking the thousands of independent planning parameters embedded in individual parts to an overall scheme. Summary tools are for executive decision support and guidance.

Examples of Specific Tools

Reaching into your ERP’s database and extracting information to be processed into decision support tools of the following types is what is needed to implement the approach described above. The Inventory Analyst Detail Report in Figure 1 leverages the common language element and provides responses to two of the three key questions. The first is ‘What are the rules your buyers and planners use to decide what to order?’ Rather than allowing hundreds or thousands of individual parameters to drive the organization to unknown places, the minimum and maximum guidelines established for A, B, and C

Inventory Analyst Detail Finished Goods

Count	Class	Item	System Class	Description	Avg Daily Usage		Current On Hand			Days Under	Days Over	Dollar Opportunity
					Units	Dollars	Units	Dollars	Days			
166	A				\$120,332		\$1,292,304	77	67		\$431,801	
258	B				\$22,362		\$594,949	131	92		\$279,743	
2824	C				\$7,482		\$497,450	418	2,321		\$269,186	
3,248					\$150,176		\$2,384,703	626	2,480		\$980,730	

		Class	Min	Max	
		A	5	10	80%
		B	10	20	15%
		C	20	60	5%

Count	Class	Item	System Class	Description	Avg Daily Usage	Current On Hand	Days Under	Days Over	Dollar Opportunity		
					Units	Dollars	Units	Dollars	Days		
1	B	0093	C	475514R/4605BOF638	41	\$120	19,113	\$55,595	463	443	\$53,194
2	C	538014R	C	14 X 1.75 RIB REGULAR	13	\$17	38,975	\$54,200	3,105	3,045	\$53,153
3	A	350509R	C	9 X 1.75 DIAMOND REGULAR	1,837	\$1,278	87,111	\$60,614	47	37	\$47,832
4	A	1864	C	912007R/378508485	7,851	\$4,690	152,880	\$91,326	19	9	\$44,429
129	A	0377		NBAL09NM/1027A119	167	\$639	0	\$0	0	-5	(\$3,197)
130	A	0472		555510R/556510650	493	\$661	0	\$0	0	-5	(\$3,303)
131	A	912007R	A	7 X 1.50 DIAMOND REGULAR	12,506	\$4,645	53,572	\$19,899	4	-1	(\$3,328)
132	A	0035	C	538010R/822010558	631	\$790	480	\$601	1	-4	(\$3,350)

Figure 1: Inventory Analyst Detail

items (Highlighted in light yellow) provide specific direction to Buyers and Planners. These guidelines are expressed in the common language of days of usage. Having a minimum of five and a maximum of ten days on A items is meaningful to all participants. The guidelines are used by this mechanism to provide a roll-up of the detail (Highlighted in light blue) to identify where the largest opportunity for improvement lies. This detail answers the question, “Which items are (or soon will be) outside of guidelines?” Below the double red-dotted line in Figure 1 the Inventory Analysis Detail Report depicts a prioritized list of the items. Those items at the top are exceeding guidelines (See the example bordered in green). Responding to the parameters that drive these items will purge excess inventory out of the system. Conversely, toward the bottom of the list are those items that have fallen below desired levels and represent potential customer service issues (Bordered in red). These items require attention and, perhaps investment, in order to avoid a stock-out and to be brought within the organization’s guidelines.

The Inventory Analyst Detail mechanism compares each item to the guidelines established for it and calculates the net dollar value to bring them within their expected range. It does not however answer the question, “To what dollar value do these rules drive the organization?” That answer comes in the Inventory Analysis Summary. This summary draws together the roll-ups of each detail report for each inventory type and

Inventory Analysis Summary					
Inventory Type	Class	On-Hand Inventory			Gu Total
		Guideline Average	Actual	% Variance	
Finished Goods	A	\$902,492	\$1,292,304	43%	166
	B	\$335,429	\$594,949	77%	258
	C	\$299,270	\$497,450	66%	2824
	Total	\$1,537,190	\$2,384,703	55%	3248

calculates the average inventory value (Highlighted in light green in the excerpt in Figure 2). At any given time, even if all items are within guidelines, some items will be above their mathematical average and some below. When viewed as a whole, this average is the level to

Figure 2: Inventory Analysis Summary which your guidelines are driving Finished Goods inventory. The sum of these values for all inventory types projects the overall inventory investment.

To communicate the placement and the magnitude of the opportunity to the stakeholders, some straightforward graphics are useful. One such graphic is the depiction of Conformance to Guidelines illustrated in Figure 3. This chart shows the number of items that are currently either above or below the guidelines. This example depicts a scenario in which there are a large number of C items that are exceeding guidelines. These C items will improve very slowly. The good news is that there are relatively few A and B

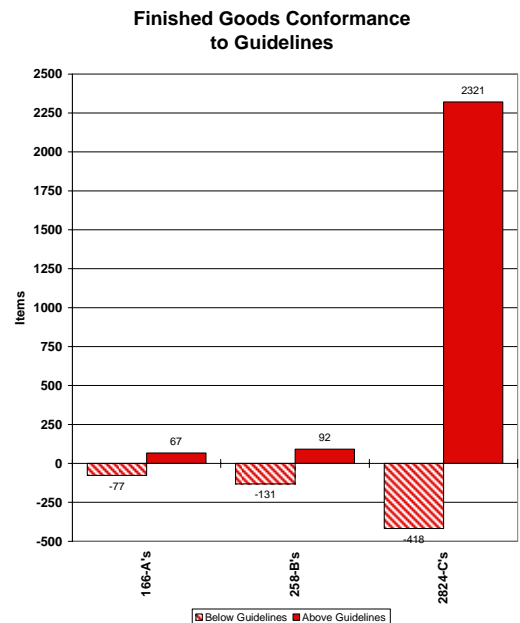


Figure 3: Conformance to Guidelines

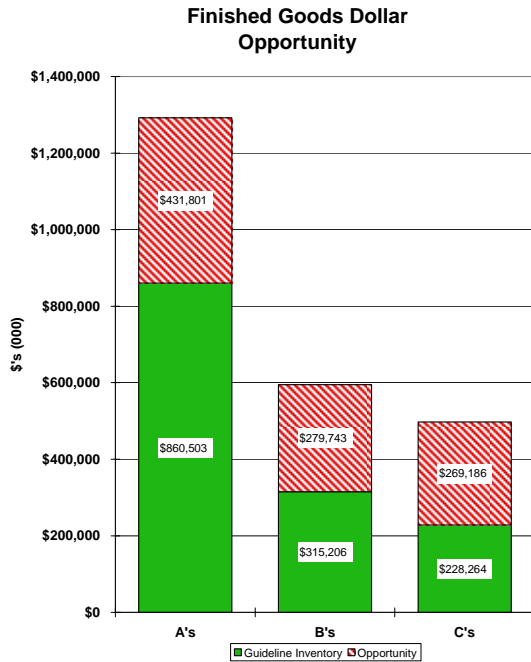


Figure 4: Conformance to Guidelines

items that need to be attacked. These will respond much more quickly. The Dollar Opportunity graphic in Figure 4 shows the value of that same scenario. There is over \$700,000 in net inventory reduction opportunity in the A and B items. Because, by definition, the A and B items are ordered and processed most frequently, these items will respond most quickly to alterations in buying and planning parameters and practices.

Reports and graphics of this type provide the ability to project the magnitude and timing of inventory reduction or of a necessary increase. Because these are driven from organizational guidelines and built up from the detail, it is possible to reconcile inventory targets (how much we wish we had) with how much we should have

based on customer service objectives and replenishment system capabilities. Also, having been constructed using the common language of all shareholders, this becomes a clear means to drive purposeful improvement at a predictable pace. As additional side benefits, these mechanisms have also been used to project the number of POs that will need to be cut; the number of receipts the warehouse can expect; warehouse space requirements; and the number of product changes that will be required in a given month.

Wrap up

A common area of frustration we frequently encounter with our clients is in managing inventory to needed levels. This frustration is driven by widely varying perspectives among stakeholders, the absence of a common language, and a lack of tools that are needed for both tactical and strategic decision support. Although your existing system is not likely to have these tools, you still retain the ability to mine ERP data for solutions that are both rapidly implementable and highly effective. The benefits include better customer service, less cash tied up in inventory, reduction in carrying costs, and the ability to refocus Materials people on supply chain issues rather than expediting. It is well worth the time and energy to develop this type of approach to inventory management as a part of fine-tuning your ERP.