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Excess Inventory -- the Root of all Evil: **A Practical Approach for Inventory Reduction Now!**

In the Toyota Production System inventories of any kind are considered to be “the root of all evil”. Inventories hide many types of management inefficiencies, including: processing problems, quality problems, ineffective procedures and poor demand management. This presentation explains the cause and effect relationships between inventory and the strategies enacted by Marketing, Manufacturing, Materials Management, and the MRP / ERP system that links these functions together. We will discuss the common causes for inventory build up along with significant but frequently overlooked contributors. Finally, a practical approach to inventory reduction will be presented in a step-by-step fashion. We will discuss how to identify and address the root causes of excess inventory and how to initiate and manage inventory reduction strategies.

Introduction to Inventory Management

A wise old consultant once shared his secret for success with me. He told me that what has made him successful over all the years “is not magic, rocket science or the ability to swiftly embrace and apply the latest miracle technique, it is the assiduous and relentless application of the basics”. The basics are the foundation and building blocks of the organization -- if the basic operating principles are not firmly ingrained in the organizational culture the business will falter – often sooner than later.

We will begin our study of inventory management the same way we would approach the task of learning any new body of knowledge -- by developing a firm understanding of the basics.

Why Excess Inventory is Evil

So, why is inventory considered to be evil?

Answer: Excess inventories directly contribute to increased overhead rates because they result in additional liabilities to the organization. These liabilities include: obsolescence, rework, storage charges and write off's for scrap. Additionally, excess inventories can



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increase the lead-time of engineering and quality improvement changes. This occurs in a rational organization because changes are delayed to permit the consumption of excess and often custom ordered (high inventory value) items.

Inventory Carrying Costs

To put it bluntly, excess inventories gradually result in raised overhead rates, which increase the costs of doing business, which raises prices for products and services and ultimately makes companies less competitive. This is why excess inventory is considered to be evil.

In many company's inventories comprises one-third to one half of the total assets. The "Rule of Thumb" for determining annual inventory carrying costs is approximately 15 – 30% of the inventories value. This estimate is based on numerous factors including: the Cost of Money (opportunity cost), Obsolescence, Shrinkage, Taxes, Insurance, Costs for Space, Labor, System and Record Maintenance, Material Handling & Storage Equipment, Taking Physical Inventories, Cycle Counting & Reconciliation, Transportation Costs, and Energy Costs such as Heating, Air Conditioning and Lighting. Simply put, there are many more costs associated with carrying inventory then the casual observer would realize. See Illustration "A" below.

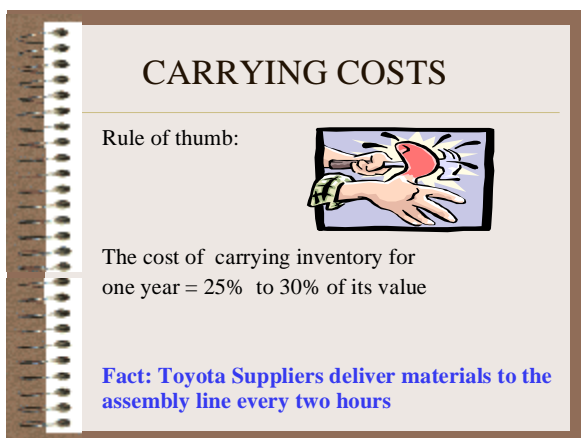


Illustration A.



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Review of Inventory Basics

In the JIT system there are three basic categories of inventory and three simple inventory classifications. See illustration “B” & “C” below.

Inventory Categories & Classifications

The three categories are self-explanatory and normally exist within every manufacturing environment.

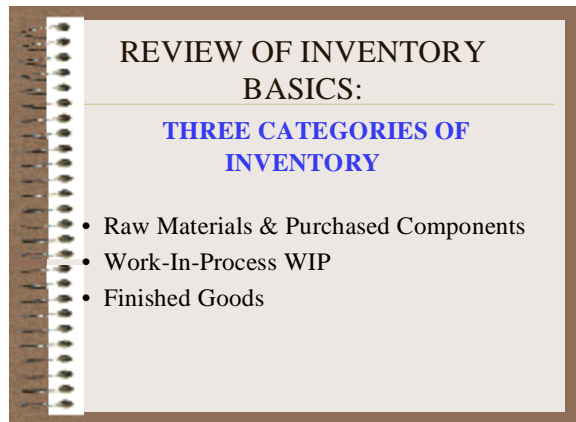


Illustration B.

Each inventory category can be sub-divided into “Live”, “Sleeping” and “Dead” inventory.



Illustration C.

Live” Inventory -- consists of the components and subassemblies that are being worked on right now – Ideally, you want to have only “live” inventories. Successful JIT plants operate with near zero Work in Process (WIP) and very low Finished Goods Inventory (FGI). This permits these organizations to minimize capital investments in inventory and to avoid many of the typical shortfalls of maintaining too high an inventory level such as Carrying costs and obsolescence.

Sleeping Inventory -- May consist of Raw, Finished Goods and Work-in-Process. Many JIT plants have achieved remarkable benefits by eliminating unnecessary WIP including increasing floor space by 30 – 40% this is because facilities, which have converted to JIT typically, require only 60 – 70% of the space originally required. One common fact is that as much as 50% of a factories floor space is used to house sleeping inventory.

Dead Inventory – The most common contributor of Dead inventory is the traditional Batch System. In the Batch system production is generally run in lots. These lots are sized to compensate for the length of time that it takes to change set-ups on a machine from one component or product to another. As it would not make good financial sense to issue lots or batches of components too small to make a machine set-up worthwhile, lot sizes are created that justify the set-up / changeover of a machine from one component to another. The problem with this approach is that it nearly always requires parts to be manufactured that are not immediately required -- resulting in excess inventory.

One of the most common inventory “write offs” (from reserves) occurs as a result design or model changes changes. To compound this problem, engineering tends to reluctant to

make needed changes for fear of creating dead inventory. Unfortunately this results in continued poor quality and a less competitive position in the market. Essential design modifications should be made whenever needed and not be hampered by concerns of excess inventories.

Fact: Most traditional Batch systems typically have 8 – 12 weeks of production on the floor at any one time. Not only does this create concerns about excess inventories, it is also the primary contributor to excessive product lead times. One very important but frequently overlooked relationship is that there is a direct relationship between the amount of WIP in a factory and the lead-times from that factory. High WIP long lead-times low WIP – short lead times. Finally, the lower the inventory the easier it is to make design changes which can improve product quality and ultimately the marketability of the product.

It is important to recognize that inventory is the effect – not the cause. It is the symptom – not the illness. To remove the symptoms we must treat the illness. In our journey to lower inventory we need to address the causes. A common metaphor that has been used is to compare the inventory level in an organization to a river. The depth of water in the river indicates the level of inventory. It is essential that we realize that we must eliminate the “excuse” for inventory before we can successfully lower the levels. In the illustration below (my own version of the classic river and rocks illustration) each of the monsters are hidden below the surface of the water – if we lower the water (inventory level) before we slay each of the monsters, they will cause us a lot of grief. So, we must lower the water a little at a time and slay each monster one-by-one when it sticks its ugly head up. See illustration “D” below.

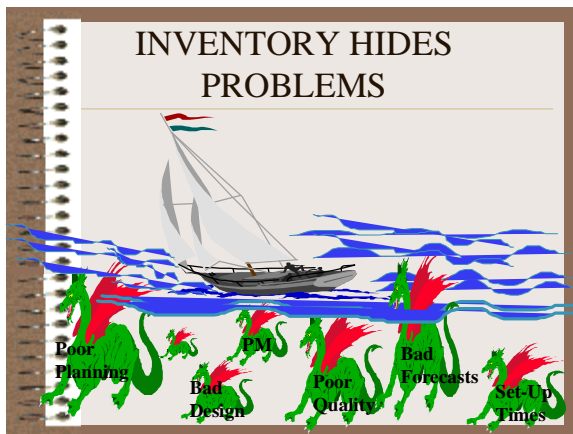


Illustration D.



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Why the Application of Powerful JIT, Lean Manufacturing & Supply Chain Management Techniques Don't Always Achieve Inventory Expectations.

There are many powerful JIT and Lean Manufacturing techniques, which are very effective in streamlining manufacturing and Supply Chain processes. Properly implemented, these techniques can eventually lead to a dramatic reduction in inventory along with significant improvements to the manufacturing process and product quality.

These approaches (to name a few) are mostly components or outgrowths of the JIT philosophy as a whole. They include: JIT, Lean Manufacturing, Total Quality Management (TQM), Cellular Manufacturing, Kan Ban, One Piece Flow, Kaizen, Single Minute Exchange of Die (SMED) and Six Sigma. Going forward I will just refer to "JIT" to blanket all of the various techniques.

The JIT approach is an enormously valuable and worthwhile endeavor for any company to pursue. Hopefully your company is already pursuing JIT with vigor.

Now for the bad news. Companies cannot simply waive a magic wand and convert to a JIT operation overnight. This endeavor may take months or even years to fully implement. Additionally, companies that rely on an ERP / MRP system to identify requirements for Planning / Scheduling & Purchasing need to take a hard look at the system to assure that the parameters which drive the MRP logic are correct. Finally, if the organizations operational procedures are not worth the paper they are written on, then Inventory problems will continue to persist – even in a JIT organization.

During periods of economic growth inventory reduction is normally a goal for most organizations. During an economic downturn or sustained 'flat' period inventory reduction is not only a goal it is frequently a necessity.

So, what can we do in the meantime?

The "Fast Track" Approach to Inventory Reduction Now!

The following approach will begin to produce immediate results and can be used independently or in conjunction with an ongoing JIT initiative if your company has embarked on one.



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Each of the following strategies will be discussed in detail:

1. Develop and articulate an inventory reduction strategy.
2. Validate existing systems, parameters and assumptions.
3. Establish / validate operational procedures and policies.

Develop and Articulate an Inventory Reduction Strategy

Establish a task team for inventory reduction and assign responsibility /accountability to its members. The team should consist of representatives of each functional area of the organization including: Purchasing, Planning, Logistics / Distribution, Information Systems, Engineering, Marketing and Accounting / Finance. The team should be led by a manager at the Director or VP level. Team members as well as management need to understand that inventory reduction is a high priority for the organization and the team should have complete management support.

Hold an initial “Kick Off” meeting where a high level manager can explain the purpose and importance of this team and encourage its members to make this effort a high priority in their workday.

Strategy – Challenge the System

- Close the checkbook
- Challenge the System and Review Open P.O’s. STOP any materials that cannot be justified.
- Implement procedures requiring Buyers / Planners to justify expenditures for “A” items and Large \$ P.O’s.
- Return excess inventories to suppliers, sell at full price, or salvage for cash

Strategy – Accountability

- Scrap obsolete inventory – Benefit from Tax write off’s and lower carrying costs
- Assign responsibilities to Buyers for specific inventory commodities and hold them



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accountable for inventory levels.

- Hold a formal Inventory Review with each Buyer on a monthly basis.

Strategy – Validation

As discussed earlier, excess inventory is a result – not a cause. Their needs to be a provision in the operational policies (once again - basics) regarding the activities listed below to insure that the materials managements group is involved.

- The Inventory Reduction Team should review all procedures than can impact inventory. Such as:
 - CR's / ECN implementation
 - Blanket Purchase Orders
 - Creating New Part #'s
 - Others?

Additionally, the team should insure that there is healthy Sales and Operations Planning (SOP) process being used. One of the benefits of materials management participating in this process is to assure that facility capacities are not overbooked. Overbooking capacity that cannot be quickly added will almost certainly result in excess inventory, as MRP will drive the materials in – even if they will only sit on a shelf.

Validate existing systems, parameters and assumptions.

The MRP system utilizes data referred to as an “order modifier” to perform certain calculations within MRP. These order modifiers are usually associated with the “Item Master” records for each line item in inventory. These order modifiers are assigned a value at the time of system implementation and as new items are added. Aside from the fact that they are frequently misunderstood - and may be entered incorrectly, once entered they are rarely changed or updated. For example “lead-time” just a couple of years ago a typical lead-time for passive electronic components such as a capacitor could have been several weeks. Today the same component may be available in several days.



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What this does is drive the MRP system to purchase these components possibly weeks earlier than needed. This is why the order modifiers must be regularly maintained and updated to reflect real world conditions.

The most common order modifiers are listed below:

- Safety Stock
- Minimum Buys
- Lead Times
- Purchased
- Manufactured

Additionally, for an MRP system to work properly the following benchmarks must be achieved:

- Bill of Materials (BOM) accuracy must be greater than 98%
- Inventory Accuracy must be > than 95%
- Supplier on-time delivery must meet the required delivery dates determined by MRP.
- MRP must be run at least once per week to rebalance supply and demand.
- Buyers and Planners must address ALL exception messages from each MRP run. Failure to address orders that have been rescheduled –out (push-outs) is a very common contributor to excess inventory.

Metrics

It is critically important that responsibilities are assigned and that “Metrics” or operational measurements are established for each of the “inventory drivers”.

Training

Don't assume that Planners and Buyers have adequate knowledge of how an MRP system operates. Assess their knowledge and be prepared to provide formal training as needed.



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Finally, get the word out that the ownership for inventory reduction belongs to everyone in the company not just the materials department.