

Inventory management: combining business intelligence & material handling hardware

Most business intelligence (BI) tools and supply chain management (SCM) applications address inventory issues from either a software perspective or a material handling perspective; however there is nothing on the market that binds both hardware and software solutions together to form a complete end-to-end solution for managing inventory. For example, SCM applications typically require that the user enter either shrink or scrap factors into the system. This injects inaccuracies that have an accumulating effect over time. The difficulty lies in the complexity of moving inventory through a variety of stages through the production process where there are no transactional requirements or no validation of transactions that take place. Such inventory challenges include support for reducing non-value added labor dedicated to surface mount technology (SMT) set up and kitting functions, ineffective use of floor space, reducing inventory inaccuracy and low SMT machine utilization, all of which results in lost margin and cash flow opportunities.

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Market assessment

Much software has been developed to support MRP or accounting functions, but most come to an abrupt stop at managing inventory. Tremendous manual efforts to effectively manage inventory have yielded little to no results while consuming additional resources and generating substantial expenses.

It is widely known that most electronic manufacturing companies have achieved near perfect inventory accuracy for their bonded inventories. However inventory accuracy falters outside of the bonded stockroom where inventory accuracy turns into best guess in most cases. Companies typically perform annual physical inventories, but this does little more than inject additional inaccuracies into the perpetual inventory.

Additionally, there is a decoupling in the software platforms and the material handling hardware. The lack of a linked material handling and software solution creates a lack of discipline in the process, whereas proven material handling techniques and transactional discipline are forgotten. The results are surprise shortages, excessive labor spent monitoring inventory, and expediting materials to 'make up' for the shortages. In addition to the obvious costs associated with these issues are the lost opportunity costs that result from cash and manpower that could be directed at opportunities to grow the business.



Figure 1. The lost opportunity costs of an inefficient inventory system.

Business challenges

No matter the effort expended on managing inventory, most executive management understands that inventory is regarded as a 'black hole', absorbing cash and resources. With appropriate business intelligence, 'black holes' can be effectively addressed, and the company will realize a direct effect on bottom line profit and customer satisfaction. Some of the challenges facing business include:

- To reduce inventory inaccuracy of inventory.
- To improve visibility to data that can help identify inventory positions and potential stock out issues.
- To reduce the non value added labor dedicated to the management of physical inventory and material kitting.
- To increase the useful production space

through the reduction of inflexible floor space dedicated to the bonding physical inventories.

- To minimize system move transactions and the multiple requirements to handle physical inventory.
- To reduce all areas with the potential to inject inaccuracies into the perpetual inventory with special focus on those areas where there is the potential for accumulation of error without a systematic recognition or potential to self correct.
- To increase the utilization of expensive SMT equipment through the reduction of set up times and reloading of feeders.

Lost opportunity cost

Figure 1 denotes several factors that consume cash due to inventory management issues. The real issue with these cash constraints, however, is the opportunities lost that could be benefiting the business, such as purchasing a latest technology piece of equipment or paying off debt.

When looking at managing inventories, several major topics come to light: inventory inaccuracy, non-value-added labor and inefficient use of floor space for bonded materials.

Inventory inaccuracy

Excessive partial component reel or tube packages

When initially setting up a machine or replacing packages on the machine, machine operators gravitate to the use of full packages in order to minimize how often a package needs to be changed out. This results in excessive partial reels in inventory. It is almost impossible to determine the remaining quantity on a reel, so most people just guess. Each guess, whether high or low, further reduces the accuracy of inventory. The only truly accurate count is for full and empty reels.

Kit to kit material movement

Because many jobs are kitted prior to being set up on the SMT machine, the components assigned to the kits are no longer in a bonded, locked-down condition and are subject to being stolen from one kit to be used in other without any transactional discipline. Of course, this leads to shortages in the job that was 100% kitted, which tends to lead to a repetition of the cycle of stealing from kit to kit.

Component damage

Typically material that was stored carefully while in bonded stock is thrown into a bin

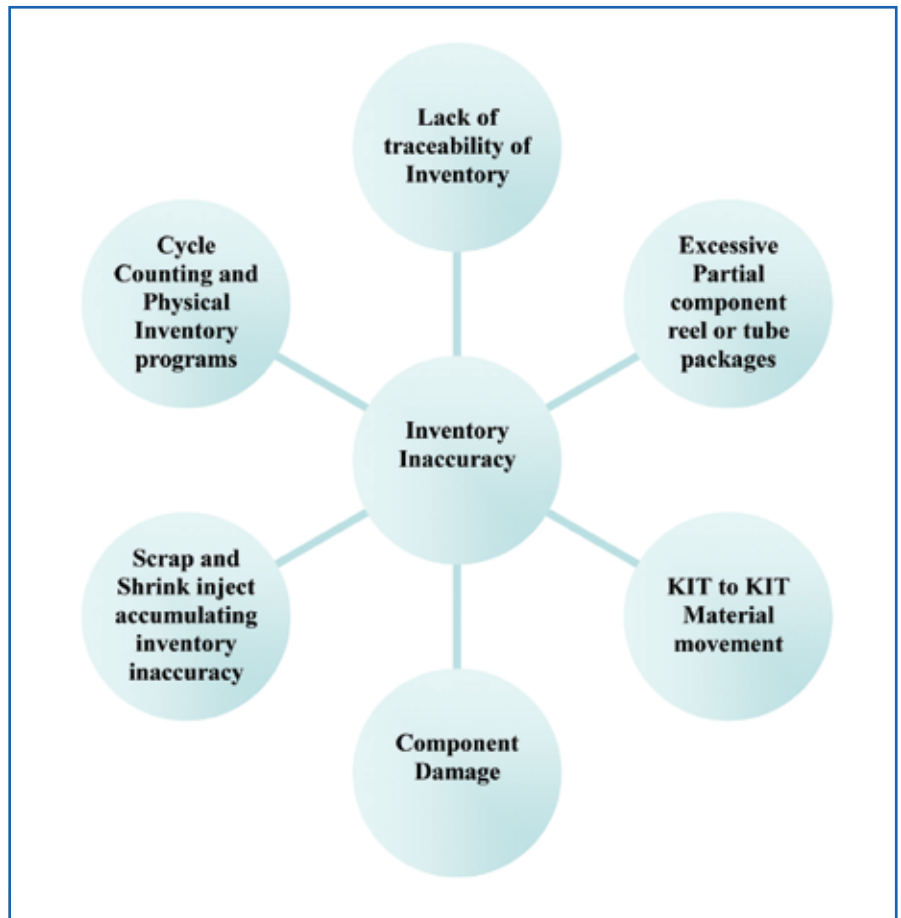


Figure 2. Sources of inventory inaccuracy.

or bucket to wait to be loaded on the SMT machine. This material handling method can result in component damage as reels are rumbled onto each other or as operators rummage through the bin looking for the correct components.

Non-value-added labor

Non Value Added labor managing bonded stock rooms

Excessive dependence on non-value-added stock room personnel and material handlers is a direct expense to the bottom line of the company.

Excessive physical and systematic move transactions

The process starts with the receiving personnel, with a PO receipt transaction, followed by a move to bonded stock, where inventory is noted the system and physically moved to a location. Upon kit request, the process happens again with a physical movement of product from shelf to cart, followed by another system transaction conducted.

Non-value-added labor managing inventory discrepancies

Managing cycle counting programs is an expensive proposition. NVA hours take time out of the day to count inventory. Inaccuracies are not traced to a root cause; they're simply fixed, which can inject additional inaccuracies in the perpetual system.

Add in a yearly wall-to-wall physical count and the company has consumed many hours of NVA labor and injected more inaccuracies into the system than were fixed.

A comprehensive solution is needed

A solution that combines business intelligence software with material handling equipment is needed to bridge the gap left by traditional MRP/Accounting software packages.

Minimize partial packages

The software should require operators to use up partial packages before moving onto full packages. This will minimize the number of broken or partial packages inventory. This can be done with a software solution that is bound custom-configurable carts - the software can then identify partial packages and designate those for use first.

Eliminate pre-kitting

Typical systems push material to a kit, which makes it difficult to change materials from one kit to another. A better solution would have kits pulled based on need, as they're needed. This eliminates damage to reeled components by eliminating the tossing of reels and tubes into bins or boxes. It also makes the operator's job easier - no more rooting through bins for the 'right' reel of components.

Eliminate non-value-added personnel
By kitting directly into a cart that is tied into the inventory system through software, companies bypass the need to have a caged-off stockroom and the NVA personnel required to manage it. A combined software/materials handling hardware solution expands the locked stockroom to all areas of the production floor. An ideal system is a cart capable of holding feeders to that kits can be presented to the machine ready to go. This minimizes SMT downtime by reducing setup time.

Put the right parts in the right place

Quality suffers when the wrong packages are loaded into the wrong feeder location. This can happen when your machine operators must rummage through a bin of materials. An integrated materials handling system would force integrity by using a one package/one location philosophy. This is especially important in the face of lead-free and RoHS directives.

Conclusion

An integrated materials handling hardware/supply chain management software solution can improve all aspects of your manufacturing process, from quality to cost to efficiency. Non-integrated inventory 'solutions' can leave you with excessive partial component reels or tubes, pre-kitting and undocumented kit-to-kit transfers, component damage, non-value-added labor and floor space and the risk of putting the wrong component in the wrong place.

Increase your opportunity cost and inventory accuracy and reduce your non-value-added costs by seeking out an integrated inventory solution that joins business intelligence software with materials handling equipment.

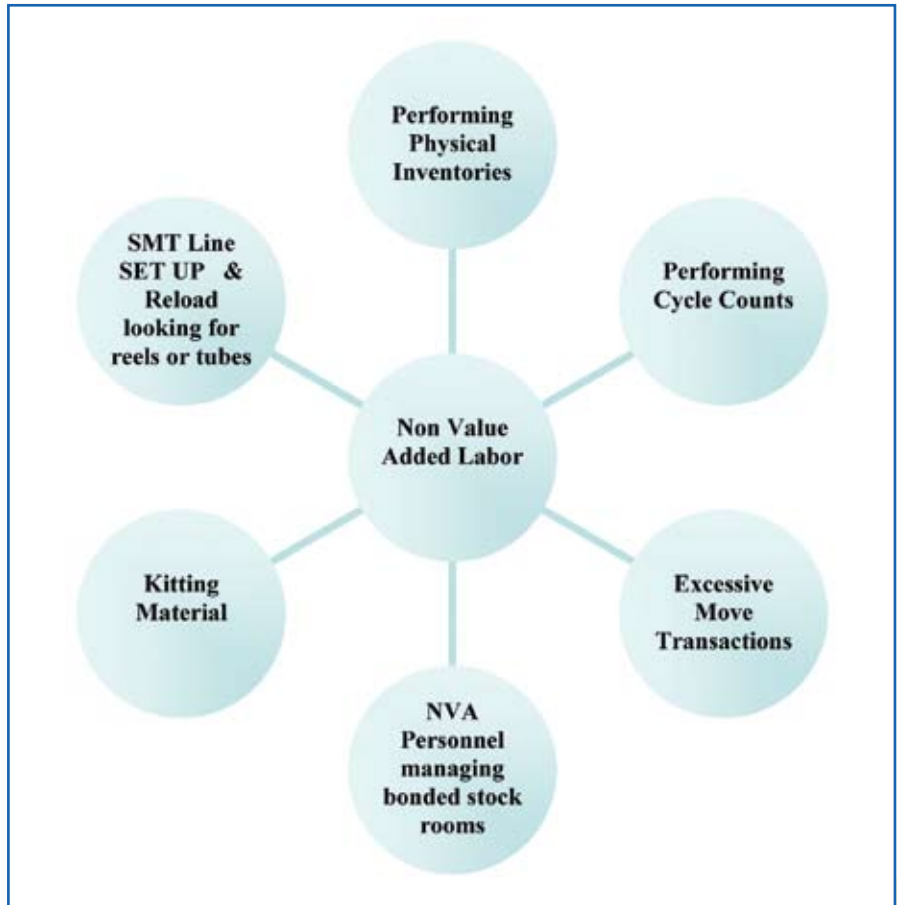


Figure 3. Activities that weigh down a company's bottom line without adding value.

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