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# Shipping Service Improvement

*Case History*

**Business:** Leading Plumbing Equipment Manufacturer

**Product:** Complex Assembled Building Hardware (Faucets)

**Customers:** Mass Merchandisers (Home Depot, et al) and Wholesalers

**Situation:** (Initial Information)

1. In the previous six months, On-Time Shipping performance dropped from 97% to 86% of order-line-items shipped.
2. Customers were not happy and contracts were in jeopardy, including one with a mass-merchandiser giant. The trigger event!!!
3. Inventory reduction was a current business goal in the main distribution center that currently stocked about 1,200 different stock keeping units (SKUs).

**Initial Reactions:** (In staff meeting discussions)

1. People suggested increasing finished goods inventory to make sure there is always enough on hand to avoid late shipments.
2. Warehouse personnel questioned the "more inventory" idea, noting that:
  - "The warehouse is already full. Where would we put any more?"
  - And "how would we work efficiently in a warehouse overloaded even more than it is now? We're already wasting too much time rearranging skid loads in bulging storage areas just to get to them for order-picking."

**ImpAct Team Project Steps:**

Finally, it seemed that the problem required the attention of a cross-functional project team with a broad-enough view and authority to correctly analyze the root causes of the performance problems, and develop solutions that would meet everyone's objectives. Management commissioned a team with respected members of the functions involved.

The team got help from a process management consultant who brought methods for process improvement work and provided facilitation for their work sessions so they could work quickly through a comprehensive analysis, solution development and implementation.

Cause-and-effect analysis was part of the initial project work, including a technique called “Ask Why? five times.” It helped the team dig deep into the possible causes so they were not tempted to stop with the first plausible one and start working with it when the true root cause/s might be just a layer or two farther below the surface.

### **Root Causes Analysis Questions and Answers:**

The team’s “Why?” questions looked like:

1. Why are items on customer orders frequently not shipped on time?  
Ans: SKUs (stock-keeping units) are often “out of stock” with no inventory in the warehouse. Orders are shipped without them so the rest of the items on the order aren’t late.
2. Why can’t we just increase inventories across the board to reduce the chances of stock-outs?  
Ans a.: We have a corporate goal to reduce finished goods inventory levels (increase turn rate). However, service to key customers trumps the inventory goal. Plus, it’s an arbitrary financial goal, not linked to demand or service levels. Therefore, we can increase inventories, if needed.  
Ans b.: Audit found < 10% open storage = no capacity for more since at least 10% open space is needed to maintain order.  
Ans c.: Observation = many SKUs are over-stocked and not moving (dust on the pallet loads).
3. Why are some SKUs chronically out-of-stock while others are over-stocked and clogging valuable warehouse space?  
Ans: Because that’s how our SKU stocking policies (including safety-stock levels) are currently set.
4. How are base-level inventories (safety stocks) set?  
Ans: Manual stocking-policy adjustments using “rules of thumb” for the safety-stock targets: Based on volumes, A-items = 2 weeks, B-items = 4 wks, C-items = 8 wks, etc.
5. Why do those levels not match actual customer demand variations very well?  
Ans: Because they’re only guesstimates; not based on measured customer demand variability.
6. Why are we not measuring actual demand variability to set safety-stock levels for all SKUs?  
Ans: We have never done it before.
7. How might total inventories change if safety stocks are rebalanced?  
Ans: Liquidation of the dust-covered dogs should leave plenty of space for important SKUs now chronically short. = Ah ha!!!!

### **Process Redesign Questions, Answers and Actions:**

It took more than five “Why?”s, but with the “Ah Ha!” discovery from question seven above the team next focused on the upstream business processes that affect the finished goods safety-stock levels in the distribution center.

1. What business process steps could maintain 3-sigma safety-stocks (99.8% on-time shipments)?

Ans: Periodically recalculate SKU variability and adjust SS targets

2. Does the ERP system have a standard module that could be used for managing safety stock levels to more precisely accommodate customer demands?

Ans: No. But the next update does include the modules required (statistical demand analysis, safety stock management). However, that’s too far down the road to solve the current, urgent problem.

3. Can we build a temporary work-around system?

Ans: Yes. Excel spreadsheet will work; just do the updates less often than with an automated system.

At that point they knew enough to develop a solution for trial. The process consultant laid out a spreadsheet with the normal formulas for calculation of standard deviation of demand by SKU. The IT manager programmed a routine to access the SKU order history for the demand calculations. And the materials planning folks used the demand statistics to set new safety stock levels for all finished goods SKUs. That was all done in about three weeks, even with temporary manual work to edit the stocking policies in MRP.

### **Support Systems Questions and Answers:**

Now, with confidence in the safety stock levels, the team asked “what is needed to help the operating organization maintain the target levels? And how can that be given priority in line with the importance of meeting the major customer shipping requirements?” The key question at this stage was:

1. What support systems would help us control the new safety-stock levels?

Ans: Install a perpetual operating process measure for Safety Stock Compliance. Immediately inform those who control replenishment order schedules when a SKU drops below the safety stock level; they can expedite a replenishment order to arrive sooner than originally planned.

That one change was a key. However, they also planned on minor adjustments in the Support Systems for Communications, Organization/Involvement, Accountability and Recognition/Reward to ensure sustainability. Taken together — inventory management process and related support systems — they constituted a portion of the requirements set for the new ERP system planned a couple years in the future.

## **Results**

The results of the team's efforts were much faster and more effective than they expected.

- Lines Shipped On-Time went from 86% to 99% in two months
- Finished goods inventories dropped by 23%

The relatively quick recovery of high On-Time Shipping performance was a relief for all involved. And it gave them confidence in using more systematic methods for inventory and production control (Toyota Production Systems Rule #4), even if they didn't have the latest automation on hand.

The drop in finished goods was a surprise to most everyone. They had feared at least a serious J-curve effect with an increase in inventory during the transition from old to new stocking policies. But that did not happen as the new stocking policies cut some replenishment quantities as others were being increased. And in the end, a huge glut of low-volume inventory was worked out of the DC as the new stocking policies clearly showed real demand for them to be well below even the old "dogs" rules.

## **Project Success Factors**

- Team-based project methods for comprehensive input and committed actions
- Measurement of key variables (demand variation)
- Support systems for on-going process control

Once the process was scrubbed down to the basics, it was obvious what value it should be adding, and how to modify the routine process steps to make that happen. And by following through with a simple support system modification (safety stock compliance reporting) the project team implemented a Lean process solution that achieved better, faster, cheaper shipping service — and ensured retention of key customers!

## **Lean Note**

Readers might wonder why the other dimensions of inventory stocking policies (production lot sizes, promotions forecast from retailers, etc.) were not mentioned in the Root Causes section above. They were, in other legs of the cause-and-effect diagram that took shape. However, the mechanisms for major near-term changes in them (e.g. production changeover time reductions already underway in the Lean program) had less near-term impact than the safety-stock issue.