

MANAGEMENT

The Dark Side Of Process Measurement

by **Martin F. Stankard**

As quality management systems place a greater emphasis on process design and management, process measurements will become more important and, unfortunately, more of a problem.

In 50 Words Or Less

- **Process measurements are valuable, but they have a dark side that can do a lot of harm if you're not careful.**
- **A change in employee behavior must accompany all new process measures.**
- **The change won't be easy, but it is essential for organizational progress and improvement.**

Measurements are helping replace decisions based on opinion with decisions based on facts, allowing process operators to detect and control unwanted variation. The analysis of measurement data is increasing our understanding of cause and effect and enabling us to make process breakthroughs. Though these transformations sound promising, the naïve introduction of process measurements can cause widespread damage to organizations due to what I call the dark side of metrics.

Why the Chronic Inventory Adjustments?

Several years ago, a grocery warehouse for a supermarket chain was handling approximately 2 million cases of dry goods and grocery items per week. The warehouse manager reported to a logistics VP whose incentive compensation depended on warehouse throughput and productivity measured in cases shipped per full-time employee (cases/FTE). A new warehouse computer system implemented two years earlier made it easy to obtain reports on total cases received, in stock, shipped, cases/FTE, level of service, warehouse errors and omissions, and various productivity measures.

During the logistics VP's two-year tenure, warehouse productivity measured by cases/FTE improved. However, as productivity rose, service levels measured by the percentage of store order line items fulfilled deteriorated so much that store in-stock positions (the percentage of time shoppers find an item in its assigned slot) significantly lagged those of the chain's competitors.

A proposal to deploy a new multimillion dollar warehouse system floated up to the supermarket chain's VP of administration and systems. In response, the VP formed a process improvement team made up of employees from the warehouse office and systems departments.

The improvement team's goal was to look at the warehouse process from end to end and find ways to improve service levels. The team members were relatively low ranking and included two inventory auditors, the warehouse office manager, two clerical workers from the warehouse office and two process analysts in training. Warehouse selectors and foremen were not included on the team because they were union members and their participation might violate the chain's labor contract.

The team began by mapping the warehouse's selecting process. Warehouse operations flowed smoothly throughout the day in alternating selecting and restocking waves. The first was a selecting wave in which workers (called selectors) steered carts through the warehouse and selected cases of items as directed by picking lists. Each picking list

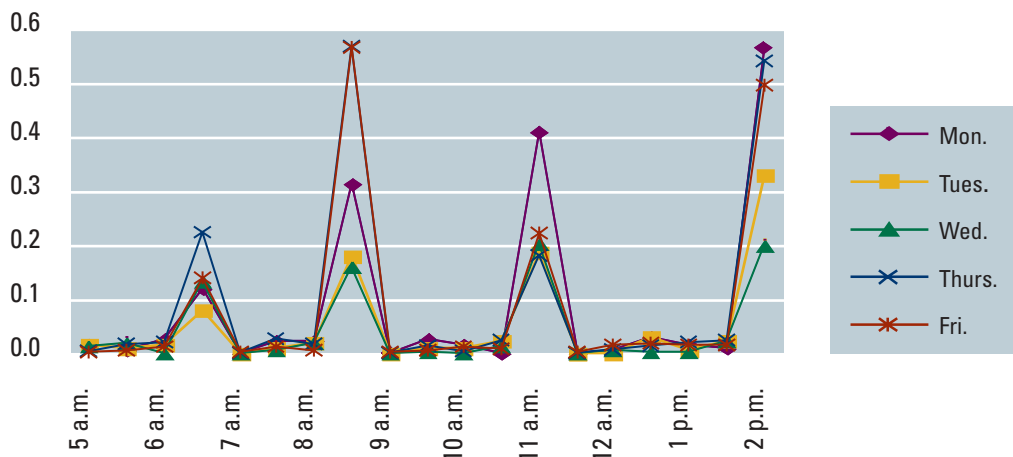
contained a quota of work to be done within a fixed time. If a selector found the slot for an item on the picking list empty, he or she crossed out that line on the list and wrote the letter "M" (for missing) next to it. The M indicated the slot was empty, and the item was omitted from the store shipment.


After completing a picking tour, the selector returned the marked up list to the warehouse office, where a clerk entered each missing item into the warehouse system. These entries deducted the missing items from the store's invoice, put them on back order and updated book inventory for that slot to zero in preparation for the next restocking wave. During restocking waves, warehouse workers moved pallets of stock from overhead storage into the picking slots as directed by the warehouse management system.

When the warehouse system was initially installed, a staff of four inventory auditors had been temporarily assigned to perform cycle counts to ensure the system's inventory records were accurate. Unfortunately, the computerized inventory records never became accurate enough to cease cycle counting. Consequently, the temporary auditors became full-time auditors. They constantly cycled through the warehouse, counting stock, entering data into portable electronic terminals and updating the warehouse management system with hundreds of adjustments each week.

After mapping the process, the team quickly identified the chronic inventory adjustments input

FIGURE 1 Rate of Missing Items vs. Time of Day (Disguised Data)





by the auditors as a possible cause of the service level problem. To check this theory, the team analyzed a one-year history of inventory adjustments for each item in a random sample of 100 items. To the team's surprise, one year's worth of adjustments on each item netted out to zero; there was no physical loss of merchandise. The adjustments were evidence of chaos in the book inventory records but didn't indicate the cause of the chaos; these adjustments did not indicate theft or inventory shrinkage.

One team member's job included updating the warehouse computer system by entering missing line items from completed picking lists. After a while, she decided to start recording the number of line items marked missing and the number picked in half-hour intervals for a week. She plotted the data as a run diagram (see Figure 1), which showed the rate of missing items was well below industry benchmarks throughout most of the day, except for time periods just before rest or lunch breaks when the rate of missed items shot up tremendously.

Thanksgiving Jell-O

All team members were mystified by the surprising peaks in missing items before each break. The team member who drew the graph volunteered to confidentially share it with several selectors and ask them what was going on. At the next team meeting, she reported what her friends on the warehouse floor had told her.

When the warehouse system was installed two years earlier, the selectors said their picking lists suddenly became longer. Selectors found they had to work harder and faster to complete their assignments in the allotted time. Although they attempted to keep up with the higher picking rate, many fell behind as fatigue set in.

As time for each rest or lunch break approached, selectors who were behind on their orders arbitrarily crossed out a fraction of the line items they had yet to pick so they could finish their picking list in time for the break. The further they fell behind, the more line items they marked as missing and skipped. Eventually the entire warehouse workforce learned and used this trick, but no one publicly admitted or discussed it. Absolutely no one in management knew what was really going on.

This explanation implied most missing items just before breaks were bogus. The picking slots marked

as empty actually held stock in most cases. The process was mass producing hundreds of inventory errors each day, creating the need for the constant cycle counting to restore accuracy in the inventory records.

An industrial engineering unit maintained the time factors the warehouse management system

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used to generate picking lists. In pursuit of the root cause, representatives of the improvement team met with the head of the industrial engineering unit, showed him the graph of missing items and repeated the explanation the selectors had given. The industrial engineer confirmed that nearly two years earlier, the logistics VP ordered the engineers to speed up the work standards when they set up the new warehouse system. The VP wanted to increase cases picked per employee. According to the engineer, the previous standards had been tight. This additional tightening set a faster work pace than most selectors could sustain.

A few weeks later, the team got a further glimpse of the widespread damage done by the dark side of this situation in an interview with a store manager. The manager said the chain had featured Jell-O in its holiday advertising, but his store ran out of Jell-O a day or two before Thanksgiving, and the warehouse was out of stock. He took \$300 in cash from store receipts and drove around buying all the Jell-O from his nearby competitors' shelves. He brought his station wagon full of Jell-O back to his store and had two clerks reprice it and put it out on the shelves.

Later that day, his boss, a regional VP, dropped in on the store unannounced. As the manager and his boss walked the aisles of the store, the VP noticed the fully stocked Jell-O display and asked about it. When the store manager told his boss about his buying trip, the VP began strongly reprimanding the manager for violating numerous policies. At that same time, a passing customer stopped in front of

them and began loading boxes of Jell-O into her shopping cart. The store manager turned to his boss and said, "Fine, why don't you go over and tell her she can't have her Jell-O mold this Thanksgiving because it would be against company policy?"

Self-Defeating Responses To Bad News

Human nature generates the dark side of measurement. Behavior in reaction to process measures can damage organizational performance far distant in time and place from the root cause of trouble.

In the warehouse example, measuring the performance of the logistics VP on warehouse throughput led him to put pressure on the methods engineers to set impossible work quotas. These quotas drove warehouse employees to secretly cut corners. The omitted items ultimately pushed at least one enterprising store manager to take unconventional steps to satisfy customers by violating financial controls.

As a result, all stores were operating at much higher out-of-stock levels than the competition, costing the chain customer good will and sales. Yet no one in the company discussed the embarrassing truths until the process improvement team researched the root cause of poor warehouse performance and produced irrefutable facts. Even then, discussions were very, very tense.

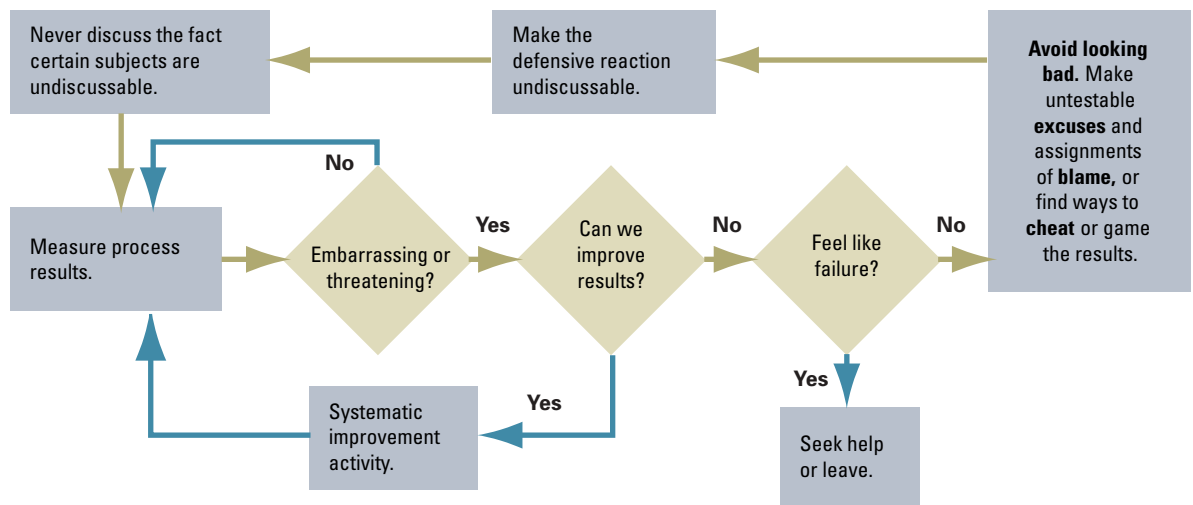
The dark side of process measurement usually exists in the form of secrets sealed in a cocoon of


silence maintained by the desire to avoid embarrassment or defensive reactions. Figure 2 shows how the dark side and its consequences arise from measuring process results. On the left side of the diagram, measurements of process results raise the first question: Do the measurement results embarrass or threaten people—process owner or operators—or put them on the defensive? General management will not tolerate poor results for long before it does something.

The next decision block to the right asks whether a capability exists to make actual improvement that will correct the poor measurement value. If the answer is yes, those in charge can initiate systematic improvement activity to eliminate the bad results. If the answer is no, the process owner lacks real improvement capability, so the next decision block to the right asks whether people are willing to feel like failures.

If those concerned are unwilling to let the poor results make them feel like failures, their not knowing how to improve things will not stop them from taking action. Instead, they move to the next block and begin taking steps to avoid looking bad. Those who lack knowledge of improvement still want to avoid looking bad when results are unfavorable, but if they feel threatened, they become defensive and behave in counterproductive ways. These counterproductive behaviors are the dark side of process measurement.

FIGURE 2 Human Nature Generates the Dark Side of Measurement





When threatened, people try to avoid looking bad by making untestable excuses and attributions of blame. In the warehouse example, the logistics VP blamed the lack of improved throughput on lazy union members as a justification for tighter work standards. Neither the selectors nor their union representatives were present or given a chance to refute these flawed claims. The VP's attributions of laziness in the workforce—not backed up with any facts—became untestable. Of course, no one dared talk about this, making the situation undiscussable.

Another aspect of the dark side arises when those who lack understanding of process variation resort to tampering. People who are threatened or embarrassed when a process measurement moves in an unfavorable direction will react, no matter whether the move was significant or random. When tampering fails, a lack of understanding of variation can lead to cheating, falsification and manipulation to avoid embarrassment.

Once bad results put people on the defensive, they usually default to behaviors learned in early childhood to avoid embarrassment.¹ People around them notice the defensive reaction and no longer discuss whatever creates the defensiveness. This actual behavior makes the poor measurement results and the defensive reaction undiscussable.

Those on the defensive shape discussions about results so they look good, or at least don't look bad, by making excuses, laying blame or making attributions—all of which are kept general and untestable. Others wishing to avoid further upset and defensiveness never discuss the fact people do not talk about the touchy subject. Once no one mentions certain embarrassing facts are undiscussable, the situation becomes self-sealing.²

When embarrassing truths about process or organizational performance become self-sealing, good people leave, and cynics and political operators thrive. Discussion of what is really wrong ceases, and even the fact no one talks about what is really wrong is taboo, sealing the situation even more. Performance in self-sealing situations goes from bad to worse to terrible.

These defensive behaviors often appear in the form of helpful and constructive advice that skillfully avoids breaking the seal on the embarrassing truth about the real problem. Such helpful and con-

structive advice is flawed. The introduction of new process measures in most organizations must be accompanied by learning and practicing more effective behaviors, or the dark side will inevitably arise to fill in the vacuum and do more harm than any set of metrics can offset.

What Leads to the Dark Side?

Several root causes contribute to the dark side of process measurement. Much management education and training fail to create an understanding of process behavior analysis at the level of XmR charts as a minimum.³ Without tools to separate random from significant variations of measurement results, process tampering becomes rampant. Managers

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often don't adequately understand the role of cause and effect analysis in process improvement. They identify a problem based on some measurement, form a team to fix it and then defeat their own purpose by demanding results before the team can drill down to root causes.

Another widespread cause of the dark side of measurement is that most organizations lack a broad, mission oriented management framework. To fill this management system vacuum, narrow, self-serving functional metrics arise in self-defense. These narrow, nonsystematic measures encourage functional behaviors that cause damage elsewhere in the organization. The picture gets even darker when nonsystematic process metrics become inputs to misguided executive compensation formulas, such as the one that drove the behavior of the logistics VP.

Management performance assessments often overweigh functional and process level metrics because they appear objective. At the same time, they underweigh organizationwide measures of mission level accomplishment that may sacrifice

some functional performance. When these various root causes come together, a culture of blaming emerges from the deployment of process measurement, not the hoped for culture of cause finding and process improvement.

Avoid the Dark Side

In order of increasing risk and payoff, quality and business managers can do one of four things:

1. Avoid or minimize process measures: This option saves money, is fast and easy, and doesn't make people look bad. Unfortunately, it also fosters a climate of political maneuvering and backstabbing while it slows down learning and improvement.
2. Set up measures and let people try their best: This option leads to tampering and dark side behavior.
3. Set up measures and learn process improvement: This option falls short because short-term, random acts of improvement do not lead to durable organizational payoff, even if each and every project or action passes a rigorous cost-benefit analysis.
4. Set up planning, improving and measuring as a system to accomplish the organization's mission: This option, which few firms pursue, is ideal and the gold standard of process measurement and management.^{4,5}

To avoid the dark side of process measurement:

- Keep discussions about processes factual and testable. Accompany any bad news from process measurements with one or two specific proposals for process improvement teams or corrective action.
- Turn the deployment of all new process measures into opportunities to provide training and coaching in understanding variation,⁶ process improvement tools and teaming.
- Audit and edit measurement subsystems regularly to ensure each measure is still aligned with the organizational mission, strategy or top priorities. Make it safe for people to discontinue informal measures. Look for metrics that drive behaviors that hurt other areas, assess whether the metrics in use are easy to keep current and have proper trending and behavior charting in place to avoid tampering. Audit improvements to check whether process measures are being

manipulated. Institute improvement training when manipulation is found.

- Stress mission level organizationwide measures in executive incentives. Include mission level measures that encourage cross functional collaboration and cooperation.
- Steer clear of any metric that pits function against function. Avoid attaching incentives to in-process or end-of-process metrics unless the process owner/operator demonstrates reliable improvement capability, better performance is achievable with cross functional cooperation and adequate capability, and time and resources are available to achieve improvement and optimize the incentive earnings.

Avoiding the dark side of process metrics is difficult but essential for progress and improvement. You need to understand the dark side so you can add value to management decisions and organizational performance.

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MARTIN F. STANKARD is president of Productivity Development Group Inc. in Westford, MA. He earned a doctorate in operations research from the University of Pennsylvania in Philadelphia and is a member of ASQ.

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