

What Gets Measured, Gets Done

© 2001 Mark Woepfel

What is it that manufacturing companies are looking for? Why do managers spend thousands and millions on programs to improve business performance? Because the market and their shareholders demand it. What are they demanding?

- Improved return on investment
- Improved profitability through improved productivity
- Reduced lead times to market
- Greater flexibility and responsiveness to customer demand

Could it be that the most prevalent measure of manufacturing effectiveness itself prevents the manufacturing organization from improving? Who ever heard of such a thing? The measurement of performance blocks the system from improving performance? That it is exactly what is happening in plants all over the world.

The measurement? "Earned hours" (also called variance to standard).

To understand how this is so this requires a short lesson in measurements in a standard cost system.

How the Variance Measure Works

An organization measuring productivity using a "standard" cost system has established a "standard" method of producing their product (and components) and the amount of time it "should" require. When production produces a part (it is delivered to stock), it "earns" the standard hours allocated for that part's process. At the end of the month, the total hours earned are compared to the total hours spent (actually, the hours converted to currency) and a variance is produced. A plant that produces product more efficiently than the standard creates a favorable variance. One that spends more hours than standard produces an unfavorable variance.

Let's say I make 100 parts that have a standard of 1 hour per part. When I complete these parts, I will have "earned" 100 hours (100 x 1). If, in the same period, I spent 110 hours, I will have an unfavorable variance of 10 hours. If, on the other hand, I am able to produce the same 100 parts in 90 hours (I'm more productive!), I will have 10 hours of favorable variance.

Parts produced	Standard hours	Hours earned	Hours worked	Variance
100	1	100	110	(10)

This is then translated into financial terms. My labor rate is \$10 per hour, I spend \$1,000 (100 actual hours x \$10) to earn \$1,000 (100 standard hours at \$10) my variance is zero (\$1,000 actual minus \$1,000 earned). It is considered good if I spend \$1,000 for labor and earn \$1,100 in standard dollars. However, if spend that \$1,000 and only earn \$800, I may be fired for under-utilizing my labor resources.

Hours earned	Std. Labor Rate	Labor Earned	Labor spent	Variance
100	\$10	\$1,000	\$1,000	0
110	\$10	\$1,100	\$1,000	\$100
80	\$10	\$800	\$1,000	(\$200)

In theory, this scheme makes sense. We become more productive, make more product using the same or fewer resources, and we seem to be doing a good thing for the shareholders. However, there are some problems.



What Gets Measured, Gets Done

© 2001 Mark Woepfel

Behavioral Implications

While the variance measure may drive production managers to be “efficient”, this efficiency is only localized and has other effects that damage the overall performance of the business.

Let’s start with two assumptions about the environment:

1. Most companies have excess capacity
2. Standards are inaccurate
3. Set up & batch sizing assumptions are arbitrary
4. There are different pay scales associated with different skill sets

Most companies have more capacity than is being dictated by the market because demand fluctuates and customers want their products NOW. In order to satisfy the demands at peak times, one must have greater capacity than is dictated at other times. You can determine if your company has excess capacity by checking your WIP and FG inventories. If you have excess inventory, you have excess capacity – the inventory didn’t magically appear.

If you have excess inventory, you have excess capacity

The time standards the system uses to determine performance are often inaccurate. Many times, the person establishing the standard has not tested the validity of it, or the standard was set some time ago, and the process has changed. Furthermore, very few companies devote the resources to maintain accurate standards. Therefore, the company that has hundreds or thousands of part numbers will have many parts with standards under what they actually require and other parts with standards greater than they require.

Production is Punished When They Produce to Demand

Production managers that generate unfavorable variances must produce greater number of (unneeded) parts with overestimated standards in order to “earn back” the hours they lose on the parts that have underestimated standards. They will also be reluctant to produce those parts with underestimated standards.

Production is Rewarded for Building Excess Inventory

The production department can increase its earned hours by producing more parts that are not needed. This is done using its excess capacity to work ahead or build safety stocks. Their variance number will look good, but the company will have cash tied up in inventory it does not need today. By increasing the amount of inventory in the system, they will have increased their average lead times and blocked themselves from quickly responding to immediate customer demands.

Production is Punished for Being Responsive

In order to minimize variances production will minimize setups and make long runs. They generally don’t earn hours on setting up; they lose hours. Thus, the fewer the setups, the fewer the hours “lost” to non-productive activities. These longer runs are result in longer lead-times and thus are in direct conflict with the overall objective, to be responsive to the customer.

Production will be punished for working overtime, even if the customer demands it because the overtime pay is greater than standard pay, generating unfavorable variances. Everyone knows overtime is a sign you don’t have control of your plant! (tongue firmly in cheek) Production has no control over the product they produce or the time in which they must produce it. The sales department promises customer orders, and the decision to accept an order is often made by the



What Gets Measured, Gets Done

© 2001 Mark Woepfel

scheduler. The poor schmoe responsible for the plant doesn't stand a chance, because he doesn't control the work or the timing.

Production is Punished For Having a Flexible Workforce

In a plant with a multi-tiered pay structure (skilled people earn more than less skilled) production is punished for moving skilled labor to work on jobs that where the "standard" labor resource is a lesser skilled, lower paid person. Production will spend \$10 an hour to work on a job that only earns \$8 per hour, thus earning an unfavorable variance. This does not exactly promote inter-departmental cooperation, and introduces a delay (to wait for the less skilled person) that punishes the customer. Furthermore, the highly paid people will look for work that has the "right" standard, again introducing excess inventory into the system.

Bottom Line Implications

The "earning hours" policy produces effects that are exactly opposite to the organization's need to improve performance.

- More inventory is produced than what is required, increasing the scrap, warehousing, material and obsolescence costs
- It is difficult for manufacturing to determine what the real priority of a given job really is, creating increased expediting and associated costs
- Lead times are longer than they need be
- Customers must wait longer for product
- The ability to allocate resources based on market need is discouraged
- Inter-departmental cooperation (sharing resources) is destroyed
- Production is punished for cooperating with customers
- Excess cash is tied up in the system, reducing overall ROI (bad for stockholders)

Few managers examine the underlying assumptions upon which their systems are built. Instead, they tinker with the machinery, organization, and the manufacturing process, missing the foundation; the measures.

Improving the system's performance can only be accomplished by changing the behaviors within the system because behavior is dictated by measures. These measures must produce behaviors that move the organization to improve *overall* business performance. We must redefine the measure of good performance from one of being busy to one of being effective; from local performance to global performance. We must not only teach them what to do, we have to stop punishing them when they do it!

Here are some examples of appropriate measurements:

1. Cycle time (order lead time or manufacturing lead time)
2. Productivity ratio (throughput divided by operating expense)
3. On time delivery (to delivery promise or to delivery request)

Each of these measures are directly related to customer satisfaction or shareholder value. Each one, if improved, will have an impact on the customer or shareholder.



What Gets Measured, Gets Done

© 2001 Mark Woepfel

A famous manufacturing philosopher has said, "Show me how you measure me, and I will show you how I behave". If your behaviors aren't changing, have a look at the measurement system first. Then, after you've fixed that, you can accurately assess other options to improve performance.

