A Model for Creating and Measuring Productivity Improvement

“If you can measure it, you can improve it.”

Peter Drucker

Peter Drucker’s well-known comment sets a deceptively simple expectation for us – namely that once you have captured the numbers, you’ll be fully armed to somehow “make it better.” While labor measurement is not easy, it is the easier part of “Creating and Measuring …” The secret of productivity improvement lies in what you do, after you figure out how to measure it.

Some Notes on Technology and Measurement

Measurement practices in our industry have become much more sophisticated in the past two decades, unless you consider labor. To a degree, this is understandable, as we tend to gravitate to the “readily quantifiable” when we measure (readily, in this context, meaning data that is easy to obtain, and data that is reliable, objective and complete). Anyone who has tried will tell you - “‘Readily quantifiable’ and ‘labor measurement’ do not mix very well.”

This is also the reason labor management software is immature as compared with inventory management or transportation management software - the other two largest costs in most operations. Highly effective technology solutions for these areas have been widely available for some time and are comparatively inexpensive. Until recently, practical solutions for labor were hard to find at any price. But that has all begun to change.

Similar to bar coding, the grocery industry led the way in implementation of labor productivity improvements decades ago. Today, the conjunction of a tight labor market, a sharper labor focus by software developers, and rising distribution have resulted in greater interest and some significant gains in other industries. Managers are beginning to use tools to optimize labor resources, even in highly dynamic work environments and have the results show for it.

An Organizational Profile

Not surprisingly, the organizations leading this charge are the same innovative, industry leading companies who have sought competitive advantage elsewhere. They range in size from less than $100,000 million to multiple billions in sales, from a single site operation to multi-tiered distribution networks.

A typical organization might average four to seven sites, has had recent grown at or above 25% per year, employs hundreds of employees on at least two shifts five days per week and averages fully loaded wage rates of between $12 and $20 per hour, union or non-union.

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As a rule, the organization has several objectives for a productivity initiative that might include:

- Improving productivity through labor measurement
- Improving labor resource utilization
- Controlling or reducing payroll expenses

To attain those goals, many companies have turned to an approach found throughout the grocery industry – engineered standards, combined with sophisticated data capture and reporting technology.

As a strategy, the organization looks to develop a combination of team and individual metrics best suited to each operation. They are applied throughout the system so that all associates are treated fairly and “everyone has an equal chance for the brass ring.” Interfacing the data reporting function to the resident warehouse management system (WMS) permits real time reporting; this benefits both management and the individual employee. Work plan execution and current performance are then accessible to those most qualified to impact both for the better. In multi-site organizations, each site’s performance can also be rolled up to headquarters, giving top management fresh, meaningful information with which to run the business.

Putting the Strategy to Work – Software

The ideal productivity improvement initiative has two major components:

- engineered standards to establish goals and improve the ability to predict work content
- labor reporting software to make results available quickly and in the most suitable format for taking action.

The first piece requires industrial engineering experience and strong people skills. The second piece usually appears in the form of commercially available software. Because of the specialized nature of the calculations used and the nature of predicting and tracking labor activity, in-house development of this kind of application is generally not recommended.

Although picture is changing, few of even the top tier WMS vendors provide solutions that accommodate both engineered standards calculations and highly flexible software tools to report labor activity in real time. The functionality is specialized and to date has not warranted much attention from most WMS vendors. The most powerful and capable applications come from other software developers who have focused on the labor aspect of distribution.

Professional educational organizations such as the Council of Logistics Management, WERC or APICS, or consulting firms are usually good resources for locating and recommending software for this purpose. The software tools are a key ingredient. An effective productivity program relies as much on the timely communication of results as it does on establishing goals and calculating performance against those goals. Getting information into the hands of people who can impact the results is essential.
The software supports timely reporting of both performance and utilization, assists in balancing labor across all functions in the warehouse, facilitates labor allocation planning, and enables analysis of historical data housed in the data base.

“So How Do You Measure Labor Performance Well?”
Standards & People

The heart of the issue is always the establishment of a fair and objective means by which to measure work. It is complicated by the fact that neither the work itself, nor the individuals who perform it are the same from instance to instance. And, by the way, neither are the supervisors and managers who are charged with planning and acting on the data produced.

The single most effective process for establishing a reliable, objective metric for performance is the classical engineered standard developed through detailed time study of each task in context.

Best Practices. This approach begins with the identification and implementation of the optimal methods and procedures for performing the work (put-away, whole or broken case replenishment, case or pallet picking, etc.). There is no point in developing metrics for the inefficient or inconsistent methods – they will not have much value. Rather, you want to train people to do things in the best way and plan that way as well.

Building Standards. After implementing best practice improvements, an engineer then studies the work, breaks each task into its constituent elements and develops an allocation of time for each occurrence of each element in that work. For instance, if an order picking task involves one line and three cases, the unit of work would contain elements and related time for picking up the order, moving to the location, picking each of three cases and moving those cases to outbound staging among other things. Some highly varied tasks may use 30 or 40 elements.

A precise calculation of the total “earned” time for this task presumes that the individual performing the work is using mutually agreed methods. Management’s expectation should be that a normal person with normal skills can sustain this pace for the duration of their shift (eight or ten hours) without undue fatigue.

For some tasks (loading, pass along picking or unloading a truck), an individual measurement may be especially difficult. In those cases, the most common solution is to create a standard time for the task and relate it to the total time for the entire team. While not as precise, this approach retains the fairness and objectivity that is essential to a sound measurement process.

By studying many iterations of each work task and element, the engineer is able to arrive at time allocations which are highly reliable across a very wide sample of the work associates are asked to perform and can very accurately predict how long any given work assignment should take. However, before any standard is applied to a working situation it needs to be validated by the facility’s management to assure that everyone is satisfied that it is fair and accurate. Measurement then becomes the process of capturing actual time applied to the task and comparing it with the predicted or calculated “standard” time.
**Capturing Actual Performance Data.** This process need not be complex, but must be complete in order to be valid. Beginning and ending times for all tasks and all users are essential. Data can be captured automatically by radio frequency (RF) devices, or manually by bar code scanning or keyboard entry. The key is to minimize the time required to capture the information, while assuring that it is captured properly. This affords management an opportunity to see both performance and utilization at the individual or any other level.

**Calculating Performance.** Performance calculation simply relates standard time to the actual time applied by that individual to the accomplishment of that task. If, in the course of the task, time elapses which does not relate to the work and which is beyond the individuals control (a fire drill, a battery change, a spill clean up), an adjustment is made to remove that portion of the total time from consideration (exception time).

By dividing standard time (360 minutes) by the actual time (400 minutes), the system returns a performance rating of 90% (or in a “0-based” form –10%) of the expectation or standard.

**Calculating Utilization.** While performance measures the employee’s work, utilization measures management. It is the application of available time (labor) to the open work and indicates how well managers have used the labor resource. For an individual, as an example, there are 450 minutes in an eight hour shift (two 15 minute breaks; lunch is not included). If 400 minutes of that time were applied to relevant work, that person’s utilization would be 89%

**Calculating Total Productivity.** In combination, these two calculations provide a powerful and otherwise unseen indication of how efficiently work is being accomplished. This metric is derived from relating the two results discussed above. By multiplying performance for a whole period (90%), by the utilization factor (89%) the total performance for the facility is actually 80%. When performance is less than 100% and labor is applied less than 100% of the time, the overall result is significantly lower.

<table>
<thead>
<tr>
<th>Total Performance Calculation - Example</th>
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<tbody>
<tr>
<td>AVL = 450 minutes</td>
</tr>
<tr>
<td>(8 hour day, not including lunch, minus 2, 15-minute breaks)</td>
</tr>
<tr>
<td>ACT = 400 minutes (actual time worked on standard)</td>
</tr>
<tr>
<td>EXC = 50 minutes (meeting time with management)</td>
</tr>
<tr>
<td>STD = 360 minutes (standard time)</td>
</tr>
<tr>
<td>% UTL = ACT/AVL x 100 = 400/450 x 100 = 89%</td>
</tr>
<tr>
<td>% PERF = STD/ACT x 100 = 360/400 x 100 = 90%</td>
</tr>
</tbody>
</table>

TOTAL PERFORMANCE = % PERF x % UTL = 90% x 89% = 80%
Improving Performance

So far, nothing has been improved except work methods – we have only established measurements. Standards and reporting software have value only when they facilitate change for the better. The whole point is to position users and managers to be able to make improvements.

Implementation. Following the validation of the standards for each area, management needs to work with all associates, assuring that they understand how the standards were developed, how the reporting process works and that they use the right methods. The implementation of the process itself takes place over a period of several weeks, with the expectation that associates will attain 100% performance level by the end of that period.

This illustration depicts a typical learning curve for implementation of a standards program.

The dashed line represents an approximate rate of expected improvement across an eight-week period. The precise rate of improvement will vary for each individual (the other lines), but needs to be planned and communicated to everyone involved. By assuring that expectations are clear, the prospect of success is enhanced.
Observations, Feedback and Training. Supervisors and managers are frequently better prepared to manage inventory, transportation and information than they are to work with people. With few exceptions, the innovative and industry leading organizations we discussed at the beginning of this article have made a strong commitment to assure that their management has the tools and training needed to do the job properly.

Supervisors are trained to identify those who need help in attaining the graduated rate of improvement during the implementation period. The primary vehicle for accomplishing this task is personal observation and interaction with each individual during the course of their work.

By learning how to interpret the data generated by the process, supervisors can quickly identify those who need more training and counseling. A high level of feedback for all parties is important to establish at the outset. This includes daily and weekly reports by individual, supervisor, department, shift and facility. It also includes an option for individual associates to inquire about their status at their convenience. A veteran line supervisor put it best: “Everyone wants to know how they are doing. It’s important to make it easy to find out.”

This is the stage where full realization of the benefits is most at risk. Productivity improvement is as much about training management to use the tools and develop their teams as it is about establishing goals and capturing performance data. Ironically, it is also the point of greatest opportunity. Supervisors who are actively involved in helping their associates attain objective and reasonable goals very often attain results well beyond the point where initial expectations are set.

Planning and Analysis. Management also can now begin to use performance data to build plans for the future periods and to monitoring the work as the plan unfolded during a shift.

The screen print example shown below enables a manager to watch the plan unfolding using actual, current performance data in real time.

The information can be viewed from any of a number of perspectives, depending on what is best suited to each supervisor’s needs and responsibilities. Labor levels can then be adjusted by department, zone, wave or function to optimize production, minimizing both downtime and overtime.
Maintaining Data Validity. There are many other refinements and nuances that can be added to the process. By integrating reporting data with the payroll time clock function, for example, management can account for all time being paid for operations work. With an effective report writer, management is able to create or customize reports to suit individual needs, in addition to keeping corporate management well informed overall.
Results, Generic and Otherwise

One the most appealing aspects of a productivity initiative is that it is usually very cost-effective and begins generating meaningful benefits well before the project is completed. It is not unusual to have an ROI for a project that is under six months. Most are less than one year.

The precise degree of improvement is obviously a function of the individual company, and often, the individual facility. One way to locate your operation on the spectrum is to rate the quality of your supervisory group, using the grid below.

### Typical Industry Performance Levels

<table>
<thead>
<tr>
<th>Quality of Supervision</th>
<th>Poor</th>
<th>Average</th>
<th>Good</th>
</tr>
</thead>
<tbody>
<tr>
<td>Norms (no standards)</td>
<td>40%</td>
<td>50%</td>
<td>70%</td>
</tr>
<tr>
<td>Historical (past performance)</td>
<td>50%</td>
<td><strong>65%</strong></td>
<td>80%</td>
</tr>
<tr>
<td>Reasonable Expectancy (designed)</td>
<td>60%</td>
<td>75%</td>
<td>85%</td>
</tr>
<tr>
<td>Engineered Standards</td>
<td>85%</td>
<td>95%</td>
<td>105%</td>
</tr>
<tr>
<td>Individual Incentives</td>
<td>90%</td>
<td>110%</td>
<td>125%</td>
</tr>
</tbody>
</table>

Potential results are also impacted by the demographics of your workforce. The following chart illustrates a common distribution of performance levels across a representative group of warehouse associates. The least productive 25% are often the group with highest rate of turnover, increasing management’s training burden as well.
Employee Performance - Non-Standard Operation

<table>
<thead>
<tr>
<th>% of Workforce</th>
<th>Typical Performance Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Employees</td>
<td>75% to 80%</td>
</tr>
<tr>
<td>Most Employees</td>
<td>65%</td>
</tr>
<tr>
<td>Lowest Employees</td>
<td>40% to 60%</td>
</tr>
</tbody>
</table>

Taking these factors together, you should be able to approximate improvement that is possible. By relating improvement to your payroll, you can estimate the annual dollar savings available. The following are reasonable improvement expectations by area for most facilities:

Typical Savings

<table>
<thead>
<tr>
<th>AREA</th>
<th>PERCENT OF PAYROLL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receiving</td>
<td>10% to 25%</td>
</tr>
<tr>
<td>Stocking</td>
<td>10% to 25%</td>
</tr>
<tr>
<td>Selection</td>
<td>20% to 100%</td>
</tr>
<tr>
<td>Replenishment</td>
<td>10% to 25%</td>
</tr>
<tr>
<td>Consolidation / Loading</td>
<td>15% to 50%</td>
</tr>
</tbody>
</table>
During the course of implementing productivity improvement programs some organizations have made other important discoveries as well.

- it is important to conduct multiple observations with each associate and in each work area during implementation and beyond
- a greater emphasis needs to be placed on training of associates and management (especially as related to interpretation and use of planning and balancing data by management) than is usually expected; the benefits are exponential
- more emphasis on frequent communications of all kinds is a key. This took several forms: real time feedback on performance, more frequent counseling for improvement, and wider participation in decision making about productivity.
- as employees attend to their performance, quality rises along with productivity

People are focused on their job to a greater extent. When people know what’s expected, how they are doing, and that their contribution is fairly and objectively documented and recognized, they tend to become better, happier workers – the kind everyone is looking for. And they tend to stay longer.

About TZA

Tom Zosel Associates (TZA) is the world leader in optimizing logistics performance. Consistently delivering results for numerous logistics leaders, TZA helps clients reduce operating costs, substantially improve logistics processes, eliminate bottlenecks, increase throughput and capacity, achieve material handling automation goals, and optimize total logistics network performance.

These results are achieved through a focused portfolio of consulting services and technology tools. TZA’s unique methodology, which helps companies improve strategic decisions through an unbiased, comprehensive evaluation of appropriate alternatives, enables companies to achieve their logistics goals at the minimum level of required investment.

TZA’s core competencies include Strategic Network Design, Facility Design and Material Handling Engineering, Transportation System Design, Logistics Software Solutions and Productivity Improvement Programs. TZA’s ProTrack software offers the industry’s most powerful labor planning and reporting software solution.

TZA is passionate about helping its clients succeed with a laser-focused methodology built on value realization.

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