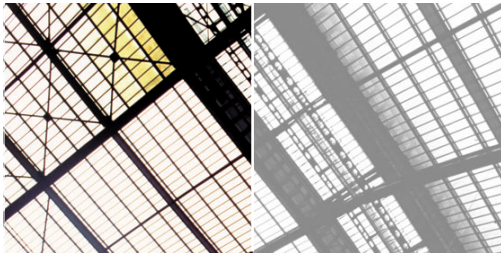# Powerful Performance Measures

An executive primer to performance measures that drive improvement

By John R. Brandt

and

George Taninecz

Powerful Performance Measures
An executive primer to performance measures that drive improvement

Every organization has its favorite metrics – measurements that gauge control, progress, and success. At a world-class organization, these measures serve as a common "performance language" that links corporate strategy, divisional goals, plant targets, departmental budgets, and individual incentives into a unified, results-oriented system. But at a mediocre or failing organization, these measures usually turn into management babble and confusion – reams of records and disjointed findings tracked simply because "that's what we've always done." Metrics at these organizations become straitjackets – restraints that actually waste resources, aggravate employees, and block improvement.

How can companies break out of the metrics maze and develop a more successful performance-management process? By focusing executive effort on what makes performance measures powerful *and* useful – and by implementing a seven-step review that continuously analyzes, updates, and transitions new and better metrics into the organization.
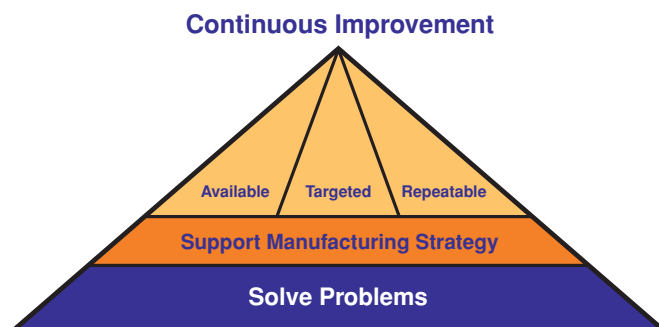
What makes a powerful measure?

World-class manufacturers use performance measures as tools to help their company or plant solve problems – problems that result in poor performance or that block improvement. Every measure must either stretch their organization toward better performance *or* be required for financial reporting or regulatory compliance. Powerful performance measures answer questions that emerge from the problem-solving process:

- **What is the problem?** World-class manufacturers clearly identify the problem that a measure should help solve or prevent – costs, quality, delivery, safety, productivity, etc.

- **Why is the problem occurring?** Performance-driven executives invest time and effort in understanding the root causes of the problems they seek to solve. For example, quality problems in the form of rising warranty costs might be traced back to employee error, poor supplier components,
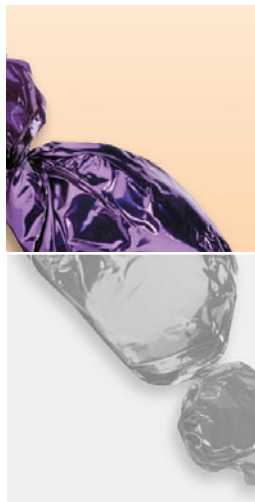
Building Powerful Performance Measures

Continuous Improvement

Available | Targeted | Repeatable

Support Manufacturing Strategy

Solve Problems

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customer misuse of product, or a combination of all three. World-class manufacturers keep digging until the real cause is found. For example, some companies with poor safety performance have chosen not to focus on actual accidents (which they must report to OSHA) but on events that *almost* led to an accident or where an accident was narrowly avoided (i.e., "near misses"). A study within Fortune 100 organizations found that near misses are the "most significant predictor variable for accidents" and that employees who experienced a near miss "are almost twice as likely to experience an accident as those who have not experienced a near miss."[1] Thus, by tracking and measuring near misses, an organization hones in on the root causes of safety problems and can reduce the likelihood of accidents.
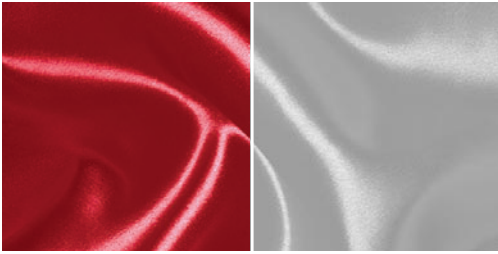
- **How can recurrence of the problem be reduced or prevented?** World-class manufacturers establish measures that accurately identify the occurrence of root causes, thus helping employees to eliminate them and improve performance. But at mediocre firms, metrics often measure the wrong processes and results. For example, customer-support staff may be measured on call volume, regardless of whether customer problems have been solved. A more effective performance metric would be the number of call-backs per customer and case number – allowing analysis to discover the underlying problem(s).

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[1] Sarkis, Hank, "How to insure success in safety and operating reliability," The Reliability Group, 1997.

Like any tool, a performance measure must be applied in the appropriate context. A powerful metric will:

- **Support the manufacturing strategy.** Manufacturers can only solve problems within the scope of their chosen manufacturing strategy – which means all measures must support that strategy. Plant management must focus on what it can control; problems uncovered outside the scope of manufacturing – e.g., chaotic sales promotions that create demand and scheduling fluctuations – will be shared with other teams with the authority (and metrics) to solve them. It's because of this need to "scope" the measures that many organizations will cascade broad corporate measures down to departments and locations, empowering those units to establish more discrete measures.

- **Target specific process points.** Broad performance measures are a necessity, but they must be supported with metrics sampled at a variety of distinct process points to provide targeted problem-solving. For example, tracking finished-product yields or customer returns may only validate what's already known – that there's a quality problem – without narrowing the problem to specific processes or causes. Similarly, if on-time delivery to customers is always near 100% but requires significant overtime or expediting, then management must also seek more targeted measures such as internal on-time delivery between production processes, expediting costs as a percentage of all logistics, etc.

- **Be readily available.** Unfortunately, some valuable metrics may prove impractical or too costly to capture, particularly if information needs to be leveraged in real time. If, for example, a measure requires repeated documentation by a production operator, the process of collecting the metric may under-

mine the operator's primary objective of producing a quality product. Automation is a common means to collect otherwise unattainable measures: 58% of executives rely on real-time data from automation systems, and about 33% use a formal real-time performance management system in their operations.[2] A Continental Teves plant in Morganton, N.C., winner of the Best Plants award in 2000, displays individual productivity rates and operating equipment efficiency for seven assembly lines every *30 seconds.*[3]

If a tough-to-capture metric is crucial, smart companies may consider:

- Capturing the metric less frequently;
- Videotaping the process and calculating an average measure; or
- Developing a metric that indirectly measures the same thing (e.g., assemblies per shift per operator, which indicates if substantial assembly rework is occurring).

- **Be consistent and repeatable.** If a metric varies constantly with no repeatable distribution, it will never offer any insights. And while most measures will vary, there must be a reasonable distribution pattern that allows an organization to identify good performance from bad.

Within this framework, world-class manufacturers identify, adopt, and implement powerful performance measures. MPI recommends the following seven-step process that streamlines such activities:
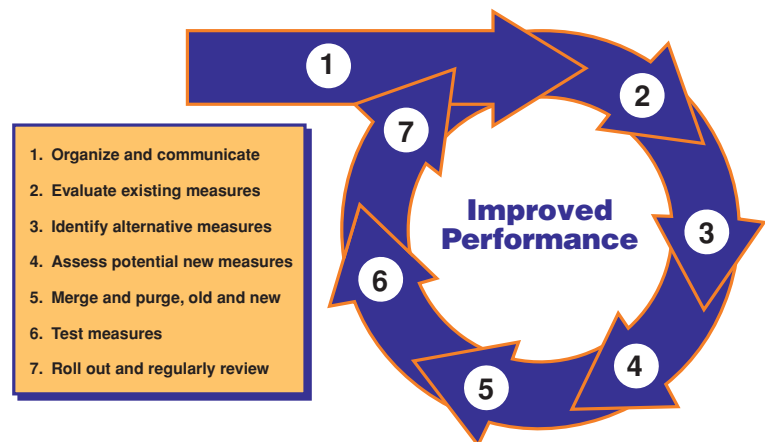
1. ORGANIZE AND COMMUNICATE

A transition to better performance measures can begin from a variety of starting points. For example, at a small company or plant, a CEO or plant manager may organize the effort. In larger companies and plants, leading the transition usually falls to a continuous-improvement team or a group in charge of performance management. (In large organizations, the metrics-improvement process may focus first on a "model" facility or department and then move throughout the organization.) Regardless of person or group that starts the effort, the initiative must establish a clear goal: identification of metrics that solve corporate problems, improve performance, and support the organization's manufacturing strategy.

Next, a cross-functional performance-measure (PM) team will be assembled, including representation from all elements of the organization. If, for example, the transition is being led at a corporate level, PM representation can be by location or division (e.g., by regions or markets served) or by function or department (e.g., finance, marketing, operations). The PM team will meet in person or via conference calls on a regular basis (weekly, monthly). All members must have sufficient time dedicated for team activities and assignments.

After being briefed on the process and the concept of *powerful performance measures*, the PM team in turn communicates the process to the rest of the organization, describing why the company or plant is undertaking this effort and how it will help the plant or company improve. This initial communication should also solicit comments and ideas from everyone within the company or facility. Each PM team member will also discuss the process in more detail with his or her departments and/or locations, encouraging shop-floor personnel to submit measures that get to the root causes of problems.

Revitalizing Performance Measures

1. Organize and communicate
2. Evaluate existing measures
3. Identify alternative measures
4. Assess potential new measures
5. Merge and purge, old and new
6. Test measures
7. Roll out and regularly review

Improved Performance

[2] Gerold, Jane, "Throughput, productivity top KPI list," Automation World and www.automationworld.com, April 1, 2004; survey of online subscribers and Web site visitors.
[3] Stevens, Tim, "Small parts, big performance," IndustryWeek, Oct. 16, 2000.

2. EVALUATE EXISTING MEASURES

If a performance-measures database does not already exist, the PM team gathers into one master spreadsheet or database all metrics (good and bad) currently tracked by the plant or company. This material should be organized in a way that makes the most sense to the organization; if most measures are tracked by department (e.g., purchasing, engineering), findings should be presented in that manner.

PM team members will have individual responsibilities, too, for finding and logging metrics required by their constituents. For example, a maintenance supervisor will record machine-related measures, such as mean time between equipment failures, while a divisional VP might gather measures that allow his or her colleagues to assess a plant network, such as return on invested capital (ROIC). Accompanying each measure in the spreadsheet will be:

- Frequency with which the metric currently is tracked;
- Who or what department(s) is responsible for tracking the measures;
- How the metric is typically captured (e.g., visual recording, automated, outside auditor);
- Department(s) or person(s) that require the measurement;
- Current rationale for tracking the metric; and
- Problem the measure presumably prevents or solves.

The latter three pieces of information are critical to determining the need for existing measures. Why? Because once the spreadsheet is complete, the PM team will use them to identify the "low-hanging fruit"- the measures that no longer need to be tracked. The PM team will distribute the list of low-hanging fruit to all employees with a deadline for requests to "restore" a deleted metric. The PM team should remain flexible; if even one person in the company or plant can substantiate a need for a given metric, the measure should be restored. All other low-hanging fruit will be removed from the spreadsheet, with employees responsible for tracking these measures notified to stop their capture.
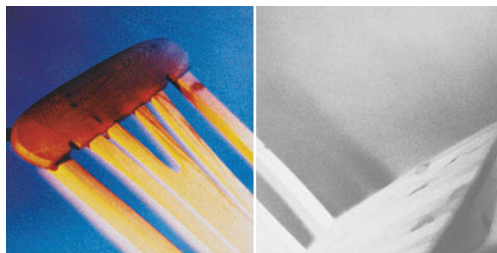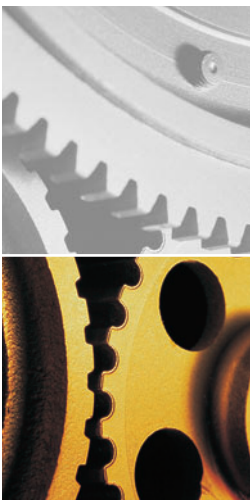
3. IDENTIFY ALTERNATIVE MEASURES

Next the PM team looks externally to find measures being used by other manufacturers both inside and outside their industry. During this step, the performance-measures process will intertwine with a sound benchmarking program. As in benchmarking, PM team members will seek organizations that have solved problems similar to those that vex their own organization. Online benchmarking resources can help the PM team to quickly identify what measures other companies and plants track. In addition, each member should call on his or her own network of colleagues (e.g., association members, mentors) to learn what's available and useful. During this step, the PM team should err on the side of bringing back too many measures, even if it's not obvious how the measure can be applied; if a best-practices company tracks it, there may be an excellent reason for using it that is not immediately apparent.

There are many good repositories of performance measures and practices. For example, many companies cull the criteria demanded of winners of the Malcolm Baldrige National Quality Program. Baldrige organizations submit details (and often metrics) regarding performance achievements and improvements in seven key areas:

- Leadership;
- Strategic planning;
- Customer and market focus;
- Information and analysis;
- Human resource focus;
- Process management; and
- Results.

Approximately 2 million copies of the Baldrige criteria have been distributed since 1988, and many users believe the criteria help move their companies closer toward Baldridge-like performance. Interestingly enough, a hypothetical stock index of publicly traded Baldrige-winning companies has outperformed the Standard & Poor's 500, with the 2003 "Baldrige Index" outperforming the S&P 500 by 4.4 to 1. More than 50 programs in 44 states now model the Baldrige criteria.[4]

[4] Malcolm Baldrige National Quality Award, National Institute of Standards & Technology, www.nist.gov.

4. ASSESS POTENTIAL NEW MEASURES

The PM team then evaluates all the potential measures using the criteria of what makes for a powerful measure. This assessment process will enable the team to categorize each measure as "must use," "maybe/manipulate," or "remove."

Must-use measures meet all the primary requirements of a powerful performance measure and are certain to elicit a consensus response within the organization. These will likely spur comments such as, "I can't believe we haven't been tracking this;" they often turn out to be the most basic of metrics. Observers are continually surprised by the number of companies (especially small- and mid-sized organizations) that fail to track even rudimentary process and operations measures. Many basic measures are cornerstones of operational excellence. For example, of those manufacturing plants that report 100% on-time delivery, a commonly captured metric, more than 42% indicate they have made "significant progress" toward world-class manufacturing status or "fully achieved" world-class status. More than *four-fifths* of plants with on-time delivery rates of less than 90% say they've made only "some progress" toward world-class or made absolutely "no progress." While flawless delivery alone won't guarantee world-class performance, manufacturers can be reasonably certain that without it – and certainly without tracking it – a company has little chance of moving toward world-class.[5]

Even as they track measures required for accounting, many plants haven't got a clue as to which measures can evaluate strengths and weaknesses in their organization. For example, a plant with quality problems may be smart enough to track returns by both customer and channel, but neglect to track specific causes for returns – missing opportunities to identify the real problem, whether internal (e.g., components from a plant department or a specific supplier are breaking down) or external (e.g., the

product doesn't function properly in extreme humidity). *Must-use* metrics are immediately added to the spreadsheet.

Maybe/manipulate measurements warrant continuing discussion, evaluation, and revision. For example, operating equipment efficiency (OEE) is a valuable measurement of efficiency but is skewed toward equipment-centric processes (machine-availability percentage X quality-yield percentage X percentage of optimal production rate). A manually intensive assembly operation within a cell might revise OEE by substituting a cell's time available-for-production for machine availability. As the PM team develops new, powerful measures from the *maybe/manipulate* set, these are added into the spreadsheet.

It's prudent to remember that overemphasis on any one performance measure – existing or new – is rarely good. Measures should work together, with some, such as profitability or other measures of return, often taking precedent. For example, it might be possible to improve OEE on the factory floor by tripling the staffing and hours of availability of maintenance personnel or by annually replacing equipment, but that would defeat a higher-priority measure of corporate profitability. Most managers realize this; according to the Maintenance Performance Metrics survey sponsored by *Plant Services* magazine and Rockwell Automation, about 53% of respondents use a category of "budget compliance" to measure the performance of MRO activities.[6]

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[5] IndustryWeek/Manufacturing Performance Institute 2003 Census of Manufacturers, The Manufacturing Performance Institute 2003 Benchmarking Toolkit, www.mpi-group.net.
[6] Berger, David, "Know the score," Plant Services, Nov. 5, 2003.
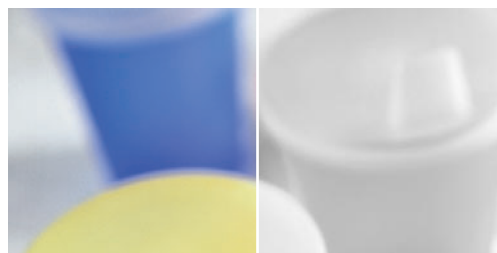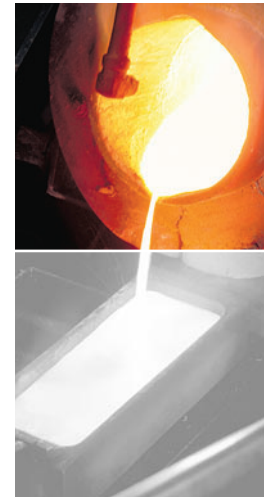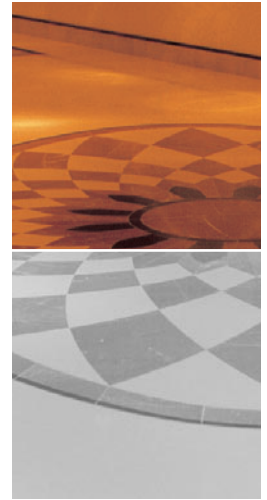
5. MERGE AND PURGE, OLD AND NEW

The PM team now needs to identify where measures overlap (making some unnecessary) and complete its scrutiny of both new and old. In instances where a new measure replaces an older one, the PM team will contact the employee or department responsible for tracking the old metric. If the employee or department agrees with the PM team's logic for the newer measure, the old metric is immediately removed. If the employee or department disagrees, the plant or firm will temporarily track both measures, with a periodic review to assess the utility of both new and old measures. The PM team must be both flexible and firm; if an older measure has only limited support, it should be eliminated by fiat.

During this step, the team will also review tracking frequencies for all measures. Tracked too often, a measure may end up wasting manpower and effort. Tracked too infrequently, a metric may gather data skewed by seasonal or other fluctuations. The PM team must select tracking periods that encompass the volatility inherent in a given metric (e.g., in a highly seasonal business, tracking periods must include an entire year to be accurate). Conversely, a measure that changes rarely can be sampled less frequently.

Above all, the PM team must hone the spreadsheet down to a list of problem-solving measures that support the manufacturing strategy and accommodate all the nuances of a given business, such as unusual product mix, market conditions, or customer needs. This customization is critical for two reasons:

- Metrics customized *now* for a given plant or company prevent excuses *later* for not meeting performance targets; and
- Comparisons with other organizations – a crucial step toward becoming world-class – are easier and more accurate when measures are precisely designed and applied.

6. TEST MEASURES

Before releasing a revised list of performance measures, the PM team will consult the source of metrics (e.g., the shop-floor) and test the capture of each new measure, asking:

- Can it be tracked?
- How easily can it be tracked?
- Are results of tracking it logical and repeatable?
- What is the measure initially indicating (i.e., will it really help to solve a problem)?

Some measures that look useful on paper fail in real-world testing. The PM team will either revise or eliminate these. Production employees will be great allies during this stage, offering insights that only they possess on how to hone or capture measures.

Some metrics offer immediate insight, but others can only be tested over time, such as dollar savings due to a certain improvement process or results from a training curriculum. Longer-term measures will be listed until they can be appropriately evaluated.

7. ROLL OUT MEASURES AND REGULARLY REVIEW

With the final spreadsheet in hand, the PM team introduces the new measures. Plant-wide meetings or corporate newsletters can reintroduce employees to the performance-measure transition process and highlight the new set of metrics. In smaller settings, PM team members will discuss the new measures in detail with their departments or locations, coaching those responsible for capturing and using the new metrics. In situations where no performance-management system currently exists, the PM team will help to devise a rudimentary process (e.g., line supervisor reviews hourly operator measures, department manager reviews daily supervisor measures, plant manager reviews weekly department measures).

It's crucial that the PM team monitor whether the new measures actually help the organization to solve problems – or if they merely create more work. The PM team will also monitor the use of new metrics, ensuring that performance measures are appropriately reported at all levels of the organization. When problems arise, the PM team must take immediate action. If, for instance, a measure requires too much effort in capture, hurting production flow or creating unsafe behavior (e.g., measuring *consecutive days without an OSHA incident* may prevent employees from reporting incidents), the PM team must discontinue its use immediately.

The PM team will continue to meet periodically to discuss problem measures – and its own future. At a predetermined date, the PM team will select new members to replace its founders, passing on its process and its responsibility for driving powerful performance to a new generation of leaders.

MEASURE AND IMPROVE

Does every successful manufacturing company follow this process to establish, recreate, or upgrade its performance measures? Certainly not. But every successful organization does embrace these fundamental concepts:

- Regularly reviewing current measures:
- Adding new measures;
- Discarding measures that have outworn their usefulness; and
- Pushing the organization to overcome problems or obstacles that keep it from reaching maximum operational excellence.

The framework for managing the process may differ, but world-class manufacturers *always* get their performance measures right. For example, Medrad, the 2003 Baldrige Award recipient in the manufacturing category, has an executive committee and "Waterfalling Process" that reviews the company's five corporate scorecard goals, sets one- and five-year targets, and identifies the top 12 objectives to achieve those targets. Medrads then deploys the scorecard goals and 12 objectives throughout the organization, where managers create departmental objectives and plans to support the corporate scorecard and objectives. Employees then develop individual goals to support departmental goals. Medrad's revenues have grown from $35 million in 1988 to $254 million in 2002, and operating income as a percent of revenue has increased from 16 % in 1999 to 20 % in 2002.[7]

Where will your revenues and income be in three years? More importantly, what (and how) will you measure to get there?

If your company would like to increase productivity and improve yields while being cost-efficient at the same time, then Italian machinery and technology should be a consideration in your upcoming capital purchases.

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[7] Malcolm Baldrige National Quality Award 2003 award recipient, manufacturing category, Medrad, Inc.; National Institute of Standards & Technology, www.nist.gov, 2004.

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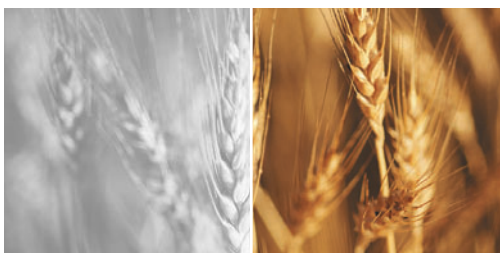
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