



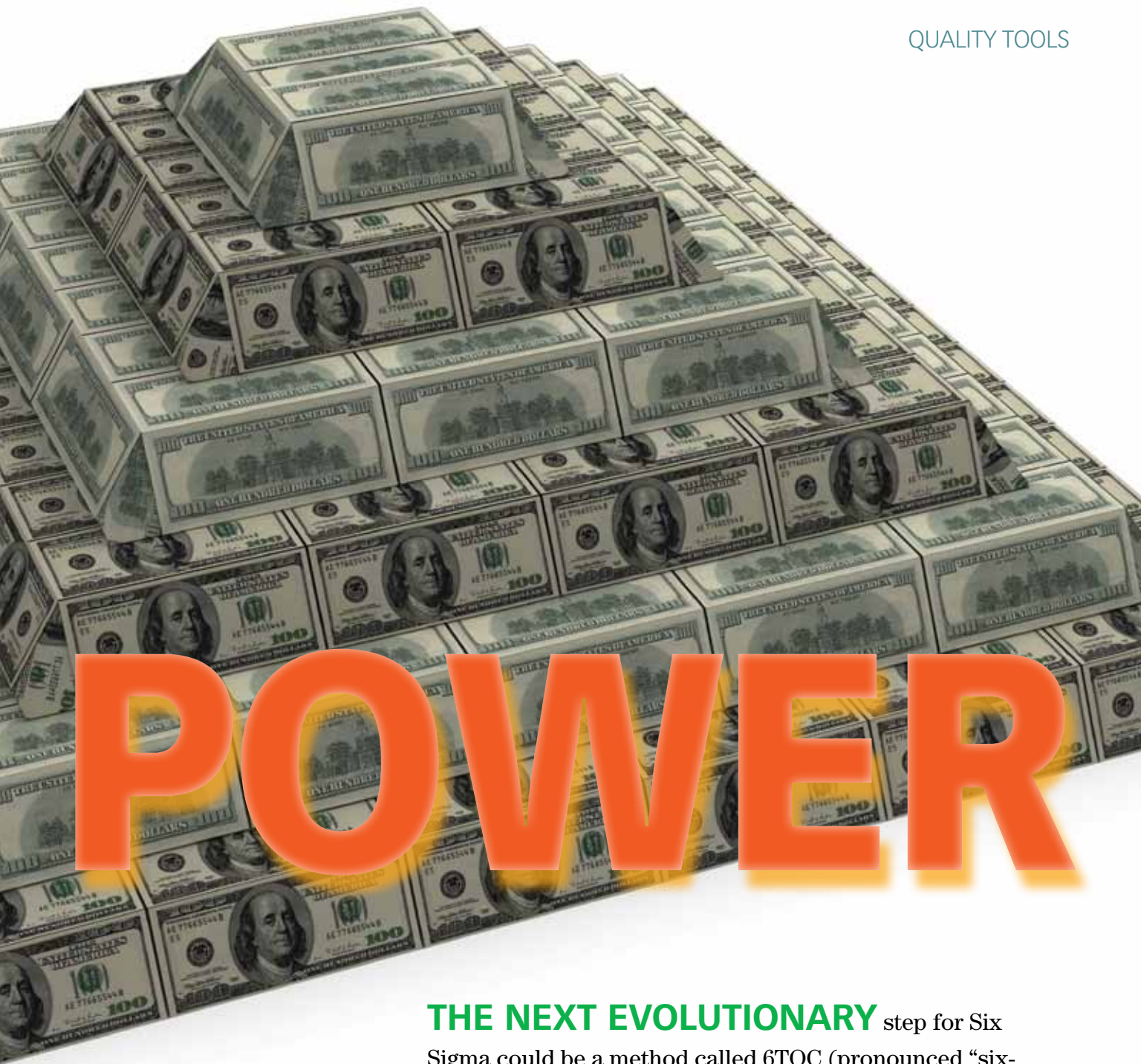
# Pyramid

by Todd Creasy

## In 50 Words Or Less

- 6TOC combines lean Six Sigma (LSS) and the theory of constraints (TOC) for bottom-line benefits.
- The method's metrics pyramids and communications allow organizations to retain gains and monitor benefits.
- 6TOC goes beyond factory floors or points of sale to reduce constraints, defects, waste and variation.

Get **bottom-line results** by combining **LSS** and the **theory of constraints**



**THE NEXT EVOLUTIONARY** step for Six Sigma could be a method called 6TOC (pronounced “six-tock”) that combines principles of lean Six Sigma (LSS) with the theory of constraints (TOC).

While using the tools common to lean and Six Sigma methods, 6TOC constructs a systemwide improvement process that aims to produce measurable, line-of-sight, bottom-line benefits; an organizational metrics pyramid; and a management and employee communication system for retaining gains and monitoring performance.

Discussing Six Sigma's emphasis on variation reduction, lean's focus on waste removal and TOC's interest in constraint management, one author wrote, "Many process improvement methodologies appear to conflict with each other or at least downplay the contribution of other methodologies."<sup>1</sup> Rather than choosing one over the other, 6TOC looks for synergy among the methods.

Six Sigma has migrated from improving manufacturing processes to project management, change management, culture change, teaming and other goals.<sup>2</sup> 6TOC may help Six Sigma practitioners fashion these and other concepts together, producing a holistic system that eliminates or reduces constraints while enhancing flow and reducing defects, waste and variation.

I have found the results of 6TOC applied in process manufacturing and construction management environments to be impressive. But, before we discuss the details of the 6TOC system, a brief discussion of its forerunners will be helpful and can be found in the online sidebar, "Predecessors of 6TOC," at [www.qualityprogress.com](http://www.qualityprogress.com).

### 6TOC's capstone metric

Each of the improvement methods described so far has its commonalities with the others and general criticisms. However, I believe complementary aspects of each can be combined to produce a powerful improvement opportunity. I agree with the comment that "to achieve maximum performance improvement ... lean, Six Sigma and other approaches should be brought together as a part of a holistic improvement method."<sup>3</sup>

6TOC is best initially understood by envisioning a pyramid containing several empty cells with a single capstone at the top (see Figure 1). That capstone represents the single metric that has the greatest capability of predicting success within your organization. As Jeff Immelt, president and CEO of General Electric, said, "Every initiative needs a metric."<sup>4</sup>

If initiatives need a metric, shouldn't a company as well? While not arguing for a single metric mind-set, I maintain that continuation of complementary

metrics is important. But there is one metric in most organizations that possesses a stronger likelihood of predicting success above all others.

According to Peter Drucker, "Profit is not the explanation, cause or rationale of business behavior and business decisions, but the test of their validity."<sup>5</sup> We need an indicator that has a strong association with a firm's profitability.

In the popular book *Good to Great* by Jim Collins, several great companies were discussed and compared with those of lesser status.<sup>6</sup> One of the great companies was Walgreens. According to Collins, Walgreens found the one metric that was used to measure the success of work and ideas—revenue per customer visit.

Looking through that prism, activities of all the management and hourly personnel were considered. Generally speaking, if the results in either group did not increase revenue per customer visit, then those activities were rethought, revised or removed. This one lens through which management viewed the organizational landscape was credited with helping Walgreens increase market share and profitability.

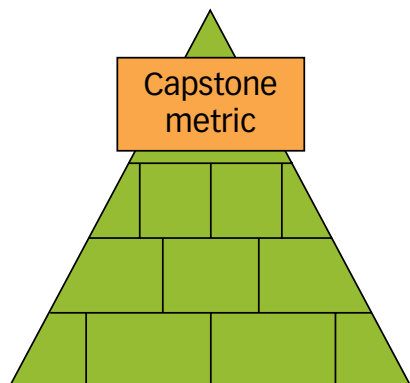
6TOC begins with a clear understanding and consensus of what the organizational metric should be. Differing from Six Sigma or LSS—with metrics that can be buried deep within the organization, a process or a value stream—the 6TOC metric should have direct line-of-sight visibility to organizational success or failure, which is usually measured at the bottom line.

This metric should be senior management's most monitored and communicated metric and the one least likely to become a victim of managerial manipulation. Think in financial terms such as revenue per sales order, operating income per payroll hour and revenue per share.

This one metric is the capstone metric in the 6TOC pyramid. There should be unity across divisions and departments on the metric's identity, its calculation definition and, ultimately, on operating tactics that will improve the metric. Consider tying some of senior management's—and others'—incentives to this metric.

When finalizing the capstone metric, work needs to be done to ensure the determination of the processes most influential to that metric. If products per labor hour were selected as the capstone metric, the manufacturing process could be easily identified as the most obvious process affecting that metric. While true, the manufacturing process is a complex combination of

**Metric pyramid** / FIGURE 1



# The **6TOC metric** should have direct line-of-sight visibility to **organizational success or failure.**

multiple paths converging to produce the critical path or chain that produces all final products.

Through the lens of volume flow improvement, examination of that chain's links will yield areas of improvement that are referred to as constraints or bottlenecks. Once the bottlenecks are identified, they are placed in descending order of negative influence on the capstone metric.

Keep in mind that at this stage of the project evolution, subject matter experts influence this ranking exercise, and opinions may vary. Reaching consensus and validating theories through data collection and analysis is advantageous but not always possible.

## Process chain review

Now that a list of significant bottlenecks has been constructed in descending fashion, the team should examine the chain in process-flow form from beginning to end and should segment the chain—or value stream—into logical, functional phases (see Figure 2). I suggest no more than four phases in most situations.

This segmenting improves the project's manageability, places and focuses the team's project within the critical chain, and affords an opportunity for small gains to create momentum propelling the team forward. Once the chain is segmented, identify the phases in which each of the bottlenecks occurs. In most instances, your focus will begin in earnest with the phase that contains the bottleneck with the most negative impact.

Before moving to the next phase, bottlenecks within the original phase should be resolved. In some cases, dependencies among phases may require examination of multiple phases to relieve a bottleneck of its constraining effects. This approach builds on the approaches of Six Sigma, with its emphasis on cost of poor quality, and of TOC, which recommends working bottlenecks in descending order regardless of where they exist in the chain.

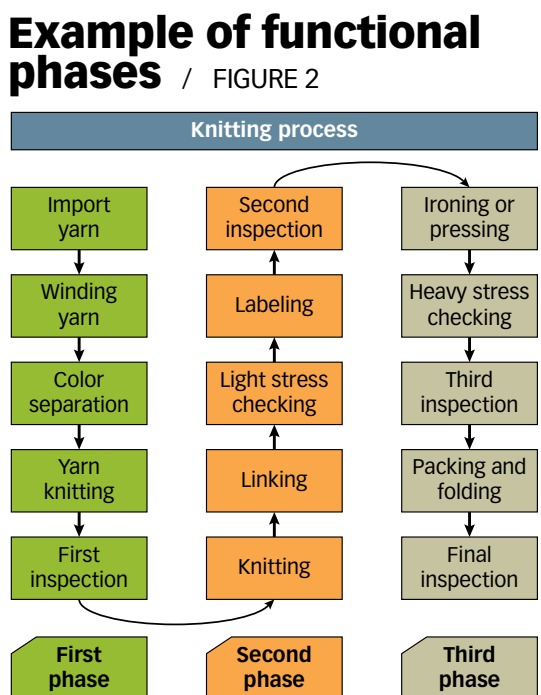
Continuing to work within the phase that contains the most troublesome bottleneck, the investigative team should seek to understand the maximum output of that phase. In other words, if all things ran perfectly,

if no equipment or personnel were underutilized and all materials were present when needed, at what volume could that portion of the chain—or phase—produce?

Within 6TOC, the maximum volume a process can optimally achieve is called "process capable." This is derived from Joseph M. Juran's definition: "What the process can do under certain conditions."<sup>7</sup> A common approach to begin determining process capable is to ask the plant supervisor or foreman how much can be produced on a good day.

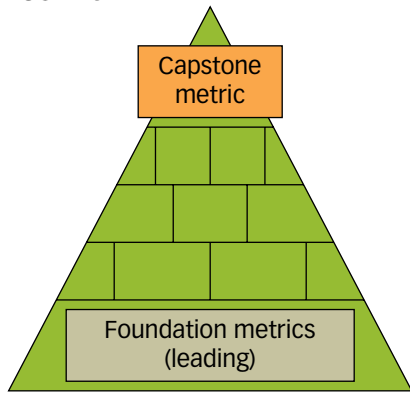
With some additional data gathering and analysis, process capable can be derived. Once process capable is derived, the real-time production for that portion of the process is then measured and referred to as "process actual." By gathering a relevant sample of current production, process actual can be established.

Through improvement initiatives, the team's goal is simply to improve process actual to the level of process capable—thereby increasing volume in that segment of the chain.



# Foundation of metrics pyramid

FIGURE 3



When matching capable with actual, lean tools (such as cycle times) are used to improve speed and reduce inventory. Six Sigma tools (such as correlation) are used to ferret out cause and effect relationships in the quest to establish a leading metric that will predict that portion of the manufacturing chain's success. This metric, and others yet to be created, are key and form the foundation of the metrics pyramid (see Figure 3).

These metrics are leading in nature and point upward to a performance metric of another specific function, with combined influences having a significant impact on the capstone metric. In some instances, a control chart, with its upper and lower control limits, can take the place of a metric within the pyramid.

## Middle metrics

Once the bottlenecks are relieved and process capable equals process actual within that phase, it's time to move forward to the phase that contains the next significant constraints. Six Sigma and lean are again employed in the investigative process to speed production and determine associations, trends and relationships between inputs and outputs. This 6TOC improvement process continues through the entire chain until the capstone metric begins to move in the right direction and achieves the goal desired by senior management.

How is the foundational layer of leading metrics bridged to the capstone metric? The connection is relational in that the processes measured by the leading metrics feed other processes within the production chain that ultimately feed the capstone metric.

The capstone metric could be an organization's revenue per product. Each department (purchasing, staging, pressing and

machining, for example) within the company has its own set of leading metrics that, if combined with the other departments, will ultimately impact the capstone metric.

Metrics that lag the company's foundational metrics but lead the capstone metric occupy the spaces between the two and are called middle metrics. Middle metrics can serve two purposes: They act as lagging metrics for processes feeding them and as leading metrics for departments, units or other functional areas in which they reside.

When considering these organizational metrics in pyramid form, consider a baseball team. Each batter has a batting average, which serves as that batter's performance metric at home plate. The team also has a batting average that is the average of all the players' batting averages. The team batting average serves as the middle metric between each player's batting average and the number of team wins—the capstone metric.

Middle metrics concern themselves with total department operations at the company. The summation of all middle metrics for all departments moves the needle for the company's capstone metric (see Figure 4).

## Communicating the pyramid

Juran taught the concept of placing employees in a state of control by doing three things:

1. Inform the employees of your goal.
2. Tell them how they are performing toward that goal.
3. Give them the autonomy to make changes to positively affect their performance.<sup>8</sup>

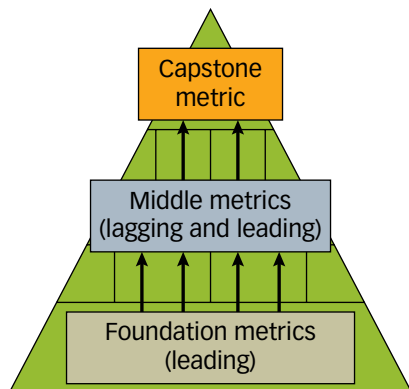
Unfortunately, efficient, informative management communication is often an oxymoron. 6TOC can help bridge the communication gap from management to operators by producing a communication plan that enables your employees to stay in a state of control.

Examine Figure 5, noting that several communication media are employed that announce leading and lagging process results that ultimately influence the capstone metric. These various forms of communication serve as signals toward ultimate capstone movement, either positive or negative. Their continuous communication allows for proactive decision making and cause and effect analysis before monthly, quarterly or yearly results are published. Once functioning, their ease of use should not be managerially taxing.

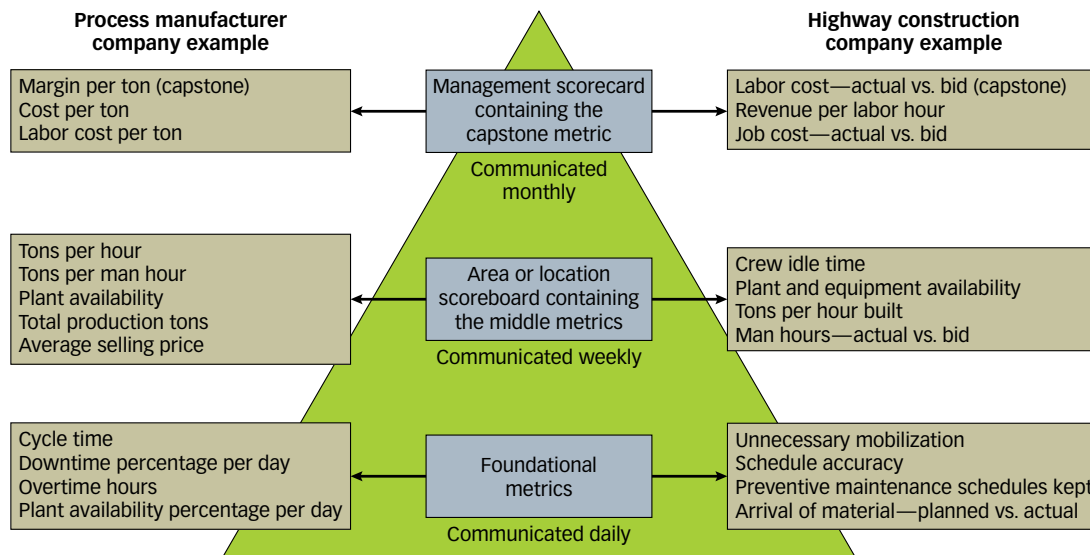
While I found the implementation of 6TOC in both the process manufacturing and construction management industries to be successful, practitioners need to

# Middle metrics

FIGURE 4



# Forms of communication / FIGURE 5



“Metrics Pyramid” copyright pending.

realize the vital importance of senior management support as well as accountability from those performing the actual work.

It is imperative that the participants understand the link between the metrics in the pyramid and that management reviews the performance of the middle metrics as often as possible—at least weekly—while the foundational metrics are reviewed daily.

The approach from management should be supportive and coaching in style, but demanding of accountability in orientation. Participants need to fully understand the importance of their commitment—not just compliance—to the 6TOC system.

Frankly, some participants may not be able to make the jump up from story-based management—and its frequent underperformance and frustration—to metrics-based orientation and a proactive management style. Some difficult personnel decisions may loom. With 15 to 35% production improvements possible and significant cost reductions likely, however, those decisions may be justified.

The discussions comparing the value-adding ability of lean, Six Sigma, LSS, TOC and other methods must rise to the next level to showcase their complementary elements.

“Partisans for Six Sigma maintain the key to better performance is the reduction of process variation. Adherents of lean question the wisdom of reducing the

variation in a process that is inherently wasteful,” according to Ronald Snee and Roger Hoerl.<sup>9</sup> Both add value. Our goal should be to use each within a system to surgically improve a company from top to bottom.

Since the seminal work of Frederick Winslow Taylor, industry has been seeking improvement ideas that lead to the holy grail of better results with the same or fewer resources employed.

The 6TOC system may be the next step in allowing managers and process investigators to combine Six Sigma, lean and TOC to reach the next rung on the evolutionary improvement ladder. **QP**

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