

WhatTheyThink?

eXpert Row - David Dodd

The Tools and Techniques of Lean—Part 1

By G. David Dodd

August 28th, 2008 -- This is the third in a series of six columns that are discussing the use of lean manufacturing and management methodologies by print service providers. The first column in the lean series described the growing popularity of lean and reviewed the results of a recent survey conducted by PIA/GATF and Point Balance regarding the use of lean in the printing industry. Last month's column discussed the primary business objectives and fundamental principles of lean. This column and next month's column will describe some of the tools and techniques that lean organizations use to achieve dramatic improvements in productivity and profitability.

All management systems use specific tools and techniques to accomplish their objectives. For example, Pareto analysis, fishbone diagrams, and process control charts are all essential tools of a total quality management system. Some practitioners argue that lean can be defined by a set of methods and practices. Others contend that the essence of lean is found in the principles I discussed in last month's column and that specific tools are secondary. One thing, however, is clear. You cannot grasp the essential nature of lean without having a basic understanding of the tools and techniques it uses.

Lean is associated with a large number of specific tools, techniques, and practices. For example, one well-known lean website contains a glossary of over 240 lean-related terms, and nearly 40 of those terms refer to lean tools and methods. Since I cannot realistically describe every lean tool and technique in this series of columns, I will focus on a dozen tools and methods that are used by most lean organizations. This column will describe six widely used lean tools and practices, and next month's column will cover six additional tools. In the PIA/GATF-Point Balance survey, printing company managers reported using several of these tools, and I'll include the survey results where appropriate.

5 Whys - 5 Whys is a technique for identifying the root cause of a problem. By repeatedly asking the question "Why?" you can get past the symptoms and find the root cause of a problem. Taiichi Ohno, the principal architect of Toyota's lean production system, has emphasized the importance of the 5 Whys method. Ohno writes that, "The basis of Toyota's scientific approach is to ask *why* five times whenever we find a problem. . . . By repeating *why* five times, the nature of the problem as well as its

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solution becomes clear.”

5S - 5S is a methodology for cleaning and organizing the work areas in a company. The term refers to five Japanese words that start with the letter S. *Seiri* or *sorting* means going through all of the tools and materials in a work area and keeping only those items that are really needed. *Seiton* or *straighten* means designating specific places and manners for storing all necessary tools, supplies and materials. *Seiso* or *systematic cleaning* means keeping the work area clean and neat at all times. *Seiketsu* or *standardize* means standardizing the tasks needed to maintain a clean and neat work area and assigning responsibility for performing those tasks. And finally, *shitsuke* or *sustain* means making the other four steps of the 5S process a habit. The 5S process supports other lean tools and techniques. For example, 5S makes finding tools, supplies, and parts faster and easier, which helps enable SMED or quick changeover, which, in turn, is a primary enabler of just-in-time production. Fifty-seven percent of the executives responding to the PIA/GATF-Point Balance survey said they were using 5S in their companies.

Autonomation/Jidoka - Autonomation is usually translated as “automation with a human touch.” The essence of autonomation is giving machines the ability to detect abnormalities or defective products and stop automatically. Autonomation is one enabler of *jidoka*, which can be translated as “built in quality.” If an abnormal situation arises, the machine stops automatically, and an employee will also stop the production line. The problem or defect will be corrected immediately, and employees will also attempt to identify the cause of the problem (using the 5 Whys process). In addition to improving quality, autonomation is what allows one employee to monitor several machines simultaneously.

Cellular Manufacturing/Work Cells - Cellular manufacturing is the term for a manufacturing system in which the equipment and manual workstations needed for a product (or a family of similar products) are arranged sequentially so that products flow from one manufacturing step to the next with minimal movement and waiting time. A work cell consists of all the machines and manual workstations that are needed to produce a product or component part (or a family of similar products or components) from start to finish. The basic objectives of cellular manufacturing are to improve the flow of products through the manufacturing process and improve flexibility, while at the same time reducing processing time and work-in-process inventories. About 31 percent of the respondents to the PIA/GATF-Point Balance survey reported using Cellular Manufacturing.

Heijunka/Production Leveling - *Heijunka* is the act of leveling the mix and/or volume of products processed by a work cell or a production line over a set period of time. A company that uses *heijunka* takes the total volume of orders in a particular period and “levels” them out so that the same amount and mix are made each day. *Heijunka* is essential for the successful use of lean because no production system can continually respond to wildly fluctuating orders without suffering from *mura* (unevenness in quality and productivity) and *muri* (excessive demands on machines, managers, and employees). What Taiichi Ohno and others at Toyota recognized long ago, is that *mura* and *muri* combine to create *muda* (waste).

Kanban - *Kanban* is a tool for controlling the volume, rate, and timing of production in a lean organization. *Kanban* means “visual card,” and *Kanban* is essentially a signaling system that uses printed cards to signal the need for more products. In a company that uses a *Kanban* control system,

nothing is manufactured unless there is a “signal” to act. *Kanban* is often called a “pull” system because downstream processes pull materials or products from upstream processes. For example, suppose that my job is to install pulls on the drawers of metal filing cabinets. In my work area, I have two bins that hold the drawer pulls I use. Each bin holds a specific number of pulls, and a *Kanban* card is attached to each bin. The *Kanban* card contains a description of the pull, the number of pulls the bin should contain, and other relevant information. When I have used all of the drawer pulls in a bin, I send the empty bin to the upstream work center that produces the pulls and pick up a full bin. The appearance of the empty bin at the upstream work center signals that work center to produce the specific number and type of drawer pull shown on the bin’s *Kanban* card. *Kanban* controls the level of work-in-process inventories, prevents overproduction, and is the primary tool for achieving just-in-time production. Thirty-one percent of the executives responding to the PIA/GATF-Point Balance survey said they were using *Kanban* control systems.

In next month’s column, I’ll describe *Poka Yoke*/Mistake Proofing, SMED/Quick Changeover, Standard Work, Takt Time, Total Productive Maintenance, and Value Stream Mapping.

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G. David Dodd is a principal of Point Balance, LLC (www.pointbalance.com), an executive education and management consulting firm. Point Balance provides cutting-edge management education programs designed for printing and publishing executives. The firm also provides management consulting services involving business strategy development, strategic marketing, cost management (including activity-based costing), business process management, and balanced scorecard performance management systems. Dodd is a co-author of *Activity-Based Costing for Printers: An Implementation Guide*, the authoritative resource relating to the use of activity-based costing by printing and publishing firms. Dodd also co-authored *Making Value Added Services Work*, a comprehensive reference tool for printing company managers who are just beginning to consider diversification or who have already added new services and are not receiving the benefits they expected.

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