

# 5S for Suppliers

*How this technique can help you maintain a lean material supply chain*

by **Kimball E. Bullington**

**W**HAT DOES SUPPLY management for lean production look like? In some companies it looks like lean production because these lean leaders use the 5S—*seiri*, *seiton*, *seiso*, *seiketsu* and *shitsuke*—technique to ensure the proper maintenance of a lean material supply.

The term “lean supply” implies that the supply chain is appropriate for lean production. This concept of waste elimination in processes has been popular at some manufacturing companies. Its basic tenets are to:<sup>1</sup>

- Specify value.
- Identify the value stream.
- Organize the value stream to promote flow.
- Communicate demand through pull.
- Strive for perfection.

## What is 5S?

The 5S’s are key lean concepts derived from the Japanese words *seiri* (sort), *seiton* (set in order), *seiso* (shine), *seiketsu* (standardize) and *shitsuke* (sustain).<sup>2</sup> Companies adopting the lean production philosophy often implement the 5S process to bring order to the workplace and support lean production. One important aspect of the lean production philosophy is its emphasis on value. In the United States, the cost of purchased materials accounts for approximately 35 cents of every sales dollar.<sup>3</sup> Any comprehensive effort to focus on the value a customer receives must include the supply perspective.

## Why use 5S?

The 5S program is a proven model for organizing and maintaining a production operation. It is frequently used in manufacturing operations, particularly progressive ones.

The supply function, especially the purchasing

department, often reports to the manager of operations, and that person is usually not a purchasing expert. The relationship between purchasing personnel and the general management of operations can be improved if they use a common vocabulary built around concepts familiar to the head of the organization and the heads of the other departments. The 5S program provides that common vocabulary.

The program also supports the visual workplace. Hiroyuki Hirano referred to the 5Ss as “pillars of the visual workplace” in the title of his book on 5S.<sup>4</sup> In a 5S environment there is a place for everything, and everything is in its place. Time spent searching for items is essentially eliminated, and out of place or missing items are immediately obvious in a properly functioning 5S facility.

The 5S program performs a similar function for supplier maintenance. The users of the system immediately know where to find information about their supply base, and missing or out-of-date information is instantly apparent. To implement a 5S program for supplier maintenance, you should abide by the following five guidelines.

### 1. Sort

The first step in implementing 5S for lean manufacturing is to take a tour of the target area and mark with red tags those items that appear out of place or unnecessary. After each item is reviewed, it is either put in its proper place or removed if it is unnecessary or redundant. The sort process is essential to organizing the workspace needed for lean production.

When applying the sort method to the supply base, you select suppliers to add to the system and eliminate from the system. In purchasing jargon, this is known as supply base consolidation or rationalization. Sorting the supplier base through consolidation:

- Reduces the waste of inefficient work methods by

reducing the number of suppliers that must be managed by the procurement staff.

- Reduces the waste of supplier selection quality by focusing efforts of selection, evaluation and improvement on a few select suppliers. It also improves the quality (conformance to specifications and delivery) of the products received from these suppliers by focusing quality assurance, control and improvement activities on a smaller number of suppliers.
- Reduces processing waste as fewer purchase orders are necessary and fewer selection audits are needed.
- Increases the opportunity for supply chain partnering when suppliers are aware of their sole-source status.

So for the management of supply, the primary focus of the sort step is to select suppliers. It cannot be done by physically attaching red tags to suppliers, so how can it be applied? Several criteria can be used to identify candidates for elimination in the sorting process:

- Isolate some candidates for elimination by conducting a performance review—a review of their quality, delivery and price performance. A lean producer may be much more interested in delivery performance or inventory levels than the actual purchase price. But even a lean manufacturer’s emphasis on delivery, price and inventory will shift as conditions dictate.
- Perform a review of redundant suppliers. Ask how many suppliers have identical or overlapping capabilities. The effort to consolidate suppliers this way rewards the best suppliers with additional business.
- Determine how many parts are purchased from each supplier, which will often result in identification of a large number of suppliers providing only one or a few parts. Some suppliers may not have been used for some time and may be candidates for sorting or consolidation.

After completing all the sorting, you will likely end up with an optimum number of suppliers. W. Edwards Deming said, “No manufacturer I know of possesses enough knowledge and manpower to work effectively with more than one vendor for any item.”<sup>5</sup> Many companies choose to use more than one source for a single item for a variety of reasons, including risk, capacity and price, but Deming’s point should be heeded. Multiplying suppliers increases variation and overhead. The practice of using multiple suppliers for a single part in order to reduce risk often increases risk, just as increasing the number of components in an assembly usually increases the probability of failure. Veteran

supply managers often build their improvement efforts on an initial sorting of the supply base.

## 2. Set in order

In a manufacturing implementation of 5S, “set in order” means to arrange products and equipment so they are easy to find and use. Equipment and storage locations are labeled so the tools will be easy to identify when they are needed and put away when they are no longer in use. Labeling storage locations with tape on the floor or the workstation facilitates visual management. One glance is all that’s needed to identify missing or improperly stored tools.

Arranging suppliers so they are easy to use involves the concept of segmentation. To complete the initial segmentation, you need to perform a portfolio analysis. This analysis provides a place for everything and allocates everything in its

place. It sorts the supply base by value potential and risk, strategic value and opportunity for cost improvement, and value potential and criticality.

The proper place for a supplier is identified in a segmentation matrix. To create one, you need to clearly determine how each supplier will be treated based on identifiable criteria. See Table 1 for a sample supply base segmentation by annual expenditures and risk. It yields four segments of suppliers with different opportunities for value contribution.

The key suppliers for lean production companies tend to fall into the high risk/high value partnership segment of the matrix. Partnership suppliers represent a higher risk to the company in terms of design complexity, start-up communication, custom tooling, overall higher demand for buyer input and schedule pressures. You can also think of risk as the level of opportunity for adverse effects on value, such as deterioration in delivery, lead time, price or quality.

The other supplier segments have different needs. The low risk/high value potential segment includes commodity items. The value contribution of these suppliers is primarily driven by price. A partnership is not the ideal model for these relationships.

Low risk/high value potential purchases are characterized by intense negotiations, competitive bidding, online auctions and long-term contracts. If the risk can be reduced for low risk/high value potential items, significant savings can be realized by some form of competitive bidding. For example, automobile

**TABLE 1** Supplier Segmentation Value Matrix

	Low value potential	High value potential
High risk	Risk value	Partnership value
Low risk	Transaction value	Price value

manufacturers willing to redefine their tire requirements so they can purchase fewer types of tires could realize cost savings in the tens of millions of dollars.

The high risk/low value potential suppliers affect value by the nature of the factors that make them high risk, including demanding delivery requirements and advanced technology. The factors that drive risk are often the factors that contribute to the value of the product. Temporary situations, such as cash flow problems or capacity limitations, could be the major risk factors.

A minor supplier of plastic injection moldings, for example, lost a major account, which significantly changed its cash flow situation.

Normally this supplier would have been considered moderately high risk because it required customized tooling, but for a time it moved near the top of the high risk category. In an undesirable situation such as this, the supplier has the potential to reduce the value, but little or no potential for adding value. Suppliers in this category are usually overlooked by supply management until some sort of failure occurs, but segmentation can help the supply manager identify these potential problem suppliers before something bad happens.

The low risk/low value potential suppliers typically have high transaction costs compared to the value of the product. The opportunity for adding value comes by consolidating these purchases and reducing transaction costs.

Several different segmentations may be conducted to properly categorize your suppliers and can include an evaluation of the supplier's quality. Performance measures may be helpful in segmenting the remaining supply base.

Deterioration in the segmentation step can arise when new suppliers are added. It can only be prevented by making classification a step in the process of adding a supplier. Another source of deterioration comes when a supplier's risk factor changes. Changes such as financial difficulties or capacity problems should be evaluated on an ongoing basis for key suppliers, but the problem can also arise at a relatively minor supplier.

To address the location aspect of the set in order step, identify the location of each supplier on a large map. It will help you further consolidate by forcing you to group suppliers locally, in targeted areas or

along trucking routes so more than one supplier can be visited on a single trip.

### 3. Shine: Keep everything swept and clean

Cleaning implies system maintenance and inspection. As a work area is cleaned, problems such as oil leaks or other maintenance issues become apparent before they have a chance to affect performance.

To maintain and inspect suppliers, you can conduct surveys or audits. The audits can include site surveys, supplier self-assessments, remote surveys, third-party certification type surveys such as ISO 9000 or QS-9000, or third-party quality awards such as the Malcolm Baldrige National Quality Award.

When auditing suppliers, you should try to obtain objective evidence that supports your sort and segmentation decisions or evidence that supports action of a different type, such as risk reduction and continuous improvement. Audits enable the supply manager to detect problems early so they can be corrected before further deterioration occurs. Auditing provides an opportunity for reviewing supplier performance. It lets you ask, are the right measures being used? Is the supplier performing adequately? What are the reasons behind a particular supplier's less than desirable performance?

Third-party audits such as those conducted during the ISO 9000 certification process provide limited insight under these circumstances. First-person audits or customized surveys are much better, but you must remember audits are not a panacea. For example, a team audit of one new supplier revealed a low level of business activity, which should have been a warning of future new product introduction problems. Unfortunately, the warning signs were ignored.

You should schedule regular on-site visits with the key suppliers identified in the set in order or segmentation stage. High risk/high value potential suppliers usually receive the most visits, followed by high risk/low value potential suppliers and low risk/high value potential suppliers. Low risk/low value potential suppliers are generally not surveyed except through mail surveys of regulatory compliance issues.

Partnership maintenance is a key element in preserving your supply base. A sound preventive maintenance program is as essential to supplier maintenance as it is to manufacturing. The basic elements of a



preventive maintenance program include:

- A schedule of the maintenance, such as a team meeting schedule with expectations defined for each meeting.
- A log of the maintenance, which could include meeting minutes.
- An audit of the maintenance, such as an audit of the team's processes and performance.

Partnership maintenance is not complicated, but it is necessary.

#### 4. Standardize: Integrate sort, set in order and shine

This step should follow your successful implementation of the sort, set in order and shine steps. Standardizing or integrating all three steps ensures your implementation of the first three pillars won't deteriorate over time. It formalizes the procedures, schedules and practices that sustain the system and drive future improvements.

Several problems can be avoided through standardization, including:

- The number of suppliers growing unchecked.
- The number of suppliers becoming unknown, which can lead to supply base growth and segmentation deterioration.
- The segmentation deteriorating and the classification of the suppliers becoming unknown.
- Suppliers not being visited on a regular basis.
- The conducting of surveys informally or with renege processes.

What's the easiest way to standardize? By assigning 3S duties. Make sure the personal plans or objectives of the supply management personnel cover the necessary sort (supplier consolidation), set in order (segmentation) and shine (audit) issues. For instance, some purchasing agents maintain bar charts showing the number of suppliers over time. They also keep a segmentation chart showing their key suppliers in the relevant segments and use different colors to indicate when the supplier was last audited.

Strategic buyers, commodity managers or the purchasing manager are responsible for surveying the charts in each buyer's area to guarantee they are current. The results of these surveys can be displayed on checklists that show the level of implementation.

The motivation for consolidating suppliers often comes from outside the purchasing department, but do these other departments understand why consolidation is valuable? One advantage of the 5S approach is that it forces purchasing and manufacturing to use a common language. This facilitates the communication between these two groups, but what about interactions between design engineering and purchasing?

This is a critical interface for two reasons. First,

engineering is the source of many requests for new suppliers. Second, engineering, particularly design engineering, may harbor a creative environment that feels constrained by programs that promote rigid discipline. Engineers have been known to say they see no reason to limit their supplier selections just so the buyers can play more solitaire on their computers. Fortunately, the 5S program provides the reasoning behind the consolidation efforts.

#### 5. Sustain: Discipline starts with the leadership

Do you care enough to be consistent with your message and vision? Are you communicating the program, including the reasons for your actions, outside the procurement department? Are you properly training new employees? Does the appropriate structure exist to support this program? Is supply base maintenance a significant part of the employee performance appraisal process?

These are issues for leadership to conquer. No 5S process for supply management will be effective without vigilant leadership. Lean producers have used this process effectively, and consistent leadership over time is necessary to prevent system deterioration.

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#### REFERENCES:

1. James P. Womack and Daniel T. Jones, *Lean Thinking*, Simon and Schuster, 1996.
2. Hiroyuki Hirano, *5S for Operators: 5 Pillars of the Visual Workplace*, Productivity Press, 1996.
3. *Annual Survey of Manufacturers*, U.S. Census Bureau, 2000.
4. Hiroyuki Hirano, *5 Pillars of the Visual Workplace*, Productivity Press, 1990.
5. W. Edwards Deming, *Out of the Crisis*, Massachusetts Institute of Technology, 1986.

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