# Elgin Sweeper Company Employees Clear a Path Toward Lean Operations with Their Lean Enterprise System

*Where 5S and lean events are part of the culture.*

Lea A.P. Tonkin

Within the past few years, people at Elgin Sweeper Company, Elgin, IL literally cleaned up their act, discovered how to make employee involvement (EI) work well, and reaped the benefits of an enterprise-wide commitment to lean operations. Plant employees led the way in this cultural change, but process mapping and learning how to share information for improvement are concepts now at work in engineering, finance, sales, and other administrative areas.

Implementation results so far have been notable — cost savings, higher productivity, reduced space requirements enabling production to be brought in from another facility, etc. Next will come follow-up rounds for improvement blitzes — and keen attention to sustaining the gains over time, according to General Manager Tom White. Participants in the recent AME workshop, "5S Process and Tour" at Elgin Sweeper learned more about this success story.

## *Elgin's Lean Enterprise System*

As a market leader in the street sweeping equipment industry, you'd think Elgin Sweeper could've tolerated "the way things were." However, back in 1997, Mark Weber (currently group president, then serving as vice president of operations) realized that the potential for continued success depended on improving *all* areas of the enterprise. He initiated a Lean Steering Committee led by a lean coordinator (a lean expert with experience in Toyota Production System [TPS]-type production systems), along with the plant manager, business managers, the materials man-

**In Brief**

Elgin Sweeper Company employees learned how to do 5S right during the past few years, as lean concepts became part of their culture. Improvement projects in administrative, engineering, and sales areas as well as production work centers yielded significant initial performance improvements and "lessons learned;" the lean journey continues.

## About Elgin Sweeper

The company's sweepers have been cleaning roadways for many years. John Murphy of Elgin, IL noted the dusty, muddy condition of area roads, and invented a machine to pick up debris and collect it in a front hopper. The first sweeper was delivered to Boise, ID in 1914. Murphy's three-wheel design allowed the machine operator to maneuver around carriages, horses, and automobiles.

The Elgin Sweeper name means exceptional sweeping performance and longevity, according to the company. Whether the need calls for broom, vacuum, or regenerative air; ground-dump or variable height dump; general street maintenance, specialty airport, PM10 efficient, waterless, or alternative fuel vehicle — there is an Elgin Sweeper model to fit the application. As part of the Federal Signal Environmental Products Group, the company continues to add new, specialized products. Just as important is the company's network of more than 80 dealers worldwide who provide customers with service, training, and parts availability.

ager, and two manufacturing engineering project leaders. The Lean Steering Committee meets twice a week to keep the lean momentum strong, develop strategies, charter projects and resources, and monitor lean implementation efforts.

At the start of the lean journey, most of the manufacturing operations were arranged in a typical batch process. The first lean pilot project was to create a weld cell to manufacture hydraulic tanks. This cell also piloted Elgin's pull systems strategy. The results were astounding; quality improved and shortages of hydraulic tanks disappeared overnight. After several more successful pilots, process/product mapping was used to identify new layouts for the entire manufacturing and assembly processes. The 5S (Sort, Set in Order, Shine, Standardize, Sustain) process was then utilized over a two-year period in the implementation of the new layout on a cell by cell basis.

A key element of Elgin Sweeper's 5S program is that it was incorporated in a "blitz" format based on training received from an AME 5S Blitz held at the company several years ago. The entire 5S process is accomplished in a targeted work area during a two- to three-day focused blitz. According to Jeanne Hem, former lean coordinator, this approach created an opportunity for complete participation with the operators in the targeted work area so they could totally focus on layout and improvement opportunities in a team setting. As the blitzes rolled out across the plant over three years, cultural change emerged. The workforce gained greater involvement and understanding of lean. The 5S process also facilitated necessary layout changes to move the plant from batch processing to cells and implement pull systems plant-wide.

The radical cultural change accompanying this "lean sweep" could hardly be underestimated. Employees learned how to take a new look at the traditional ways they'd worked for years, then swap ideas with fellow employees about better ways to do their work, and then made good ideas happen. They changed layouts, eliminated paperwork, shared ideas with each other on a regular basis, and figured out ways to trim waste as they made jobs easier. Plant employees previously worked in their specialty as welders or assemblers, etc. but now are being trained to work in cross-functional areas.

This 5S/lean campaign (Elgin Sweeper dubbed its program Lean Enterprise System, or LES) does not mean unfocused, "Let's change something around here!" activities. It is a disciplined approach that asks employees to be accountable for their results. Elements of the company's 5S blitz process are shown in Figure 1.

### *How the 5S Events Work*

Elgin Sweeper's initial plan to use 5S events in all areas of the operation, from the plant floor to engineering, finance, and other areas of the business was geared towards streamlining work areas, explained General Manager Tom White. "Though it initially served as a lever for culture change by introducing lean into the organization, most 5S project areas were initially selected according to business impact," he said. "Now they get the green light based on a combination of supervisor request and/or audit process scoring."

Every 5S blitz has a sponsor (a manager or supervisor) who sets goals, assembles the team, and attends daily updates to help clarify any issues as needed. The team also has a facilitator to coordinate project logistics, monitor team progress during the event, and challenge the team to push harder. The ideal facilitator is a veteran of such events, has served as team leader in at least two 5S blitz

## Elgin Sweeper's 5S Blitz Process

- Identify the area for 5S improvements
- Select team members and identify their roles
- Develop and document a team charter (safety, quality, etc. improvements)
- Logistics
- Training in 5S and lean basics
- Set a budget
- Conduct the project
- Provide a 30-day list of action items not completed during the initial event with assigned responsibilities
- Senior management walk-around to see the improvements at work and hear about the project details, plus team recognition
- Audit process ("We stubbed our toe a few times until we learned that we need this step to follow up on the actual event," said Roger Himrod.)
- The team/management discuss learnings and pitfalls discovered during the event.

***Figure 1.***

events, and demonstrates lean leadership abilities. A team leader is appointed for every event to organize and lead team activities, as well as to keep the team on track. Qualifications for team leader include participation in at least two 5S blitz events, leadership skills, and the ability to work with team dynamics. The core 5S project team members are mostly area "owners." At least one "outsider" from other areas or functions is included. White noted that teams include three to ten members, depending on the area being evaluated and specific needs.

The team charter is critical to the blitz project success. It defines the area, date for the 5S blitz, process boundaries (start and end points), key objectives, and measures as well as the sponsor, facilitator, and team roster. Among the charter objectives for an engineering area 5S blitz, for example, were: Clean out and clean off all work areas; standardize work areas; develop visual measures and post for each group; organize the engineering library; provide access to departmental references, etc. The 5S project logistics basics cited by White are shown in Figure 2.

Corporate funding for 5S events has helped to build improvement momentum. Lighting, peg boards, work tables, paint, tooling, and signage are among the items funded. However, 5S as a rule should not be cost prohibitive, according to White. He noted that for some events, the only outlays were for food. Advance planning of needed items for standardized work areas prevents extra expense and employees expecting extra gadgets, etc.

A 30-day checklist (called an Opportunity Log or Op Log) covers targeted improvement areas that have not been completed by the end of the 5S blitz event. One member is assigned to be in charge of following up on these items; the entire team discusses and ranks items for later action, limiting follow-up items that need outsourcing

## 5S Event Logistics Checklist

- Complete event charter
- Reserve meeting area
- Create an event folder — paper and electronic (create/use standard forms)
- Coordinate lunches and refreshments
- Take "before" photos
- Send event invitations
- Supplies — cleaning, paint, etc.
- Identify any known needed purchases in advance
- Coordinate resources — maintenance, suppliers, etc.
- Take "after" photos
- Schedule wrap-up team recognition.

***Figure 2.***

and indicating those requiring a capital expenditure.

### Training

Elgin Sweeper lean champions have learned that 5S and lean training is most useful when it is provided close to the time associates will begin using it. The plant lean coordinator developed separate shop and office 5S training packages, used at the start of the event. The team also receives lean training utilizing a Lego exercise in which teams of up to 12 participants simulate batch processing and one-piece flow.

The 5S training covers all the "Ss" and "Why we are doing this." For employees, it's discussed as a way to provide a safer and more pleasant workplace, creating ownership and a process that makes sense. For the company, 5S initiatives feed into overall lean objectives of better quality, less waste, and higher customer satisfaction, according to David Eakins, project manager and 5S facilitator.

Employees also learn about yellow tagging in the "Sort" training. Yellow tags are placed on unneeded equipment, supplies, etc. that should be removed from the work area. Items used *daily* can stay in the work area, items used *weekly* remain in the cell, those items used *monthly* stay in the plant, and anything not used in a year is thrown out. A "quick and ruthless" yellow tagging approach is suggested (being mindful of possible long-term needs for various kinds of tooling, etc.).

For the "Set in order" training, associates learn to arrange materials and other needed items so they are easily used. That means putting them where they can be quickly located, with correct (easy to read) labeling and documentation as needed. Visual controls indicate how work should be done; tool boards and color coding make it a challenge to put tools, etc. in the wrong place. Tool storage is based on frequency of use; tools used together are stored together. Developing a map of the work process flow, with arrows on a floor plan showing how things move along from one stage to the next, yields valuable information. Associates evaluate this "spaghetti diagram" and then draw a streamlined map of a more efficient work flow.

> ***... a formal audit process was needed to sustain the improvements achieved during lean events ...***

"Shine" activities are pretty much self explanatory. Get rid of grit and grime, maintain tools and equipment, and do some inspection of the work area and related tools and equipment. Develop a schedule for checking the work area and then cleaning/painting etc. as needed.

The team learns how to maintain the progress made in Sort, Set in order, and Shine stages, in the "Standardize" stage. They describe the easiest way to get the job done in a safe and efficient manner, give people adequate time to do what needs to be done, and post cleaning guidelines.

Then they move on to "Sustain," or making it their habit to maintain good 5S practices. Periodic evaluations, feedback on action plan results, and employee "ownership" of results drive continuing progress.

### Audit Process: A Needed Change

Eric Larson, project manager and 5S facilitator, noted that Elgin Sweeper found a formal audit process was needed to sustain the improvements achieved during lean events such as 5S, kaizen, and pull systems projects. This process was developed with input from employees in various functional areas and launched in the second half of 2003.

Sixteen volunteer auditors from the shop and office each review two areas per week. After checking a database to identify the areas they'll evaluate, auditors work against standard forms (5S audit, pull card, and two-bin forms that can be quickly printed out). A sample 5S audit form is shown in Figure 3.

The auditors rate a particular work center for 5S and pull systems and give copies of their audit to the supervisors who share them with work center associates. Copies are centrally located; they can be accessed by any associate. Supervisors maintain a master scorecard for all work centers in their department. Work centers scoring below 75 percent of acceptable performance will require action such as another 5S blitz event, pull systems rework, etc.

### Lean in the Office Environment

After a couple of years implementing pull systems and implementing layout changes using the 5S blitz process, the Lean Steering Committee determined that it was time to leverage lean concepts in the office environment. The manufacturing engineering office space was targeted for the first office 5S blitz.

5S Office Audit Form

LES ELGIN
Lean Enterprise System

| No | Description | Score | Score | Comments |
|---|---|---|---|---|
| | **Sort & set In Order: get rid of what isn't needed and organize.** | | | |
| 1 | Equipment, files, supplies are accessible and ready to use. | | | |
| 2 | Items put away when not in use. | | | |
| 3 | Files, Folders and reference materials are neat, labeled and relevant to current work. | | | |
| 4 | Files/folders and general office supplies are in use if away from the normal storage locations. | | | |
| 5 | File Cabinets/organizers, Reference Materials, and in/out boxes are organized and labeled. | | | |
| | **Shine** *plus Safety* | | | |
| 6 | Equipment, floors and workplace are clean and free of debris. | | | |
| 7 | Aisles and walkways are free of material. | | | |
| 8 | Garbage and other waste materials are removed in a timely fashion. | | | |
| 9 | Fire extinguishers and other safety equipment are clearly labeled, unobstructed and fully functional | | | |
| 10 | Appropriate safety requirements, evacuation and emergency procedures etc. are clearly posted and adhered to. | | | |
| | **Standardized:** ***consistency of work processes and practices.*** | | | |
| 11 | Work instructions, computer programs(screens) are easy to understand. | | | |
| 12 | Office equipment,file cabinets, etc. are properly labeled. | | | |
| 13 | Work areas utilize visual instructions where practical. | | | |
| 14 | Preventive maintenance sheets are posted. | | | |
| 15 | Standard work guidelines and procedures are posted | | | |
| | **Sustain:** ***following the set procedures over time*** | | | |
| 16 | People understand and follow the standards set for the area. | | | |
| 17 | Team members do their jobs in a consistent manner. | | | |
| 18 | Standards are considered targets for improvement with systems to promote on-going improvement at work site. | | | |
| 19 | Visible performance feedback tools are up-to-date and used in the work area. | | | |
| 20 | Bulletin boards are arranged neatly and with no out-of-date information or announcements. | | | |
| | **Totals** | | | |

***Figure 3.*** 5S audit form.

Several dumpsters were filled with discards during the two-day event. Participants improved the common printer/library area. Several desks were repositioned for easier information sharing. The 5S blitz process was later used in the accounting department; it was scheduled before an accounting kaizen blitz to introduce lean to this part of the organization. Engineering area "before" and "after" photos are shown in Figure 4. All office areas held 5S blitzes during 2003. Many office functions launched their own lean projects.

***Figure 4.*** "Before 5S" and the amazing "after 5S" views in engineering.

## *Lessons Learned*

Plant Manager Roger Himrod reported many "lessons learned" from Elgin Sweeper's lean cultural transformation. He noted:

- Support is needed from all management
- Engage supervisors (don't launch projects in a vacuum)
- Balance cross-functional resources (manufacturing engineering, production, materials, etc.)
- Dedicated resources such as "ME techs" are required
- Additional training and understanding are needed
- "Sustain" is the most difficult challenge
- Take risks for better results.

"A huge challenge everyone discovered after our initial 5S events was how difficult it is to sustain improvements several months after the events are held," said Himrod. He noted that the audit step in the 5S event process helped to prevent slippage after related events conclude.

"Lean is here to stay in our organization. It's not the 'flavor of the month,'" said Himrod. "It's about continuous change." He added that 5S blitz events and related improvements affect every area of the operation. The 5S blitz event was used to impart lean concepts and lean thinking to employees. A total of 90+ employees (plant and office) have received lean training and held 5S events. This approach has contributed to overall attitude changes about lean ideas and accelerated lean activities enterprise-wide.

**LES Results**

| | |
|---|---|
| Capacity | Improved 37 percent |
| Inventory turns | Increased 52 percent |
| OSHA Injury Index | 41 percent improvement |
| Sales/employee | Increased 28 percent |
| ROS (return on sales) | Improved 15 percent |
| Space savings | 25 percent |

***Figure 5.***

***Editor's notes***: *Editor's notes: Additional presenters and tour leaders in the recent AME event at Elgin Sweeper included: Jay Chandran, materials manager; Jim Feltes, business manager; Brad Splinter, business manager; Jeanne Hem, former lean coordinator; Dave Eakins, project manager; Eric Larson, project manager; and Al Collins, ME tech/5S coordinator. The assistance of Jay Chandran and Dave Eakins in the development of this article is appreciated. The author, a dedicated "pileontologist" (dedicated to the creation, movement, sorting, and occasional disposition of accumulated materials) for some years, confesses that a tiny bit of guilt about the condition of her office emerged, after viewing the "before" and "after" photos in Elgin Sweeper's engineering department (there were a few similarities in the "before" version); that regret has passed, replaced by a renewed effort to keep 5S in mind from time to time and the pleasant surprise that beneath various paperwork piles formerly occupying her work area there is a wood table surface; to be continued …*

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