

SUPPLIER IMPROVEMENT CASE STUDY

CARBON COMPOSITE SUPPLIER

This supplier is located in Southern California, on a 26-acre property with 400,000 square feet of working floor space, is a provider of innovative material solutions and composite structures.

The SEA Lean Enterprise System

The SEA Lean Enterprise System captures the best practices for manufacturing enterprise improvement with a model with three key focus areas; leadership and culture, workforce development and operational excellence. The reason for these three areas is to emphasize the importance of a total organizational approach to managing the transformation. It also acknowledges that long-term sustainability of improvements relies on enterprise-wide solutions and well-managed change. Large-scale changes that do not address all three areas often fail. Implementations of lean that address all three take less effort and are more often successful.

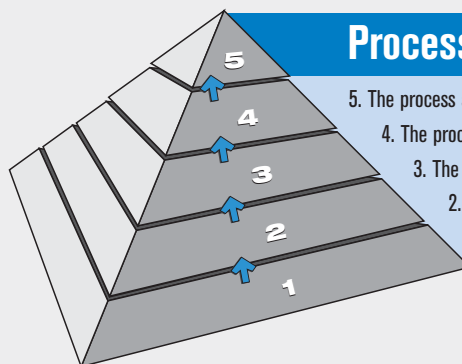
The Process Maturity Model™ is the central element of the SEA Lean Enterprise System.

Process Maturity Model (PMM)

The PMM was developed as an aid for companies who wanted to self-assess and consistently manage overall process improvement. Because the PMM serves as the backbone for all process improvement efforts whether lean, Six Sigma, or whatever comes next, it provides for long-term integration of all improvement approaches.

Supplier Case Study

With an 80-year heritage, this supplier has customers in a variety of industries: aerospace and defense, thermal management, metal and chemical processing, and automotive.



Process Maturity Levels

1. The process has been identified, defined, and has an owner
2. The process has been documented to the work instruction level
3. The process has certified trainers and is standardized
4. The process is under process control, is analyzed, and improved using data
5. The process shows continuous positive trends and benchmarks world class

Leadership and Culture

In December of 2003, the leadership team launched their lean planning activity by completing a four-day Management Planning Workshop. Fifteen (15) attendees, ranging from executive to middle management, participated in this foundational activity. Key outcomes included learning the SEA LES and development of a master plan for Phase One implementation.

On day four, the facilitators for the Managing Process Improvement and Job Skills Development Workshops delivered a brief overview and facilitated a discussion that helped the team link their improvement plans to the three tracks: Leadership and Culture, Workforce Development and Operational Excellence. In addition, the team identified five Kaizen events over the next four months (Receiving, Shipping, Machining, Atlas Fairing, and QA lab) and schedules were established for the Managing Process Improvement and Job Skill Development Workshops.

In January of 2004, the Managing Process Improvement Workshop was conducted with the executive and middle management team. This workshop provides the necessary foundation for leadership to effectively implement a lean enterprise culture and, subsequently, sustain the results achieved through workforce development and operational excellence activities. The CEO was quoted, COO: "This first phase has initiated a process of transformation in our management culture". Key outcomes included an updated company mission statement, values, strategic goals, action plans, balanced scorecard, communication system, and a critical process inventory matrix.

Key supporting values focused around: people, customers, suppliers, and community/environment.

The Critical Process Inventory Matrix included 46 processes and from this list, 12 processes were given high priority for improvement. In addition, PMM levels were determined, and process champions/owners were assigned to these processes. The role of process champions/owners is to drive continuous improvement and advance to higher PMM levels.

Workforce Development

The Workforce Development track focuses on establishing training needs and developing internal master trainers and materials to deliver the training. Workshops include: Job Skills Objectives, Advanced Planning, Master Trainer, and Training Materials. At the conclusion of these workshops, certified trainers will have the training materials to train/certify applicable employees. The end result is that key processes will approach Level 3 PMM, where trainers are certified and work is standardized.

With a focus on changing the culture, the CEO said "This is the beginning of transforming our employees' work ethic from a focus on routine work to constantly seeking improvement opportunities to ensure the long-term competitiveness of the organization".

Operational Excellence

The Operational Excellence track is focused on improving the supplier's key processes using Kaizen events, which is a team-based continuous improvement tool. The CEO reflected that, "the team process has given us the opportunity to observe our employees' performance in a completely different light. This has resulted in some very pleasant surprises as a number of employees have risen to the surface, demonstrating significant leadership, analytical and implementation skills.

The five Kaizens identified during the Master Planning workshop included-were: Receiving, Shipping, Machining, Atlas Fairing, and the QA Lab. All of these processes are linked to the primary objectives of:

- Response time through the factory
- Reducing the customer past due backlog and costs

Kaizen 1: Receiving

In early January of 2004, the supplier conducted a Kaizen event of the "receiving" process. Ten employees were formed into three sub-teams focusing on: material receipt, inspection of outside issues, and inspection of inside issues.

The key objectives of this four-day Kaizen event were:

- Reduce/Eliminate errors to reduce the Dock to Stock SPAN time
- Reduce the backlog in Receiving (as measured by the number of line items on the IN083 report)
- Modify and standardize the process (procedures and reports)
- Improve the process to effectively expedite priority material

A BREAKDOWN OF THE METRICS				
Metric	Baseline	Target	Actual	% Change
Dock to Stock SPAN Time	3.8 Days	1 Day	1.98 Days	48%
INO83 Report Length (Parts in REC./RI, MRB, and RTV)	8 Pages	2 Pages	4 Pages	50%
Time to Clear Priority Receipts	3 Days or Less	0	0	100%

Operational Excellence Cont.

Kaizen 2: Shipping

In late January of 2004, the supplier conducted their second Kaizen event of the “shipping” process. 13 employees participated in this four-day event. Three sub-teams were created to focus on documentation, scheduling/planning, and program requirements flow down.

Key objectives included:

- Reduce customer past due backlog (AR041 report)
- Shipping reports accuracy improvement (OE1 report)
- Standardize work
- 5S practices with dedicated work space for Source Inspectors

Source inspectors now have dedicated workspace with desks, phone lines, data lines, etc. This has significantly improved the work environment for the source inspectors and has significantly reduced the amount of time the documentation people have to spend with the source inspectors.

A BREAKDOWN OF THE METRICS				
Metric	Baseline	Target	Actual	% Change
AR041 Backlog Report Past Due Instances	122 Line Items (\$1.5M)	0 Line Items	67 Line Items (\$540K)	45% 64%
Number of Blank Fields in OE1 for Ship	671	0	340	49%

Kaizen 3: Machining Process

In February of 2004, the third Kaizen event was conducted with a focus on the machining process. Ten employees participated in this four-day event. Because the machining area has a common set of processes that are linked to a significant portion of customer demand, this is a critical process and is viewed as a potential bottleneck in the overall process.

Overall key objectives included:

- Eliminate queues
- Reduce set-up times
- Provide a better flow into and out of machining to improve productivity

One of the immediate impacts of this Kaizen was the installation of work boards. These boards provide a clear signal on what to work on next, based on the priorities established in the twice-weekly planning meetings. The result is that activities that can be performed externally to the machine, such as set-up, are initiated while the machine is still running, thereby reducing set-up time.

In addition, anticipated cycle time reduction on selected part numbers (brake discs) currently indicates a 20% improvement. Based on current volume, the supplier predicts an annual productivity savings of \$30K based on this cycle time reduction for one product line. Both figures are expected to increase, as new orders are booked. Furthermore, they are currently looking at other product lines to implement these same improvements.

Kaizen 4: Atlas Fairing

In March of 2004, the fourth Kaizen was conducted, focusing on the Atlas Fairing process. 12 employees participated in this four-day event. The primary focus was on the core forming process.

Overall key objectives include:

- Reduce cycle time and labor
- Identify issues that prevent people from “just doing their work”

As a result of this Kaizen, major improvements were made in how the work is performed; for example, total labor hours will be incrementally reduced by 33%, with a potential savings of \$72K.

Kaizen 5: QA Lab

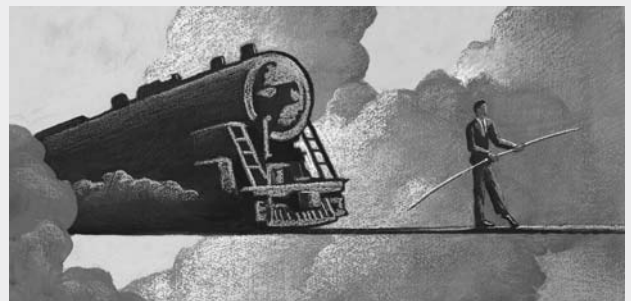
In April of 2004, the supplier conducted their fifth Kaizen event, the QA Lab process. 12 participants participated in this four-day event that mainly focused on response time improvement by; eliminating roadblocks, reduce/eliminate queues, improve logistics of parts and documentation movement and prioritization of work.

The Kaizen team implemented several improvements including:

- Developed QA lab request, interruption, and qualified technician matrix reports
- Defined a conflict resolution process.
- Modified the 1209 report, which will alleviate multiple work orders for a single lot of materials.

- Buy new capital equipment, which will improve estimated throughput by 50%.
- Establish criteria for valid testing, which will reduce shipment and retest delays.
- Established an electronic notification process for test completion that will save an average of 5.5 to 7.5 days per month.

With these improvements, it is expected that 7.75 days of monthly-accumulated delays will be eliminated, which equates to approximately \$131,000 reduction of annual material carrying costs.





SUMMARY OF OVERALL RESULTS	
Kaizen	Anticipated Benefits
Kaizen 1 - Receiving	48% reduction in Dock to Stock Cycle Time
Kaizen 2 - Shipping	\$960K reduction in customer past due backlog (64% reduction)
Kaizen 3 - Machining	20% reduction in cycle time, \$30K in savings
Kaizen 4 - Atlas Fairing	33% reduction in labor, \$72K in savings
Kaizen 5 - QA Lab	\$131K reduction in yearly carrying costs

The management team meets monthly to review the Kaizen key metrics established for each event, and to work with the teams to establish action items, ensuring continuous improvement against goals.

A substantial number of employees participated in the SEA Lean Enterprise System and internal process improvement activities are ongoing. “This program has had a significant impact on employee morale. The empowerment to change the work environment for the better and to see the change implemented has been highly motivating.” In addition, with regard to anticipated results, the CEO commented, on anticipated results “the capacity, inventory, and bottom line results have only begun to materialize. It will take another 18 months for us to fully realize the impact of this ongoing company transformation.”

Members

- BAE Systems
- Bombardier
- Hamilton Sundstrand
- Lockheed Martin
- Parker Aerospace
- Rockwell Collins
- Textron
- The Boeing Company
- Cessna
- JPL - NASA
- Northrop Grumman
- Pratt & Whitney
- Sikorsky
- United Technologies

SEA is an alliance of leading aerospace, defense and space prime, tier one, and major sub-contractors whose purpose is to accelerate the development of supplier capabilities in order to ensure American competitiveness

Our Overarching Goals

Create a unified vision and a collaborative industry-wide approach to supplier development that eliminates duplication and aligns existing resources

Lead the deployment of lean manufacturing throughout our supply chains

Mission

Accelerate Supply Chain Performance

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- BAE is BAE Systems
- BC17 is Boeing C17
- BCA is Boeing Commercial Airplanes
- LM is Lockheed Martin
- NG is Northrop Grumman
- PA is Parker Aerospace
- RC is Rockwell Collins
- T is Textron
- UTC is United Technologies Corporation

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