

SUPPLIER IMPROVEMENT CASE STUDY

PRECISION MACHINING MANUFACTURER

This supplier is a precision manufacturer of complex components for the aerospace and commercial industries. Unlike most machine shops, this supplier has grinding, gun drilling, and honing capability, while specializing in cellular machining of tolerance hydraulic assemblies and complex machining of castings and forgings. At the time of this case study, the California-based supplier employed approximately 78 employees and occupied a single 42,000 square foot facility.

The SEA Lean Enterprise System

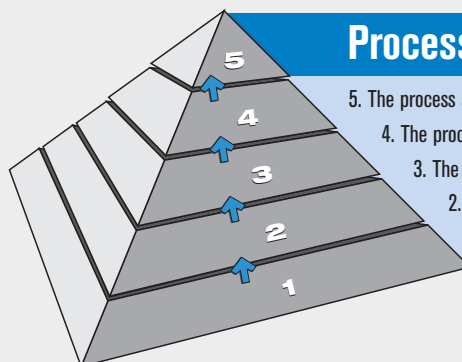
The SEA Lean Enterprise System captures the best practices for manufacturing enterprise improvement with a model with three key focus areas: leadership and culture, workforce development and operational excellence. The reason for these three areas is to emphasize the importance of a total organizational 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 do address all three take less effort and are more often successful. Company President “Everybody is going to take the lean journey.

Either you are going to take it now and make a lot of money or you are going to take it later to survive. SEA maps this journey step by step.”

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 their 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.



Process Maturity Levels

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

Leadership and Culture

In March 2005 the Strategic Planning Workshop was conducted with the executive and middle management team. This workshop provided the necessary foundation for leadership to effectively implement a lean enterprise culture and, subsequently, the ability to sustain results generated through the workforce development and operational excellence activities. Key outcomes include an updated company mission statement, supporting values and assessment, strategic goals, SWOT analysis, action plans, process owners, balanced scorecard metrics, communication system, and understanding of the process maturity model.

Key processes were identified, PMM baseline levels were established, and champions and process owners were assigned. Listed are Priority A processes and their initial

PROCESS	PROCESS MATURITY LEVEL
Shipping and Receiving	1
Purchasing	0
Engineering of New Jobs	1
Outside Processing Mgmt.	1
HR Processes	1
Cell Process	1
Grinding	2
Manual Machine	1
Inspection	1
Certification Package	1
Quality	1
Contract Review	2
Production Control	1
Recruiting of Skills	1
Lean/Continuous Improvement Process	1

PMM level:

In May 2005, this supplier launched their lean planning activity by completing a four-day Management Planning Workshop. Key outcomes included learning the SEA Lean

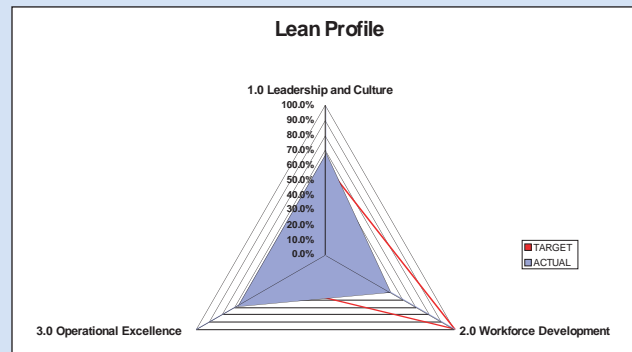
Enterprise System (LES) and development of a master plan for Phase One implementation. The master plan enables leadership to own and lead the significant changes that will be made in the next six months. In addition, an initial stabilization audit was conducted, which will be a benchmark for subsequent audits, and value stream-maps were created on some key processes.

On day four, the facilitators for the Managing Process Improvement and Workforce 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 leadership team identified four Kaizen events, and schedules were established for the Managing Process Improvement and Workforce Development Workshops.

The Kaizen events selected were:

- Grind and Lap Cell
- C17 Cell
- QA Inspection Lab
- Kanban

Initial Stabilization Audit:



In June, the two-day Managing Process Improvement workshop was conducted with 10 participants. The purpose of this workshop is to prepare process champions and process owners to fulfill their roles in the company's Lean Enterprise system. Also, the leadership team held "all hands" meetings with the workforce to communicate and promote the adoption of the SEA Lean Enterprise System.

The leadership team will meet again January for a Strategic Planning follow-up workshop along with benchmarking the Process Maturity improvements (PMM levels).

Workforce Development

SEA Chairman, Michael Beason, “Workforce Development and Standard Work are the unforeseen foundation for lean. Everyone tries to jump over it. Everyone comes back to it eventually when their lean efforts fail to produce intended results.

In June, the leadership team also attended a half-day Job Skills Objectives Setting workshop. The team identified and prioritized training objectives linked to key company goals. A matrix was created and used to determine the participants, (Subject Matter Experts and Trainers) for the Master Trainer, Advanced Planning and Training Materials workshops. Some of the key topics identified to get the Process Maturity Model (PMM) to level 3 are as follows:

- Hanger Cell
- Sidewinder Cell
- Lapping (Port Cap)
- GM Mill
- Port Cap Cell
- Grinding (Hanger)
- Assembly
- G.M Lathe

In addition, cross training was identified for the CMM process, along with Blueprint Reading, and Geometric Tolerancing. Furthermore, work instructions were created for their “Net Inspect” System, which is an on-line system to track quality data and metrics.

The three Workforce Development workshops concluded in November and the training will be rolled-out to the applicable workforce. The company president states, “Train the Trainer and the Workforce Development Track are the keys to success. It is a lot easier to develop the people you have than find good people in the market place.”

Operational Excellence

Company President, “ Our return on investment in the SEA program has more than paid for our off-the-job time as well as our expense. I think that return on investment should govern the thinking of suppliers who contemplate the SEA Engagement.”

Kaizen 1: Grind and Lap Cell

This team, consisting of 10 participants, conducted a 5-day Kaizen event that focused on set-up reduction.

Operational Excellence Cont.

Activity improvements were:

- Created 14 work instructions SWD
- Utilized 5S methods to identify improvements
- Created a resource planning tool
- Created a line design
- Created a maintenance request form

KEY METRICS FOR THIS PRODUCT LINE			
Metric	Baseline	Post-Kaizen	% Change/ Dollars Saved
Lead-time Grind	3	1	2 \$133,331 per year
Set-up Time Grind	2.4 hours	1.85 hours	23% \$3,575 per year
Set-up Time Lap	1	.58	42% \$2,730 per year

Kaizen 2: C17 Cell

This five day Kaizen was conducted in August with 14 participants. The goals centered on the cell line design and resource planning for the C17 process that will reduce set-up time. In addition, Kanbans for heads were installed, which ultimately reduces lead-time.

KEY METRICS			
Metric	Baseline	Post-Kaizen	% Change/ Dollars Saved
Lead-time C-17 Products	42 weeks	17 weeks	60% \$361,440 per year
Set-up Time C-17	7 hours per machine, 4 machines	6 hours per machine, 4 machines	14% \$5,200 per year
Kaban Heads	0	80 pieces 20 of each	80 pieces \$20,000

Kaizen 3: QA Inspection Lab

This event, which concluded in early October, focused on lead-time reduction through the QA Inspection Lab. In addition, there was focus on inventory accuracy of related equipment and tools for this area (over 700 equipment and tools). This 10-member Kaizen team created the following improvement activities:

- Resource Planning
- Prioritization and sequencing of work
- Written procedures
- Layout efforts were all contributing factors in achieving positive results.



Operational Excellence Cont.

KEY METRICS FOR THIS PRODUCT LINE			
Metric	Baseline	Post-Kaizen	% Change/ Dollars Saved
Lead-time for QA Inspection	3 day average	1 day average	66%
In-process Inventory of Inspection Products	36 average	24 average	33%

Kaizen 4: Kanban

The goal of this late October Kaizen event was to develop a tool to assist in the Kanban of materials from outside processing to reduce lead-time. The team, consisting of 14 individuals, spent four days making several improvements:

- New layout flow design for Shipping & Receiving to improve internal processing
- Developed tools (Kanban sizing calculations, and time analysis for outside processing)
- Developed a schedule to implement the process of material movement
- Minimized paperwork, which impacts material flow

KEY METRICS FOR THIS PRODUCT LINE			
Metric	Baseline	Post-Kaizen	% Change/ Dollars Saved
Kanban Tool for Outside Processing, Lead-time Reduction	2 - 57 days	2 - 21 days	\$306,000 ROI

- Established visual material flow tools to reduce lead-time
- In late December, there will be an additional quick Kaizen to address supplier involvement with Kanbans and change in materials.

The first engagement will be completed in January with a follow-up Strategic Planning day.



Members

The Boeing Company	Bombardier
Cessna	Firth Rixson
Hamilton Sundstrand	Honeywell Aerospace
Lockheed Martin	Northrop Grumman
Parker Aerospace	Pratt & Whitney
Rockwell Collins	Sikorsky
Smith's Aerospace	Space Systems Loral
Textron	TW Metals
Tyco	United Technologies

SEA is an alliance of leading aerospace, defense and space prime and subcontractors whose purpose is to accelerate the development of supply chain capabilities in order to ensure American competitiveness

Goals

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

Lead the deployment of SEA Lean Enterprise System throughout our supply chains

Mission

Accelerate Supply Chain Performance

Board of Directors & Officers

The Boeing Company - Robert Gower
Firth Rixson - Michael Carr
Hitco Carbon Composites - B J Schramm
Honeywell Aerospace - Bill Hayden
Space Systems Loral - Larry Wray
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SEA - Mickey L. Wiebe (Executive Director)

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