

2005-2008

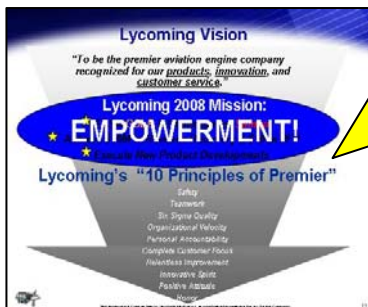
“The journey to premier is not about the end-state. It’s about the path we choose and impact we make!”
- Ian Walsh, SVP & GM
Six Sigma Black Belt

From 2002-2004, Lycoming’s world turned upside down. Major quality issues led to aircraft groundings and crippling increases in product liability costs. There had been no significant product development in over a decade, sales were dwindling and customers were walking away. The physical plant facility was in need of updating. The company had not had a UAW labor agreement in over eight years due to stalled negotiations and a past strike. The supply chain was faltering. The leadership team was struggling to find a solution to these challenges that threatened the ongoing viability of their business.

With new leadership in place on January 1st, 2005 the Lycoming team started on a great **Transformation** journey built on a foundation of Lean Principles that today I am proud to share with you.

New Lycoming Vision:

To be the premier aviation engine company recognized for our products, innovation and customer service.



- Principles of Premier
- Safety
- Teamwork
- Six Sigma Quality
- Organizational Velocity
- Personal Accountability
- Complete Customer Focus
- Relentless Improvement
- Innovative Spirit
- Positive Attitude
- Honor

- Decreased Cost of Quality by 52%
- Decreased warranty claims cost by 58%
- AS-9100 registered (1st time for Lycoming)
- Created new VSIP (Value Stream Improvement Process) – *Textron Best Practice*
- Developed new QIP (Quality Improvement Process) - *Textron Best Practice*
- Created Quality Impact Score measuring entire product life-cycle – *Textron Best Practice*
- Created new QSV (Quality, Speed, & Value) supplier performance process and award
- Formed Lycoming’s 1st “Kaizen Office.”
Conducted 12 strategically focused kaizens annually including customer & supplier kaizens

Delivery: Top Supplier Status

- OEM OTD from 60% to 95%
- Improved largest OEM customer’s OTD from 40% to 100% and became their first engine supplier to achieve “top supplier status” for 12 months of perfect delivery, quality and cost

Cost: Plan for Profit

- Developed new PFP (Plan for Profit) process that delivered cost out of \$32.3M in hard savings over 4 years - *Textron Best Practice*
- Instituted all employee suggestion system to collect employee improvement ideas
- Improved Productivity by 18%
- Improved Operating Margins by 46%

Leadership & Teamwork: Journey to Premier

- Created NMR (New Management Report), which is a dynamic digital dashboard of Lycoming’s key metrics containing SPC charts and P-values - *Textron Best Practice*
- Increased Textron Six Sigma footprint from 2 to 5-7 full time BBs and from 5 to 108 Green Belts certified or in training. Achieved \$6.9M in BB savings and \$3.9M in GB savings '06-'07
- Instituted new RBO (Relationship by Objective) process with UAW leadership committee – *Textron Best Practice*
- Achieved SILVER on Textron Lean Assessment
- Developed and deployed Lycoming 1st all Employee Transformation Award: all employee gain sharing award program focused on safety, quality, delivery, cost, and Leadership & Teamwork
- Benchmarked by Boeing, General Dynamics, Vanguard, West Pharmaceuticals, plus other Textron companies: Greenlee, EZ-GO, Bell Helicopter, and Cessna.
- Employer of the Year Award from Dept. of Pennsylvania Veterans 2007
- Launched the Lycoming / Lindbergh Grant focused on technology development but with a balance of preserving the environment

ACHIEVEMENTS (2005-2007)

Safety (EH&S): Environment of Prevention

- New Safety Vision, Mission, and Commitment
- Improved TRIR by 53%
- Improved LTIR by 86%
- 1 million hours achieved without an LTIR
- Textron Safety Award in 2006
- New Human Performance program
- Reduced disability management costs by 71%
- Implemented a new Ergonomics Safety Program
- Absenteeism of 0.87%
- Employee turnover of 6.7%

Quality: Six Sigma Performance

- Improved Supplier PPM by 78%
- Improved Manufacturing PPM by 61%

- Awarded State Funding Grant by Governor to support Training and Transformational objectives
- Discovery Channel: “How It’s Made” (2008)

PEOPLE: Empowered and Aligned

The most profound transformation over the last three years is the mindset, culture and behavior of Lycoming’s 515 employees. 335 are UAW hourly, to include Textron’s first certified UAW Green Belts in Six Sigma, and 180 are salaried. Our diversity has increased from 9% to over 26.5% in the last three years. We have 3rd and 4th generation workers. The beginning of our transformation started with rapid infusion of training at all levels. Practical problem solving continues to be taught to every employee. Basic lean tools such as 5S, materials and tools at point of utilization, standard work and kaizens (under the guidance of Shingijutsu Global consultants) were foundational efforts and are now part of our employees’ daily mindset and behavior.

We have quickly matured where we now have operator self verification, pull systems, operate to takt time, continuous improvements to standard work encompassing poka yoke, 6S (safety) and empowerment at every level to help improve our manufacturing quality, competitiveness and exceed our customer’s expectations. In 2008 we recently launched an all employee empowerment action plan to improve organizational velocity, safety, mistake proofing and waste elimination. Lycoming’s new Leadership Standard Work has recently aligned the entire organization to provide the necessary support to our value stream management.

PROCESS: ROIC improvement of 88%

Lycoming is the leading designer and manufacturer of general aviation piston aircraft engines around the world. In 2007, Lycoming delivered \$175M in annual sales and eliminated \$15.1M of waste. We created and instituted VSIP or Value Stream Improvement Process as part of our new Leadership Standard Work. VSIP is designed to measure “flow” through our process. VSIP measures every single disruption from our supply chain, manufacturing, assembly, test and delivery to our customer. Our business process starts with robust VOC collection which drives our NP&SI (New Product and Service Introduction). We manage daily operations through a best practice SIOP (Sales Inventory & Operations Planning) process. QIP or Quality Improvement Process is the other major part of our operations process focusing on continuous quality improvement.

Our Transformation has four phases:

- **2005 Foundational:** Leadership, training, open communication, teambuilding, organizational alignment
- **2006 Operational Excellence:** Process

Lycoming Engines

improvement, redesign, waste elimination & variation reduction

- **2007 Break-Even Profit:** Voice of the customer used as the basis for our multi-generational new product development planning and launch via our PLCP (Product Lifecycle Process) and DFSS (Design for Six Sigma) gated processes
- **2008 Profitability and Growth:** The relentless improvement mentality of all our employees, supported by robust process, has now become known internally as “The Lycoming Way.”

PRODUCTS: 70% Market Share

We build 5000 engines each year composed of new FAA-certified engines, Overhauls, and Rebuilds. We also deliver spare parts to the global market and recently created and launched a new line of experimental non-certified engines called Thunderbolt Engines.



We have 6 primary engine models of 4, 6 and 8 cylinder types with over 750 different customer variations.

PLANT: Factory of the Future

Lycoming Engines was founded in 1929. We have one primary facility with 750,000 square feet located in Williamsport, PA. In 2005, the Lycoming Leadership Team developed a master facilities plan aligned with Lycoming’s new “Art of the Possible” facilities vision. This vision was developed to achieve a state-of the art manufacturing, assembly, and test environment based on lean principles such as visual management and flow. This vision includes the creation of a premier campus in partnership with our city government to assist with their revitalization of the greater Williamsport area.

CORPORATION: Global Premier Brand

Lycoming Engines is an operating unit of Avco, a wholly owned subsidiary of Textron Inc.. Lycoming Engines is part of the Textron family of business totaling \$12.5B in revenue.

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