



TWI Job Instruction - the Foundation for Standardized Work

ESCO Turbine Technologies-Syracuse

ESCO Turbine Technologies-Syracuse (formerly Gray-Syracuse, Inc.) is a world-class producer of precision casting parts for highly engineered products used in aircraft engines, power generation equipment, and missiles. Workforce competencies encompass computer modeling using complex dimensional integration software, metallurgical specialties, and foundry operations. Additional components in the value proposition included high-quality precision products, timely delivery, and competitive prices. The company had organized the finishing areas into flow lines based on lean and synchronous management principles. In order to take maximum advantage of the flexible management approaches that were already in use in the back end of the production process, the company reorganized the wax area into the same flow lines as in the finishing area that revealed a significant opportunity to reduce initial wax defects.

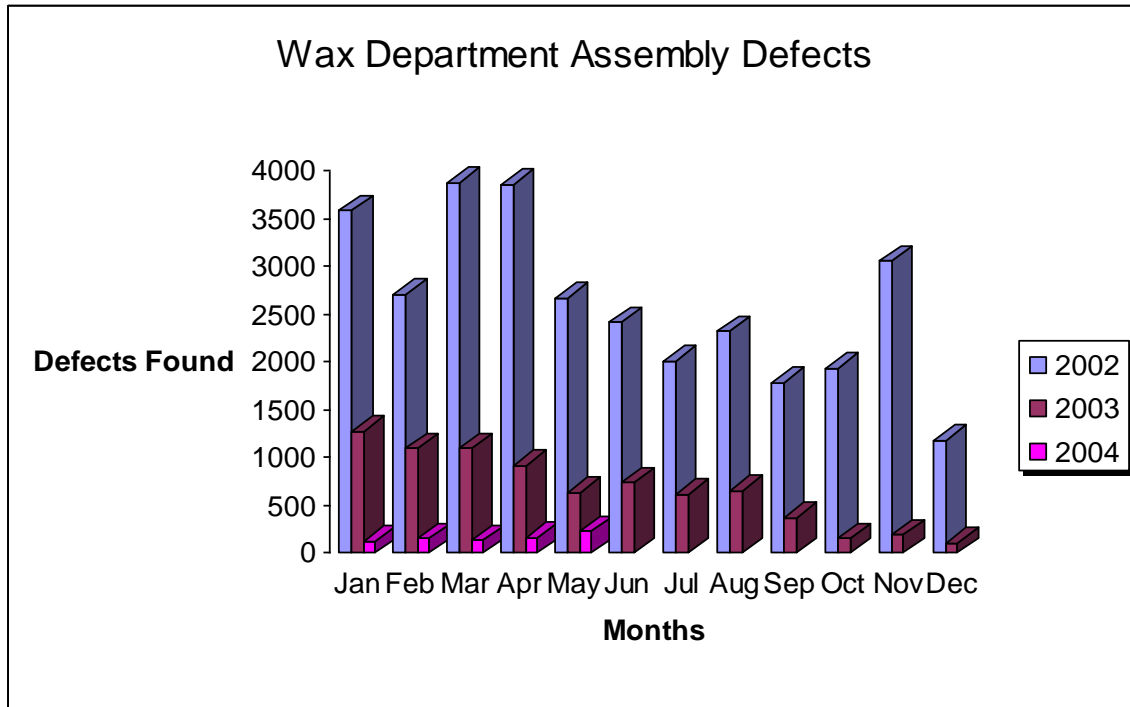
The Opportunity: ESCO-Syracuse introduced cellular manufacturing in 1995 to remove department silos in and followed up with *Kaizen*, Synchronous Manufacturing and then Six Sigma. Although *Kaizen* Events were completed on almost all of processes, there was still significant variation at the operator level in the Wax Department where as many as 4000 defects were detected in any given month in the assembly of initial molds. Since Wax is the front-end of the manufacturing processes, having to rework the molds increased touch time and adversely impacted on-time release and cost. The on-time release of molds in the Wax Department was 73% for the year 2002 affecting both manufacturing cycle times and customer delivery. According to Director of Human Resources Paul Smith, "We identified that the training approach for the entry level position of mold assembly was not effective. Employees were being trained utilizing the buddy technique by assigning one of the best assemblers to train new employees. We needed a better method of training employees that was repeatable and verifiable."

The Goal: Implement TWI Job Instruction Training (JI) to identify and document best practices and retrain people to standardize work throughout the plant beginning with the wax mold assembly operation. Job Instruction was selected because the methodology requires breaking down each job into Important Steps and Key Points that document best practices in the form of a Job Breakdown Sheet that becomes the standard for training and performing each job. Requiring each worker to demonstrate competence provides verification to the trainer that the employee has in fact learned to do the job correctly, and safely.

Action: From a Six Sigma perspective, TWI Job Instructions establish the best practices for a process by providing a proven method to stabilize processes by minimizing variation in how jobs are performed. Over 60 employees were trained in JI to date using hundreds of Job Instructions that have been written and added to a company database. In Wax, all operators have been trained and random audits are now conducted to verify conformance. An operator is certified for each element after having passed six audits and future audits are conducted on a monthly basis. The goal is to certify employees in the elements common for all lines and then certify within a flow line. Once employees are certified within a line their training will continue with the goal to certify them in all lines. This will give the company maximum flexibility to minimize cost by being able to move employees to where customer demand requires. Now that Job Instruction is fully implemented in the Wax Department, the JI program is now being introduced in the finishing end of the operation and will soon be followed by Job Methods to continuously improve every work standard.

The Results:

- Reduction in Wax Department Assembly Defects:**
 2003 vs. 2002 - 75% 2004 vs. 2003 - 83% 2004 vs. 2002 - 96%



- The Human Capital Readiness Report was raised from 40% to 84%** in the initial twelve month period that TWI Job Instruction training was implemented with the mold assembly job family, cutting the time in half to achieve strategic readiness.
- Significant improvements in average monthly on time release of wax molds:**
 - 2002 - Average per month 73.2%
 - 2003 - Average per month 89.5%
 - 2004 - Average per month 98.6%
- Significant improvements in on time release variability from month to month:**
 - 2002 - Variability 38.0% - 96.1%
 - 2003 - Variability 67.3% - 100%
 - 2004 - Variability 98.3% - 99.9%
- Improved wax mold release times increased productivity in other areas:**
 - Training Time Reduced 2 mos. to 2 weeks
 - Reduced Cycle Time 64%
 - Reduced Inventory 50%
 - On-time Delivery Improved 80%
- The TWI Job Instruction program was credited by management for its contribution to this plant becoming the first and only recipient to date of the prestigious Platinum Supplier Award from the Dallas, Texas based Lockheed Martin Missiles and Fire Control division at a public award ceremony in Chittenango, NY on June 21, 2005.**