



ImpleMentors of Manufacturing Solutions

Powder Coating & Enamel Industry First Piece Yield, Labor Utilization, Quality Improvement

Project Start Date: May 6, 2005

Project End Date: December 2, 2005

Company profile

This client specializes in several metal applications such as: metal stamping and forming, metal finishing techniques, powder coating and enamel applications, and screen printing to name just a few. The company is a major supplier for both the appliance and industrial truck industry.

Business situation

This client provides enamel applications to burner bowls as well as laundry (washer and dryer) doors. Prior to the enamel application the parts run through a powder-coating application to strengthen the characteristics of the parts. Shortly after powder-coating, the parts run through an enamel application which gives the parts their color. Immediately following the enamel application the parts would run through an elongated, high temperature oven to bake the enamel and color onto the parts. Lastly, a quality check would be performed to determine if any hairline cracks occurred on the product or if any discoloration or oil spots appeared on the product. Once the quality check passed, the part would be packaged for shipment to the customer.

However, quality problems were apparent within the enamel and baking applications. The business identified a quick need to engage with Strategy3 and deep dive the problems affecting the first piece yield on the lines. Also, downtimes on the lines were frequent and long. The complete time it took a part to convey from one part of the line to the other was approximately 15 minutes. This 15 minute downtime every time the line stopped and restarted contributed to lost labor revenue.

Implementation Approach

Strategy3 quickly began identifying time lost on the lines due to changeovers, setups, shut-downs, and breaks. First piece inspections on the line were timely, also preventing production from running. Once production did begin, quality defects were apparent on approximately 35% of the parts.

Labor Improvement

First, Strategy3 changed the equipment for the enamel hoses so that they were quick-changeover hook-ups versus manual and timely setups. Having the next hose and enamel gun configuration on the shelf allowed the operator to shave his or her time down by 75%. Strategy3 next recognized that with 4 lines, only 3 ever ran while 1 was idle. Using the fourth line as an additional resource, Strategy3 used it to always have it ready for the next run of parts. This introduced complete flexibility to the labor pool as well as operations. Using this technique, in addition to rotating the workforce through lunches and breaks one at a time kept the lines running the entire shift. By doing this, operations gained an entire hour per line, per day using the same labor pool.

Next, Strategy3 identified a waste point prior to the part entering the baking oven tunnel. The part was manually removed from a fixture and placed onto a heat-safe fixture after receiving enamel and before being baked. Four different fixtures were invented before one worked that allowed the part to be contained entirely to one fixture versus using two before. This did two things: it allowed the part to be untampered (receiving less quality problems), and it relieved one person from each line. The labor went from 4 people per line to just 3 people per line, for an overall labor savings of 25%.

Quality Improvement

Narrowing down the quality problems to 6 or 7 categories led to a training program for the quality inspectors. This initiative qualified who could and could not inspect until further certification. Out of a blind test with 10 good parts, the average number of parts failed by each operator taking the test was 6.7. This revealed that parts had been failing on the line which were passable.

Once this was revealed, Strategy3 made a very subjective quality-pass system a very objective quality-pass system. This, in turn disqualified the inspectors that failed the blind test, and forced further testing and setting parameters and tools for quality inspectors on the line.

Results

Labor reduction per line was 25%, while the overall gain per line of production time was 1 hour per day. Quality first piece yield significantly increased by 10%.