CASE STUDY: REDUCE SCRAP RATE AND LABOR EFFICIENCY LOSS

Industry: Product Based Companies
Company Type: A leading global provider of medical devices
Project Title: Reducing scrap rate and labor efficiency loss
Tools Used: Six Sigma DMAIC

Total Savings: $413,656

Project Timeline: Five months

PROBLEM STATEMENT

A leading global provider of medical devices found that their breathing mask line was running at a scrap rate of 70,000 parts per million (ppm), with a labor efficiency loss of $4,000 per week.

PROJECT GOAL

The company wanted to reduce the scrap rate to 10,000 parts per million (ppm) and completely eliminate the additional labor costs that were being incurred due to inefficiency. Working with Juran, this medical device manufacturer implemented Six Sigma, a systematic approach and data-driven methodology to reduce product and process defects and variation. This organization's goal was to save an estimated $345,000 per year.

BUSINESS CASE

By reducing scrap, $130,000 per year would be saved. Increasing labor efficiency would add an additional $4,000 per week, totaling labor savings of $200,000 per year. A more stable output would provide more predictable employee scheduling, saving a further $15,000 in overtime premiums per year.

PROJECT SAVINGS

The medical device manufacturer was able to save a total of $413,656 by increasing their output and lowering their defect levels. This was achieved by standardizing procedures and methods in the breathing mask manufacturing process. All inspectors received training and a sample board of products to help them determine which masks met the pass/fail criteria. Check sheets were supplied to all supervisors so they could follow up with all operators and ensure processes were being followed. The type of glue tip that was used became standardized, along with the methods on how to press and form the shape of the breathing mask. The cone pressing station and the cone loading station became separate instead of combined. These changes led to increased safety, reductions in cycle time, easier machine change-overs, and a cleaner work environment.

SUMMARY OF RESULTS

This manufacturing company was able to meet their labor efficiency goal after only 3 months of working with Juran. The scrap reduction goal of 10,000 ppm was met after 5 months. $174,096 was saved in scrap, $205,000 in labor costs, and $34,560 in overtime pay.

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CASE STUDY: LEAN – VALUE STREAM ANALYSIS AND MANAGEMENT

Industry: Product Based Companies
Company Type: Glass Manufacturer

Tools Used: Lean – Value Stream Analysis and Management:

- 6 S
- Current State Value Stream Map
- Process Maps
- Data Collection and Pareto Analysis
- Corrective and preventative actions
- Safety stock calculation
- Kanban
- Standardized Work
- Production Boards
- Visual Manufacturing
- Preventative maintenance
- Control charts on key processes

Total Savings: Meeting the 75 ton/day goal will save $1.6 million annually

Project Timeline: Eight weeks

PROBLEM STATEMENT

Identify areas to improve glass throughput and yield for solar products and reduce WIP overage.

PROJECT GOALS

- Increase throughput from 17.3 tons/shift to 25 tons/shift
- Improve yield from 84.4% to 92%
- Reduce WIP overage from 15% to 10%

BUSINESS CASE

This solar glass manufacturer realized that they needed a better understanding of their environment and the current work flows in their factory. They knew there were opportunities to increase their yield and tons per shift throughput without increasing their WIP.

PROJECT

Working with Juran, this manufacturer implemented S1-S3 (Sort, Set in Order, Sweep and Shine). The goal was to encourage shared ownership in the setting of workplace standards. By getting rid of unneeded or unused items and debris, space was freed up in the factory, which enabled better movement and easier storage of materials. Shadow boards for tools were designed for easy identification, eliminating time wasted while trying to find the necessary tools at workstations. Procedures for regular cleaning and standards for maintaining a clean work environment were developed with all workers. These procedures became one of the metrics that were tracked daily.

Different value streams had to be determined. The team worked together to map out the as-is flow of work—from when raw material was delivered at the back door until finished products were shipped out the front door.

Mapping the flow of work helped the team identify the necessary data to measure process productivity and efficiency. The following areas were identified for data collection and further analysis:

- WIP overage analysis
- Move distance (non-value added)
- Line downtime
- Maintenance procedures (Oven, Quench and Edgers)
- Line losses by station
- Line gap and speed
- Final inspection vs. main line inspection criteria and techniques
- Scheduling and glass/cut paper demand
- Downtime/lost time at feed-in
- Incoming glass breakage

Through Pareto analysis, the team discovered that two out of ten plus steps in the process contributed to close to four hours of overall line downtime per day. Collecting and analyzing data on what causes breaking and line losses, the team identified three categories that contributed to almost 60 percent of the problem. Corrective and preventative actions were developed and implemented, resulting in a significant impact and reduction of these issues.

Time studies, including speed and gap measurements combined with daily demand, helped the team to understand their current takt time performance. The team was able to establish an ideal takt time and loading of resources to reach their objective of 25 tons per shift.

	Tons/Shift	Tons/Day	Tons/Year
Theoretical	32.2	96.6	28,400
Goals	25.0	75.0	22,050
Current	17.3	51.9	15,259
Goal Achievement	7.7	23.1	6,791

More improvements that were implemented as a result of data collection and analysis included:

- Raw material to make solar glass was bought in rolls and cutting it down to the correct size was done on-site. The team identified that six sizes accounted for 64% of the most frequently run sizes. The team negotiated with the vendor to provide the factory with pre-cut material. Safety stock was calculated and Kanban replenishment was implemented.

- Observations and time measurements of the glass feeding workflow identified many improvement opportunities. Time was lost waiting for material. To optimize flow, the right raw material had to be delivered at the right time for the next production run.

- It was observed by the team that variation is caused as a result of non-standardized work. The team brainstormed a solution, and developed a new feed-in process to the conveyer, cutting downtime and improving safety. The new process was easier for operators as well, making this change a real win for all.

- Downtime due to breakdowns of equipment was reduced by implementing a scheduled maintenance and preventative maintenance plan.

To achieve per shift goals and to sustain the gains, Juran helped the team develop audit metrics and production boards. Regular audits were performed and results were posted on the production boards.

Supervisors identified members of their teams to be responsible for updating the production results on a regular basis. This encouraged a sense of pride and accomplishment and respective teams worked together to achieve their per shift goals. The new way of work empowered them to troubleshoot when things got off track and take immediate corrective action when needed.

A partial list of suggestions that came from the factory floor included:

- Improve incoming glass quality – utilize laser or photo inspection
- Automate feed-in
- Partials – WIP storage
- Use Mylar pads for WIP glass in cases

- Use cardboard under cases and rack glass
- Furnace software upgrade
- Use alarms – lights/audible when line is down
- Sample limits from main line at tempering with training
- Formalize ongoing employee training

SUMMARY OF RESULTS

Actual savings after one month:

	Tons/Shift	Tons/Day	Tons/Year
Actual-January '07	27.8	83.4	24,520
Goals	25.0	75.0	22,050
2006	17.3	51.9	15,259
Actual Achievement	10.5	31.5	9,261

83.3 tons/day in January saved $200K for the month

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