

# Case Study

## Reduce Snowmobile Plain Link Scrap & Rework

### Project background

A leading manufacturer of precision motion technology products produced silent chain for the niche market of snowmobile drive chains and had dominant market share.

A competitor was making significant inroads and plans to combat competition included an increasing emphasis on meeting changing customer requirements and improving product quality.



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### Problem

Management were concerned that maintaining market share in the snowmobile drive chain market was dependent on improving quality and delivery.

A Lean Six Sigma team was set up to reduce scrap and rework. Through Pareto analysis the team identified that plain links contributed 67% of the cost of poor quality for snowmobile chain. Scrap was 3% and cost \$38K per year.

The team reviewed plain links manufacturing process and discovered variation in tool grinding, design, life and tool composition in the presses. They monitored five characteristics: burrs, hole to toe length, hole to flank length, outside to outside pitch length, pitch hole size plus pre- and post- heat treat hardness.

In conducting capability studies they found measurement system errors affecting the ability of the Minster press to manufacture plain links to specification.

Undersized punches were causing excess variation.

The team also noted variation in pitch produced by the two row tool.

### Solutions

Management were convinced to develop a focused factory for producing snowmobile chain links. Manufacturing and assembly personnel were co-located and operators, setup personnel, and tool grinders were cross trained to use standard operating procedures and statistical process control techniques.

Utilization of skilled tool and die makers to sharpen tools led to better tool life and a better part being produced.

A database was developed to determine average tool life, which allowed proactive tool replacement. The press was programmed to stop prior to tool failure.

Control plans were updated to require adherence to sampling plans in order to achieve better process capability.

The punch press process was changed to apply Kanban quantities, allowing time for operators to check all five press characteristics, rather than passing on as many parts as they could.

### Business benefits

Scrap was reduced to less than 0.5% ,saving \$36K per year, enabling customer deliveries to be met on time and achieving zero returns from customers for faulty plain links.