

Case Study

Improved assembly line productivity in newly acquired bearing company

Project background

A manufacturer of bearings for use in agricultural, mining, air, material handling and marine applications purchased a manufacturer of ball bearings and all operations were moved for cost reasons. However production rates for the acquired business were too low, a backlog of orders accumulated and sales were lost due to poor delivery performance and quality issues with an external defect rate of 15,000 ppm. The variation in both processes and operators was too high. Continuous improvement Kaizen activities alone were unable to fix the root causes or implement sustainable control mechanisms. Therefore, a decision was made to assign a Black Belt to the project in order to reduce variation and improve output.



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Problem

Productivity was not high enough to meet customer demand resulting in excess overtime of €114,000. A Lean Six Sigma project was set up.

The Black Belt and his team discovered that the ball insertion, seal and slinger tools were ineffective. Output expectations from distribution to manufacturing were not clearly defined. Using new unskilled operators, in the absence of sufficient experienced workers who had transferred employment to the new owner company caused reducing throughput, and there was excess tooling and inventory on the assembly line.

The team's micro maps, failure modes and effect analysis (FMEA) and process capability studies also found bearing clearance defects, incorrect parts and specifications, poor tooling design and maintenance, inadequate training and 17 individual key process inputs that did not have documented operating procedures or work standards. The gauge repeatability and reproducibility (gauge R & R) study found that gauge error consumed 45% of the tolerance.

Solutions

Amongst the many solutions implemented, an air booster was installed to increase the force to deflect the outer ring for easier insertion of balls. A positive stop was added to vice blocks to reduce the possibility of cracking outer rings. A positive stop was also added to seal and slinger tools to ensure the correct depth of seal/slingers, reducing the need for rework and improving part quality.

Tools were organised and colour coded to aid set-up time and location of the correct tool for the task. A 5S system was developed for the area, along with a training plan, training matrix and Standard Operating Procedures (SOPs) to ensure all operators functioned at the required skill level.

The Black Belt also guided development of visual factory techniques to aid 5S, SOPs and output expectation for the newly acquired company's employees. Set-up reduction activities were performed on the sizing station.

Business benefits

Productivity increased initially from 6.4 to 9 units per man hour and later doubled to 12 units per man hour. Overtime costs were reduced by €93,000 per annum. Set-up time was reduced by over 90% and run time by 55%.