

## Title: Construction and Praxis of Six Sigma DMAIC for Bearing Manufacturing Process

### Introduction:

In today's fiercely competitive market, maintaining peak performance while curbing costs stands paramount. This necessitates methodical approaches such as Statistical Quality Control (SQC) to consistently refine quality and minimize manufacturing setbacks. Process Capability Analysis, a pivotal segment of SQC, offers a quantifiable measure of a process's capacity to deliver acceptable outcomes, aiding in strategic prioritization of enhancement endeavors.

### DMAIC Methodology:

The Define-Measure-Analyze-Improve-Control (DMAIC) methodology was employed to augment the bearing manufacturing process at Kirloskar Oil Engine Ltd. Pareto analysis identified critical defects, with nine anomalies notably influencing rejection rates. During the Measure phase, an assessment of process capability indices spotlighted 'Finish wall thickness at crown' as a pivotal area necessitating refinement.

### Analysis and Improvement:

Fishbone analysis discerned clamping pressure, cutter utilization, and bimetallic strip length as pivotal factors influencing 'Finish wall thickness at crown'. An L27 orthogonal array facilitated systematic experimentation, unearthing crucial interactions among variables. Subsequent optimization efforts yielded substantial improvements, with Cp and Cpk values transitioning from inadequate levels to satisfactory thresholds.

### Conclusion:

This case study underscores the efficacy of integrating Six Sigma DMAIC methodology with Taguchi's robust design to bolster process competence in bearing manufacturing. By systematically identifying and rectifying key factors impinging on product quality, significant enhancements were realized, culminating in the attainment of robust Cp and Cpk values for critical quality attributes. This approach not only mitigates rejection rates but also ensures sustained operational efficacy and heightened customer contentment.