

Reduction of Threading Defects in Shaft Manufacturing Using Six Sigma DMAIC Methodology

Shahbaz Ansari

Graduate Student

Manufacturing Systems Engineering and Engineering Management

California State University of Northridge

shahbaz.ansari.809@my.csun.edu

Nikhil Naik

Graduate Student

Manufacturing Systems Engineering and Engineering Management

California State University of Northridge

nikhil.naik.462@my.csun.edu

Sepideh Abolghasem

Associate Professor of Manufacturing Systems Engineering and Management

California State University of Northridge

sepideh.abolghasem@csun.edu

Abstract

In this paper outlines a Six Sigma DMAIC initiative led by to address excessive threading defects in shaft production at Den Scoth Engineering Pvt. Ltd. With an initial defect rate of 30%, the project aims to reduce this figure to below 5% through the systematic application of Six Sigma methodologies. Threading issues, including improper fit, dimensional deviation, and alignment errors, have led to elevated rework, operational inefficiencies, and customer dissatisfaction. Through a structured application of the Define, Analyze, Improve, and Control phases, the project team will conduct root cause analysis, identify critical sources of variation, and implement robust corrective actions. Key improvement strategies include enhancing process standardization, upgrading machining precision, improving operator training, and implementing real-time process control mechanisms such as Statistical Process Control (SPC) and stricter adherence to gauge compliance standards. JMP statistical software will be utilized throughout the project to support data analysis, visualization, and validation of improvements. By aligning quality objectives with business goals, this initiative is expected to significantly improve product consistency, reduce waste and cost, and strengthen Den Scoth Engineering's competitive position through operational excellence.

Keywords

Six Sigma, DMAIC, Threading Defects, Root Cause Analysis, Process Standardization, SPC, JMP Software, Operational Excellence.