

Impact Analysis and Formulation of Corrective Measures for Fault Reduction in Roller Bearing Elements

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Abstract: Roller bearings are widely used in mechanical systems to reduce friction and improve the efficiency of rotating components. However, they are prone to wear and failure under high loads, improper lubrication, or misalignment. This project aims to conduct an **impact analysis** of roller bearings, specifically focusing on the failure mechanisms and corrective measures for fault reduction. The project involves selecting an **existing roller bearing**, analyzing its specifications, and testing it under physical conditions to identify various failure parameters. The bearing will be modeled in **SolidWorks** and subjected to **Finite Element Analysis (FEA)** using **ANSYS** to simulate the failure modes and predict performance. By comparing the experimental and simulation results, corrective measures will be proposed to improve the reliability and lifespan of the bearing. Additionally, **composite materials** will be modeled and analyzed to evaluate their potential for fault reduction. The goal is to develop a methodology for improving roller bearing performance by optimizing material selection and design modifications.

Keywords: Roller bearings