Defects Data Analysis and Insights Report

Introduction

This project involves analyzing defects in automotive parts inspections for Little Panda Quality Analysis (LPQA). Using a comprehensive dataset that includes part codes, operator experience, training levels, tool usage, and calibration data, the goal was to identify key insights to improve operational efficiency and reduce defects. The analysis was performed using Tableau, where various data visualizations helped uncover patterns and root causes behind defects. This report outlines five critical insights derived from the data and offers actionable recommendations to enhance LPQA's quality control processes.

View the Tableau Dashboard:
https://public.tableau.com/views/DefectsDataDashboard/Dashboard2?:language=en-GB&publish=yes&:sid=&:redirect=auth&:display_count=n&:origin=viz_share_link

Dataset: Attached in the GitHub repository for further reference and analysis.

Key Insights and Recommendations

1. Defects by Part Code with Experience and Training Level

Insight: Parts B and D have the highest defect counts, with significant differences in defects based on the operators' experience and training levels. Inexperienced operators contribute more defects, especially for parts B and D.

Recommendation: Focus on training inexperienced operators, particularly on parts with high defect rates. A more experienced team should oversee inspections for critical parts, such as B and D.

2. Tools Used vs Defect Count

Insight: 75% of defects are linked to a single tool, suggesting potential issues related to tool calibration or usage.

Recommendation: Implement regular tool maintenance, calibration, and operator training on tool usage to reduce tool-related defects. Prioritize tool maintenance for the tool that contributes the most to defects.

3. Impact of Calibration on Total Defects by Part

Insight: A strong correlation was found between calibration frequency and defect counts. Higher calibration counts lead to fewer defects.

Recommendation: Increase the calibration frequency for parts with higher defect rates, especially for parts B and D, to maintain consistent quality.

4. Training and Experience Impact on Defects

Insight: Standardized training significantly reduces defect rates across all experience levels, but the impact is most pronounced for inexperienced operators.

Recommendation: Introduce mandatory standardized training for all operators, with a focus on inexperienced staff. Continuous upskilling will ensure long-term quality improvements.

5. Calibration Count vs Total Defect Count for Parts

Insight: Parts that undergo more frequent calibration, such as Part D, show a lower defect count, underscoring the importance of regular calibration.

Recommendation: Implement an automated calibration system for parts with higher defect rates, ensuring consistent quality and reducing the likelihood of defects.

Conclusion

The analysis provides a clear strategy for improving LPQA's quality control processes. By focusing on key areas such as operator training, tool maintenance, and regular calibration, LPQA can significantly reduce defect rates, improve operational efficiency, and enhance product quality. The findings are based on comprehensive visual data analysis through Tableau, available for further review via the interactive dashboard.