

Implementing Product Design Development Methodology for Improving Performance of Electrical Generator

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Abstract

The purpose of this paper is to improve the performance of electrical generators. The study is conducted at Precision Industries in UAE. Analyzing the service reports for the year 2013 revealed that most failures occurred in the closed type generators. Using relevant engineering tools such as failure data analysis, reliability-block-diagram, and failure-mode-effects-and-criticality analysis enabled us to understand the system and identify the most critical problem areas. Then, we identified the stakeholders' needs using surveys and interviews, and established target specification metrics for the most critical product. Using quality function deployment method showed that three critical metrics need to be improved: insulation foam density, muffler sound level, and vibration. Next, we identified and analyzed the product requirements, suggested design modifications (solutions), and tested and selected the most significant solution based on design of experiment results. The main results of the study can be summarized as: decrease in the average noise level from 74 to 69 dBA; reduction in the average vibration level from 464 to 150 microns; drop of average engine temperature from 96 to 87 Celsius. Using product design and development methodology helps finding efficient and effective solutions that can improve the products performance, thus increasing the firm competitiveness.

Keywords

Product design, electrical generators, continuous improvement, FMECA

Biography

Imad Alsyouf is an associate professor of Industrial Engineering, currently employed by University of Sharjah, UAE, and previously worked at Linnaeus University in Sweden. He has produced more than 25 journal and conference publications. He has about 24 years of industrial and academic experience in various positions in Jordan, Sweden and UAE. His research interests include productivity improvement, performance measurement, life cycle cost analysis, reliability and maintenance engineering, and optimization of decisions at various phases of system life cycle. He has developed and taught more than 25 courses covering a wide range of Industrial Engineering and Management fields.

Alam Al-Alami and Ali Saidam both are Industrial Engineers graduated from the Industrial Engineering and Engineering Management Department University of Sharjah “UOS”. They previously worked at Precision Industries- Dubai where this study was conducted.