Improvement of First Time Quality in Circuit Breaker Manufacturing Process using Quality Techniques

Student's Name	**B. V. Gangadhar**	**EMM (PT-2007)**
Academic Supervisor(s)	B. S. Ajit Kumar	
Industrial Supervisor(s)	P. S. Rajendran, Schneider Electric, Bangalore	

B. V. Gangadhar

bgangadharv@gmail.com
Ph. No: 0 97404 88744

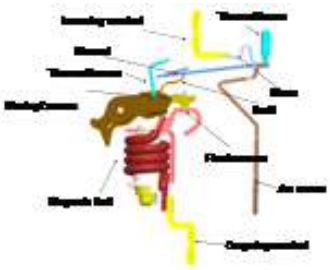
Keywords: Quality Management, PFMEA, DFM&A, Control Plan, Root Cause Analysis

Abstract:

The Project is carefully picked from the prospects of a value addition to the Course and my area of work. As part of the competitive Industrialization, achieving stringent KPI targets is a challenge. One such KPI is First Pass yield (FPY). It requires complete involvement of all functions in an industry and achieving the KPI needs holistic knowledge. Starting from Customer application, standard product requirements, Benchmarking, Costing are required for meeting KPI. The Product for the Project is MCB – Miniature Circuit breaker and the Final process is taken for improving FPY as it is important for Product requirements to be met.

Starting from the literature inputs, data collection, analysis, problem solving and process control tools, the integration of all the tools are being used in each step of the project as applicable. The project consists of analysis in the field of circuit breaker with regard to function and performance, to achieve the same process is been reviewed to meet requirements. Tools for analysis and problem solution used are PFMEA, stack up analysis, SPC, fits and clearances study. Jointly worked with process, design, quality and supplier team to analyze and solve problems. The work identifies the gaps in the Project management like DFM&A (is not effective), Controls in the Feeder line is not strong enough to prevent defect occurrence. System controls are being implemented in two instances, Design is being reviewed in another two cases, and Tooling is adapted for meeting quality requirement.

The project goals of FPY and FMEA reliability increase are met. Lessons from the project are – DFM&A should be effective, product validation to be done to the core for no failures during start off production. FMEA should have all inputs before launching to ensure controls for all failures. Next work can be on reducing Scrap and Non quality cost. Non tangential benefit is technical learning of electric principles in detail to integrate and design process for meeting consistent product quality requirements in all aspects.



Miniature circuit breaker anatomy

Before **After**

PFMEA before and after preventive action implementation

3W 1H	Problem description
What	Logo Missing
Where	M12 Pad Printing M/c
When	Final Inspection
How	Logo not printed

3W1H

Ishikawa Diagram

Why1	Why2	Why3	Why4	Why5
Not printed	Tampone not actuated	Tampone damage	Not fastened properly	Not followed setting Procedure

5why analysis

Fastening not done completely → Tampone damage during sliding due movement of tampone outside the guide → Pad not taken ink due to tampone not in position → No Ink in Pad → No print on the Product

Occurrence failure mechanism

Fastening change from spanner to hand tightening with wing nut and error proof with integration of wing nut fastened condition.

Preventive counter measure

SOP reviewed with Fastening method and PFMEA reviewed

Standardisation

Problem solving methodology and tools used in each step