

Increase in Production due to FPY Improvements



Author: José L. Rosario Colón
 Advisor: Carlos J. Gonzalez Miranda, Ph. D.
 Department: Master Program in Manufacturing Engineering

Abstract

First Pass Yield (FPY) is a critical quality indicator in our company in the electrical sector that is dedicated to manufacturing industrial breakers and its improvement can have a significant impact on operational efficiency and customer satisfaction. In this project, the use of the DMAIC (Define, Measure, Analyze, Improve, Control) methodology is proposed to address and reduce the quality problems found in the FPY analysis.

Introduction

The electrical breakers industry plays a fundamental role in ensuring safety and efficiency in the supply of electrical energy. These devices are essential for protecting electrical circuits and equipment against overloads and short circuits, making their quality of utmost importance.

However, despite the critical importance of electric breakers, companies operating in this sector face a series of challenges related to the quality of their products. These quality problems can arise at different stages of the manufacturing process, from material selection to production and distribution.

In this article, we will explore the quality issues faced by electrical breaker companies and their impact on safety, reliability, and customer satisfaction. We will analyze the underlying causes of these issues and discuss effective strategies to address them, with a focus on improving First Pass Yield (FPY) and optimizing manufacturing processes.

Problem

Our client needs to achieve and maintain a shipment to our customers of 40 MV units, including 6 38KV breakers. This would help us to reduce a backlog of 2,190 Medium Voltage breakers approximately \$19,923,726 in sales.

Methodology

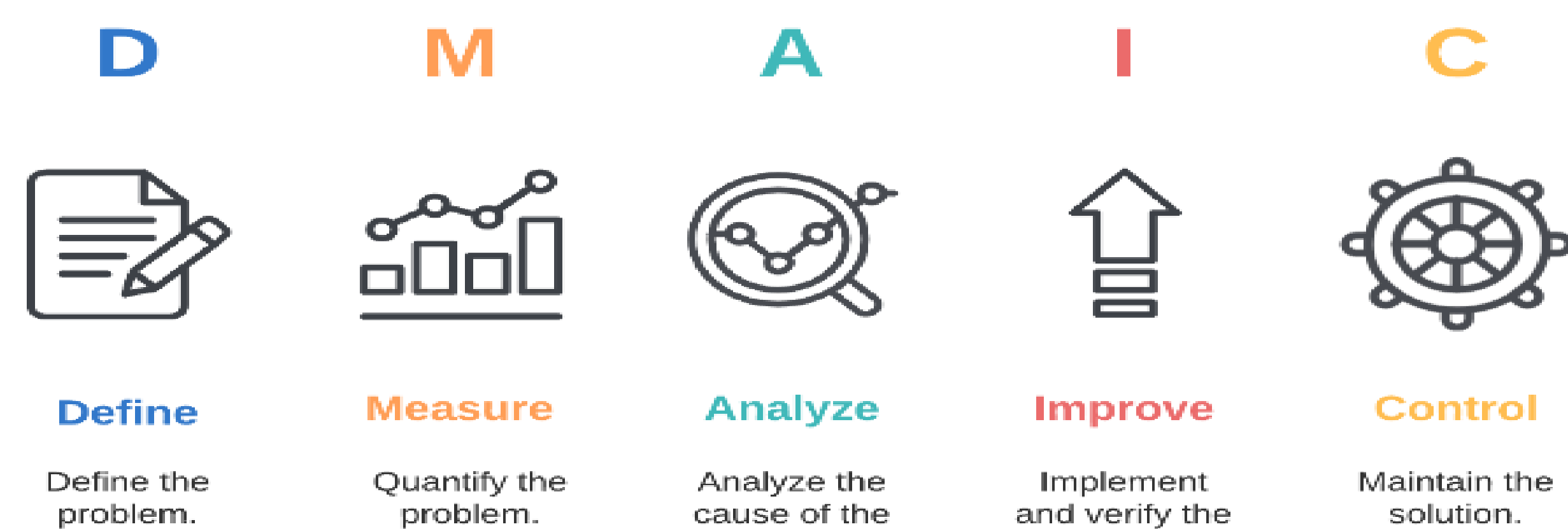


Figure 1
DMAIC

The DMAIC methodology is a structured approach used in Six Sigma to improve processes and solve problems. The letters DMAIC represent the five phases of the process..

Results and Discussion

Define Phase

Preliminary Objectives:

- Process Improvements through team walk observations aligned to MV manufacturing capacity
- Achieve and maintain a shipment to our customers of 40 MV units, including 6 38KV breakers. This would help us to reduce a backlog of 2,190 Medium Voltage Breakers approximately (\$ 19,923,726 of sales)
- Improve OTP from 47.19% average to 95%
- Improve FPY from 85% to 90% at end of May.

Figure 2
Project Charter

Measure Phase

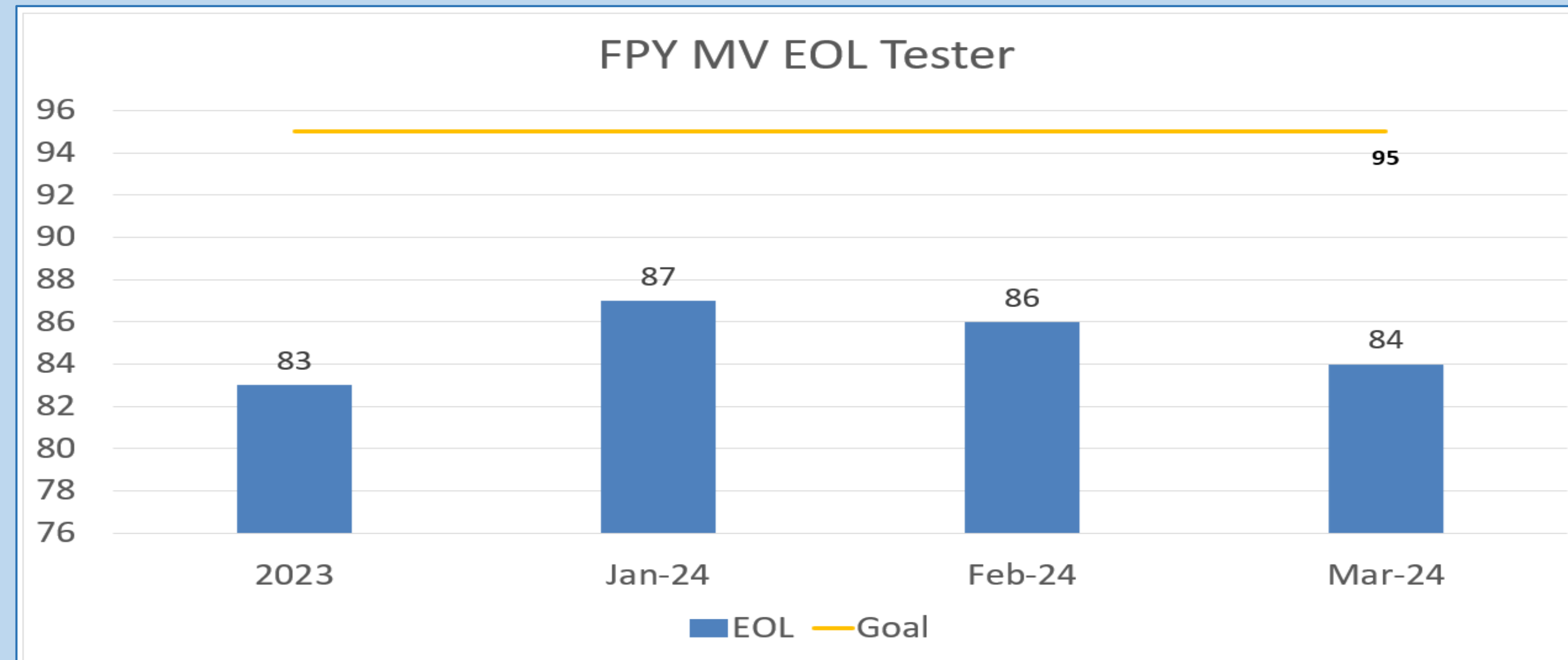


Figure 3
First Pass Yield Chart

This chart shows us that there is no consistency month after month and it behaves like a graph of peaks and valleys. It even shows us that the month of March was one of the most affected by failures in operational tests with a 84% of FPY when the goal is 95%.

Analyze Phase

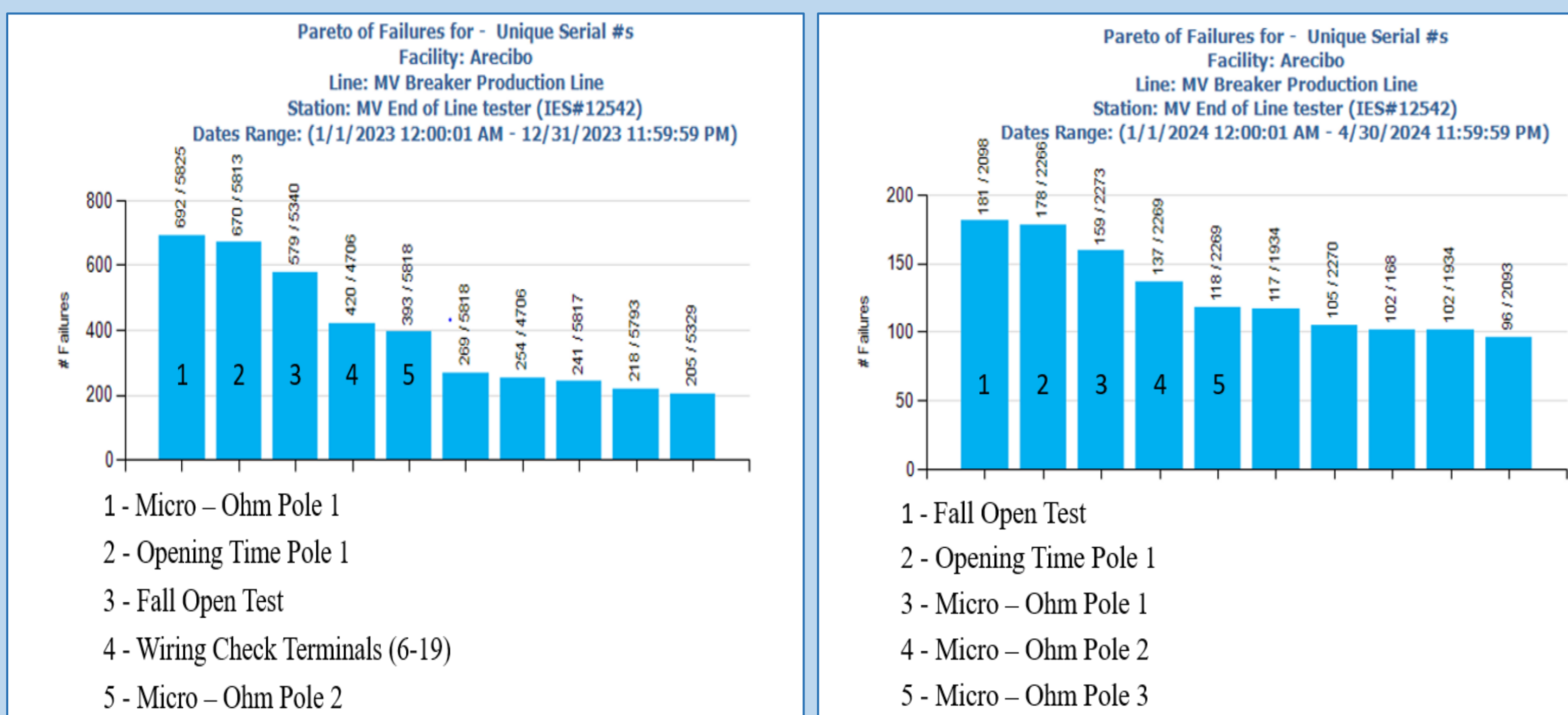


Figure 4
Pareto of Failures 2023

Figure 5
Pareto of Failures Year to Date

After analyzing the data provided in the two Pareto's by our SSR system, we selected to work with the Micro – Ohm Pole 1, 2, 3 and Wiring Check Terminals faults (6-19). Although Opening Time Pole 1 and Fall Open Test were among our top offenders, then we realized their root causes are failures related to the testing system.

Results and Discussion

Improve Phase

KAIZEN REPORT

Área: Medium Voltage	Fecha Comienzo: 3/25/2024	Foto de Antes
Estación: Assembly - General	Fecha Terminado: 3/26/2024	
Descripción del Problema:		
Los clamps que se instalan en los polos para inyectar corriente a la unidad, pudimos observar que se aflojan de los disyuntores debido a la vibración constante que se genera cuando se prueba el producto. Esta falla resulta ser el mayor detractor en el área de pruebas al tomamos en consideración que ocurre constantemente en 3 ubicaciones diferentes.		
Nivel de Kaizen: 2	Responsable: José Rosario	Número de MOC:
Miembros del Equipo Kaizen:		
Robert Rodriguez, José Rosario		
Herramientas Impactadas de Eaton Lean Six Sigma (ELSS):		
Yield	5S	TPM
Métricas Impactadas (High 5 Metrics):	LMF	SS
Safety	Quality	Delivery
Inventory	Productivity	
Otros Impactos importantes:		
Tuvimos la oportunidad de buscar unos clamps que brinden un mejor agarre al poste y las conseguimos. Ya hemos empezado a cambiar el equipo y las abrazaderas no se salen.		
Aborros:	N/A	Mensual Anual

Figure 6
Kaizen Micro – Ohm Pole 1, 2, 3

When we conducted the analysis to improve this situation, we realized that the equipment is in good condition but we had the opportunity to look for some alligator clamps that provide a better grip on the pole and we got them. We have already started changing the equipment and the clamps are not coming off.

Control Phase

As part of the control phase we decided to training 2 employees to become Subject Matter Experts (SME), so that they will be in charge of conducting more robust and specialized training in both shifts and we implement a Total Productive Maintenance (TPM) program on all our test equipment.

Conclusion

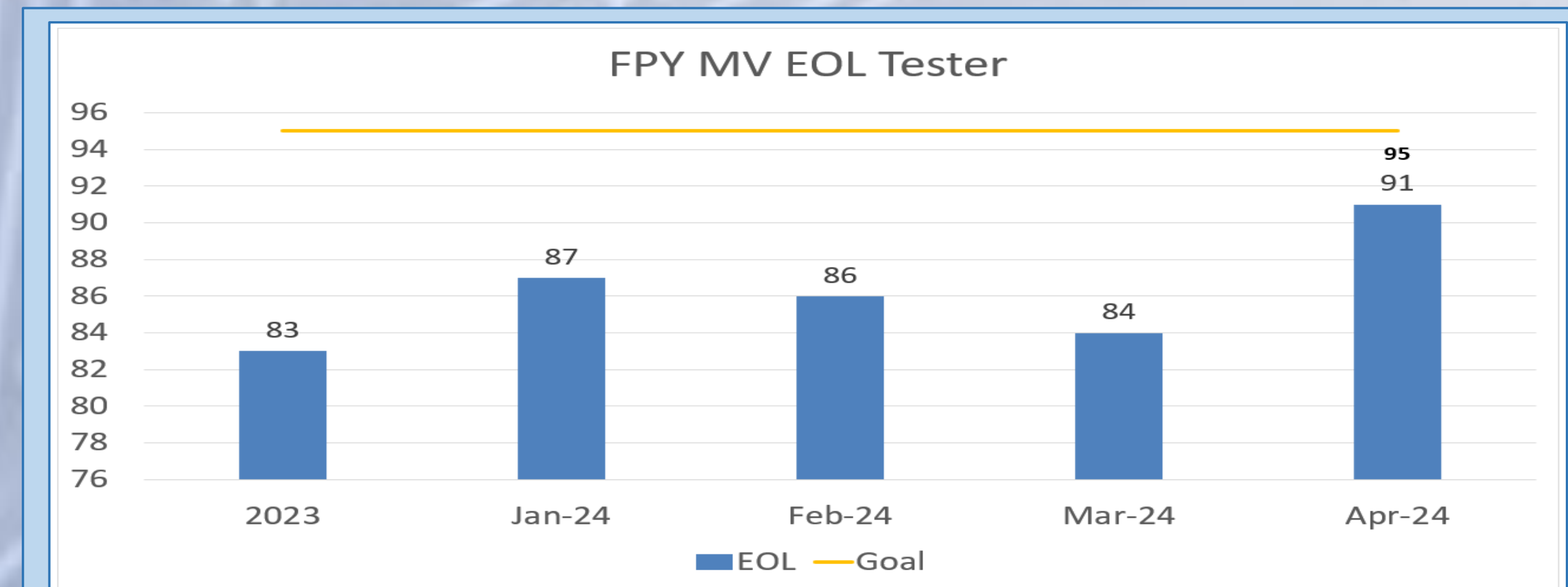


Figure 6
First Pass Yield Chart After Improvements

In conclusion, our First Pass Yield this past April increased to 91%, exceeding by 6% the average obtained between last year and so far this year.

References

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