MANUFACTURING DEFECTS QUALITY CONTROL ANALYSIS

INTRODUCTION

Quality Control helps make sure that products are **made correctly** and **meet the required standards**. It includes steps to check each stage of production from the start to the final check so that any problems can be found early. This reduces waste, keeps product quality consistent, and improves the overall process.

In this project, we used a defect sampling method, where one item is **randomly checked every 15 minutes during an 8-hour shift** (about 22–24 samples per shift). This helps us spot small or major defects early. We also **used control charts** to track how stable the process is. With these tools, we can make sure products meet quality standards and keep improving the process over time.

OBJECTIVES

- To evaluate the **frequency and distribution of minor defects** observed across ten days of production.
- To identify potential areas for **process improvement**, supporting **consistent quality** and **defect reduction.**
- To assess the stability and variability of the manufacturing **process using statistical process control techniques**

METHODOLOGY

Preliminary Check

We used the Anderson–Darling test to check if defect data followed a **normal pattern**. Since the **p-value was below 0.005**, the data was suitable for **control chart analysis**.

Phase I – Start-Up Stage

- We applied a **c-chart** to check if the process was stable.
- Sample Plan: 224 items were sampled over 10 days (one every 15 minutes during 8-hour shifts).

Phase II – Mass Production

- Sample Plan: 96 more items will be checked.
- Monitoring: The **same control limits from Phase I will continue to be used.**

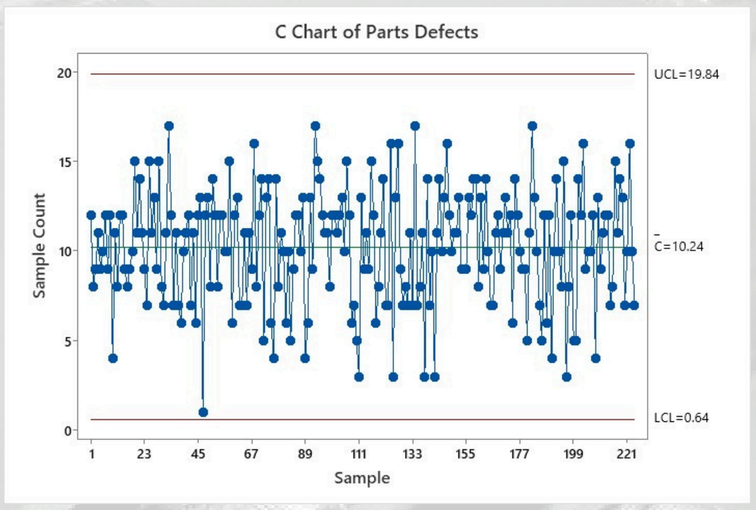
Process Capability

- Pp: **Measures** how wide **the process spread is compared to the limits.**
- Ppk: Shows how well the **process is centered within those limits.**

SOURCE : KAGGLE

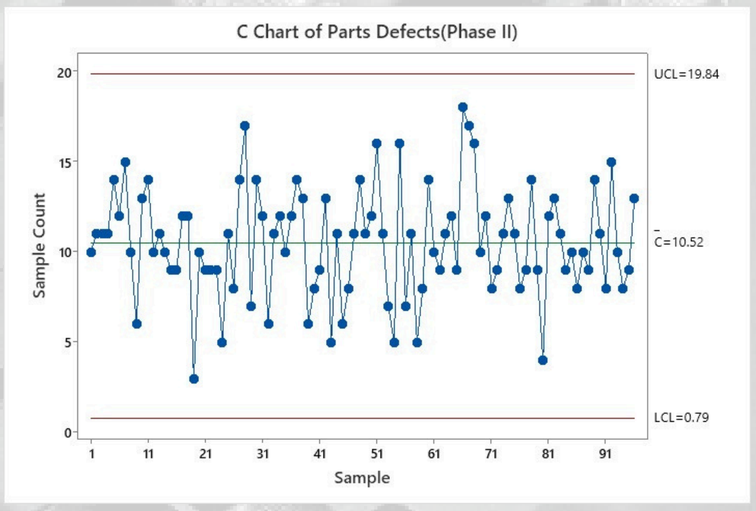
SCAN ME

RESULTS



PHASE 1

The C-chart shows no points outside
the control limits indicating the **process in control**



PHASE 2

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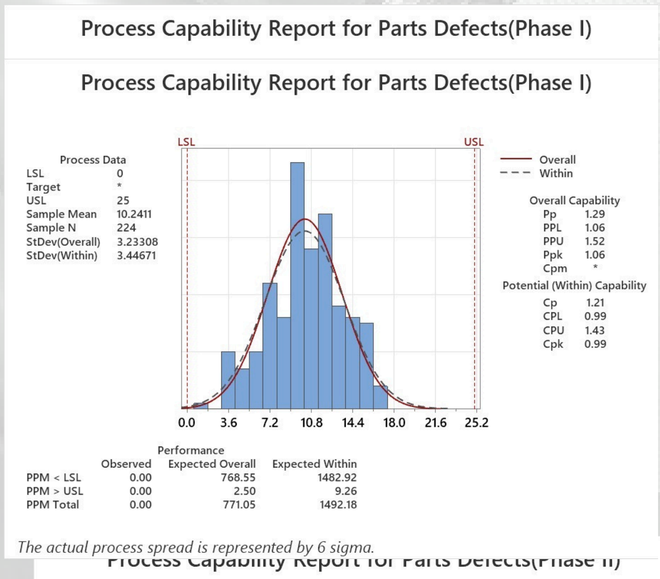
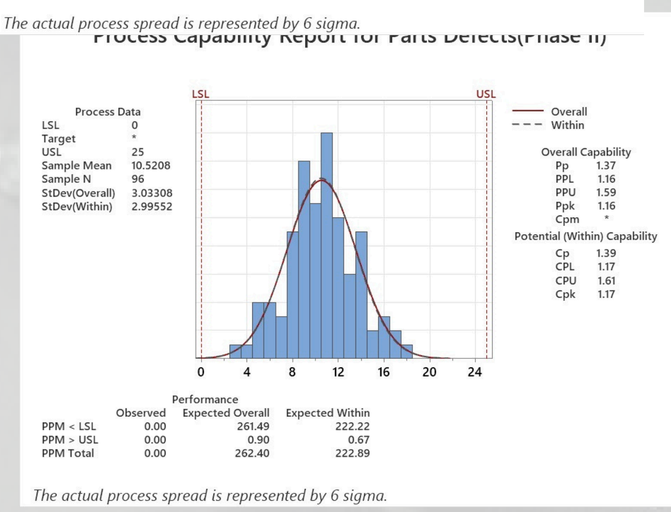


PROCESS CAPABILITY PHASE 1

USL: 25 LSL: 0
Cp = 1.21, Cpk= 0.99
the process appears stable but **off centre**



PROCESS CAPABILITY PHASE 2

USL: 25 LSL: 0
Cp= 1.39, Cpk=1.17
The process appears stable but **off centre**

CONCLUSION

- The defect data is normally distributed, suitable for control chart analysis.
- All points in Phase I & II C-Charts are within control limits → the process is stable.
- No abnormal trends or patterns detected - defects are likely random.
- Process capability indicates low variation and consistent quality output.

RECOMENDATION

- Continue monitoring using C-Charts to maintain process stability.
- Investigate immediately if future points fall outside control limits.
- Strengthen machine maintenance and operator training to prevent issues.
- Use control chart findings to continuously improve product quality.

GROUP MEMBER

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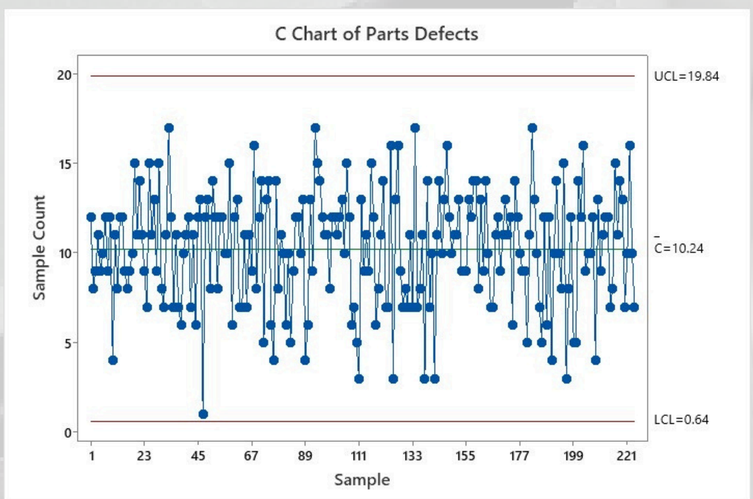

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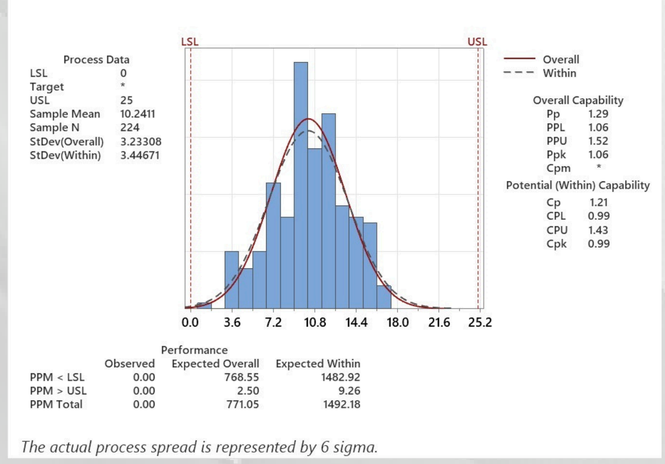

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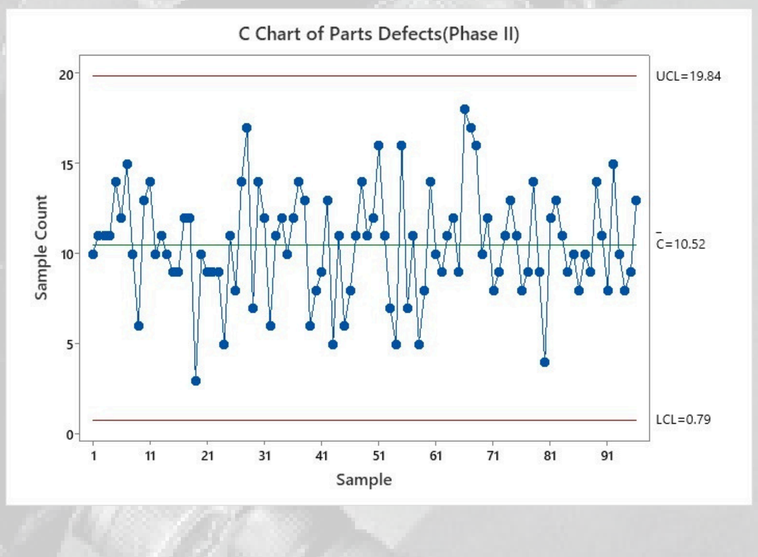

PHASE 2

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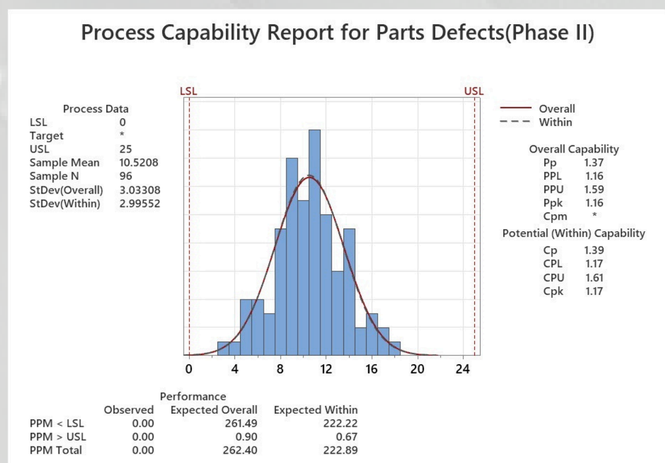

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