

Optimization of PCB Manufacturing Processes Using Statistical Quality Control (SQC)

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Introduction

- Overview of Manufacturing Landscape:
 - importance of efficiency, cost reduction, and quality
- Focus on PCB Assembly:
 - Backbone for electronic devices.

Importance of SQC

- What is Statistical Quality Control (SQC)?
 - Systematic approach using statistical methods.
- Techniques Used:
 - Control charts, process capability analysis.

Reference

- [1]. [Quality Control in PCB Manufacturing | TOPFASTPCBA](#)

Objectives of the Project

- Main Aim:
 - Optimize a PCB assembly line.
- Targets:
 - Identify inefficiencies and reduce defect rates.

Real-Time Monitoring

- Continuous Monitoring
 - Cycle times and defect rates.
- Benefits:
 - Detect variations in real-time.
 - Implement corrective actions promptly.

Reference

[2]. [PCB Quality Control: Everything You Need to Know | PCBMay - PCBTok.](#)

Integration with Lean Principles

- Lean Manufacturing Principles
 - Streamlining processes.
 - Eliminating non-value-added activities.
- Enhanced effectiveness of SQC

References:

[3]. [How does PCB company ensure PCB quality control Methods? - Leadsintec.](#)

Quality Control Methods

- Key Techniques in PCB Manufacturing
- Automated Optical Inspection (AOI).
- X-Ray Inspection.
- Electrical Testing.

- Reference:

- [1]. [Quality Control in PCB Manufacturing | TOPFASTPCBA](#)
- [4]. [Complete PCB Quality Control Method - Jhdpcb.](#)

Role of Quality Controls

- Enhancing defect detection rates. 

- Reducing waste and improving quality. 

- Reference

[5]. [Quality Control of PCB using Image Processing - ResearchGate.](#)

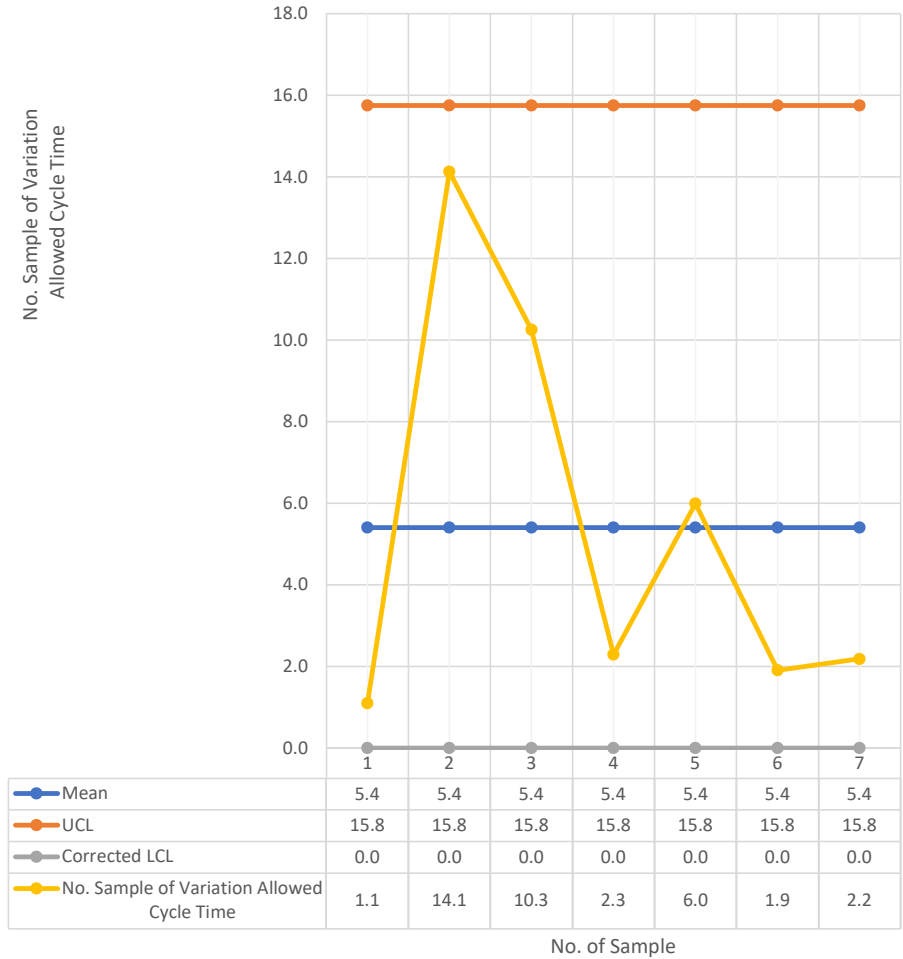
Methodology Overview

- Process Selection
 - Focus on PCB assembly line.
- Data Collection
 - Cycle time, defect rate, performance metrics.

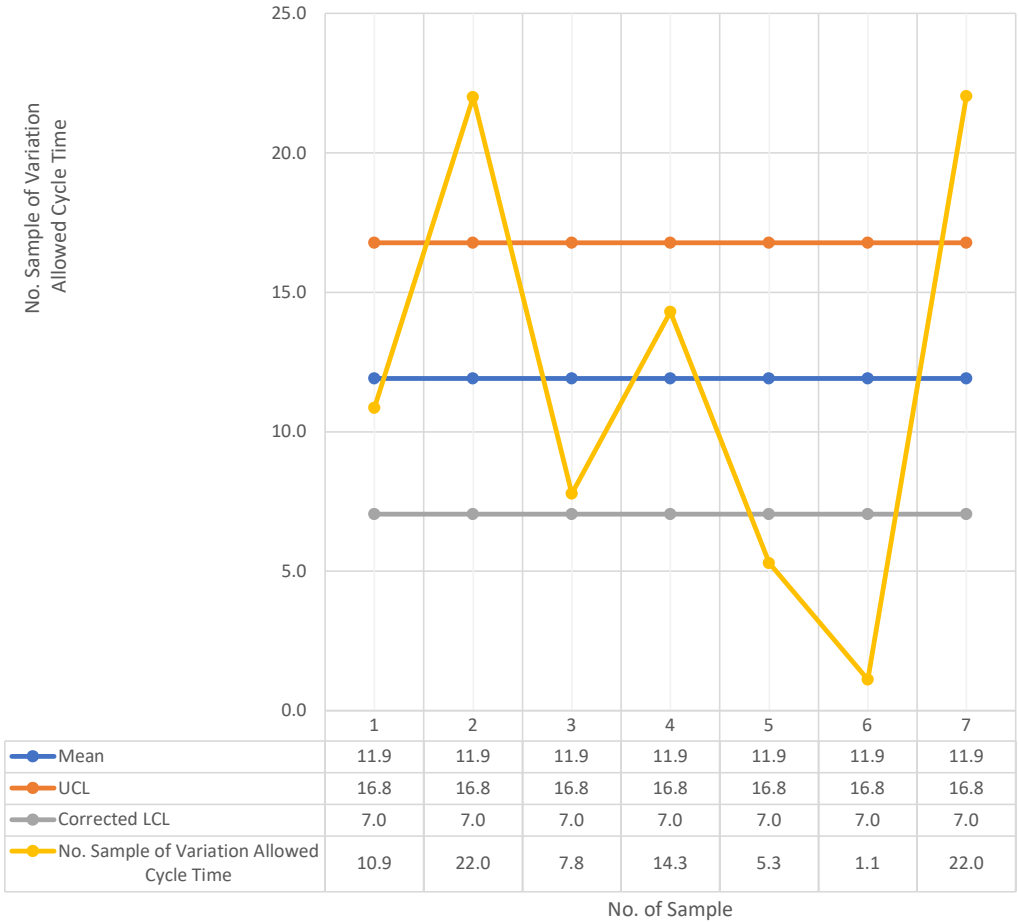
Methodology Continued..

- Analysis Using SQC Techniques
 - Develop control charts for stability monitoring.
- Propose solutions
 - Standardize cycle times, reduce variations.

Control Charts for Packaging Workstation



Control Charts for Component Placement Workstation



Validation and Assessment

- Final Steps in Methodology
 - Validate proposed improvements.
 - Analyze updated process metrics.

Expected Outcomes

- Process Optimization
 - Improved efficiency and reduced cycle time variations.
- Quality Enhancement
 - Lower defect rates and consistent product quality.
- Organizational benefits
 - Reduced costs and increased productivity for manufacturing systems.
- Student learning
 - Practical application of statistical techniques to solve real – world industrial problem.

Conclusion

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- SQC techniques can significantly enhance PCB manufacturing Processes.

References

- [1]. [Quality Control in PCB Manufacturing | TOPFASTPCBA](#)
- [2]. [PCB Quality Control: Everything You Need to Know | PCBMay - PCBTok.](#)
- [3]. [How does PCB company ensure PCB quality control Methods? - Leadsintec.](#)
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