



Author: Angeliz Rosado Cardona
 Advisor: Prof. José A. Morales, Ph.D
 Department: Industrial and Systems Engineering

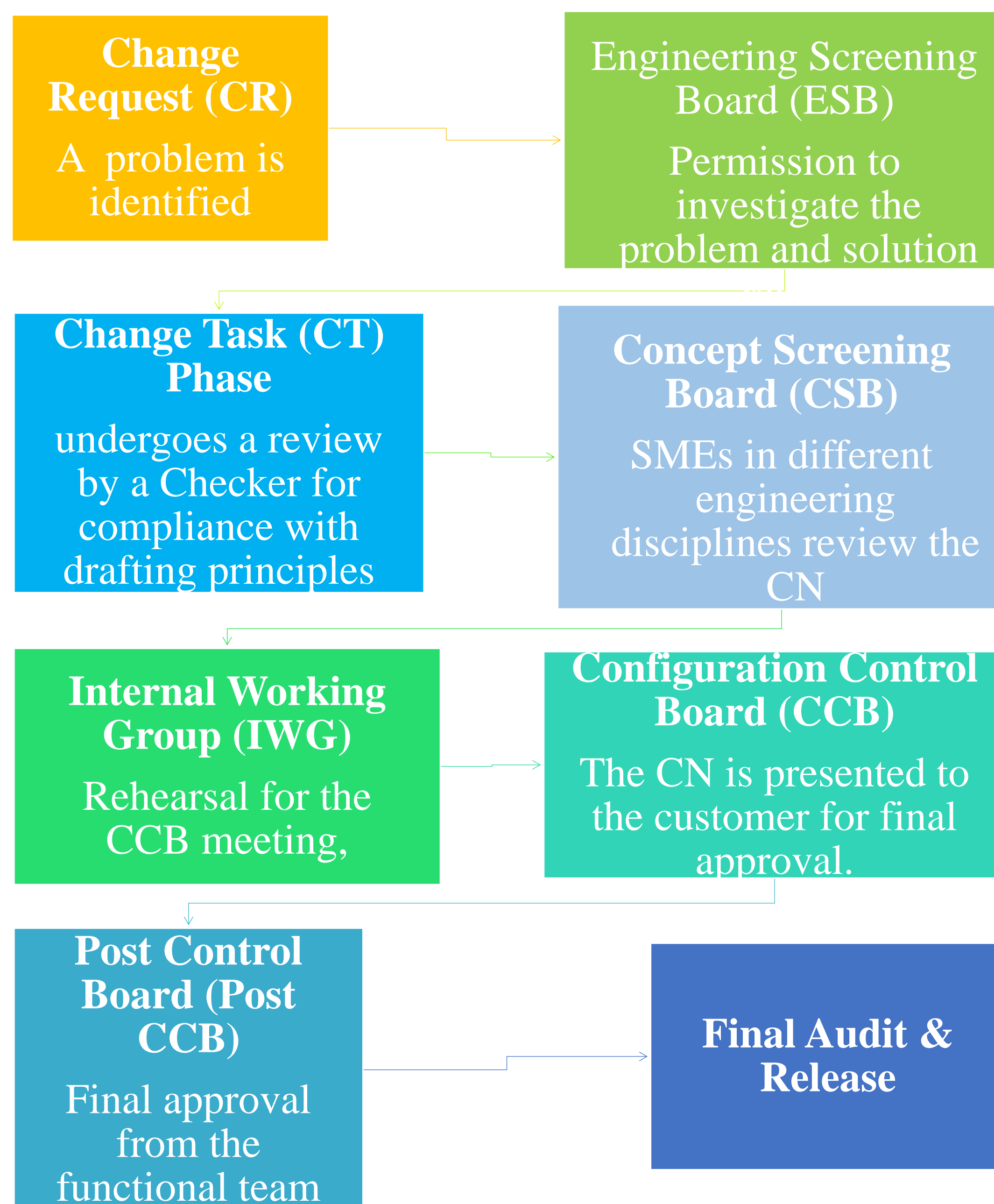
Abstract

This project addresses inefficiencies with the Missiles and Defense company Engineering Configuration Control Board (CCB) process. The objective of this work was to improve the efficiency of said process by finding and eliminating the chokes that delay the completion of Change Notices (CNs). Proposed enhancements resulted in radical timescale compression of the CCB cycle time, which is crucial for keeping production schedules on target and meeting contractual deadlines. The results of this process improvement include a 43% overall reduction in the CCB cycle, positively impacting operational efficiency and cost management.

Introduction

The CCB is a structured process used to manage engineering changes and ensure that all modifications to a product's design or materials are thoroughly reviewed and approved.

The CCB is divided in several stages:



Problem

The present CCB process is burdened with inefficiencies that have delayed the release of engineering documents. This has resulted in missed deadlines, production stoppages, and increased costs. This project seeks to streamline the CCB process, reduce idle time, and improve overall operational efficiency.

Methodology

The project was carried out using a structured five-step approach:

- 1. Process Mapping and Stakeholder Identification:** The CCB process was mapped out, and key stakeholders involved in the process were identified.
- 2. Data Collection and Bottleneck Analysis:** Data from the last 3 months of 2023 was gathered to identify the stages in the CCB process where delays occurred. Excel and Tableau were used for analysis.
- 3. Developing and Testing Solutions:** Potential solutions were developed based on the analysis. These included workflow changes, automation of task reminders, and appointing a process coordinator.
- 4. Implementation and Standardization:** The proposed solutions were tested and implemented across the entire CCB process. A new Standard Operating Procedure (SOP) was created to standardize the improvements.
- 5. Monitoring and Continuous Improvement:** The new CCB process was monitored over six months to assess performance and make adjustments as needed.

Results and Discussion

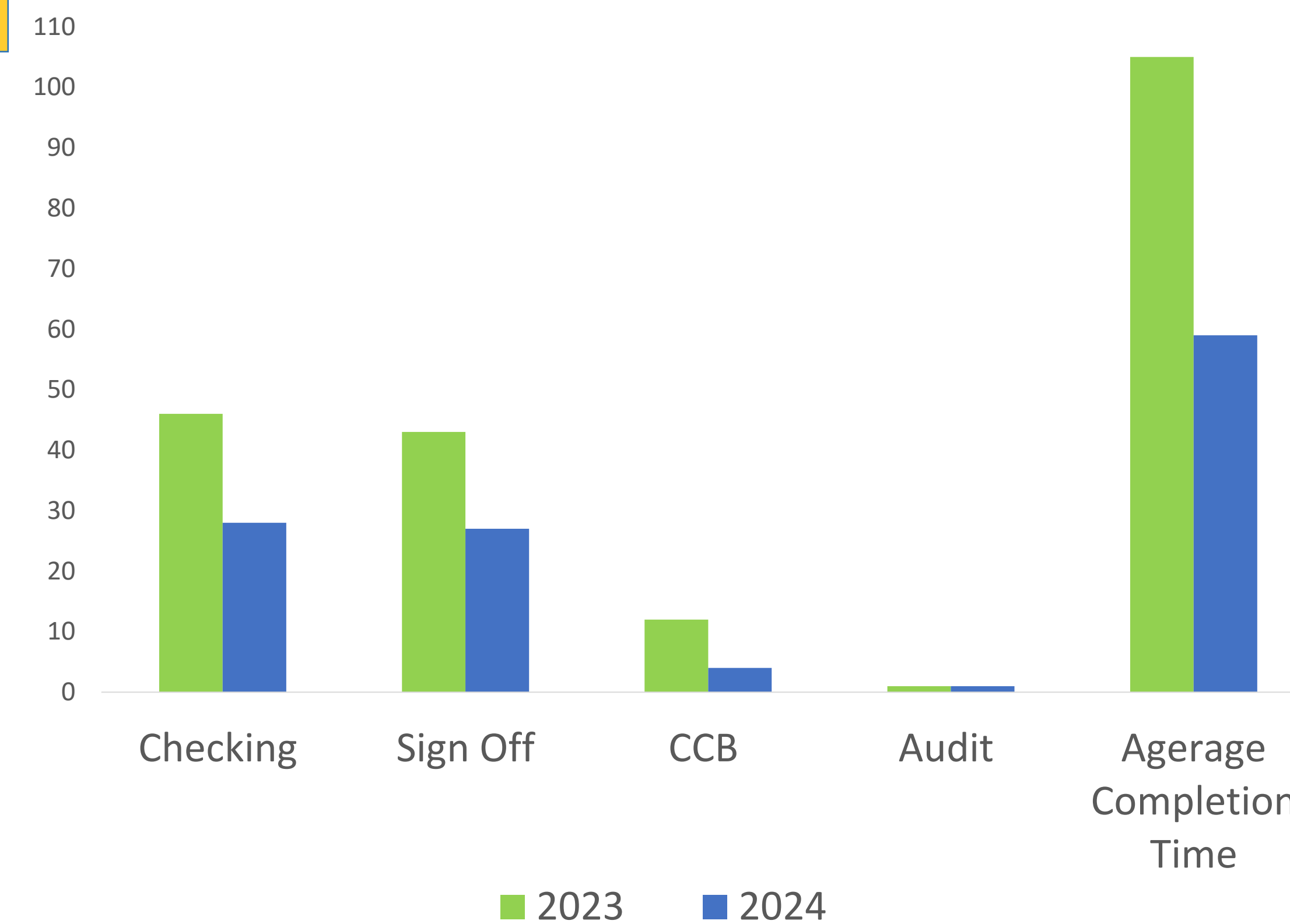
The performance of the newly implemented CCB process was tracked for six months (October-December 2023 to January - March 2024) using Windchill (PLM Software). Key performance metrics, including idle time, task completion rate, and CN turnaround times, were monitored, and feedback was gathered through monthly review meetings.

CCB Process Comparison: 2023 vs 2024

| Stage | 2023 Calendar Days | 2024 Calendar Days |
|-------------------|--------------------|--------------------|
| Checking | 46 | 28 |
| Sign off | 43 | 27 |
| CCB | 12 | 4 |
| Audit | 1 | 1 |
| Total Time | 105 | 59 |

A comparison of pre- and post-implementation results highlighted reductions in bottlenecks. The checking and Sign Off stage where the most impacted due to miscommunication regarding the CN's workflow. Once the reminders were implemented the process began to achieve a steady flow.

CCB Average Completion Time (Calendar Days)



The Checking review time decreased by 39%, the Concept Screening Board (CSB) time by 37%, and overall, there was a 43% reduction in the CCB cycle time

| T Distribution | | | F Distribution | | |
|-------------------------|--------|------|-------------------------|---------|---------|
| Hypothesis Test Results | | | Hypothesis Test Results | | |
| Miu | 25.50 | 25.5 | A B | | |
| Std. Dev. | 22.4 | 14.5 | Sigma | 22.4277 | 14.4914 |
| X Bar | 25.5 | 15 | V | 3 | 3 |
| N | 4 | 4 | F exp | 2.40 | |
| T exp | 0.79 | | Pvalue | 0.2416 | |
| v | 5.0 | | Alpha | 0.05 | |
| Pvalue | 0.2536 | | | | |
| Alpha | 0.05 | | | | |

Despite these improvements, a **variance analysis** was conducted, and the results indicated that while there was a decrease in averages (from 25.5 days to 15 days), the high variance suggested that this reduction could still fall within the potential outcomes of the original process. The standard deviation also decreased, from 22.4 to 14.5 days. The original data couldn't be obtained for more detailed comparisons at each stage of the process. Therefore, the analysis was made out of the averages.

Conclusions

The bottlenecks present in the Engineering Configuration Control Board (CCB) process were found and addressed by implementing task reminders, appointing a process coordinator, and eliminating duplicated approvals. These changes resulted overall reduction in the CCB process. For further improvements, it is recommends obtaining original data to assess specific changes at each stage, ensuring the process continues to evolve and perform efficiently.

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