

## Abstract

The main goal of this project was to develop a new process that would meet customer needs and help reduce human error by documenting a completed task. Early in 2021, Heatsinc was unable to submit the required documentation to Keys Energy to perform the commissioning process on the newly installed equipment, delaying the project for 60 days. To solve the problem, the improvement team decided to use the structured DMAIC model in combination with the 5S methodology for the development of a new process. As a result, new standardize procedures were established and the company has minimized the lead time and guaranteed customers unsurpassed services.

## Introduction

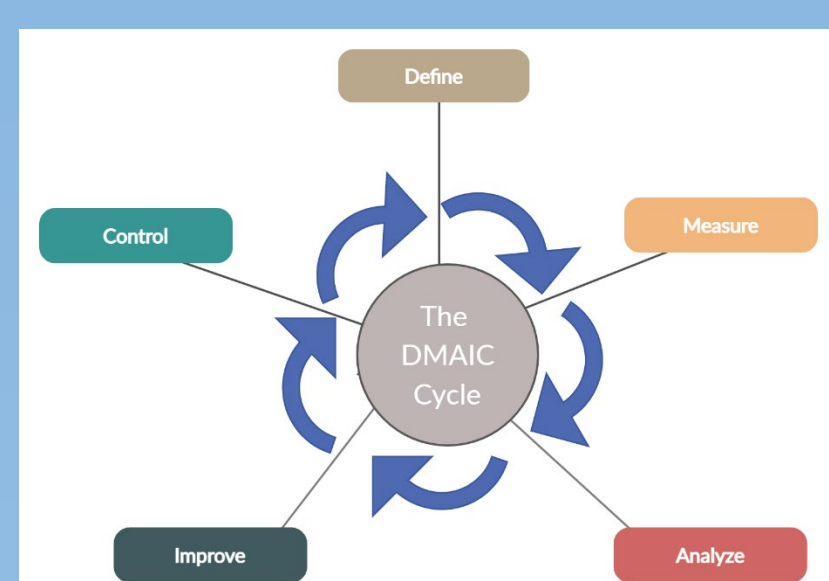
Heatsinc is one of many US registered companies that provides some services including electrical testing and commissioning. Heatsinc was committed to presenting the client with documentation that included the testing process that was to be performed on newly installed equipment as a requirement of their contract during the final phase of a construction for Keys Energy. The client advised Heatsinc that the testing step could not be completed until the documents were reviewed and approved by them. The main objective of this research is to develop a standard operating procedure that fulfills the needs of the customer and helps to reduce human error while documenting a task performed. These documents must be remained as a living document in the company library, where it can be easily accessed in any demographic location of the company for future revisions or use in accordance with the needs of the customers.

## Background

Throughout the years Heatsinc strives to evolve and grow improving up to date guidelines, procedures, and standards to meet clients demands and be the first choice as a provider in the testing and commissioning market as well as others. Electrical testing has been employed as an important tool in all types of electrical installations and equipment over the years due to the high occurrence of accidents and human errors within the workplace [1]. All processes utilized to validate equipment for electrical systems should be well implemented with procedure adherence well defined while serving a commissioning process, weather placing into service new or retrofitted equipment. Beyond the implementation of a new documentation process to assist electronic document management, the fundamental objective is to allow the company to implement better practices and procedures that can be used throughout the life cycle of every project.

## Methodology

For this project Heatsinc improvement team determined to use the structured model DMAIC for the development of the new process.



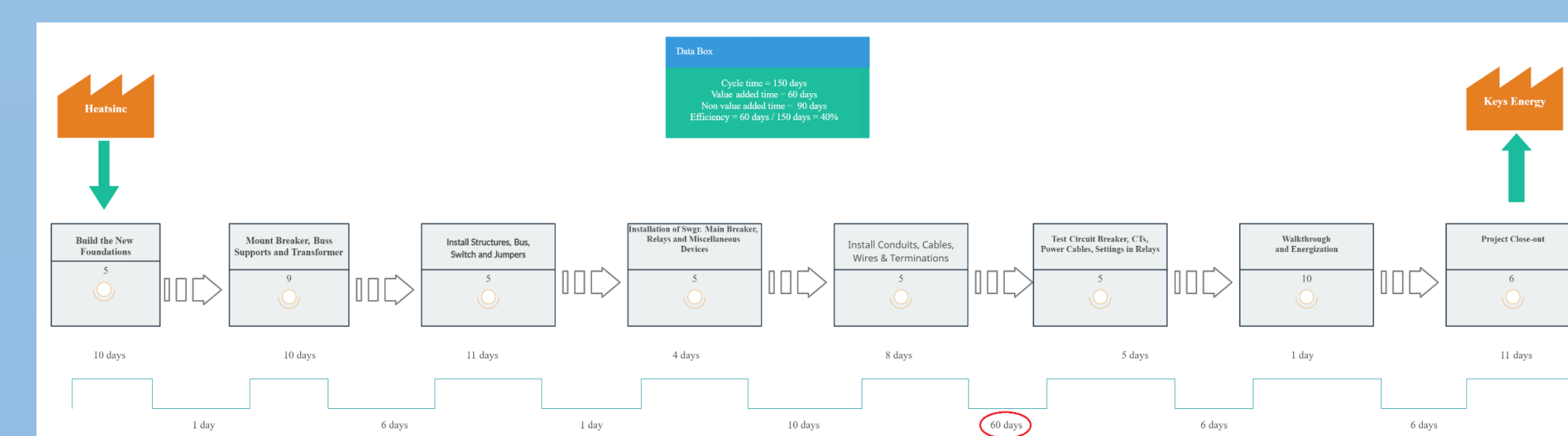
## Results and Discussion

### Definition Phase

To define the problem, an improvement team was established. This team of planners developed a project charter to achieve company's objectives [2]. In the project charter, the company's objective was formulated, where the main goal is implementing a standard operating procedure for system commissioning testing. This document must be electronically submitted through a system that can be accessible in any demographic region where the company is located.

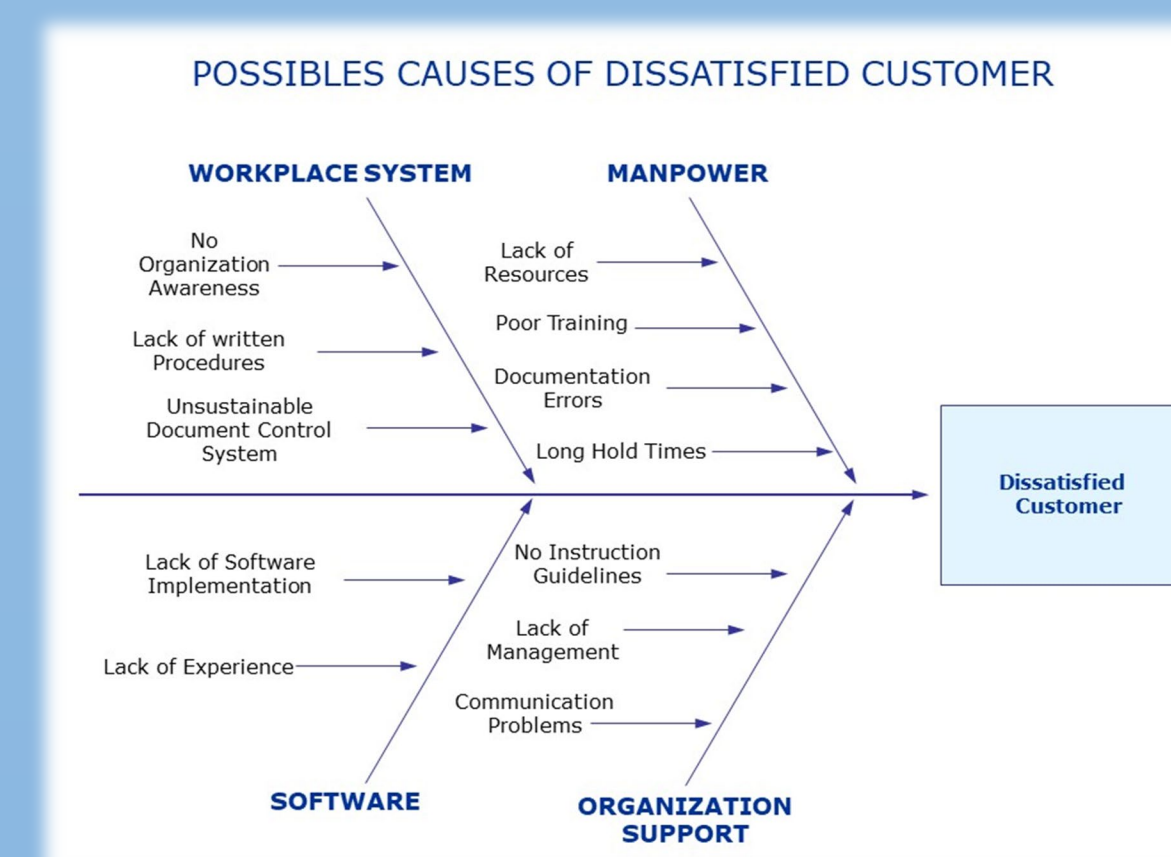
### Measure Phase

A value stream map was created to analyze the time required by all activities carried out by the Heatsinc teamwork from the start of their task to the end of the project. This flowchart shows the real time of each stage carried out indicating the time lost as a result of the lack of documentation and resources

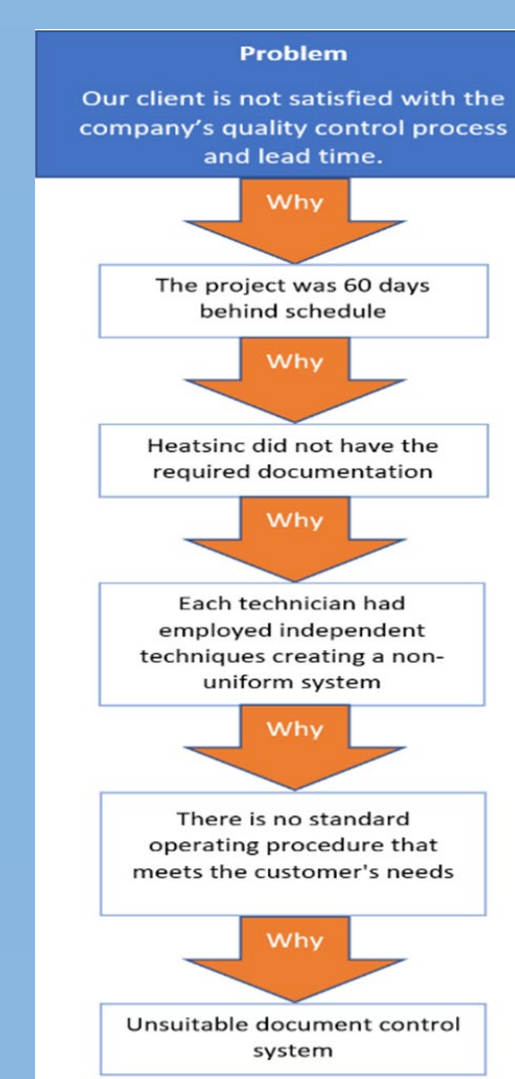


### Analyze Phase

A cause-and-affect diagram was designed in order to determine the potential causes of the company's problem.



Another essential tool used in the analyze phase was the 5 Whys analysis. This diagram was used to identify the root cause of the problem in order to eliminate it.

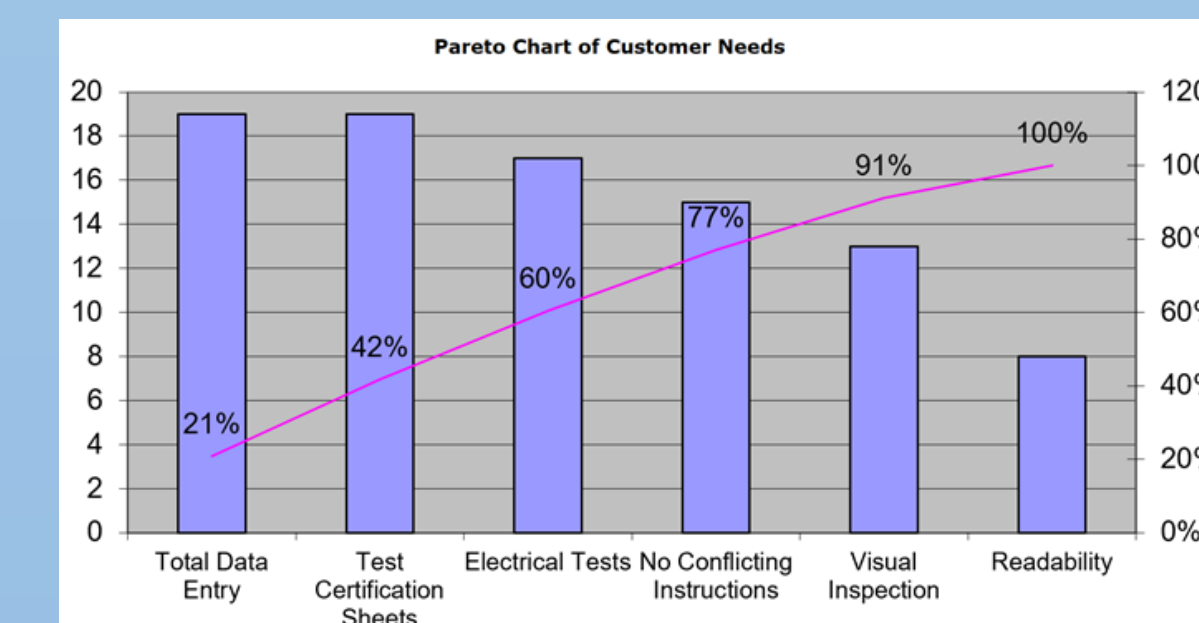


### Improvement Phase

Based on the analysis that has been performed, the improvement team decided to implement the 5S technique to achieve an organized workplace in order to avoid future misunderstandings, minimize of time wasted during electrical commissioning tests documentation, and prevent human error.

### 1. Sort

In the first step, the improvement team performed an interview with the customer in order to understand client's needs. Clients were asked to rate their needs in order of importance from 1 to 20. Then, using a Pareto chart they identified and prioritized the customer's needs.



### 2. Set in Order

In this phase the project manager has aligned customers and set priorities for the design of the new standard operation procedures. Specific test procedures should be developed for each commissioning test referencing the equipment to be used, also step by step procedures with readings to be recorded and forms for the results.

### 3. Shine

The team created a template in Microsoft Words which includes all the necessary tests requested by the client, including Equipment Data Sheets and Test Certification Sheets for testing and commissioning. On the other hand, the company has adopted Microsoft SharePoint to store and share its documents electronically.

### 4. Standardized

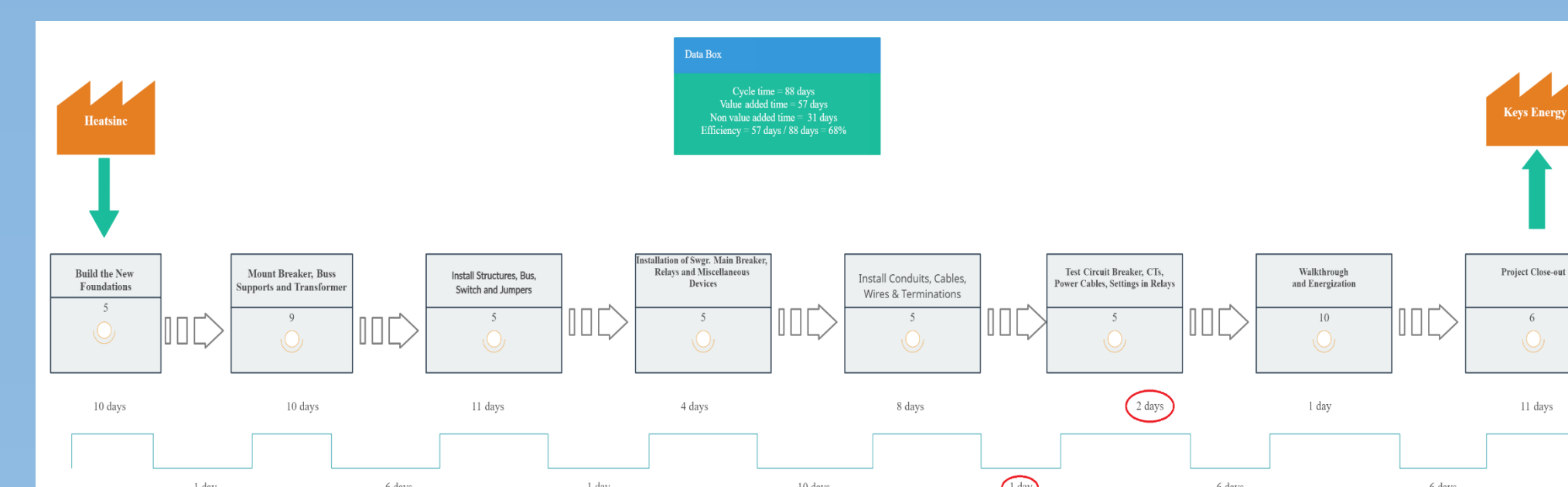
The fourth step is the standardization of the process. New standards have been archived as a living document in the virtual library. These documents show step by step the testing processes for cable, gas circuit breaker, protective relays, power transformer and others. Once the company operating procedures and guidelines are created, evaluated, and accepted the team must be introduced to the newly established.

### 5. Sustain

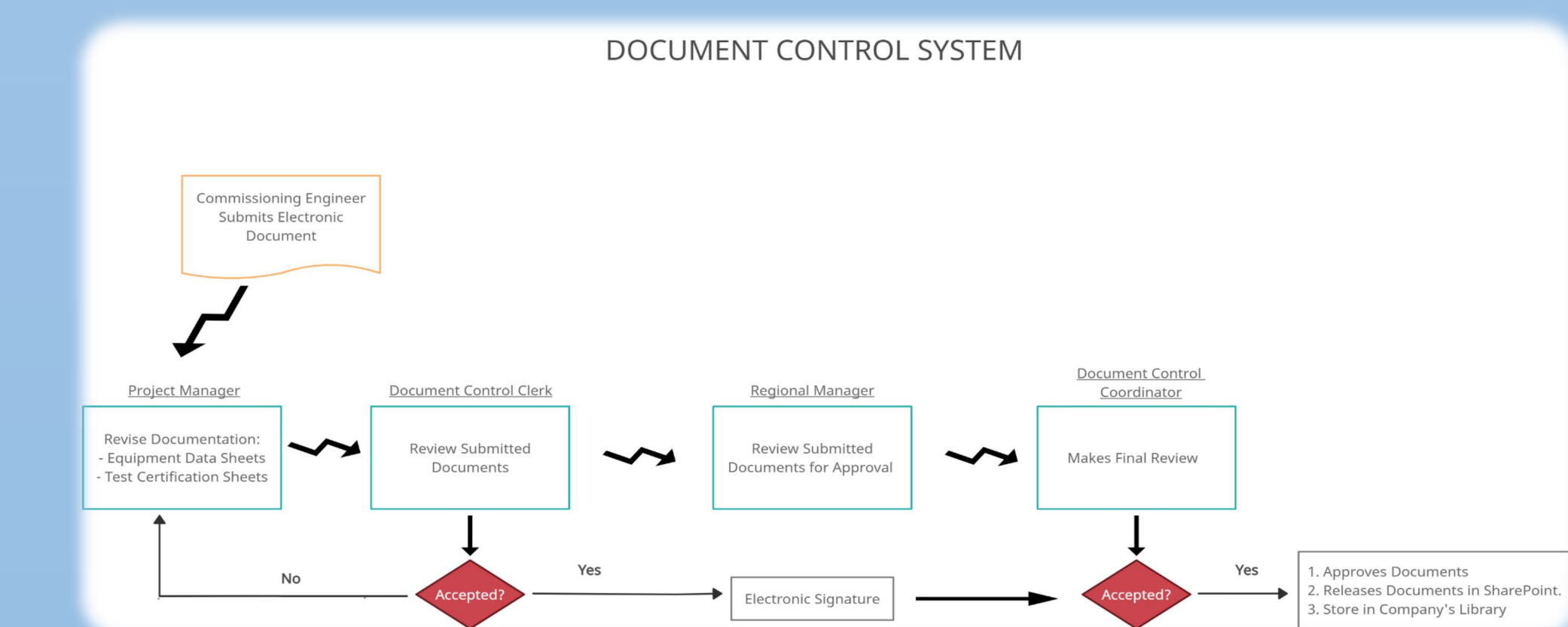
Procedure adherence has been established, implemented, and followed to maintain quality control when the testing and commissioning process takes effect, guaranteeing customer satisfaction and ensuring reliability standards. In this step managers must ensure that the procedures are implemented well and continuously.

### Control Phase

Electronic documentation has been used by many businesses because it reduces costs, saves time, and improves the efficiency of the process [3]. The next figure shows the complete processes performed by Heatsinc's employees but this time with the new implementation processes using Microsoft SharePoint.



All documentation will be shared through SharePoint and will have to be reviewed and approved by company managers before finishing the project and prior to the energization. Having a document control system promotes minimization of documentation errors and ease the automation of tasks and processes. The next figure shows the document control system established by de company.



## Conclusion

The main objective of this proposal was to develop a standard process that would help commissioning engineers to document their tests and create uniformity in the company. The principle of continuous improvement using DMAIC tool in conjunction with Six Sigma and 5S methodologies helped the improvement team in decision process and in the development of a new document control system. With the new documentation process shared, reviewed and storage digitally by the quality control system, Heatsinc clients can now benefit from an industry established operating practices that will delivered a second to none services at the same time increases in profits.

## Acknowledgements

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## References

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