PROCESS IMPROVEMENT OF EQUIPMENT SUPPORT PROJECT REQUESTS

Nicole García Miranda
Advisor: Héctor J. Cruzado, PhD, PE
Graduate School

ABSTRACT

A project request package moves through five different departments: Pre-Induction, Engineering Design, Planning, Material and Execution. The project request package is constantly returned to a previous department for rework. Engineering design drawings are the most recurring returns, therefore improvement efforts of this project were focused on how to set guidelines for the engineering design department to provide complete, comprehensive and quality drawings the first time. A Drawing Checklist was designed by a team made up of engineers, planners, schedulers and craft shop supervisors that will ensure quality drawings with accurate measurements and materials.

INTRODUCTION

BACKGROUND

The project takes place in Robins Air Force Base Georgia, an Air Logistics Complex. The base provides depot maintenance support to C-130, C-5, C-17, F-15 and Special Operation Forces (SOF) aircraft. The Maintenance Support Organization receives Equipment Support Project Request from four other organizations on base that sustain the weapons system and the warfighter. The Project Requests can range from installing new equipment, relocating equipment, equipment upgrade/updates or enhancements, providing utilities for equipment (like compressed air, power, water), preparing equipment staging areas, manufacturing dollies or stands to fit equipment and more. A high-level view of the Project Request Process is shown in Figure 1. The process has five different Phases: Pre-Induction, Engineering Design, Planning, Material and Execution. The process is designed to move in a linear form, visiting each department once.

Figure 1
Project Request Process

MOTIVATION TO STUDY

The Air Force encourages any opportunity of improvement that will enhance warfighter capabilities. An Equipment Support Project Team meets every week to discuss new projects, updates and constraints on current projects that support the warfighter. Occasionally, the term “sent back” is used to explain when a project request package is incomplete and returns to a previous department for rework.

PROJECT OBJECTIVE

The objective of this project is to make an equipment support project request run smoothly through the process with no rework required.

METHODOLOGY

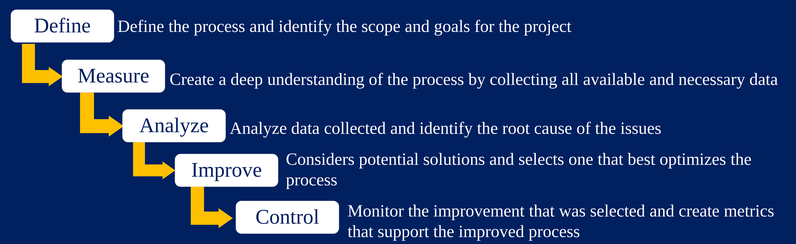

Figure 2
DMAIC Methodology

DEFINE

The problem statement was established as follows: The Equipment Support Project Packages move forward and backward during its design, planning, material and execution phase causing rework and delays, not meeting customer deadlines.

To better understand the process, a Project Request Process Flowchart is broken down into a cross-functional flowchart that shows in detail how the project request package moves between departments and the customer. The Project Request Process Flowchart is shown in Figure 3, which illustrates how all departments have multiple functions, participation and responsibilities within process.

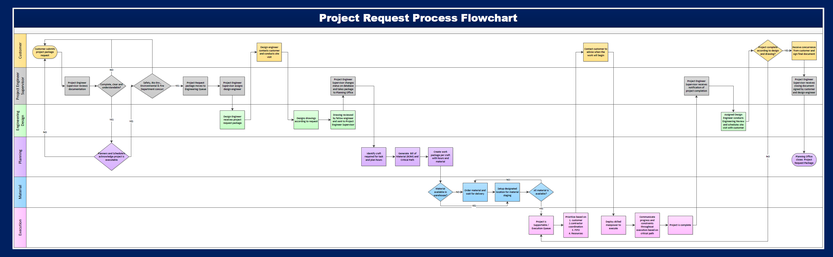

Figure 3
Project Request Process Flowchart

MEASURE

This project used historical data available in a database used to collect and store project information. A sample of 100 projects was pulled from the database on August 26, 2020 for all closed projects. Ninety-four (94) projects had a complete set of data. Twenty (20) projects detailed when the package moved back in the process. Table 1 shows a breakdown of each project and how many times it re-visited a department. Three main reasons where identified in the database as constraints shown in Table 1 below: Issues with Engineering Drawings (Green), Facility/ Equipment Availability (Red) and Customer Change Scope (Yellow). In occasions, one or more constraints are found within the same project.

Table 1
Project Request Process Breakdown

Project #	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Engineering	XX	XX	XX	XXXX	XX	XX	XXX	XXX	XX	X	XX	XX	XX	XXX	X	XX	X	XX	XX	XXX
Planning	XX	X	XX	XXXX	XX	XX	X	XXX	X	X	XX	X	XX	XXX	X	XX	X	XX	X	XXX
Material	X	X	X	X	X	X	XXXXX	XXXX	X	XX	XX	X	X	X	XX	X	XXX	X	XXX	X
Execution	X	X	XX	XX	X	XX	X	X	XX	X	X	X	X	XX	X	XX	X	XX	X	X
Eng. Drawing																				
Fac./Equip.																				
Change Scope																				

ANALYZE

A Pareto Chart was used to identify which of the areas is where the problem is most recurring. Figure 4 shows that Project Request packages returned to Engineering Design are the most recurring with twenty-three (23) returns. Followed by project request packages returned to the Material Office with seventeen (17) returns, then the Planning Office has fourteen (14) returns and lastly the Execution office with seven (7) returns.

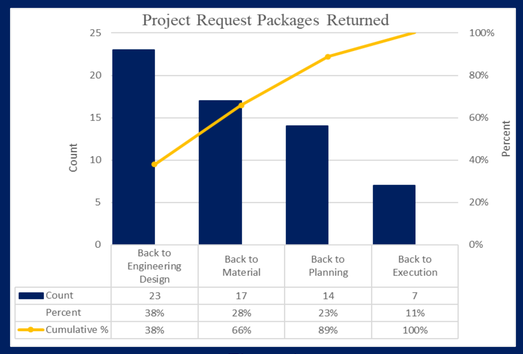

Figure 4
Project Request Packages Returned

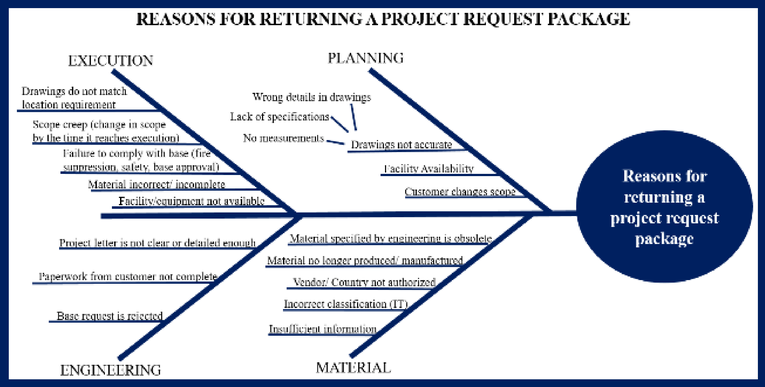

Figure 5
Cause-and-Effect Diagram for returning a project request package

IMPROVE

Based on high recurrence and root causes identified, the focus on improvement for this project was on engineering design drawings. The proposal to control the quality of the drawings is to introduce a checklist for design engineers that would standardize the drawings. The checklist would minimize inconsistencies between design engineers, increase accuracy of measurements and materials as will provide complete, comprehensive quality drawings for the rest of the departments. The Drawing Checklist will serve as a guide for the Design engineers to do quality drawings for the benefit of the organization.

CONTROL

The proposed control plan is embedded within the Drawing Checklist, where the design engineer signs and dates the document. Then the design engineer provides the equipment support project request package to the PES, who confirms the checklist is signed and dated prior to delivering the package to the Planning office.

CONCLUSION

This project delineates a problem of rework and delays within a Project Request process within the base. The process itself is complex and involves many entities from different departments. Information collected from an internal database, interviews and sessions of brainstorming showed how all the steps within the process are interconnected. The use of the DMAIC methodology pointed out that the beginning of the process was already lacking quality. Therefore, the lack of quality in the engineering design drawings directly impacted the planning office performance, the material office purchase and staging of material and execution.

The results of the study in the Analyze phase, motivated management to support the proposal of a drawing checklist. The Drawing Checklist will serve as a guideline for all design engineers to provide complete comprehensive drawings, with less inconsistencies between design engineers. A complete set of drawings would allow all other department entities with sufficient information to reduce or eliminate rework and delays in the project.

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