Reducing Waste & Process Standardization Paperless Fabrication

Brenda Torres Agosto
Carlos Gonzalez
Industrial Engineering

Abstract

This research project was focused on the Paperless Harness/Cables Fabrication used for Documentation Control for an Aerospace Company. The Documentation Control improves paper work handling, as well as the gathering and filling of all the documentation required for the Harness/Cable Build.
In order to improve the handling of documentation, the Lean Manufacturing methodology was used. The goal of Lean Manufacturing is to eliminate waste- the non-value-added components in any process. This research will be focused on eliminating waste, using the Lean Manufacturing 5S principle to improve the cleanliness and organization of workspace. The 5S Concept include the following definitions: Sort, Simplify, Shine, Standardize and Sustain.
This research seeks to implement the Paperless Work Order Traveler of Harness/Cables Fabrication. This is important for the process because it will add Fabrication status visibility to the internal customer, reduce/eliminate the waste of paper in the fabrication area, reduce/eliminate the loss of documentation, standardize process and improve the space in the workstation clean area.
Lean Manufacturing methodology brings structure and the tools to improve a process by standardizing and improving a process. In this case, paperless Harness/Cables Fabrication for an Aerospace company.

Introduction

For many years, Aerospace Companies have provided critical contributions to critical challenges. This company is not a mass production manufacturing company. They rely on manual labor (handcraft). Their end the result is remarkable. The company needs to keep itself competitive, by reducing and/or eliminating processes that are impacting negatively time and effectiveness of the harness/cable fabrication. This research project will be focused on a Paperless Harness/Cable Fabrication that will help the company in standardizing processes and adding fabrication status visibility to internal customer.

Background

This project aims to achieve Database Standardization. This will add fabrication process visibility and correlation between Fabrication and Integration and Test (I&T) Work Orders.

This project seeks to keep the Fabrication Documentation in the same database already are in use by Integration and Testing area. Reducing the usage of paper will contribute to the company: Prevention of Loss Information, Accountability (changes will be adding in real time), miscommunication, process improvement, record of relevant data and wasted time reduction.

Across the Company, critical contributions are made to engage critical challenges through the applications of science and technology. The Company is committed to continual improvement. To implement this policy, the Company has developed the Quality Management System (QMS), which is scaled according to task characteristics such as complexity, visibility, risk, and intended use.
The quality Manual has the Records and Information Management (RIM), where this project is focused on. As part of the overall enterprise RIM Program, the company maintains records to support the effective operation of the Quality Management System (QMS). The specific controls outlined in these sections include identification, storage, protection, retrieval, retention, disposition of required records in support of the associated requirements of the QMS.

Problem

The Fabrication Laboratories are running the build using hard copies of the Work Order Traveler while I&T team is using Paperless Work Orders. At the moment we are running the operations using 2 different processes. With the standardization of process (Paperless Work Orders), we can correlate Work Orders between the fabrication and Final Integration Test (I&T), we can improve the organization of the work stations and the documentation loss.

Methodology

A systematic approach needs to be used as a methodology to achieve the goals of the project. Since the purpose of the project is reducing/eliminating, paper usage is the first step to cutting waste and adopting lean manufacturing principles.
5S methodology will be use in this project to keep the area paperless, clean and organized. Fig1

Lean Manufacturing methodology will help us to eliminate the Non-Value-Add in the process. Waste in a process.

Results and Discussion

The goal of this project will be defined by focusing on becoming paperless.

Goal #1: To evaluate whether the Company subsystem-level fabrication activities should move from a paper-based system to a paperless system.
Goal #2: To evaluate options for a paperless system and to determine a best fit for the Company subsystem-level fabrication activities.

Evaluation:

- Stakeholders
  - Technicians
  - Manufacturing Engineering
  - Harness Engineers/Designers
  - Harness Routing Engineers/Designers
  - SMA (Quality)

- Some potential evaluation criteria (a starting point)
  - Technician usability
  - Engineer/author usability
  - Flexibility (redline/blackline, steps out of sequence, etc.)
  - Compliance with SMA/CM requirements
  - Data entry methods (barcode scanners, etc.)
  - Links to parts system
  - Links to harness 3D CAD routing design
  - Manufacturing data capture (durations, workloads, etc.)
  - Links to nonconformance tool

This new system will be implemented in advance of the projected starting date of June 2022.

Conclusions

The Database to be used in the harness shop was selected, and the meetings with the technicians were completed.
The second phase of the project is the implementation of the database:
- Open Database accounts for all personnel who's responsibilities is to create, approve, and validate Work Orders.
- Paperless implementation will be completed by the end of July 2022.
- Training Completion by June 2022
- To create test Work Order by June 2022 and to run the test for process validation.
- To eliminate paperwork related to the Work Order Traveler.
- Work Order Closing as soon as the last step is completed.

Once the project is implemented, the expectations are to run the Harness Fabrication 90% paperless.

Future Work

The next step to continue improving the process is to evaluate tools/equipment required to convert the area 100% paperless.

Acknowledgements

The following persons were part of the of this investigation:
- Professor Carlos Gonzalez (Advisor)
- Justin Hahn – Section Supervisor
- Company Technicians
- Design Engineers
- SMA (Inspectors)
- Other departments

References

The Basic of Lean Six Sigma. http://www.goleansixsigma.com/dmaic-five-basic-phases-of-lean-six-sigma/ - retrieved on 03-07-2016

George, M, L, Maxey, J, Rowlands, D, & Price, M, The Lean Six Sigma Pocket Toolbook, August 01, 2004

5 Lean Principles Every Engineer should know hhttp://www.asme.org/topics-resources/content5-lean-principles-every-should-know, March, 09,2016