Shadowbox Request System

Colby Miller, Shannon Sullivan
IE 4350

ABSTRACT

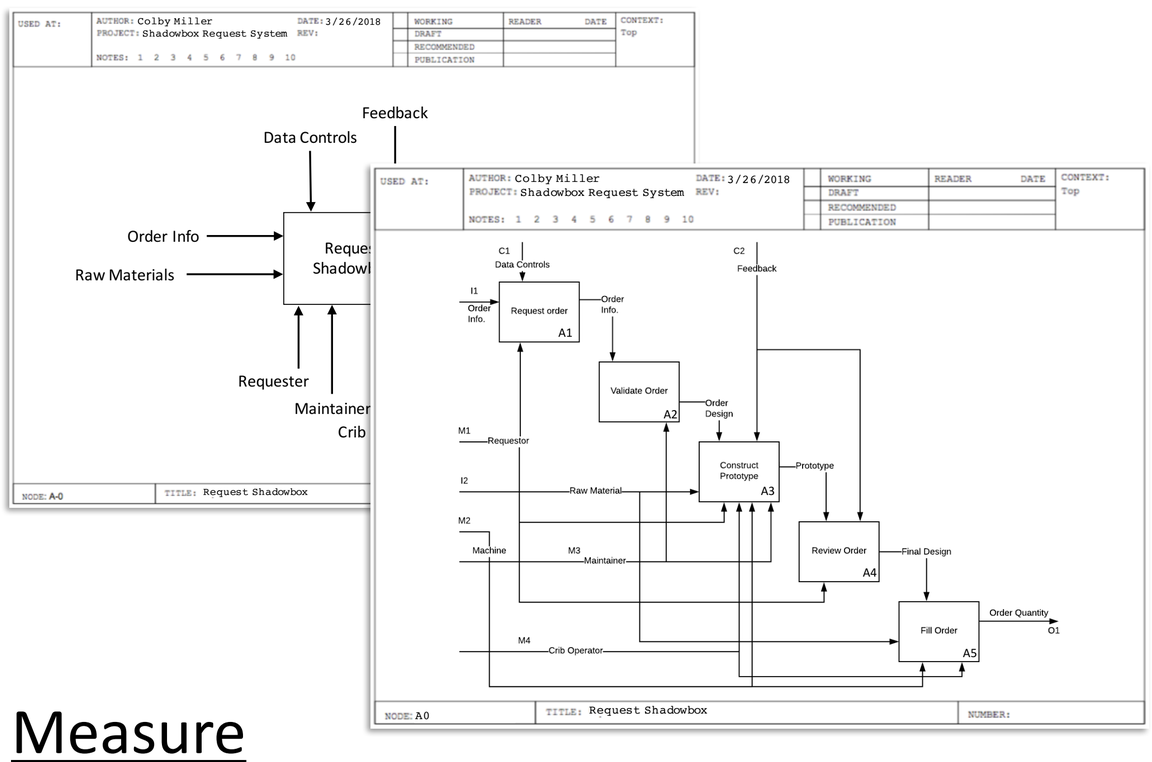
Develop a facility layout and request process for shadowboxing of material

INTRODUCTION

Lockheed Martin Aeronautics Company is working to ready their processes and facilities for full rate production of F-35. One of the key areas of improvement has been identified as Material Handling Operations. Parts can become damaged in the current process of material flow throughout the Fort Worth facility. Shadowboxing is being used to decrease the amount of scrap, repair, and rework (SRR). The previous process to make shadowboxes was having a production worker cut shadowboxes by hand. With the decision to move to an automated solution, a new system needs to be implemented and controlled.

METHODS

Define

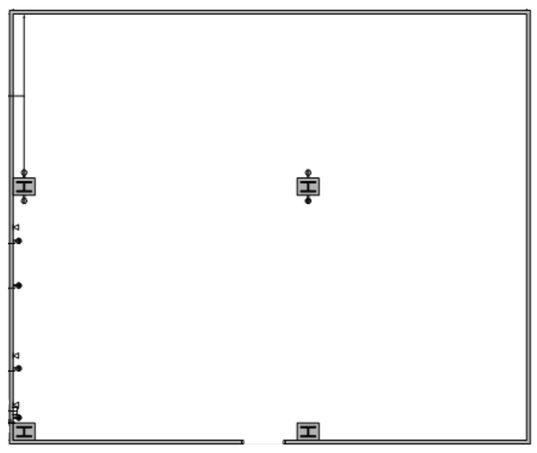


Measure

The old process has no data collected from the process cycle times. The new process will need to have defined measurement points to track performance of each stage of the request and quantity of requests in queue. A request system will need to be maintained to store the data on requests. A request process has been approved by the primary stakeholders. Facility space available is approximately 2000 sq. ft. for the new process to be housed. Facility space needs utility work to have CNC machine function properly. The utilities needed are power drops (2 x 270V) and air pressure (>100 PSI). Foam inventory is >9000 cubic ft in volume and needs to fit inside the current space available.

Analyze

CNC machine needs utilities to operate correctly and have space for all the inventory. From foam and CNC machine dimensions, multiple layouts were constructed and reviewed. CNC machine will need an air compressor to reach Specifications on PSI. Different software was analyzed on a list of factors To determine framework.

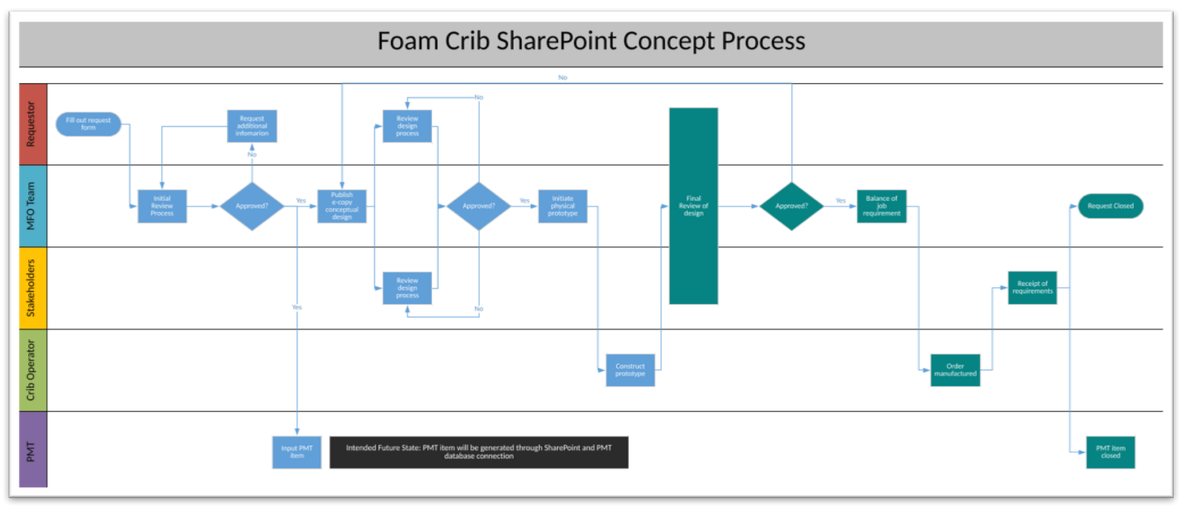


Improve & Control

Integrate into program PMT. Implement reporting of weekly and monthly metrics of request process. Facilities utilities are under review. Provided documentation for process maintenance and training.

RESULTS

Design decisions of the request system were done by SMARTER analysis. ROC were calculated, and attributes weighed by criteria. Access and Tableau will be used for the request system and metric reporting. Foam inventory was categorized by breaking down color, height, width, length, and quantity. Final layout needs a 4’ step ladder to accommodate the height of the stacks and range of motion. CNC machine has software that is compatible with internal 3D CAD model database files, and has been tested to ensure functionality.



Request System Analysis

Key	
Maintainer ease of use	A
Request ease of use	B
Data validation	C
Sustainability	D
Notification	E
Resource email	F
Transaction auditing	G
Report generation	H
Sustainability	I

Attribu	Norm. Weig	Acces	SharePoi
D	0.340	1.360	0.340
E	0.215	0.430	0.645
A	0.152	0.760	0.304
B	0.111	0.555	0.333
C	0.079	0.158	0.395
H	0.054	0.054	0.216
F	0.033	0.099	0.165
G	0.016	0.048	0.048
	Agg. Score:	3.464	2.446

ROC Weights

Rank	Value
1	0.34
2	0.215
3	0.152
4	0.111
5	0.079
6	0.054
7	0.033
8	0.016
Sum:	1.0

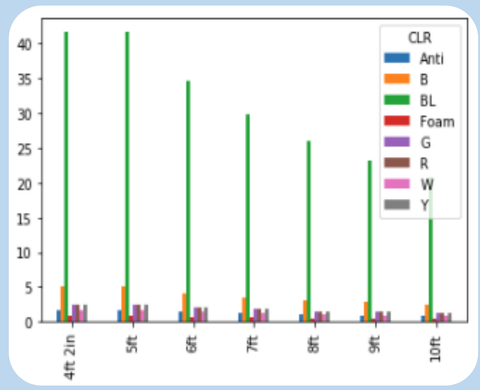
Attritube	Norm. Weight	Tableau	Access	Excel
A	11.1	44.4	22.2	33.3
I	27.8	139.0	83.4	111.2
H	61.1	305.5	61.1	244.4
	Agg. Score:	488.9	166.7	388.9

ROC Weights

Rank	Value
1	0.611
2	0.278
3	0.111
Sum:	1.0

Foam Crib Analysis

CLR	Anti	B	BL	Foam	G	R	W	Y	Total
H	2.00	3.00	3.00	2.00	3.00	3.00	4.00	3.00	23.00
H (INF)	100.00	300.00	2500.00	50.00	150.00	150.00	100.00	150.00	3500.00
4ft 2in	1.67	5.00	41.67	0.83	2.50	2.50	1.67	2.50	58.33
5ft	1.67	5.00	41.67	0.83	2.50	2.50	1.67	2.50	58.33
6ft	1.39	4.17	34.72	0.69	2.08	2.08	1.39	2.08	48.61
7ft	1.19	3.57	29.76	0.60	1.79	1.79	1.19	1.79	41.67
8ft	1.04	3.12	26.04	0.52	1.56	1.56	1.04	1.56	36.46
9ft	0.93	2.78	23.15	0.46	1.39	1.39	0.93	1.39	32.41
10ft	0.83	2.50	20.83	0.42	1.25	1.25	0.83	1.25	29.17
Total	553.57	1645.70	13604.20	281.78	830.35	830.35	563.57	830.35	19139.88



CONCLUSION

Access database system will be used for handling requests. Users will email a resource account to get access to the front end database. This front end will link to the main database and allow for querying and inputting of requests. Tableau is linked to the main database and generates reports automatically for cycle time and number of requests in each stage of the process. Facilities Planning is currently working to install utilities needs for CNC machine to operate.

REFERENCES

MAE 1351: Engineering Graphics (CAD Design), , IE 2305: VB Applications in Microsoft Office, IE 3343: Metrics & Measurements, IE 4303: PIC, IE 4322: Enterprise Simulation, IE 4344: Human Factors, IE 4343: Facilities Planning, IE 4325: Automation, IE 4345: Decision Analysis, INSY 3304: Database Management Systems, INSY 3305: Analysis & Systems Design

ACKNOWLEDGEMENT

Lockheed Martin Aeronautics Company; Sponsor: Aaron King