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Turnaround time reduction for military certificates of compliance - team 1

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Creative Inquiry

Turnaround Time Reduction for Military Certificates of Compliance

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Abstract: The objective of this project is to reduce the turnaround time for military Certificates of Compliance (COC) at the Milliken Company in Marietta, S.C. The first step was to determine the needs of the clients and determine the major losses of the system by performing a physical and Why-Why analysis as well as utilizing fishbone diagrams. With this information it was possible to then construct a Pareto chart to show the clients where the large percentage of losses is coming from.. The team found that the key losses in the system came from having to send material to an outside lab for testing and that lab technicians allowed large losses when machines were allowed to sit idle for extended periods of time. Using this data the team will generate a set of solutions to tackle the scheduling issues that will optimize the dry-lab testing procedures.

Introduction:

- Key business goals
  - Increase individual dry-lab technician productivity by 10%
  - Reduce lead-time for completed COC's by 20%
- Performed task analysis to help identify losses in current system
- Worked with both dry-lab technicians and managers
- Identified all losses that occur within the dry-lab
- Performed a root cause analysis and generated Pareto chart
- Concepts generated to address each of the losses
- Very important to keep both space and budget in mind when generating concepts

Methods:

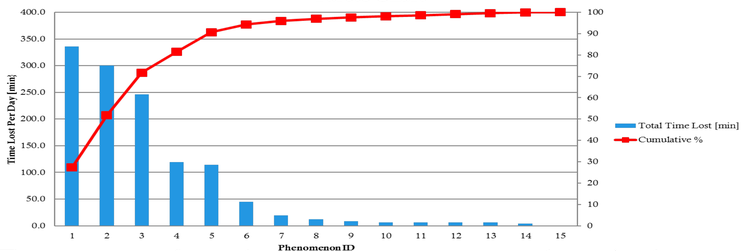
- Identified Key Business Goals
- Developed list of needs from user interviews
- Developed list of metrics based on needs statements
- Identified system losses
- Performed root cause analysis of all losses
- Generated and evaluated initial concepts
- Refined concepts using concept selection matrix
- Performed Failure Modes and Effects Analysis to further refine concept
- Developed recommendations and implementation plan

Results:

The team conducted a Root Cause Analysis and found 15 areas of loss in the current system. The areas of loss, their frequency, and magnitude is shown in the chart below.

Process/Test	Phenomenon ID	Phenomenon	Loss Magnitude [min:sec]	Frequency [per Day]	Total Time Lost [min]
Flame Test	1	Flame test is sent to Spartanburg to be completed outside of the Enterprise plant	2400:00	0.14	336.0
COC Data Input	2	COC information is recorded twice	25:00	12	300.0
Clothes Dryer	3	Time between completion signal on the dryer and the unloading of the dryer takes too long	41:00	6	246.0
Washing Machine	4	Time between the completion of the wash and the unloading of the wash takes too long	19:53	6	119.3
Washing Machine	5	Time to fill up washing machine takes too long	19:00	6	114.0
Header Delivery	6	Header delivery to the lab takes too long	45:00	1	45.0
Pilling	7	Scale takes a long time to stabilize when weighing out 25 mg of pilling yarn on scale	1:38	12	19.6
Thread Count	8	Thread count machine does not read the fabric	1:00	12	12.0
Weight Test	9	Scale will not stabilize	0:09	56	8.4
Weight Test	10	Weight reading on scale must be converted to oz/yd2	0:07	56	6.5
Pilling	11	Time to attach drum cover takes too long	0:30	12	6.0
Pilling	12	Pilling machine stops during test cycle	0:10	36	6.0
Break Strength	13	MTS machine freezes during break strength test	0:10	36	6.0
Crock Test	14	Wet crock swatch is not the correct weight	0:22	12	4.4
Break Strength	15	MTS machine needs to be adjusted to the correct height after freezing	0:04	12	0.8

By creating a Pareto chart it was discovered that the Flame test being performed in Spartanburg, the inputting of the COC data twice, and the clothes dryer account for 80% of the losses.



The root causes for each of the phenomenon were determined through the use of why-why analysis and the results are as follows:

Phenomenon	Root Cause
Flame test is sent to Spartanburg to be completed outside of the Enterprise plant	Extremely high cost to supply Methane gas to Enterprise facility
	Safety Concerns involved with working with Methane gas
COC information is recorded twice	COC generation is completed via computer
Time between completion signal on the dryer and the unloading of the dryer takes too long	Signaling device on dryer turns off after 5 seconds
	Spare timer not available for use
	Lab technicians must minimize idle time
	Not economically feasible to have dedicated technician to monitor dryer
Time between the completion of the wash and the unloading of the wash takes too long	No Signaling device exists on washing machine
	Spare timer not available for use
	Lab technicians must minimize idle time
	Not economically feasible to have dedicated technician to monitor washing machine
Time to fill up washing machine takes too long	There is not enough space to install a second water heater
Header delivery to the lab takes too long	All necessary equipment located in dry-lab
Scale takes a long time to stabilize when weighing out 25 mg of pilling yarn on scale	Technicians have so many tests on schedule that time to open and close door will lengthen process
Thread count machine does not read the fabric	Operator was distracted by other technicians
	Operator was behind schedule
	Arrival of "HOT" job
Scale will not stabilize	Technicians have so many tests on schedule that time to open and close door will lengthen process
Weight reading on scale must be converted to oz/yd2	Scale does not have capability to display oz/yd2
Time to attach drum cover takes too long	Lab technician is not properly trained on how to properly align pins
Pilling machine stops during test cycle	Defective built in timer
MTS machine freezes during break strength test	Company has been called to fix machine but has not arrived to perform repairs
Wet crock swatch is not the correct weight	No standard is included in the training procedure
MTS machine needs to be adjusted to the correct height after freezing	Machine loses stored home position upon feezing

Results:

- Concepts Developed
  - Concept 1 –purchase and implement the use of new timers/alarms for the lab technicians to use
  - Concept 2 –simplify header delivery to the lab to cut down on worker idle time
  - Concept 3 –create a Kanban card system for the dry lab to use to help schedule and track tests
  - Concept 4 –purchase a scale in the correct units so time is not spent on conversions and waiting for the scale to stabilize
  - Concept 5 –enable the flame test to be performed in the lab
  - Concept 6 –automate the recording of test results to prevent duplication of information entering, track, and schedule tests
  - Concept 7 –install a secondary water heater to allow for quicker washing machine fill up times
  - Concept 8 –repair machinery to allow for quicker completion of tests.
- One or a combination of these concepts will be selected using concept selection methods to develop and implement in the Enterprise Lab.

Conclusions:

- Root Cause Analysis Conclusions
  - Flame Test material transportation highest magnitude of time lost
  - Washer/dryer idle time major source of time lost
- Preliminary Concept Generation Conclusions
  - Concept 1 presents most promising results at lowest cost
    - Reduces time lost by 365 minutes per day
    - Feasible cost of $65.75
    - Satisfies all key business goals

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References

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