Southwire Talc Application Improvement

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Purdue Professors/Mentors: Dr. Fred Berry & Dr. Sara Leach

Team 31

Customer Background

"Our roots extend to 1937 when Roy Richards, a recent graduate of Georgia Tech, started a company to erect power poles. On March 23, 1950, Richards founded Southwire with three used machines and a workforce of 12 employees. Today, Southwire's reputation for quality and service continues to grow boating more than 7,000 employees throughout the world."

Problem Statement / Scope of Work

The Bremen East Facility of Southwire noticed an issue with the talc application process in their facility. The process was producing a lot of scrap wire. For this project team 31 took the job of improving this process, and significantly reducing the amount of scrap produced in this process.

Requirements Matrix

Req. #	Requirement	Description	Test to Verify
1	Talc on wire or not	We will need to determine whether talc powder is on the wire after the process occurs.	Sensor data or human observation
2	Confine talc application in the process	We will need to ensure that talcum powder isn't getting into the air and around the machine.	Human observation
3	Reduce talcum powder buildup	We will need to find a way to reduce the amount of buildup of talcum powder in the machine.	Sensor data or human observation
4	Evaluate how TDC talc machine is maintained	We will need to compare how TDC maintenance is done throughout the industry.	Data collection system
5	Maintenance	Talc machine should have maintenance done consistently	Checklist
6	Vacuum System	Find a vacuum system that will easily clean out the talc machine	Testing each vacuum system that is considered.
7	Training Program	Develop a training program that explains maintenance process on talc machine.	Showcase training program to Prof. Leach to see if she is able to follow.
8	Testing Fixture	Determine whether all elements of maintenance plan, from training program to vacuum system, work well together.	Data collection

Failure Mode and Effect Analysis

FMEA - Failure Modes and Effective Analysis

Key Process Step	Potential Failure Mode	Potential Failure Effects	S E V	Potential Causes	O C C	Current Controls	D E T	RPN	Action Taken
Automation / Controls									
Designing a Program that compiles and analyzes the data from each talc machine	The incorrect information is being analyzed	False or incorrect information is being displayed either in favor or otherwise	6	There is an error in the program or data collection	3	The program has been in operation and working correctly	4	72	Close monitoring of the actual performace compared to the information being analyzed
Mechanical / Controls									
Talc application to wire Talc machine operation	The talc amount is either insufficient or excessive The Talc applied continues to be inadequate	The strip force of the wire is too high The customer is unsatisfied with the product	7 7	The monitoring of the talc machine and or PM plan is inadequate The talc machines are damaged beyond repair	2 7	A stand for the testing strip force of the wire The unmaintained machines are being compared to the maintained machines	6 4	84 56	The extruded wire is being tested to make sure it is acceptable The Talc application with be completely overhauled
General									
Preventative maintenance mtten Saftey	The plan is not followed The inhalation of Talc	The talc machine begins to produce bad product It is a saftey hazard to the operator resulting in possible injury.	6 4	There is improper training or documentation the maintenance has not been performed allowing excess Talc to build up.	4 2	An in depth maintenance plan and supervised schedule. The implemented PM plan	6 3	192 24	The data from the Talc machine is closely monitored for any changes in performance Certain machines have been maintained in regard to the plan

Experimentation / Concepts Exploration

coperion

TDC

Nordson

marldon

PM Process Improvement

Strengths:
- Minimal Cost
- Utilization of Current Resources
- Improved Machine Operation
- Improved Quality Performance

Process Automation

Strengths:
- Alleviates User Error
- Seamless integration

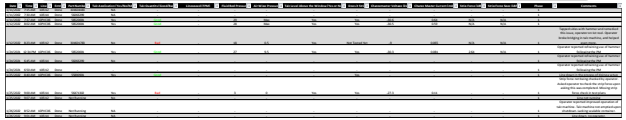
Weaknesses:
- High Cost
- Initial Learning Curve
- Large Footprint

Talc Applicator Replacement

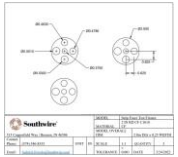
Strengths:
- Different Technology
- New Equipment

Weaknesses:
- Heavy Cost
- Initial Learning Curve

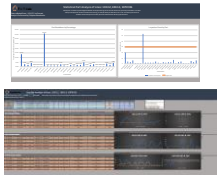
Final Design



Process Inspection



Part Analysis and Spec Generation



Overall Statistical Analysis

Talc Delivery Process Automation

Testing

Step	Test	Details	Outcome
Automation Testing			
1	Sensor Detection	Spectrum Sensor Detects the presence of talc.	The sensor was able to numerically detect the presence of flour on the wire.
Preventative Maintenance Testing			
2	3-Monthly Maintenance Plan Inspection	Evaluate control unit that receives PM's against other units	The talc machine performed better than other units that were not PM'd
3	Reduced Vacuum Clogging	Trial an ash vacuum to reduce cloggin removal	Reduced emptying from 6 times to once with the ash vacuum
4	Designated Talc Container	Try to eliminate time searching for talc container	Time searching for a container eliminated
5	Quality Testing Fixture	Provide numberical strip force data to establish specs	Data Collection for strip force occuring
6	Inspection Sustainment	Implement talc application inspection for performance and machine setting gathering	Performance and machines settings being gathered and reported
7	Maintenance Plan Sustainment	Create interactive training program to increase PM process capability	Preventative Maintenance Training Created
8	Maintenance Plan Expansion	Perform preventative maintenance inspection on 10E/14	Inspection time gathered, and parts ordered
9	Maintenance Plan Expansion 2	Perform full preventative maintenance on 10E/12	Full time frame established and remainder of pictures gathered for maitnenance sustainment plan

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