Radar Sensor Manufacturing.

I1.01- Continental stack and press

Ephraim Oluwasanya, Rhiannon Puckett , Mazen Naser , Matt Castro
Ingram School of Engineering

PROBLEM STATEMENT

- Reduce
  - Reduce WS40(PCB mating station errors) and WS50(PCB press station errors) station errors.
- Analyze
  - Analyze failure mode data and investigate/identify root cause.
- Implement
  - Implement robustness improvement solutions and permanent corrective actions to mitigate/eliminate identified failure modes from occurring.

PROJECT PURPOSE

- The purpose of this project is to optimize the stack and press cell for WS40 and WS50 stations at Continental New Braunfels, focusing on reducing errors in the process of mating and pressing PCBs.
- By addressing the current challenges faced in the manufacturing process, our aim is to improve efficiency, minimize failures, and enhance the overall reliability of radar sensor production.
- In conclusion Enhancing Efficiency and Reliability of Radar Sensor Manufacturing.

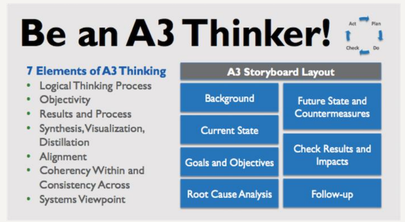
OBJECTIVES

Objective	Relative Weight
Design a new assembly housing or robot arm fixture to fix WS40 errors	70%
Reduce the scrap rate in the assembly process for different auto brands	15%
Save money from having to outsource labor to contractors	10%
Map errors and processes with the A3 system	5%

HUMAN FACTOR

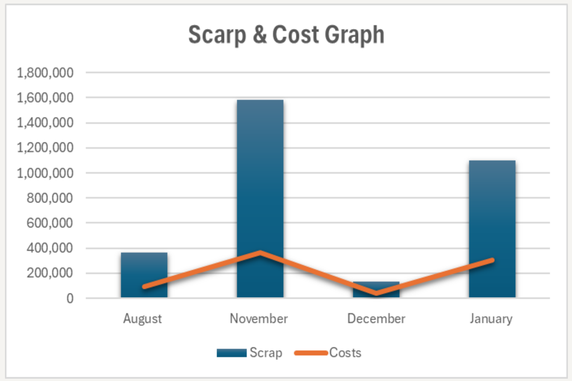
- By including principles of human factors engineering into the design and operation of WS40 and WS50 stations, Continental New Braunfels can boost production efficiency, elevate product quality, and minimize the risk of errors.
- The company can fulfill its objective of decreasing station errors and securing the reliability of radar sensors.
- Ensure the system is teachable and easy to use as the operations are ran 24/7 and comes in contact with many different engineers.

DESIGN APPROACH



- D: Identify the workstation causing the error in radar production and identify the scope of the problem.
- M: Collect the workstation data, scrap rate metrics, engineering drawings of the parts associated with the workstation and identify the tools available to assist in our product design.
- A: Run pareto analysis and hypothesis tests on the data to identify the most effective approach to the problem.
- I: Improve upon the current workstation by creating a new robot gripper arm, new fixturing jig, and/or learning mold.
- C: Control the process; identify if the new design improved the scrap rate. Document all procedures and engineering part designs for future standardization and improvement

MEASURE/IMPROVEMENT



- Utilizing the analyzed data to pinpoint the cause of scrap .
- Model new gripper based on failure rates and occurrences.
- Ensure teachability engraved into core of new design.
- Use our new gripper design to bring cost down and normalize the scrap rate.

FUTURE PLANS

Functions:	Design Specifications (Performance Targets)
1. Collect Data	• Collect data from WS40 and WS50 errors • Find trends in the data and create an optimized approach using Pareto analysis • Create an improved design for the problem component
2. Implement Gripper Arm or Housing Mold Design	• Must fit within the current workstation specifications • Must be able to work with piezoelectric and pressure sensors • Must effectively reduce the mating errors and scrap rate
3. Monitor and Document results	• After installation monitor the error rate, pressure data, and quality of the final product

EVALUATION CRITERIA

Objectives	Relative Weight	Metric	Actual Results			Score	Wt. Score
1. Reduce WS40 and WS50 station errors	0.5	Error Rate: Measure the frequency of errors occurring at WS40 and WS50 stations over a specific period. This could be calculated as the number of errors divided by the total number of transactions or tasks processed, expressed as a percentage.	TBD			TBD	TBD
2. Analyze failure mode data and investigate/identify root cause	0.2	Number of Failure Modes Identified: This measures the quantity of different failure modes that have been identified within a system, product, or process. A higher number indicates a more thorough analysis	TBD			TBD	TBD
3. Implement robustness improvement solutions and permanent corrective actions to mitigate/eliminate	0.1	Reduction in Failure Rate: Measure the decrease in the rate of occurrence of the specific issue or failure mode after implementing the improvement solutions. This directly indicates the effectiveness of the actions in mitigating the problem.	TBD			TBD	TBD
4. identified failure modes from occurring	0.2	Preventive Action Effectiveness Rate: Measure the percentage of identified failure modes that have not recurred after implementing preventive actions. This directly reflects the effectiveness of your preventive measures in stopping issues from happening again.	TBD			TBD	TBD

DATA ANALYZATION

GROUP MEMBERS

MATT COSTRO, MAZEN NASER, EPHRAIM OLUWASANYA, RHIANNON PUCKETT

SPONSOR / FACULTY

- Sponsor: Tyler Hubinger
- Instructor: Dr. Gerardo Trevino-Garza