Report on the O-inspect for SMI Aerospace

Prepared for Mr. Fewins and Ms. VanAmberg

1/21/11

Manufacturing Technology Academy

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Executive Summary

Prior to arriving to the host company, the Manufacturing Technology Academy's student problem-solving team spent two days learning the Plan Do Study Act (PDSA) system. The team used this process throughout their time at SMI-Aerospace.

The purpose in the team coming to SMI-Aerospace was to use their newly learned PDSA stills to develop a serialization method for the O-Inspect process.

The first stage in the PDSA process is *Plan* and part one of the *Plan* stage is *Define the Problem*. The first thing the team needed to do was to understand the current system. The team used tools such as the parking lot, the systems analysis, and a flowchart to organize the data gathered from the tour and to determine the initial conditions of the system.

The next part of the *Plan* stage is *State Your Goal*, which is closely related to *Define the Problem*. Here, the team looked at the problem to understand what the desired state was and to determine an approach to achieve that without jumping to conclusions. The tools used were the initial problem statement, the operational definitions, and the POPE diagram. The goal was to insure that the right serial tag returns to the right part after inspection.

After the baseline data was collected, and the team had their focus on the problem, it was necessary for the team to look back over the situation and determine what additional data they needed. This is what was done in the *Study the Current Situation* part of the *Plan* stage. They used another flowchart, the affinity diagram, a brainstorm, and the fish bone diagram. The team determined they needed to know more about the Q.C process and about the fixtures on the O-Inspect trays.

After the collection, the team implemented the fourth part of the *Plan* stage, *Define (Restate/Revise) the Problem*. This part only uses one tool, the revised problem statement. Here the team better defined the problem by focusing in more on the problem and adding key facts to the problem statement. This bettered the team's understanding of the problem, preparing them for the final part of the *Plan* stage.

The final part of the *Plan* stage is *Analyze the Causes*. This is where the team analyzed all the data gathered and determined several causes. They looked at, what caused what, and determined a potential root cause of the problem. The spider diagram, the potential cause list, the interrelationship diagram, and the very important 5 why, where used here. They determined the main cause to be a lack of a system for multiple parts to be processed, because the O-Inspect had not yet been implemented.

The first part of the *Do* stage and the last part the team used during their visit is Select *and Develop a Theory (Recommendation) for Improvement*. It is here the team, considering all the data gathered and causes determined, brainstorms and determines a recommendation for the situation the host company asked to solve. Imagineering helped the team remember the absolute, best ideal; a brainstorm was used to get recommendation ideas out; and the consensogram determined the best recommendation from the brainstorm.

The final recommendation of the team was to develop an organization system for multiple part processes by using Microsoft Excel. Microsoft Excel can be used to create templates identical to the layout of the trays placed in the O-Inspect machine. All an employee has to do is load a pre-made template for a given part and fill in the serial number of the part on the template where the part is placed on the tray.

Since there is already a computer at the O-Inspect station, and because Microsoft Excel is inexpensive, the team determined this to be a very effective, inexpensive solution. The team hopes this will be implemented in order to see if this recommendation makes a positive impact when the new O-Inspect machine arrives.

(For a sample template, see page 20)

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Background Information

The students of the Manufacturing Technology Academy spent two full days studying the Plan Do Study Act system (PDSA) in preparation for applying this process at a host company. Through the two-day training, the team learned the PDSA system to work through a sample problem and situation.

The team's first act in the system was to make a code of cooperation (inserted below). The *Code of Cooperation* is vital because it helps the team identify the factors within the team which are necessary for a higher degree of cooperation. After that, it was posted so that all the team members were able to reflect upon it. They moved onto the first step of the system, the Plan stage. This part of the process is used to understand the system, which is a basic understanding for the teams to see and understand how the company's system is operating. Also in the plan stage, the team defined the probletunity, studied the current system, and began to analyze the causes of the problem. These four steps were all carried out by making charts of individual tools so the team could visualize and truly understand what was happening.

After completing the Plan part of the system, the team began the Do part of the PDSA. During this part of the process, the team first began by developing a theory for improvement based on the information and insight gained through the Plan part of the PDSA. After all the information was gathered and facts found the team used what they knew to be true and correct to implement a theory for improvement. These were the recommendations the team gave based on the information gained over the Plan and Do part of the PDSA System. All the information and tools that were used throughout the PDSA process were put on charts to see and understand the process as a whole. This is how the team came to the recommendations.

Through the PDSA system, the team was able to identify the true causes and come up with an appropriate solution to the issue at hand. For a further insight to how the PDSA system works, you can refer to the ''Probletunity Overview'' in the appendix.

Code of Cooperation

- Listen
- Respect each others
- Be flexible
- Consider other ideas
- Be open minded
- Majority rules
- Don't take things personal
- Be positive
- No assumptions
- Be attentive
- Constructive criticism
- Don't panic or freak out

Above is the *Code of Cooperation*, it states what is expected from each team member and how the team is to work throughout the PDSA process. This chart was kept from the training and brought to the assigned company.

Purpose

A student team then worked at SMI for three days to apply the PDSA process in a real world setting. Before arriving, the company gave the team an Initial Problem Statement. This gave the team the problem that needs to be improved, the impact of the problem, the current conditions, and the desired state.

SMI-Aerospace wanted the team to develop a way to maintain serialization during the O-Inspect inspection process. This machine had not arrived yet and SMI wanted to be ready when it did. Also, the team needed to develop a strategy for staging fixtures for the cell based on a schedule. The current situation is that parts have paper operation tags identifying the serial number and plan to put multiple parts into the O-Inspect for inspection. They need to be able to associate the part with the paper operation tag. The impact was that the inspection data will not be serialized and if a part does not meet specification, then potential for shipping a bad part or each individual part will have to be re-inspected to see which part is bad. Finally the desired state is to develop a method to maintain the serialization of the part after inspection.

Attached to the problem statement were an Estimated O-Inspect Layout and the O-Inspect Description. These forms helped introduce the information on the company, which then lead to the appropriate solution. See the Appendix for the "Quality Teams Employer Sponsor Worksheet," "Estimated O-Inspect Layout," and "O-Inspect Description."

Stage 1 – Plan

Define the Problem

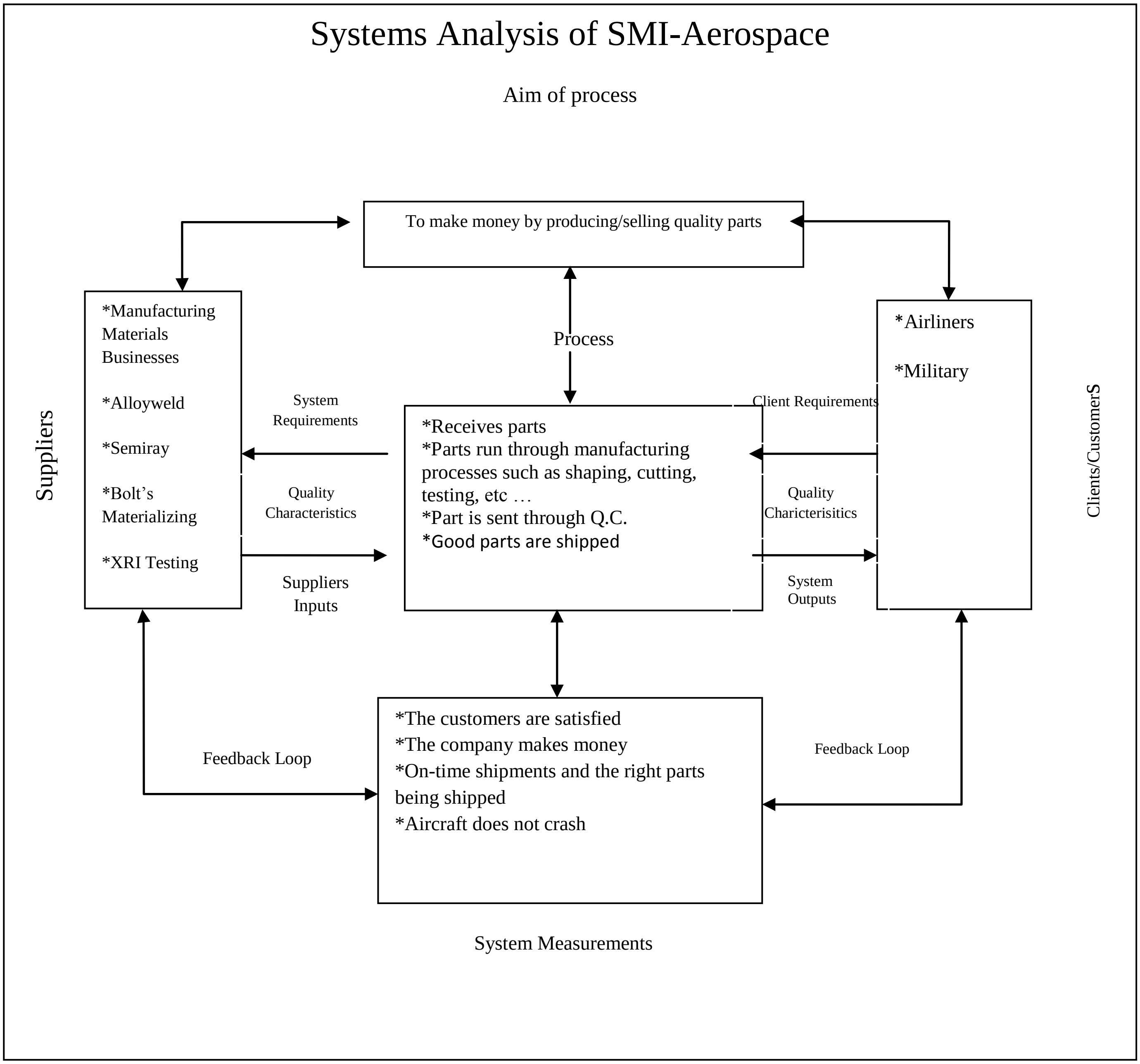
When the team first arrived at the company they were given a tour, explaining how everything worked and is run. During the tour the issue was explained and each team member took notes and collected data. This was the initial round of data collecting. After the tour, the gathered information needed to be sorted, organized and understood. Several tools were created to do this.

The first tool the team used to start organizing the information gathered on the tour was a *Parking Lot*. A parking lot is a tool where a group of people can "park" their notes suggesting positive comments, needs for improvement, and general concerns, questions or insights, so that the group can review them at a later time. It is used when questions or comments emerge but cannot be answered right away.

Parking Lot	
+ (What is going well) • Organization • Communication	△ (What needs improvement)
? (What are the questions) • What is the flow of Q.C. (Quality Control)? • How many different trays do you have? • Who is the designer of the trays? • What happens to the parts that don't pass Q.C.? • Is there a spot where stickers could be put on trays or parts? • How long does the whole process of Q.C. take? • Do the parts stay in the same place throughout the new inspection machine? • How many trays are used for the O-inspect?	I (What are the ideas) • Pre-load parts • Mark the operations tags so that they correspond with the location on the tray (X,Y) • Implement a pocket organization system • Label each tray by number • Use Microsoft Excel to create an organization grid

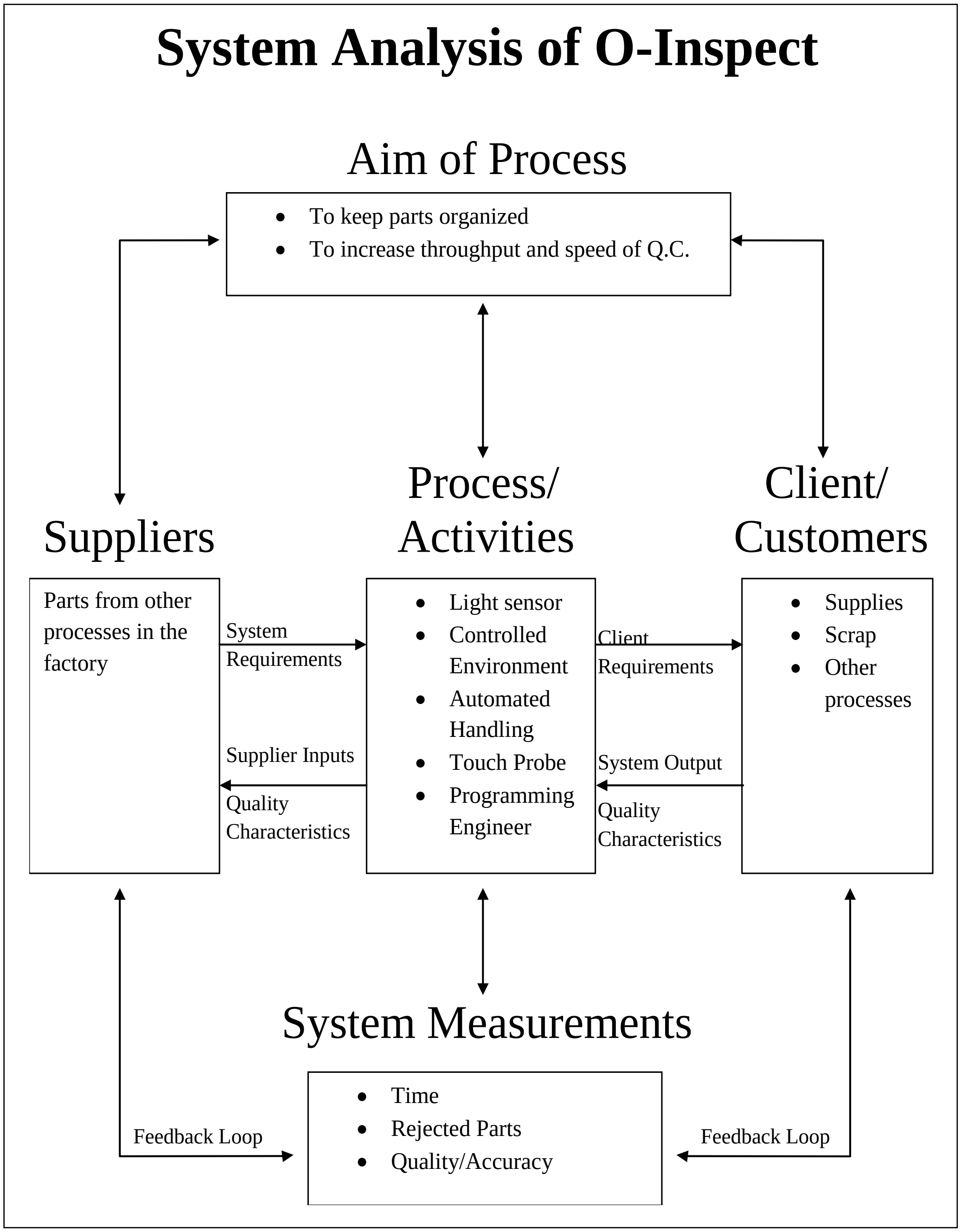
The *Parking Lot* was used to help the team collect and gather any questions, comments, or concerns that the team members have. The most valuable part of this tool was the question section because it helps organize the questions that cannot be answered at the moment, but were later answered. Questions such as: "What is the flow of Q.C.?" were later answered because the team had them in the questions section of the parking lot and follow up was done.

For the next two tools, the team used a Systems Analysis. It is used to understand processes and systems. It is a reflective tool used to gain insights concerning where to start the improvement process. The first one was created to help gain an understanding of the company as a whole. This was needed so that the team could also understand where the issue they were assigned fit into the company as a whole.



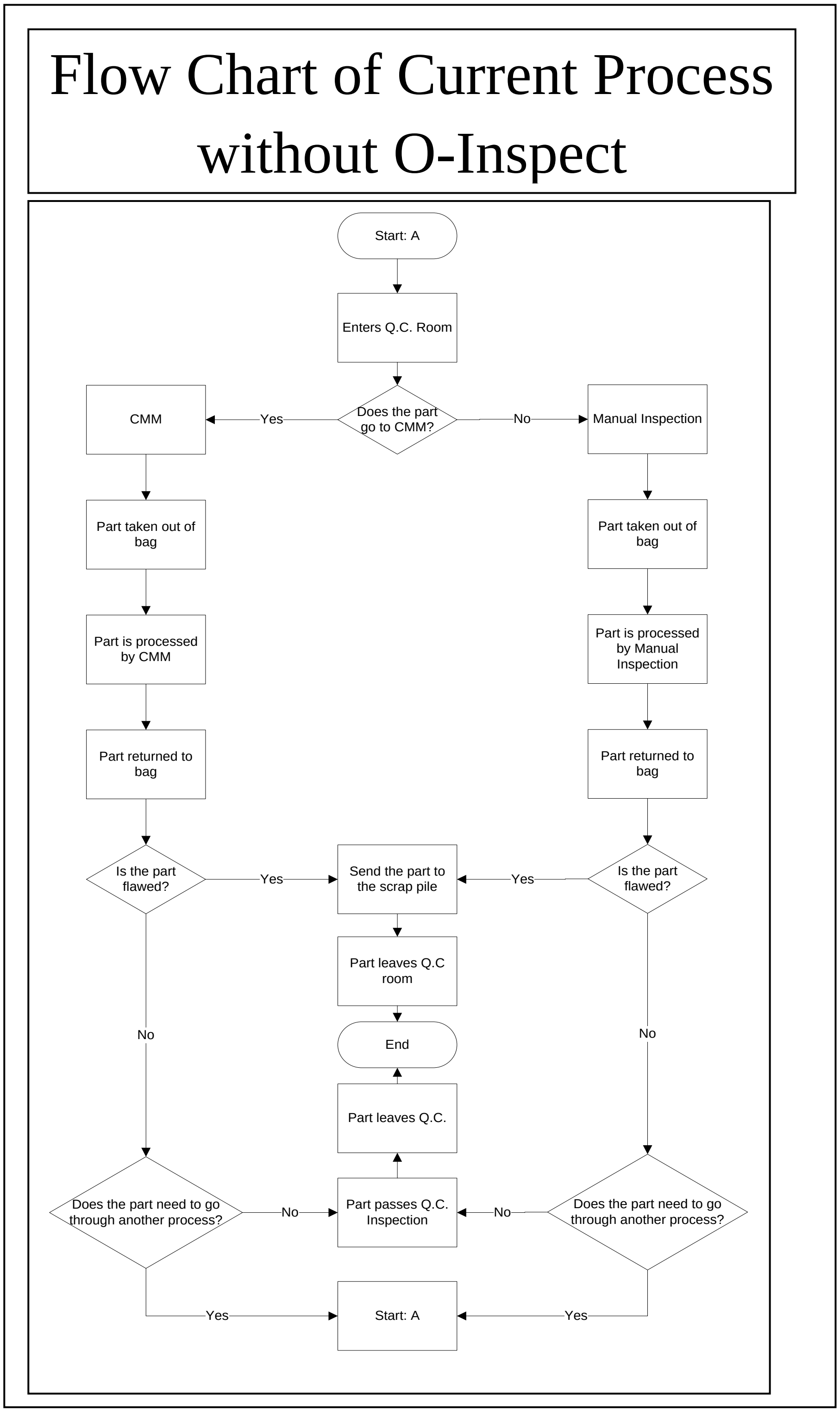
This tool showed our team the full system of the SMI-Aerospace in detail. It showed the aim of the system, clients/customers, suppliers, processes/responsibilities and system measurements. The team used this chart to better understand how the system is run and the tasks it carries out throughout the entire system. They also used this tool to see where the problem that they were assigned fits into the system as a whole.

In addition to the *Systems Analysis of SMI-Aerospace*, the team used a *System Analysis of O-Inspect* to help understand the vision system machine specifically.



The team needed this additional System Analysis to focus on the quality check process within the system of the whole company. The aim of the process, suppliers, inner-processes, customers, and system measurements were all gathered through questions asked during the initial tour. This chart helped the team focus more on the issue and pinpoint where to initiate improvement on the issue.

Next, the team used a flow chart to be able to completely visualize the process of the Q.C. room. A flowchart is a tool that shows the work path of a process while identifying decisions, inputs, and sequential activities. The flowchart is used for identifying deviations in a process, when there is confusion as to the best approach to improvement. The flowchart is used because it is easy to follow and read; it defines the boundaries of a process, and forms a common definition of a process for communication.



The team used *The Flowchart of Current Process without O-Inspect* to configure the details of how the current Quality Control process works. The team analyzed the flow chart and learned how the parts that enter for inspection flow through the Quality Control room, how the part is inspected, and what it is inspected by. Creating a flow chart furthered the teams understanding of the problem and aided in organizing thoughts.

State Your Goal

Sorting through and organizing the initial information from the tour allowed the team to gain a better understanding of the issue. The next step was to look at the Quality Teams Employer Sponsor Worksheet" more closely and use it to create an *Initial Problem Statement.*

The initial problem statement is the statement given by the company. This shows the Current, Impact, and Desired state of the company. This helps clarify the problem or situation that needs to be solved. It is used in the beginning of the process to state what is needed, what is already in place, and what would happen if it is not fixed.

Initial Problem Statement
<u>Current</u> – Parts have proper operations tags identifying the serial numbers and plan to put multiple parts into the vision system for inspection. Need to be able to associate the part with the paper operation tag.
<u>Impact</u>- Inspection data will not be able to be serialized and if a part does not meet specifications, then potential for shipping a bad part or each individual part will have to be re-inspected to see which is bad.
<u>Desired</u>- Develop a method to maintain the serialization of the part after inspection.

This tool was used to focus the attention back on the issue so that further questions could be asked and more data gathered to continue the process. The company's statement was transferred onto a chart so that the team could read it. Then, the team referred back to it several times during the process.

After the initial tour and initial interviews, the team had several terms that would be better understood if defined. So the team made an *Operational Definitions.* This tool takes a concept or word and gives it a clear, communicable meaning that allows better understanding of the processes within a system. It provides clear explanations of terms to take away confusion and achieve a shared understanding.

Operational Definitions of Quality Assurance

SPC (Statistical Process Control) – Methods to monitor and control the process to ensure that it operates at its full potential to produce a conforming product

CMM (Coordinate Measurement Machine) – A device used for measuring the physical and geometrical characteristics of an object

BPP – Best People Practices

Fixture – A fixture holds the part in the same place every time so that the Q.C. machine knows where the part is

O-Inspect – The new optical inspection machine and CMM

These five terms were alien to the team as they emerged from the tour and interviews. Their definitions were gathered through later interviews and then were put together into this Operational Definitions chart. It really assisted the team in understanding how the processes run in the company and gave an understanding of the jargon used in manufacturing.

Next the team used a POPE diagram. POPE is an acronym for Purpose, Outcome, Process, and Evaluation. The POPE diagram is a process of providing structure to an open-ended task. It is used at the beginning of a process to develop and agree on an approach to the task. The team used this tool to provide structure for unclear tasks.

POPE Diagram
Purpose- Keep part to specified serial number.
Outcomes- Ensure a good, quality part.
Process- Keep parts and serial numbers organized.
Evaluate- The proper serial numbers and proper parts are reunited.

The team decided on each of the sections. This helped the team focus further on the situation and develop an even more progressed idea on the situation. Also, it helped the team look closer at the task that was supposed to be solved.

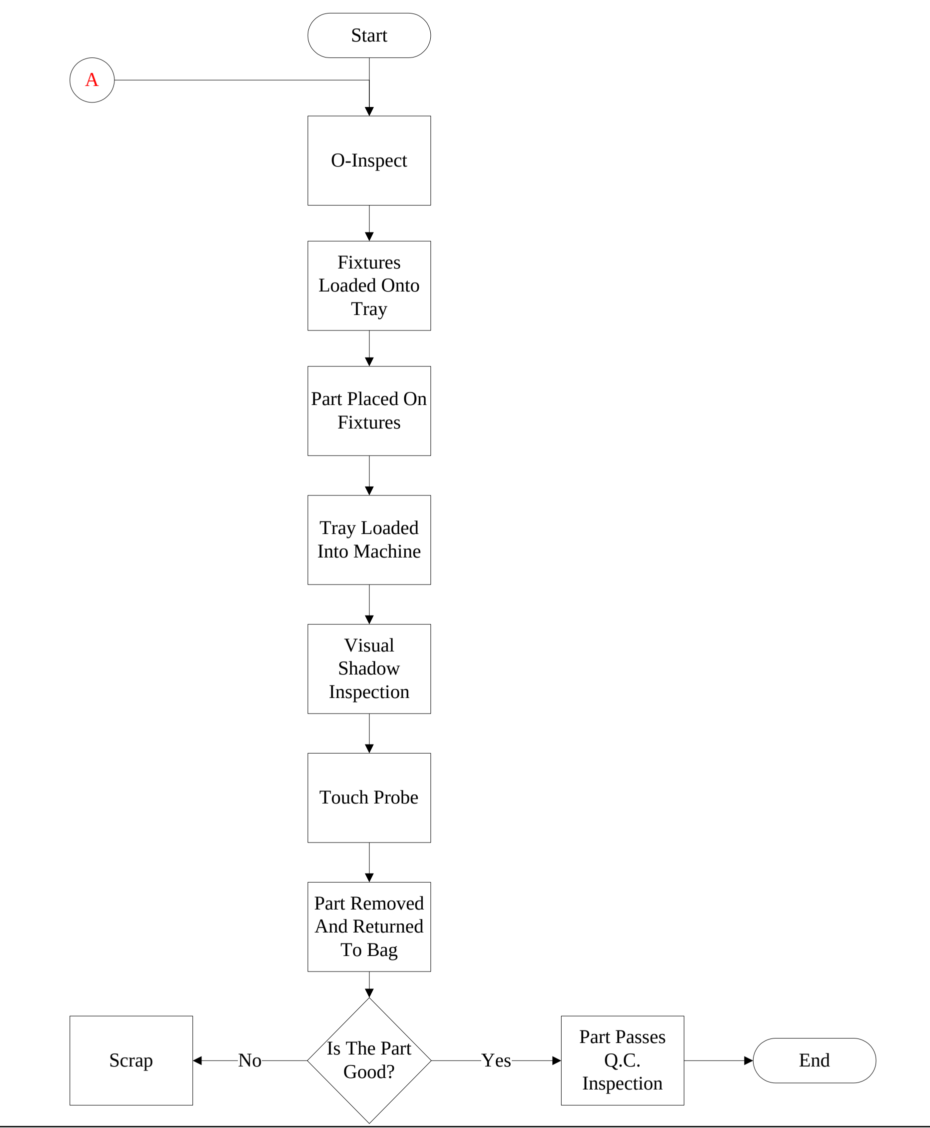
Study the Current Situation

The next part in the Plan Stage has the team slow down and ask, “What is the current situation,” “What data is needed,” and “How will it be collected?” so the team can narrow its focus on data and facts and not jump to any conclusions.

The first tool in this part of the process is the *Flow Chart of the Future Quality Assurance Process with O-Inspect*, which helped the team understand the current process. The team used another flow chart to be able to completely visualize the process of the O-Inspect system when it arrives and is incorporated into Q.C.

To further clarify the quality check process, the team developed a *Flow Chart of the Future Quality Assurance Process with O-Inspect.* This O-Inspect process is an addition to the process that is already installed, which is indicated by the circle with a red A.

Flow Chart of the Future Quality Assurance Process with O-Inspect



This flow chart shows how a part would be inspected by the O-Inspect, and the result of the inspection. This chart helped the team know more about the arriving machine, and in turn helped in finding the recommendations.

Next, the team created the *Affinity Diagram: Baseline Data*. This tool is an interactive data collection method which allows for identifying and sorting large quantities of ideas in a short time frame. Affinity means likeness or close relationship. The affinity diagram is used when people need a nonjudgmental process for collecting and grouping ideas. The team utilized this tool by grouping the collected baseline data in order to organize everything that the team had discovered so far in the process.

Affinity Diagram:

Baseline Data

Design	Organization	Layout
• R and R designs the clear trays and metal plates • The metal plates rest on the O-inspect's inspection "table" • The clear trays hook into the metal plates magnetically • The Fixtures are temporarily mounted to the clear trays • The parts to be inspected are temporarily fixed to the fixtures	• Each part has an operation tag along with the part in a small plastic bag • There is currently no existing system for organizing multiple parts while separated from their operation tags	• The fixtures are attached to clear trays at the "Load Rack" table • The parts are fixed to the fixtures on the clear trays • Loaded trays are loaded onto the "To be inspected" table • Trays are magnetically attached to the O-inspect's inspection "table" • The parts on the clear trays are vision inspected and probed • The trays are unloaded and placed onto the "Inspection" table

The team organized its collected data into these three topics: design, organization, and layout. In the first topic, design, the team placed the data related to the design of the trays for the O-inspect. From this, the team was able to see the flow of the trays through the O-inspect process. In the second topic, organization, the team placed the data related to the organization of the parts and their tags. From this, the team found that there is currently no way to organize the tags while they are separated from their part. In the third topic, layout, the team placed the data related to the layout of the actual floor as it relates to the flow of the trays from table to table. The team was able to use this collection of data to determine when the part and its tag would be separated and when the part and its tag would be reunited along with which table this would take place at.

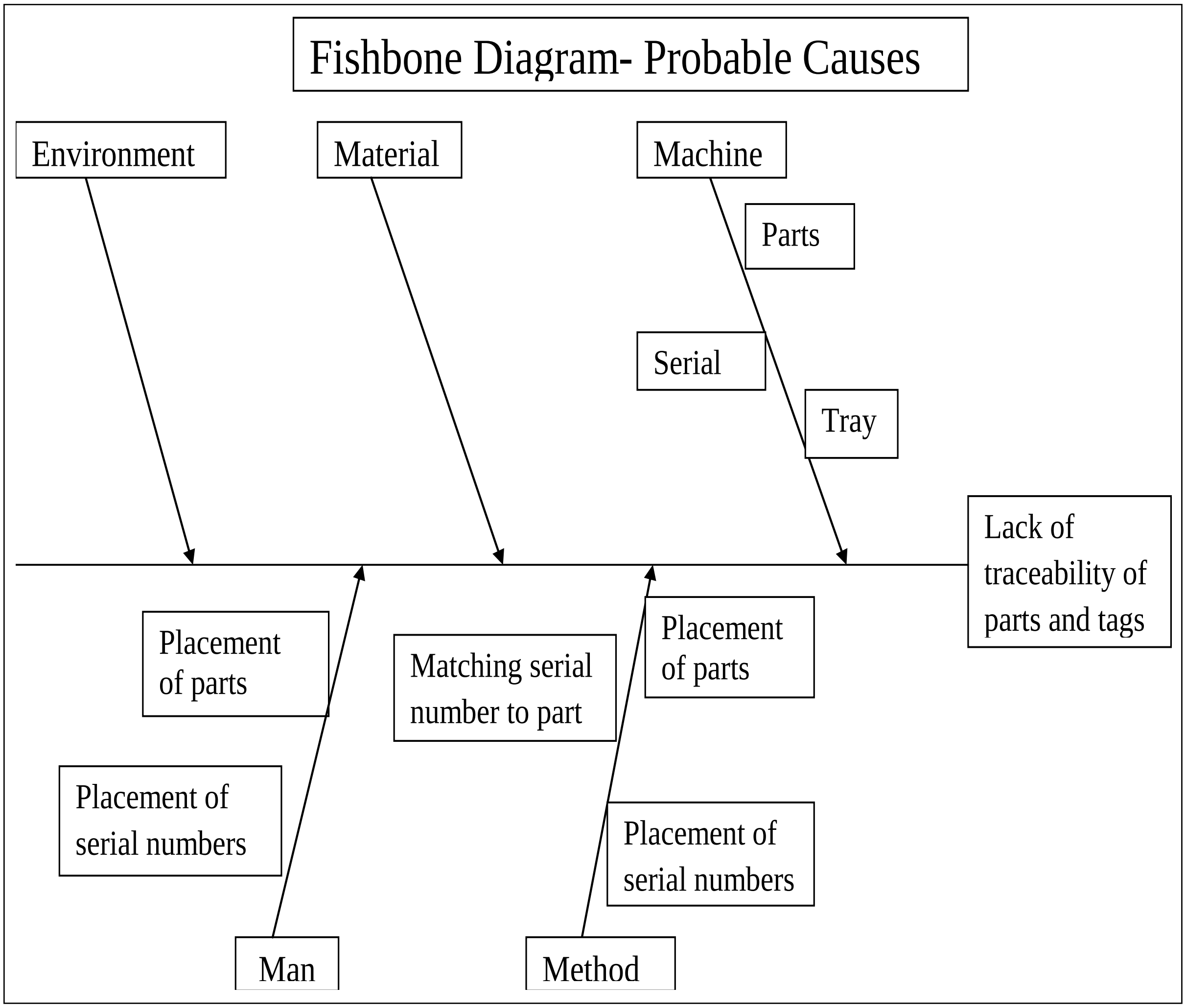
Following the *Affinity Diagram: Baseline Data*, the team used the *Brainstorm of additional Information Needed* to gather addition information. A brainstorm is a procedure that allows a variable number of people to express problem areas, ideas, solutions, or needs. It allows each individual to express their opinions in a nonthreatening environment.

Brainstorming of Additional Information Needed

- Which parts go through CMM? Manual inspections?
- Where do the scrap parts go?
- Do all parts have to go through both CMM and manual inspection?
- If so, in what order?
- What is a fixture? (check R&R fixtures' website)
- Are the plates marked with x and y Coordinates? (check on company website)

As shown above, the team made a brainstorm on additional information needed. This allowed the team to voice new concerns, ideas, and questions that had yet to be asked or answered. This included definition of parts and systems, and clarification of where parts go throughout the O- inspect system. The team all agreed that there were no bad questions that could be asked, so all opinions and questions were voiced and written down. What the team came up with in the end were ideas and questions that still needed to be answered by the team.

Following the brainstorming tool, a Fishbone Diagram was created, which is used to identify possible causes of an effect, often variation in a system or process. It is used when causes of an effect need to be visually identified and categorized for easier interpretation. This diagram is made by first figuring out the effect of the problem. Then identifying the causes, each cause goes under a category. The categories are Man, Machine, Method, Material, and Environment. This helped the team analyze the cause of the potential problem areas.



For each category, the question was asked, “What could cause the problem or situation?” this was asked to help categorize causes of the problem. Under Method, one of the many causes is matching the serial number to its part. Under Man, one cause is the placement of parts. Finally, under Machine, one of the causes is the parts. All of the causes listed are possible causes to the un-traceability problem.

After these tools, the team had a good idea of what information they needed. They gathered information from Q.C. and R & R Fixtures’ website about the trays that will hold the parts in the O-Inspect.

Define (Restate/Revise) the Problem

Now that data has been collected and interpreted, the problem is better understood and can be restated more accurately. To do this, the team needed to revise the *Initial Problem Statement.*

In order to create a revised problem statement, the initial problem statement is looked at and it is decides whether or not the statement is an accurate depiction of the problem. If it is, then the problem statement will be restated with more detail now that the situation is better understood. However, if it is not, then a new problem statement will be made. Data must be collected before the team is able to accurately produce a revised problem statement. The *Revised Problem Statement* is used whenever enough data has been gathered to either support or contrast the original problem statement.

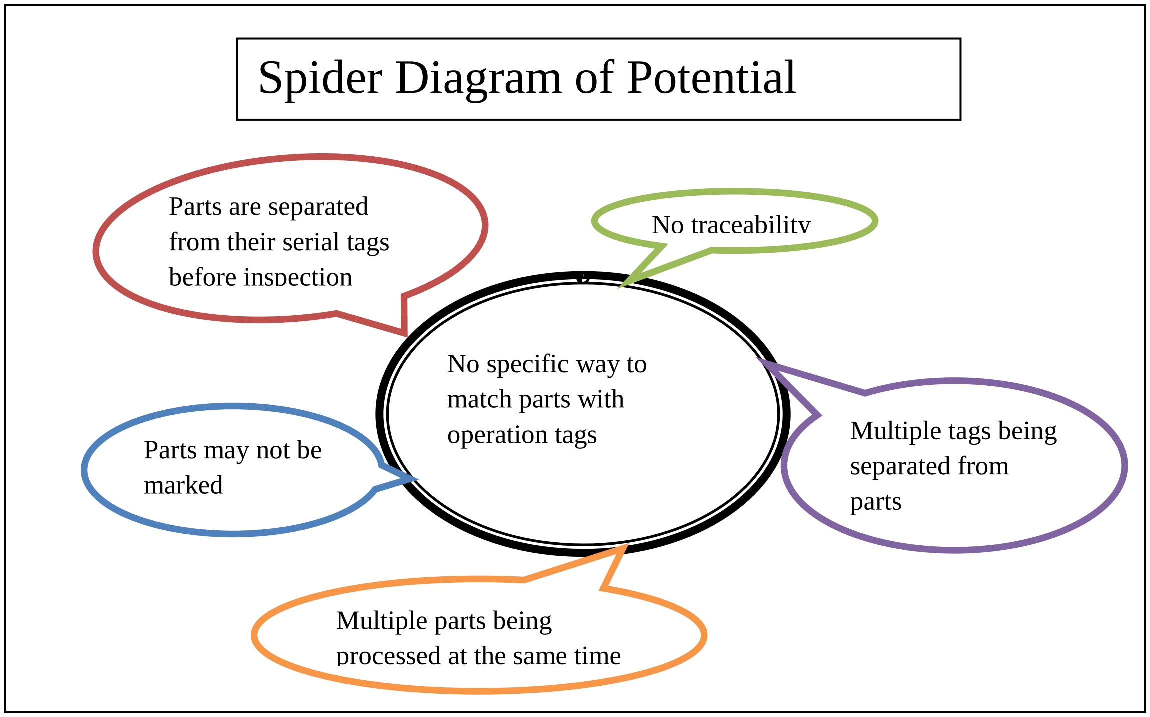
Revised Problem Statement
Current- Multiple parts in the O-Inspect need to be properly reunited with their individual serial numbers after inspection.
Impact-Parts after inspection may be matched up with wrong operational tags. There will be no traceability causing potential for rejected parts shipped to the customer and the acceptable parts scrapped.
Desired-An organized system that will keep parts and serial numbers match throughout the 0-inspect

The team's revised problem statement was not too far off from the original problem statement. It was still agreed on by the team that there is a need for an organized system that will keep the parts and serial numbers matched throughout the O-inspect process.

Analyze the Causes

The next step in the process is to analyze the causes of the problem. Certain tools such as the Interrelationship Diagram, The Five Why, and other charts that are chosen by the team take the information that is known and organizes and analyzes it in attempt to identify the possible root cause.

The team utilized the spider diagram to further their understanding. It shows the relationship of a central concept and the main ideas that branch from it. This helps to identify what causes the central concept or the effects that stem from the concept.



From the information previously gathered, the team determined that the central concept to analyze was "No specific way to match parts with operation tags." After the team determined its causes, it was necessary for them to organize and further analyze these causes.

The team then took the information from the *Spider Diagram of Potential Causes* and made the *List of Potential Causes of the O-inspect Situation*. The list of potential causes is simply a bulleted list of the potential causes derived from another tool. In this case, the spider diagram.

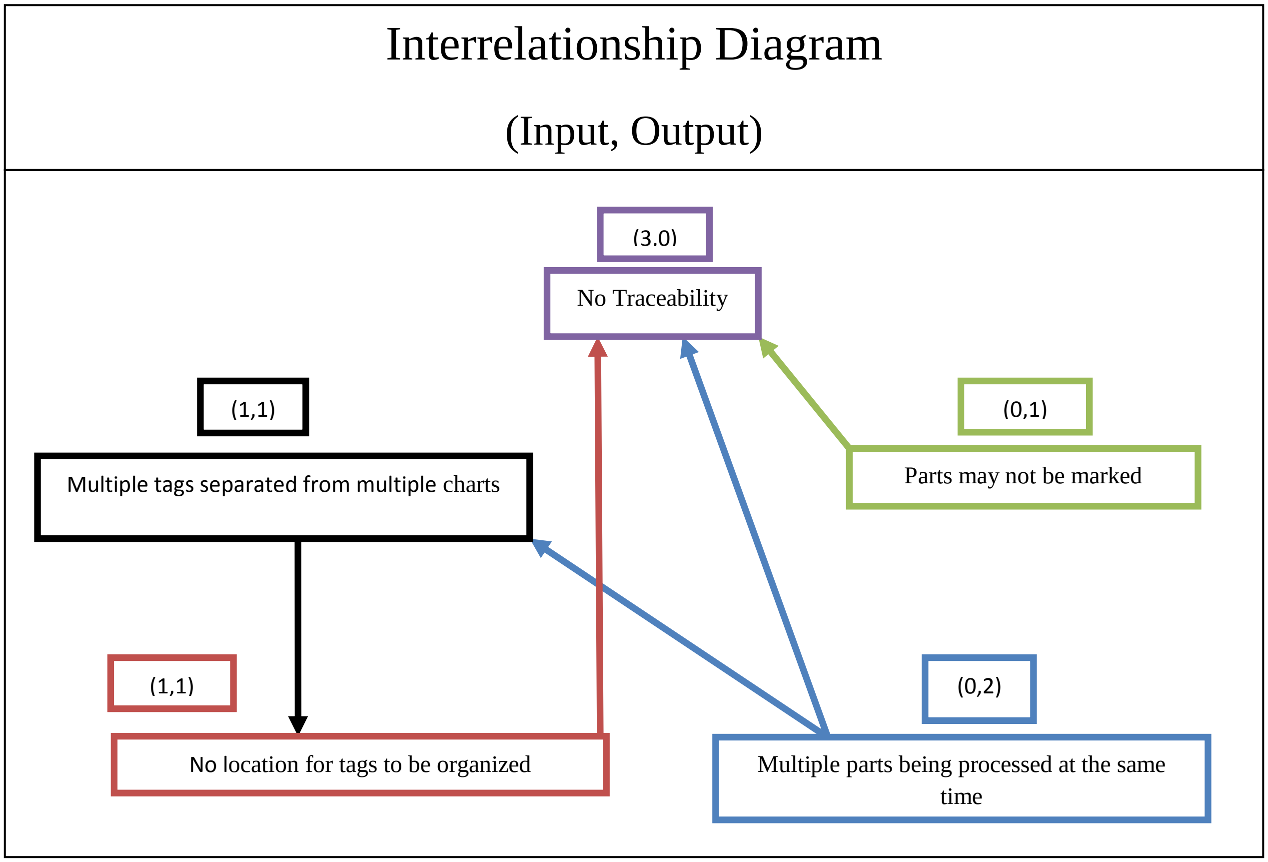
Potential Causes of

O-inspect Situation

- No traceability
- Parts may not be marked
- Parts are separated from their serial tags before inspection
- Multiple tags being separated from parts
- Multiple parts being processed at the same time

The team used it to organize the data gathered from the spider diagram and to transfer it into the interrelationship diagram to further see how the causes are related in attempts to identify the root cause.

The *Interrelationship Diagram* is used to study relationships between causes and situations. It is necessary to use an Interrelationship Diagram when there are multiple possible causes to a specific problem and the team members are unsure of the most probable causes. The Interrelationship Diagram is used to see if any of the causes are related, and if so, is there a root cause.



The team used the *Interrelationship Diagram* tool to find which of the stated possible problems were most likely to be a root cause the problem. The team learned that multiple parts being processed at the same time was the most probable root cause. From this point, the team decided that some sort of chart, graph, or drawing was needed to track the location of all of the different parts that are housed on the trays. This way the chart, graph, or drawing can be observed when the parts are finished, and can be correctly re-united with the proper tags. The visual representation would most likely be identical to the layout of the tray.

Next, a *Five Why* was created. The *Five Why* is a process of asking why a recommended five times to get to the root cause of a problem. It is necessary to use five why when people do not truly understand the situation and a deeper level of understanding is required. It is used to identify the root possible cause, to organize thoughts, and cause people to challenge their current thoughts.

Five Why:

Root Cause of Un-traceability with Parts and Tags

Why would there be un-traceability between parts and tags?

Because you can't keep multiple tags and parts together during the inspection process.

Why can't you keep the tags with the parts together during the inspection process?

Because there isn't currently a system for multiple part processes.

Why there isn't a system for multiple part processes?

Because there wasn't a need for a system until the arrival of the O-Inspect machine.

The team used this tool to determine what the possible root cause was to the problem. The team learned that the root cause was that there was no way to keep the tags united with the parts, causing for a disorganization of parts when they are placed on the tray. This affirmed the team that some sort of visual representation of the tray was needed to control the disorganization, as was determined by the *Interrelationship Diagram*.

Stage 2 – Do

Select and Develop a Theory (Recommendation) for Improvement

The final stage of the process done at the company was the *Do* stage. This is the stage where a theory for a solution or recommendation, is determined based on all the data collected and causes analyzed.

An *Imagineering* tool was created to show the effects of a perfect system. This is used to identify what the team envisions as the perfect outcome, processes, or system based upon what the company would like to see, as shown on the problem statement.

Imagineering of a Perfect System

- To know that each part and its operation tag will be re-united 100% of the time.
- To have 100% accuracy of measurements on each part.
- To know were parts and operation tags are 100% of the time through the process.
- 100% accurate traceability

Shown above is a bulleted list of all the effects that a perfect O-inspect system would have. This showed the team what they should be looking for when they put their solution into effect.

The team once again used the *Brainstorming* tool to organize the information.

Brain Storming:

Possible Solutions

- Label Each Tray by number. Make each grid identical by number
- Make identical chart of tray with parts for tags
- Pre-load parts and pre-organize tags
- Put coordinates on serial number parts
- Use Microsoft Excel templates to organize the location of parts in a (x,y) graph

The team used this problem to unify thoughts and work towards a better idea. The team found that the new organization system should include x and y axis labeled trays, pre-loading and pre-organizing tags, Microsoft Excel templates, etc. From this point, the team created and put all of the ideas together, and worked towards a recommendation.

A *Consensogram* is a statistical survey of the perception of a whole group. Ideas, such as solutions or problems, are chosen as candidates in the survey. They are then voted on by the members of the group on how much they believe the ideas to be true, which is measured on a scale from 0% to 100%. This chart's main benefit is that it not only shows the input of individuals, but also shows the input of an entire group along with the popular vote. In addition to that, the chart can easily be used to gather, display, and review data.

Consensogram of Solutions

Percentage of Approval	Label tray and make a table where you place correct tag with pocket	Make identical chart of the trays with parts for tags	Label each tray by number, make each grid identical by number	Put coordinates on the operational tag	Pre-load parts and pre-organize the tags	Use Microsoft Excel template to organize the location of the parts in a (x,y) graph
100%	IIIIII		III	IIII	IIIII	IIIIII
90%			III	I		
80%				I	I	
70%		II				
60%						
50%						
40%		II				
30%						
20%		I				
10%						
0%		I				

Ideas

The team had previously brainstormed solutions that could allow the tags with serial numbers to reunite with their parts. Those solutions are placed on the x-axis of the *Consensogram* chart, with the percentage of approval on the y-axis of the *Consensogram*. Each person on the team of six voted on how much they felt each idea would work. The recommendation of solutions was developed from reviewing the *Consensogram* for determining the ideas with the most votes.

Next the team utilized the *Desired Future Statement* which is a statement used in order to focus the team's energy and thoughts back on to the task at hand. The *Desired Future Statement* is meant to be that of a perfect system. When working on projects, it is very important to always keep in mind what the team is striving for. The desired future statement is used whenever enough data has been collected in order to determine what the most perfect future for the team's project will be.

Desired-Future Statement

An Organized System that will keep parts and operation tags matched throughout the O-Inspect.

The team's desired future statement was, "An organized system that will keep parts and operation tags matched throughout the O-inspect." The team sees this as a perfect system to strive for. If this could be achieved then the problem would be able to be solved. From here the team can now focus on how to achieve this desired system.

Lastly, the team reviewed data and every tool used thus far to come up with the final recommendations. The recommendations are the final solutions to the revised problem statement, which are supported by each and every tool. The recommendations are to be taken as professional advice.

Recommendations

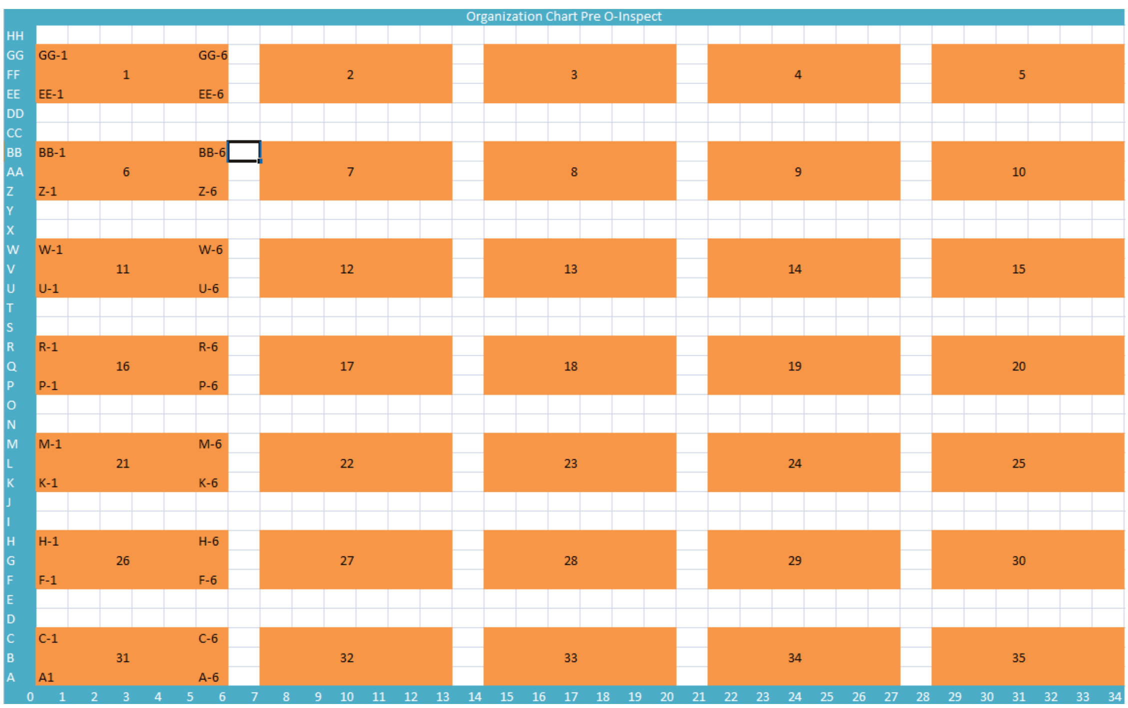
- Use Microsoft Excel templates to organize the location of parts so that they correspond with the (X, Y) axis on the O-Inspect trays.
- Label each individual tray by number.
- Put coordinates on operational tag as a precaution.
- Pre-load parts and pre-organize tags before each O-Inspect inspection.
- Place operation tags in order of left to right, top to bottom according to the (X, Y) coordinates onto a designated area on the fixture/load rack table.

The team recommended that an organization method be implemented using templates from a computer program to record where each part is placed onto the current tray. The team believes that this will be a quick and easy way to keep the parts matched with their operation tags all the way throughout the O-inspect process, from the time they are loaded onto the trays to the time when they are unloaded without physically being connected to the parts. This system would allow the parts to be properly inspected and then reunited with their operation tags so that faulty parts get scrapped and perfect parts get passed and shipped out. The Team has included an example template on the following page

Conclusion

The team found that the problem was a lack of a system that would organize tags and parts so that they could be reunited properly. One of the major causes was the separation of the tags and the parts in the first place. The tags had to be separated because they would get in the way of the inspection process. It was imminent that an organization system was needed.
The team then found it necessary to create a brainstorm to get all of the ideas out on the table. This is what the team came up with:

Since the parts stay in the same place on the tray during the inspection process, the team found it necessary to label where the parts are on the tray with an x, y coordinate grid and create a copy of the layout on a separate template. The team found that the most easy and inexpensive way to accomplish this task was through a Microsoft Excel template. A computer is already required at the station and the Microsoft Excel program is easy to use and cost effective to acquire. As for the tags, the team decided to organize them in a stack. The top of the pile would have tags that matched the parts in the top left corner of the tray and at the bottom the tags would match the parts at the bottom right corner of the tray. This creates ease when attempting to reunite the tags with the parts.



Shown below is an example of the team's recommended Microsoft Excel template. The original template can be sent via e-mail if needed.

The team recommends that SMI Aerospace create a Microsoft Excel template to organize the parts as they are inspected. The team also thanks the company for opportunity for such a great experience. Much was learned and taken away from the experience.

Bibliography

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Appendix

Probletunity Overview

Quality Teams Employer Sponsor Worksheet

Estimated O-Inspect Layout

O-Inspect Description