

Reducing the Amount of “Turnback” on the Classification Center

*Francisco J. Colón Galarza
Master of Engineering in Manufacturing Engineering
Rafael Nieves Castro, Pharm.D.
Industrial and Systems Engineering Department
Polytechnic University of Puerto Rico*

Abstract — *The research Reducing the Amount of “Turnback” on the Classification Center consists in the large amount of turnbacks that occur on the database system on a daily basis these turnbacks are errors that affect the time service that is performed when classifying items for the customers, in other words, any error that consumes a certain amount of time and interrupts the classification process. These classifications are all types of items or documents which must be classified with their correct regulation and jurisdiction. Using the DMADV tool it was possible to find the highest quantity of turnbacks that occur on the system. In this research is determined that the highest amount of turnbacks was the lack of information, which has an average of 48.41% of the total turnbacks and the other 51.59% are the rest of the defects registered. The design that was developed to solve the turnback problem was to perform a checklist where it is provided to the requestor with a simple and easy to understand guidance in order to help the requestor to successfully submit a request. This checklist is provided to all customers, and it help to avoid so many errors occurring on a monthly basis that has reduction of turnbacks of more than 50 %. The classification center of company X have less time wasted and obviously reduce the amount of expense and helped focus more of other customer and new projects.*

Key Terms — *classification, DMADV method, guidance, turnbacks.*

PROBLEM STATEMENT

The research is based on a current problem that is happening every day on the company X and is affecting the output of item and delayed the work that is being done during the day, this affect not

only the company but the business that are receiving service of the classification of item to export/import. The issue that is presented on daily basis are called “turnbacks” which means an error appears on the request of the classification of an item, the common error is poor information of the item, wrong business unit, wrong functional area, incorrect item identifier, the item is already classified or protocols that are being overlook which can’t do the classification properly. Acting on this problem would solve this issue that it is never being taken into consideration and would help the team of classifier to reject less request and work more efficiently throughout the classification.

RESEARCH DESCRIPTION

This research is based on the Reduction of defects during the processes of classification. The main purpose is to find the mayor defects that occur on the daily basis when classifying commodities, technical data, software, and equipment on the system of the company X. All the turnbacks of the past month are important to analyze since it will lead to a possible reduction on the amount of defects and waste no time on erroneous request.

RESEARCH OBJECTIVE

The objective of this research is to define the problem statement that include the definition of turnbacks and what means export/import classification, then is to analyze all the data that is available on the data base of the system. This goal can be achieved since all the turnbacks are stored and monitored on a datasheet with the results found can develop a solution to decrease the number of turnbacks that are submitted on the system and be able to reduce the defects with 20% less errors.

RESEARCH CONTRIBUTIONS

On this research the contribution that is being made for the industry and the classification center is to reduce the amount of turnbacks that is received daily which affect the number of classification process in a daily and related to time is also cost that will reduce the expanses of Company X. Also, reducing this issue will reduce the time its expended on turnbacks because in occasion figuring out a classification takes time and ends up on a turnback of 45 min to 1 hour, when maybe this time would be better on another business that needs the service. Reducing the time wasted on “turnback” it benefits Company X on costly expanses as well.

LITERATURE REVIEW

The research developed is for a process that occur in the classification center which involved turnbacks on the service that is provided and can overwhelm the system, lets explain more deeply to understand the process. The classification center is a group of professionals that classified all types of commodities, documents, software and even equipment. Let start with the International Trade Compliance (ITC) is the requirement that is implanted to products, services, and technical data to ensure it comply with all applicable laws and regulations pertaining to economic sanctions and import/export. Is important that every company comply with this regulations and laws to avoid fines and issues with the government.

There are multiple organizations that control this regulation and laws, The United States Department of Commerce administers the Export Administration Regulations (EAR) [1], there are other organization for different countries as well. The responsibility of the classifier is to classify the product or services with the correct regulation and to ensure that classification is at the correct category because if the classification is under-classified may result on export violations, fines, and loss of business and if it is over-classified may result in ITC/government investigations, so the

classification needs to be precise. This classification is done through a system, a request is received by various business that we require are classification for a new product that is being developed. The request contains different types of categories that specify the type of articles that is being classified for example it could be an equipment, commodity, technical data and software. Among other things need to be identified on the request like the business unit, functional area, identification (ID) of the item, item description and the Commercial and Government Entity Code, or CAGE Code, is a five-character ID used frequently in the government as an identifier for suppliers to the federal government [2].

When this request is fill incorrect it counts has a turnback and this affect in different form perhaps delayed the time of project, affected the target daily, it affected the efficiency of the classifier, and cost the company money. Turnback are not only error on the request, also are technical difficulties that occur on the system or computer like updates, the system freezes, blocked account, basically all the time that affected the work being done. The research is based on finding and decrease the amount of turnback occur monthly and maintained the turnbacks on a minimum.

METHODOLOGY

The way that this research is going to be developed and solve is using different primary methods and other tools to achieve better results and performance. The primary method that is being used for the research is Lean Six Sigma or in other word Six Sigma these two methodologies are different but share a bond that combining Lean and Six Sigma achieve a better result, it is going to be explained on more details ahead.

Six Sigma is a methodology that give organizational tools to elevate level of process on the business. Some of the improvement that is method give increase of performance, decrease the process variation, Improve the profit of the business, reduce the defect occur, helps employees

morale and better quality of the products or service. Six sigma has different definitions but, in some way, share the same point like the use of teams is very that this team is composed of key people with the experience and knowledge to achieve the objective the business required on a project, make a good used of the tools that are available like DMADV which is going to be used on the research and an excellent management that is able to support the team throughout the business strategy. The philosophy of Six Sigma is that the process can be define, measured, analyzed, design and validated all process requires an input data and if the input data can be obtained and control also the output data can be managed. Six Sigma has various tools set that can be used on all of the steps of DMADV (Define, Measured, Analyzed, Design & Validate).

Six Sigma improve the process control and on the same time it reduces the process variation of the business, when otherwise Lean identifies and reduced the non-values process, and standardized the step or process that give control to the business. When combining these two different concepts it is obtain Lean Six Sigma which provides a better result on the research and positive results. The combine definitions that it can be given is an improvement that emphasis the defect prevention on which drive the customer satisfaction and results by reducing the waste and variation process, while standardize the process imply to improve the process apply to achieve positive results with the involvement of all the employees.

Combining these Lean and Six Sigma is the perfect option because it gives better positive quality and results on the products or service. Lean provides less use technical tools, whereas Six Sigma provide more use of statistical data analysis.

The secondary tools that are used on this research is DMADV which it help to structure and organize the work done on the project, let start with the definition of Define.

- **Define Phase**

The phase of Define is to identify the problem, state the objective of the problem, the

improvement the process that is desire and also the customer requirements, a good tool to use on this phase is Value stream map, voice of the customer, project charter or SIPOC.

- **Measure Phase**

Second phase is Measure that the main propose is to measure the extended of the problem and is where the data collection begins, so is important to acquire the most information possible so the results have an abundant information to confirm the solution is the best possible.

- **Analyze Phase**

The next phase is Analyze, where the data collection is being processed with the goal to determine the root of the problem and the poor performance is identify, in other word, is where all the calculation and graph are presented.

- **Design Phase**

The phase of Design is where a high level and detailed design is developed, and a prototype is created to identified error that may occur on the process and eventually eliminated or reduce the amount of time wasted.

- **Validate Phase**

The final phase is Validate, where the previous phase is monitor and maybe is acceptable to all the stakeholders, several tests are conducted to ensure that the quality is at the highest point at this stage of test, results, and changes are documented so future changes are precise.

RESULTS AND DISCUSSION

This chapter is going to present the results that were obtained throughout the investigation of the project *Reduce the Amount of "Turnback" on the Classification Center*, using the methodology of DMADV. Each phase of the DMADV is going to explain the procedure that was involves on the development of the tools used in all the phases.

Define

The define phase is the first step to understand the problem and have a bigger picture of all the process that relates to the problem, is where the problem becomes clearer. On this phase the tools used are SIPOC (Figure 1) and the Gantt Chart (Figure 2). The SIPOC is a tool that identifies all the elements that are captured on the process, it helped to define a complex procedure and have a more simplified process. The SIPOC diagram is presented on table 1 which all mention all phases involve on the classification center:



Figure 1
The SIPOC Diagram.

The Gantt Chart is well known in the project management aspect, is used to organize every task or activity involves throughout the project is displayed against the time or deadline to complete the project.

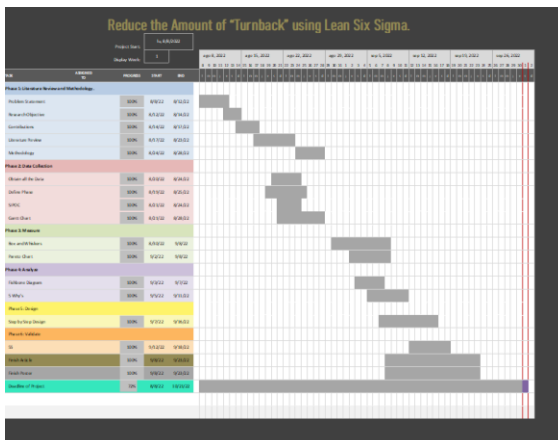


Figure 2
The Gantt Chart

Measure

This section of measure, begins with the collection of data that is provided by the company X where are on the database of the classification center and in the database there are an abundance of information related with the company but the most important is that all the turnbacks are well documented with the classifiers name, the name of the business unit that it is provided with the service, the category were the “turnback” is captured, how many minutes is wasted on that particular activity and comments from the classifiers explaining the reason why the “turnback” is being registered on the database. However, some of this information is not going to be presented for the protection and legal matters of the company X. Despite this the information necessary to measure the data is the time and the reason the request is being rejected on the first place. Having this in mind, to begin de measure of the data will the using two different tools like Pareto diagram and Box and Whisker.

• Pareto Chart

The Pareto Diagram is a bar graph in which the lengths of the bar illustrate cost, frequency but in this case, it represents time. The longest bar is position on the left of the graph and the shortest bar is on the right, this helps to have a clear picture what is the most significant defect each month. Also, the graph has a line that represents the percentage of each bar, that have behavior of a square root function until it reaches 100%.

Analyzing the pareto chart represented below, the majority of the turnbacks that are adding an excessive amount of waste time is the lack of information with an average of 48.41%% compared with all the other defects. The lack of information is request that cannot the process whether is no next higher listed of the drawing, the next higher, top assembly, and platform are not classified, needs more information to classify the item precisely like where is going to be used the commodity, software or even an equipment, also is the item is specially designed for a specific platform is rejected because the lack of information.

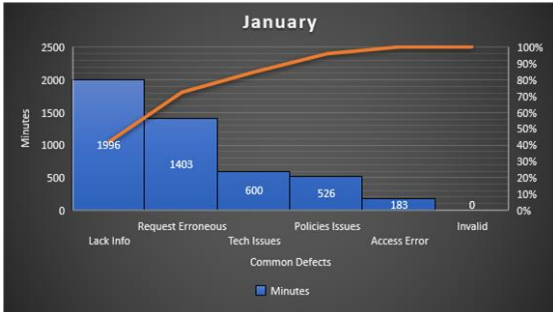


Figure 3
The Pareto Chart of January

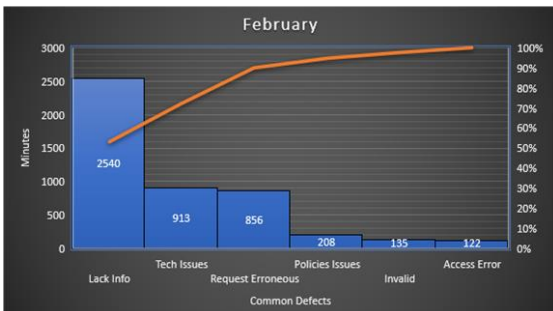


Figure 4
The Pareto Chart of February

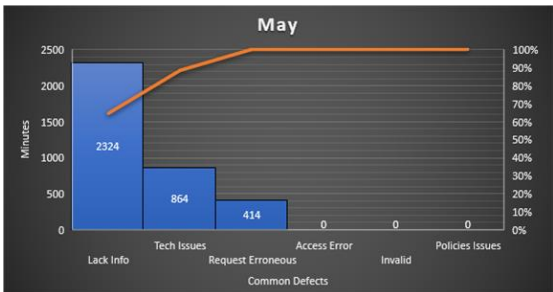


Figure 5
The Pareto Chart of May

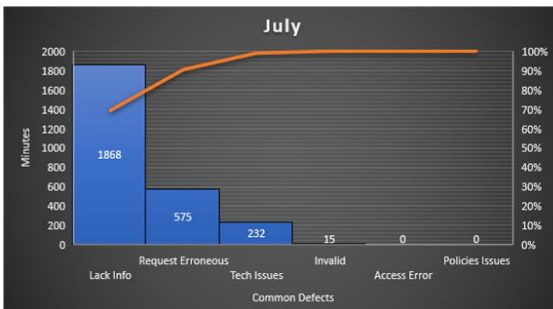


Figure 6
The Pareto Chart of July

or symmetry of the graph which on this case it is shown with quartile. The boxplot is an excellent tool because when doing the analysis brings valuable information like the maximum and minimum value, lower and upper quartile, the median, and the mean of the distribution of the data. Outliers are values that is distant from the rest of the data, this means that outliers are values that surpass the minimum and maximum limits and are represent as dot on the graph.

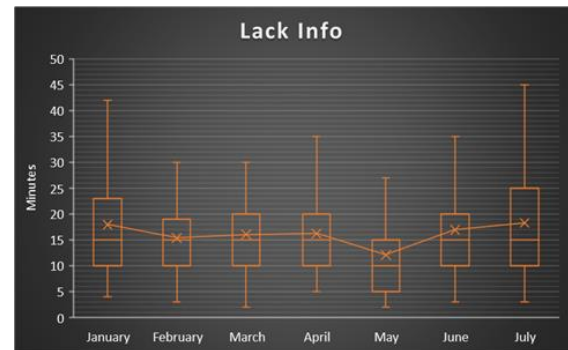


Figure 7
The Boxplot for Lack Info

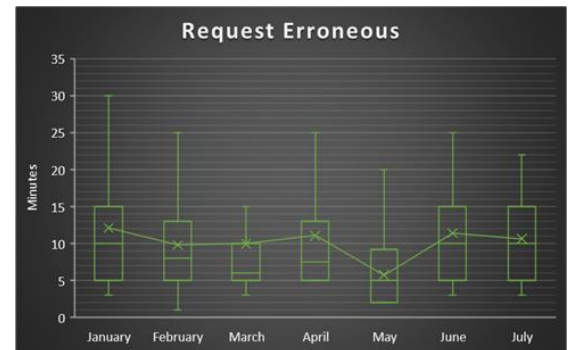


Figure 8
The Boxplot for the Request Erroneous

Each boxplot represents every defected that was found on the database, observing the graph of Policies Issues, Access Error and Tech Issues is able to analyze that those graph does not contain all the 7 month this is because the defected mention previously are very rarely registered on the database, this types of turnbacks are not going to be taken into consideration because even if the turnbacks are eliminated completely is not going to make a big change on the system. On this research, the main focus is going to be the Lack info (Figure 7) and Request Erroneous (Figure 8), this turnbacks

- **Boxplot**

The Box and Whiskers is a graph that is often used on data analysis, the boxplot it shows the numerical distribution of the data and the distortion

are constantly presented on the database and both of the defected all registered each month, reducing the amount of turnbacks that are entering the system is going to make a big impact on the problem that the company X is having on the classification center. The outliers were hidden from the data because they affect the distribution of the graph and, taking into consideration the blog on How to Deal with Outliers in Your Data [3], this situation is possible. The average time that is wasted on each turnback is between 10.1 and 16.2 minutes, in addition the amount of minutes that is wasted each month for the lack of info and request erroneous is between 727.6 and 1,988.0 minutes, therefore the design phase as to reach the goal to reduce 48.41% of the time wasted on the classification center.

Analyze

This section of the chapter is where the causes of the main problem of the turnback are going to be

detected with a causes and effect analysis, in this case the tool selected that is been apply on the analysis is the fishbone diagram (Figure 9). This tool is going to help discover the defects, failures, and variations within the process of classification, the fishbone diagram is one of the most used and efficient technique when talking about root cause analysis.

Once the fishbone diagram is developed then the 5 Whys technique can be implemented because these two root causes analysis complement each other very well, the techniques are similar, but the fishbone help to identify all the possible causes and the 5 Why's technique can identify the root of why this defect is happening. The 5 Why's is used to troubleshoot the main problem, quality improvement and to solve the problem is effectively used with other root cause analysis like on this case fishbone diagram and the main purpose is to find and solved the problem to eliminated future defects.

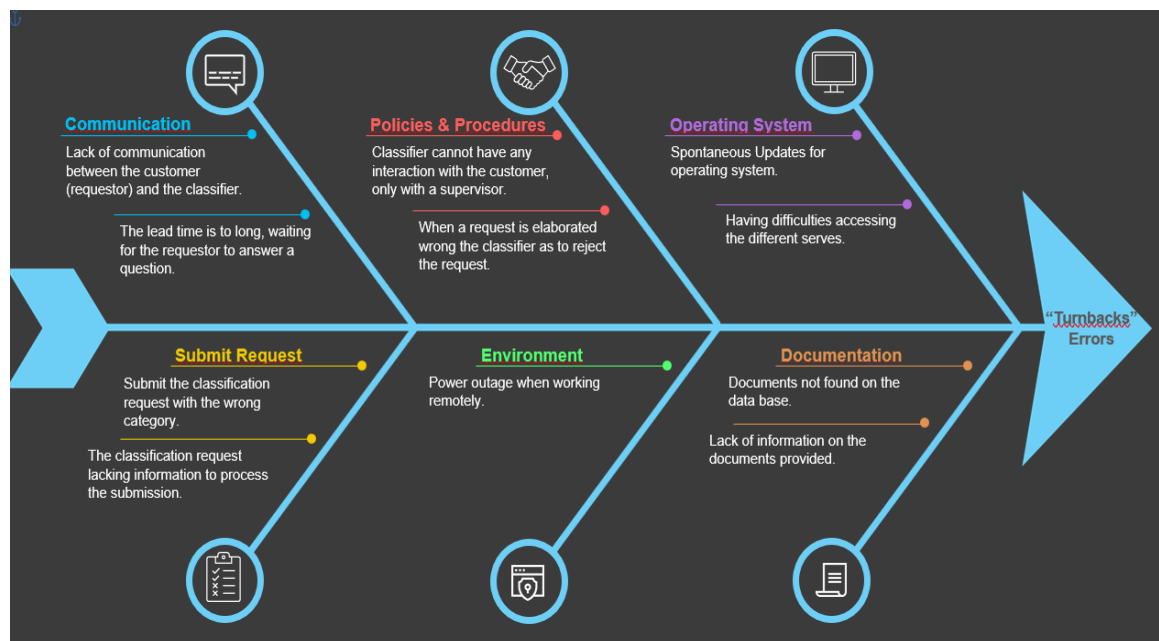


Figure 9
The Fishbone Diagram

5 Why's									
Question	Communication		ANSWER	Submit Request		ANSWER	Documentation		ANSWER
1st Why	Why the communication can be a "turnback"?	There is a limited communication with the requestor.		Why are errors on the request submitted?	Well the request is submitted with the incorrect category, CAGE code, or Business Unit		Why the documentation could be a "turnback"?	When analyzing a request the info needed is not found	
2nd Why	Why there is a limited communication with the customer?	The only communication that the classifier has is before rejecting the request a commentary is necessary to explain the rejection.		Why this types of errors occur?	Maybe the requestor do not know all the information necessary		Why the info is not found?	The database used to found the info are not available.	
3rd Why	Why the rejection commentary is the only communication?	Because to avoid any policies issues between the classifier and the requestor (customer).		Why this information is not known by the requestor?	On behalf of the requestor's company there is no proper training		Why the information is not available?	The requestor has to make sure that the database is updated so the classification can be completed smoothly.	
4th Why				Why is there no proper training?	Because there is no guide available for requestor or company.				
5th Why									

Figure 10
The 5 Why's Tool

The table presented above, Figure 10, is the tool of 5 Whys which is necessary to develop with the creation of the fishbone diagram, because the reason of errors detected on the fishbone diagram can be solve or identified the real problem behind the defects. On this exercise, it is selected 3 categories that affect most of the turnback which is Communication, Submit Request and Documentation. When using this technique is not necessary to use the 5 Why's, the requirement is to ask why until the root of the problem has been deciphered. To develop the 5 Why's classifier was asked to answer with the first and then the questions are progressively evolving with each answer. Having the results presented above, the design phase can start which is going to be developed throughout the project.

Design

This chapter is going to be focused on a solution to for the project and make possible to reduce the turnbacks with at least 48.41% reduction. It is important to conduct an excellent investigation on the previous phases because that way the design phase can target the problem and be able to solve the problem for good, if the previous phases are developed poorly the design can be a failure. The design develop is a check list were going to help reduce the amount of turnbacks and,

help the requestor get organized and obtained the necessary information to submit the request successfully with the purpose of classifying the request without any problem. This check list contains step by step information, tips, and requirements before submitting a request, this way the request can provide the document that is going to be evaluated like a tech data of an ATP (Acceptances Test Procedure) for example, and to attach any other information that may help narrow the classification of the requested submitted. The document for this phase is not going to be presented because of policies from the Company X and other companies that are mentioned on the check list but for the purpose of the research a process table is going to be presented and explained every step to explain each requirement.

Before submitting a request is recommended to verified if the item is previously classified and if the request is a tech data make sure the commodity that is related to the tech data is classified on the system. The first step on the checklist is the selection of classification purposes which are only two option that is Harmonized System and EAR this option depends on the needs of the customer, next option is the regime which on this case it all ways is going to be US because that is the only service the Company X provided since it is an American company. The following option is the

selection of the business unit, segment area and the functional area this option depends on the customers company so if the request has doubt on the previously information, it should contact the TM or the supervisor on site to ensure the information selected. Selecting the classifier for the request is necessary so in that case is Company X, this is one of the major errors that are registered on the database selecting the wrong classifier.

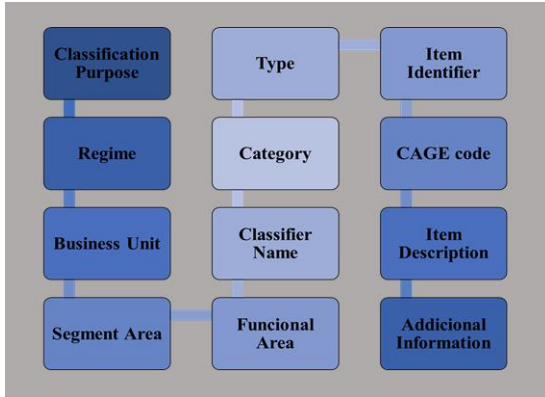


Figure 11
The Process of Requesting a Classification

The next section is the category type, that start with the selection of the commodity, software and tech data, the requestor must make sure to select the correct category. Once the category is selected the next step is the selection of the type, which all depends on the document or item that is wished to be classified, if the requestor has doubts on the type is recommended to contact with the corresponding TM of his company. When the category and type are selected, then the information of the item as to be input on the request which on this case begins with the item identifier, in other word is the P/N that is embedded on the document or item for identification purposes, next is the input of the CAGE code were all depends on the manufacturer's item, every manufacturer has his own CAGE code and to be able to classified for example a tech data the commodity needs to have the same CAGE code to process the request successfully. The last information needed to submit a request is the item description which is the title that the document or item has for example the drawing as the item description on the title section.

All the information previously mentioned above, is the required information to submit the request successfully, however, is recommended to input information on the section of additional information, that can help to evaluate the classification of the item much easier and precisely, because the database is not updated frequently by the requestor, and this could end on a turnback because no information was found. For example, the additional information could be where the item or document is going to be used, what it does, where is going to be installed, if the item is commercially available, provided vendor P/N and, if possible, the ECCN of the manufacturer, this information is highly helpful when the item is being evaluated by the classifier.

Verify

The final phase of this research is validated which is the verification of the design develop previously were multiple tests are processed to ensure that the design reach the objective that was implemented at the begin, on this case the reduction of the turnbacks that enter the database. Also, on this phase of validate, expectation are confirmed, the development is enhanced and errors that occur on the design is recorded for future information. This phase ensure that the design is sustainable for the service routine operation.

The 5S methodology that is represented on Figure 12, is going to be used on the validate phase which comply with all the requirements that is needed on this phase. The 5S is a tool used on lean manufacturing to organize, clean, and control the productivity of the service and to help to keep a system operating at the highest standard.

Sort is the first step which is to remove any unnecessary equipments, item, tool for the area of work that does not belong on the workplace. Set in order is the next activity which is to organize and identify every tool that is necessary to use on the operation service. The step of Shine is exactly what it says to clean and inspect each area around on the workplace or system to achieve a clean and sanitized area on the workplace. The step of

Standardize is basically cycle the three previous steps and make them routine activities. The final step is Sustain which is to monitor the standardized activity, track the process and continue this cycle on optimal conditions.

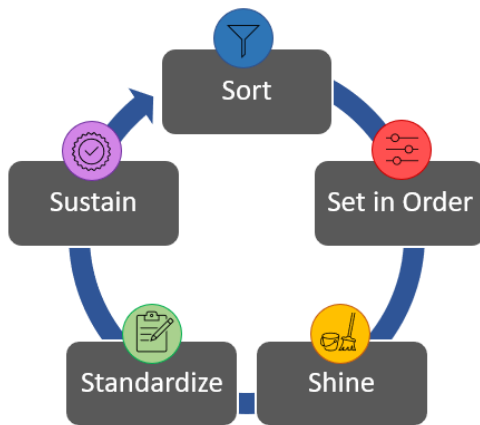


Figure 12
The Cycle Process of 5S

- **Sort**

When using the 5S on this research it begins with the first rule that is Sort, implementing the sort rule on the system is removing or rejecting any request that with a single look it is sure the request is submitted erroneous and this is easily confirmed when the Business Unit is Company X which it is wrong, another sort implementation is to verify all the item and eliminated those request that are duplicated which this are turnbacks to the system.

- **Set in Order**

The next rule on the list is Set in Order, which on this case the design phase appear because this rule consists on organizing the workplace area with the objective to simplify the submission of the request making it easy to find, used, and submit successfully. The checklist that was develop on the previously phase is to provide a guide for the requestor which explain each requirement that is necessary to successfully submit a classification request and give recommendations on additional information that would ease the process of classifying the item or document.

- **Shine**

The Shine rule consists on maintaining the system with lower turnback but it is not on hands of the classifier, the request is the one who has the control on avoiding a turnback but the classifier responsibility is to classified the item with success which consist on implementing a good investigation and comply with the order of review establish by the services that is provided.

- **Standardize**

The Standardize rule is basically to execute and repeat the previous rule Sort, Set in Order and Shine, however the rule of standardize is to make a routine and implemented the last 3 rule to the normal work procedure. Another purpose of the standardize rule to record or in this case registered every classification which is automatically done when a classification is completed and when a turnback is rejected, then is manually registered on the database by the classifiers.

- **Sustain**

The final rule to the 5S method is Sustain which is not the end to the methodology because is an ongoing cycle, therefore the procedure that is being implemented has to be evaluated regularly to make sure that the process is at optimal conditions. The Company X provides several activities or seminar that help improved the classification process some examples are training for new updates of the regulations and performance evaluations that are execute each month individuality.

CONCLUSION

In the research that was conducted on the "Turnback Control Management of the Classification Center", the problem and the solution was determined using the DMADV tools of the Lean Six Sigma methodology. Using this tool, it was possible to define the problem, measure the severity of the turnbacks, analyze the data collected, make a design plan and validate the proposal for the reduction of turnback in the classification center by using a Checklist to help

and guide the Requestor to submit the Requests in an organized and error-free manner.

In the Measure process, it was determined that the largest number of requests that were rejected in the Classification process was due to the lack of information with an average of 48.41% of the turnback registered on the database, and the other 51.59% being erroneous request, technical problems, policy problems and access denied. On the other hand, using the boxplot, it was possible to determine the amount of minutes that were wasted on each request which was approximately between 10 minutes to 16 minutes. In addition, the monthly wasted time was calculated for each month and was found to be between 727.6 minutes and 1,988.0 minutes. In the analyze phase, the cause and effect was determined the turnbacks that have been registered on the database system. During the analyze phase, it was determined that the large quantity of turnbacks that enter the database is due to the lack of information, due to the Requestors do not have the adequate training to successfully submit a Request. For this reason, in the design phase a Checklist was developed, which helps the Requestor to have all the necessary information to submit a Request and recommendations to help the classifier to determine the classification of the item without any inconvenience.

Providing this Checklist to all customers who receive the item classification service will provide a simple and easy to understand guidance to reduce errors in the system by more than 48.41% because the other defects like the erroneous request will be solved with the same guide. This research reaches each goal that was presented on the objective section, the primary objective was to reduce the amount of turnback for at least 20% and during the evaluation and analysis of the research the goal was surpass because with the checklist provided to the customer is affecting more than one type of turnback.

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