

DEFINE PHASE

Six Sigma Yellow Belt Project Charter

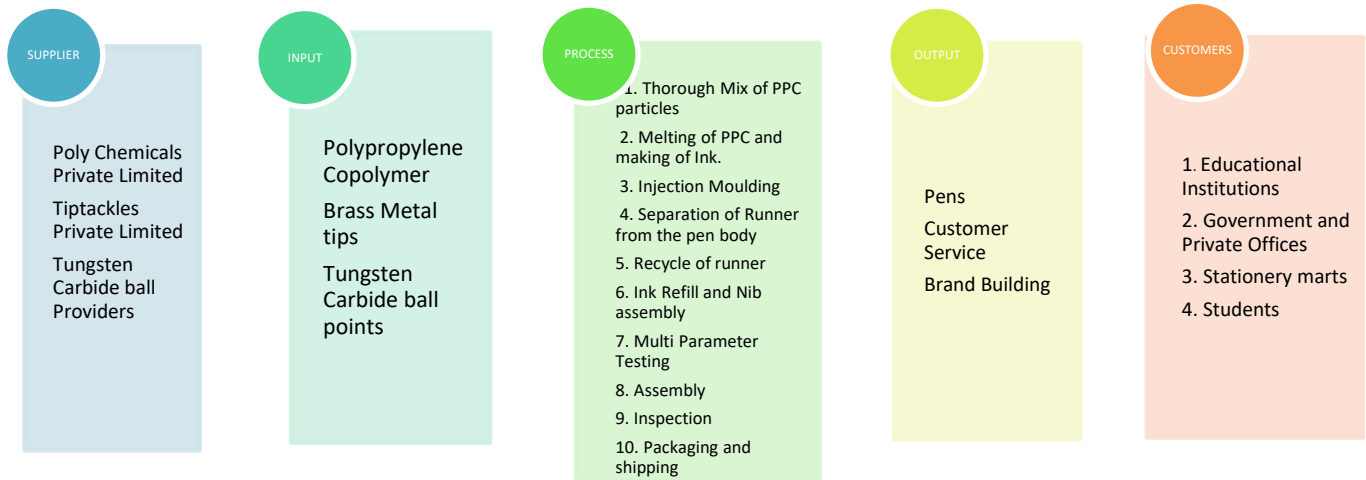
Project Name	METHODS TO IMPROVE THE STANDARD OF PRODUCTION IN A PEN MANUFACTURING INDUSTRY
Project Start Date	24 June 2020
Target Completion Date	02 July 2020

Project Element	Response
Problem Statement Includes time, measurable item, gap and business impact	The Ramsay Pens Private Limited Company is emerging as one of the top pen manufacturers of the state. So the management wanted to improve the standard of production by eliminating the unnecessary cost. So, our main aim is to draft a plan and work towards it and find the optimal ways of production with minimal use using the Six Sigma technique.
Business Case - Why is this project important to do now? - What is the project's financial impact? - What is the impact on the DPMO/ Sigma level? - What is the impact on customer service?	- This project is important to improve productivity with an increase in profit of the company by implementing Six Sigma standards. - This project has a significant effect on the share values and assets of the company. - Defects of 4 per 1000 opportunities (Sigma Level = 4.12) are occurring. We aim to achieve higher sigma levels through continual improvement - The improved standards in quality attracts a large volume of customers towards this company. Also, the amount saved from this process can be used for improving customer services and advertisements.
Goal Statement - Specific - Measurable - Achievable - Realistic - Time-bound	- To obtain a solution to improve the standards of production of the company and reduce the defects thereby reducing unnecessary investments. - Identify the Problem causing area in the production line. - To identify the possible ways of occurrence of the problem to avoid future occurrences. - To force ourselves to inspect in person about the operation lines in the industry. - To find the solution within 10 days from the start of the project.

Process Describe the process in which the problem exists	The problem has been identified in various parts of the production line.	
Project Scope - What part of the process will be addressed? - What are the boundaries of the project or process? - What areas are inside or outside the team's focus or authority? - Attach a SIPOC diagram if necessary	- Assembly line - Ink filling line to Pen cap assembly line <u>Areas Inside team's focus:</u> Examination of Assembly of Pen manufacturing units, Identification of Problem occurring area, Ways of suggestion of a solution to the management <u>Areas Outside the team's focus:</u> Organization's hierarchy, Industry timing, Management decisions. - Please find this at the end of Project Charter	
Team	Member Name	
Project Sponsor	Ramsay Pens Private Limited	
Key Stakeholders	Process owners, Company Employees, Customers	
Team Lead	Mr Prakatish P R	
Team Members	Mr Karthikeyan M, Mr Vijay J, Mr Rajan K	
Process Owner	Ramsay Sons	
Other	Assembly line workers	
Timeline by Project Stage	Milestone	Target Completion Date
Define	Project Charter and kickoff	25 June 2020
Measure	Define and collect data	27 June 2020
Analysis	Find causes	28 June 2020
Improve	Fix causes	29 June 2020
Control	Standardize the fix	30 June 2020

DEFINE PHASE

SIPOC DIAGRAM



DEFINE PHASE**Six Sigma Yellow Belt Team Charter****PROJECT TITLE**METHODS TO IMPROVE THE STANDARD OF PRODUCTION IN A PEN
MANUFACTURING INDUSTRY

Expectation	Team Rule
Attendance	• All team members are required to be on time for the team meeting • Team attendance will be taken regularly after 5 minutes of the start of the meeting • Meeting details will be mailed to respective team members a day before the meeting
Participation	• Active participation of team members is the priority of our meeting. • Team members are encouraged to have the freedom of expressing their ideas and thoughts
Focus	• The meeting agenda will be well drafted prior to the meeting • The Project Focus will be based on Project Charter.
Interruptions	• Interruptions during the meeting will not be encouraged. • The team members are required to switch off their electronic devices.
Preparation	• Team members are required to be prepared for the meeting based on the agenda. • The deliverables should stick to the proper timings and are requested not to exceed the respective timings preferably
Timeliness	• The Meetings will begin as scheduled. • The team members are strictly advised to be punctual.

PROJECT TITLE	METHODS TO IMPROVE THE STANDARD OF PRODUCTION IN A PEN MANUFACTURING INDUSTRY
----------------------	--

Expectation	Team Rule
Decisions	- The decisions will be made only after discussion with the team members. - The team members can feel free to express their opinion in this regard.
Data	- Initially we will be proceeding with the data provided by the management, and check its correctness. - The datas which are not clear or needs specific attention will be collected by the team specially with the permission from the Management. - All the decisions made will be based on the data.
Conflict	- The team members have full freedom to express their ideas during brainstorming session irrespective of the practical possibilities. - Disagreement of points are allowed after the session in a parliamentary way. - Team lead will be responsible for maintaining the coordination and understanding between members
Other	- Active Participation is expected and appreciated. - Team members can feel free to express their queries to the Team lead.

Team Member	Signature
Mr. Karthikeyan E	<i>Karthikeyan</i>
Mr Vijay R	<i>Rvj</i>
Mr. Prakatish P R	Praki
Mr Rajan K	Rajank

MEASURE PHASE

Six Sigma Yellow Belt Data Collection Plan

CHECKSHEET

Project Name: METHODS TO IMPROVE THE STANDARDS OF PRODUCTION IN A PEN MANUFACTURING INDUSTRY

Name of Data Recorder: Mr Vijay R

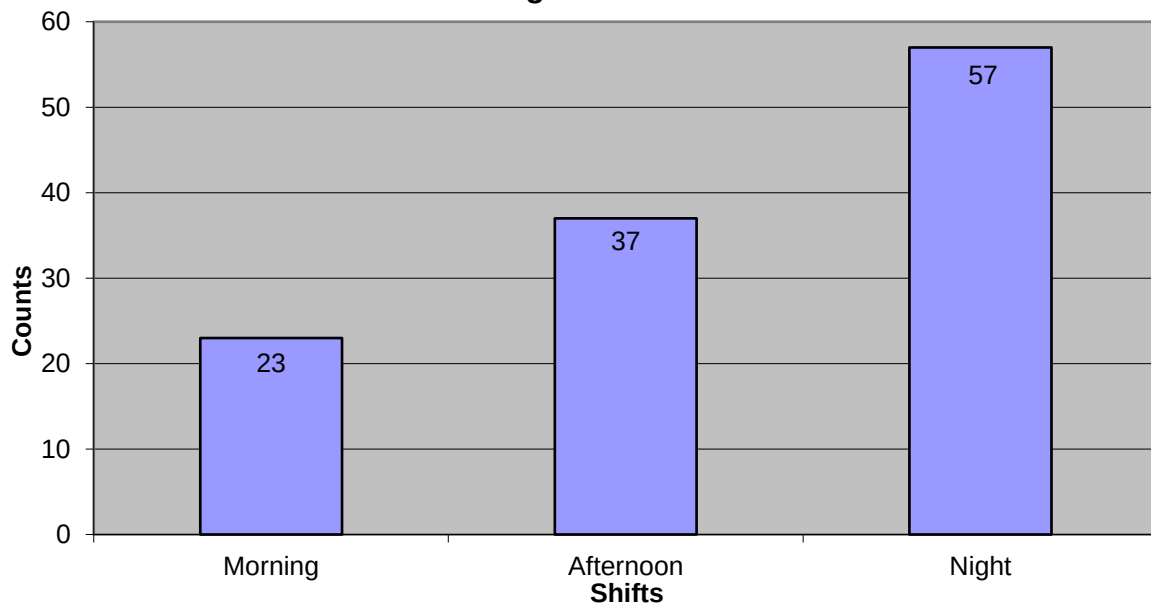
Location: CHENNAI

Data Collection Dates: 02/07/2020

Defect Types	Shifts			TOTAL
	Morning	Afternoon	Night	
Pen Body Moulding	8	10	14	32
Ink Overflow	6	7	12	25
Ball Deformation	1	3	3	7
Improper Pen tip fixing	3	5	7	15
Reduced Ink level in refill	1	3	6	10
Broken Pen Cap	0	1	1	2
Absence of Pen Cap	1	1	2	4
Loosening of bottom cap	3	7	12	22
TOTAL	23	37	57	117

HISTOGRAM

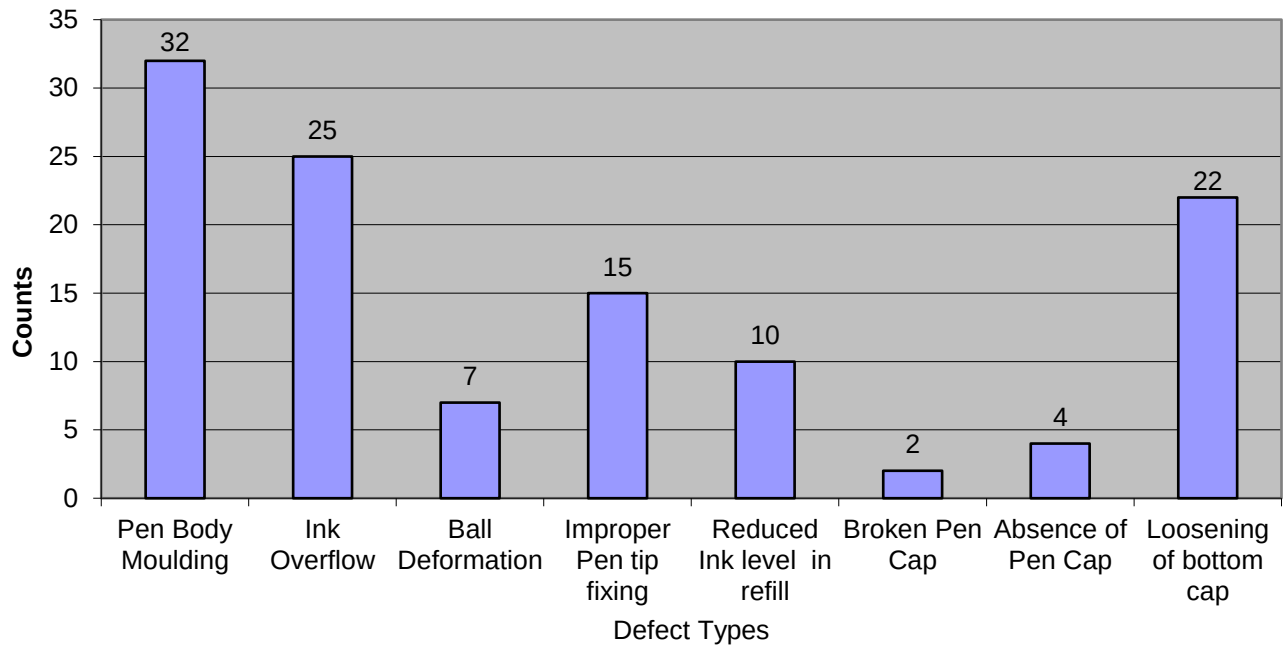
Histogram: Defects Over Time



MEASURE PHASE

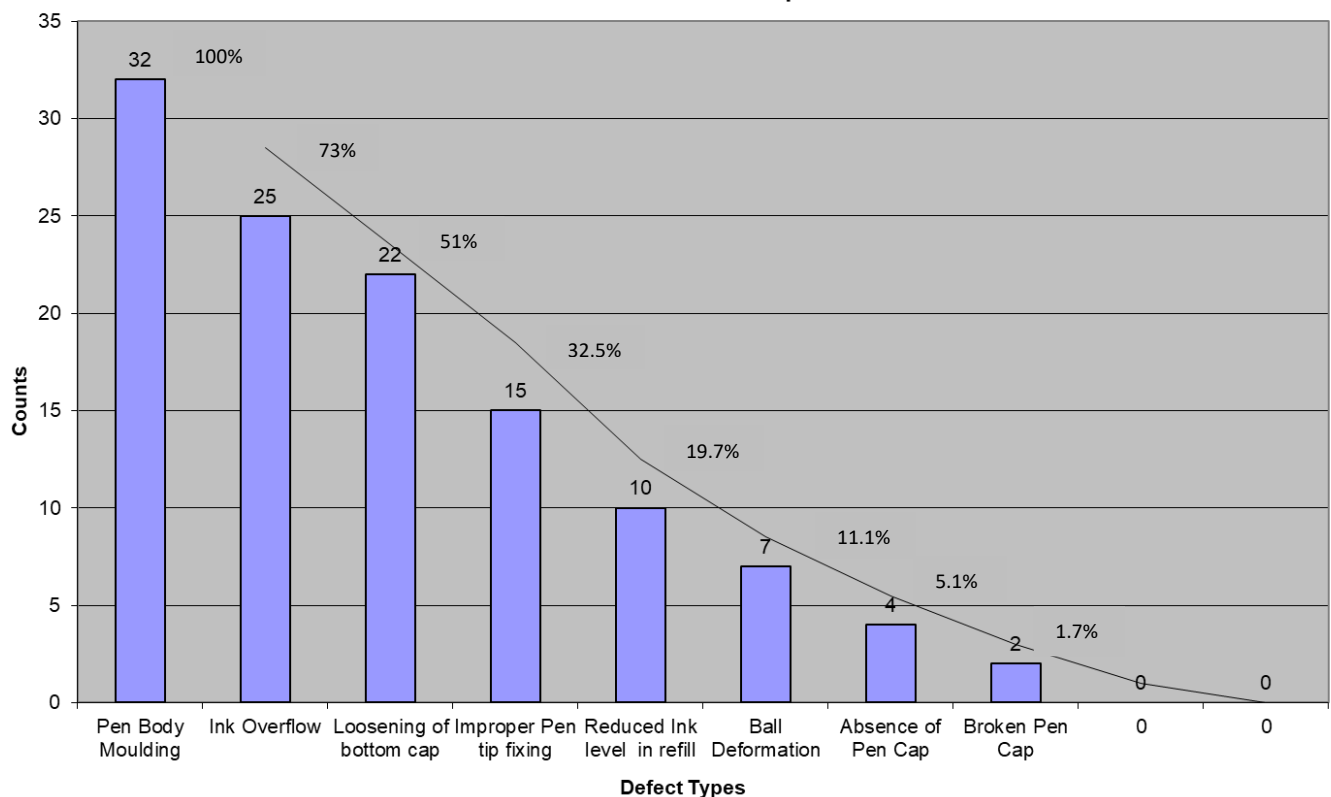
BAR CHART

Bar Chart: Defect Counts



PARETO CHART

Pareto Chart: Most Frequent Defects



MEASURE PHASE

Data Collection Plan Interpretation

Checksheets

The check sheet is a document used to collect data in real-time at the location where the data is generated. It allows the user to interpret the results readily and easily. It gives us a clear idea about **what** we are going to measure. In this project, the check sheet is used to identify the type of defect and the number of opportunities that a defect could occur during the manufacture of Ball-Point Pens. The above check sheet contains the record of occurrences of different types of defect during the three shifts on a single day. It is one of the seven Quality tools.

NOTE: For better and accurate results the data should be recorded at different dates for a considerably more number of times. Due to the limited scope of the project, we have considered a single day.

Histogram

It is a graphic summary of variation in data. It tell us **when** does the defects occur and **how** many defects happen during the different shifts. From the above histogram example, we can interpret that, more number of defects (57 defects) occur during the Nightshift. This gives us a clear picture which enables us to take the necessary **preventive action** required. Also, histograms let people to see complex patterns that are difficult to be visualized using simple tables. It is also one the seven quality tools.

Bar Graph

Bar graph gives us a pictorial view of **how** frequent the defects occur It is also used the compare the number, mean etc. for different discrete categories of data. In our project, the Bar graph gives us a clear view of the frequency of occurrence of each type of defects.

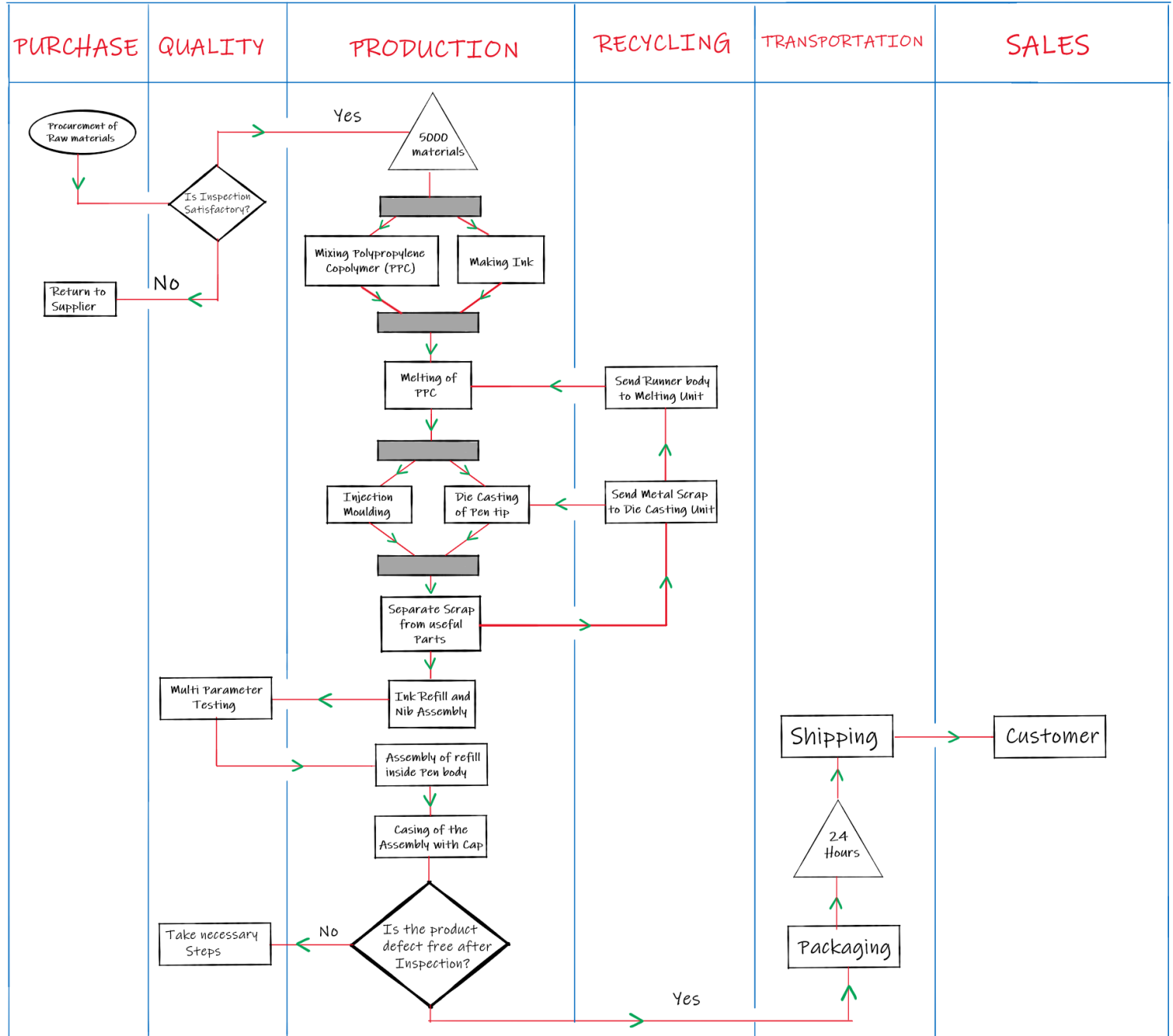
Pareto Chart

It is a graphical tool which ranks the causes causing the defects in the descending order from most significant to the least significant. The Pareto Chart is based on the 'Pareto Principle' or '80-20 Rule', which states that '80% of the effects come from 20% of the possible causes'. Pareto charts serve as a very important tool **which** helps us to identify the root cause(s).

The Pareto chart gives us a clear idea of **what** causes are need to be addressed most importantly. In our Project, the Pareto Chart shown above helped us to recognize the important defect(s) that require immediate attention. The line of the Chart indicates the cumulative percentage. Also, the Pareto Chart helps us to overcome the Capital constraint by providing clear cut idea on the important causes to be prevented, thereby eliminating the need for changing of the overall process

ANALYZE PHASE

Six Sigma Yellow Belt Process Map



ANALYZE PHASE

HYPOTHESES

Based of the above inferences we state the following hypotheses

1. The mean number of defects is greater than 14.

H0: $\mu \leq 14$ - Null Hypothesis

H1: $\mu > 14$ - Alternative Hypothesis

2. If the workers are asked to work in Nightshift then more number of defect defects occur during the Nightshift.

H0: Most number of defects occur during the Nightshift

H1: Most number of defects don't occur during the Nightshift

3. If the whole process is analyzed then the most problematic part is found to be the Pen body moulding which causes a total of 32 defects in three shifts.

H0: $\mu = 32$ defects in Pen body moulding during three shifts

H1: $\mu \neq 32$ defects in Pen body moulding during three shifts

4. Large size of inventories causing increased production Cost.

H0: $\mu \geq$ Current Inventory size

H1: $\mu <$ Current Inventory size

5. Increasing the standards of the Suppliers helps us to reduce the investment of Inspection by a very large margin.

H0: Increasing the standards of Suppliers have a great positive effect on productivity and decreased Capital Investment in Inspection

H1: Increasing the standards of Suppliers doesn't have any significant effect on the productivity and Capital Investments in Inspection



Done By: PRAKATISH P R



A SHORT REFLECTION ON THE LESSONS LEARNED FROM SIX SIGMA YELLOW BELT COURSE

This course on Six Sigma Yellow Belt by Kennesaw State University was very useful and productive not only in learning about the application and implementation of Six Sigma Techniques in improving the Production Standards of the Company but also in implementing these techniques in our very own daily routine to improve our way of living to an organized and structured culture.

The various tools and techniques of Six Sigma like the Pareto Analysis, Prioritization matrix, Brainstorming, Value stream mapping, Process mapping where new and interesting to learn.

This course served as an eye-opener for the vast field of Quality Control and Management, which lead me to shift my attention to a new area of application. The most special part about this course is that the techniques taught are also useful for implement in a lay man's day to day life, unlike other courses.

Finally, I thank Kennesaw State University Professors and Coursera for providing us with this valuable opportunity to learn more about Six Sigma.