Implementation of Lean Six Sigma at Ayesha Knitwear to Reduce the Rejection Rate of Garments

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DEDICATION

We dedicate this project to our Parents for their endless support and Prayers for our success.

بسم الله الرحمن الرحيم

Abstract

As we see it is worldwide rivalry among the organization so it’s inflexible for one to earn profits without plummeting the denial rate of manufacturing goods. Denial rate of any good plays a vital part for customer fulfillment and financial circumstances of any company. Denial rate grounds an undeviating consequence on profit margin of a good and reduces the eminence of the product. Hence organizations are besieged to lessen denial rate throughout the manufacturing processes by using diverse quality techniques, scrutiny all through dissimilar operations, instigating modifications and severe quality checkups where rate of imperfections are high. Extraordinary denial rate in garments due to diverse number of blemishes during sewing is key problem encountered by Ayesha Fabrics. This project holds significant importance from the industries perspective because of customer discontent and financial losses being faced by the organization. Lessening in the denial rate is the project in which it is effectively attempted to prompt-out bases along with numerous other factors by adopting Lean Six Sigma approach. It was certain to device Lean and DMAIC methodology in sewing department where extraordinary denial rate of stitched garments was detailed. This exploration presents a broad study with concentration on implementation of Lean Six Sigma. The key aim of this exploration is to present DMAIC process of Six Sigma. The hurdles were being practically recognized in garments manufacturing industry during exploration. It was than measured to classify the range of difficulty so that it may be eradicated or condensed. Microsoft Excel and Minitab is being used for the statistical analysis. A prime resolution will be proposed along with areas of enhancement with reduced denial rate and offer a noteworthy financial welfares.

Contents

Chapter 1

Introduction To Lean Six Sigma

1.1) Introduction

In the first place there was 100% examination and afterward in the 1940s inspecting arrangements were produced to characterize satisfactory deformity levels. In the 1970s quality master Phil Crosby made a system called zero imperfections. This project was an uplifting method for disclosing to workers the idea that everything ought to be carried out right the first run through and no amount of disappointments or surrenders in the work yield was a satisfactory execution. It concentrated on getting the single person to focus on doing mistake free work. Representatives even marked a vow card, guaranteeing to do their work "right the first time."

The zero imperfections idea was to a degree disputable on the grounds that some quality specialists felt it principally centered around gathering interior outline details. It didn't concentrate on client prerequisites or on persistent change. Numerous quality experts couldn't help contradicting the idea on the grounds that they accepted that it was difficult to have zero deserts constantly. These procedure situated experts felt that process ability prerequisites were a superior method for characterizing adequate execution. Anyway the U.S. government immediately grasped this idea and it turned into the "in" thing to accomplish for various years in the 1970s. [1]

1.2) History of Six Sigma

In 1981 Motorola's COO, William J. Weisz coordinated that all procedures ought to have a tenfold change inside a five-year period. Of course in 1986 Weisz obliged all estimations to enhance by an element of ten in three years. This called for radical changes in the route forms inside Motorola worked. To realize this extraordinary change, Motorola executed a project it called "Six Sigma Program." This system set a goal for all methodologies to measurably perform at a blunder rate no more noteworthy than 3.4 blunders every million for every open door. The genuine achievement in Motorola's Six Sigma methodology was that the Six Sigma idea was connected to all courses of action, not simply the assembling procedures.

To compute the procedure execution, tests of the yield were plotted on a histogram and the standard deviation was figured. Once the standard deviation and mean were figured, it was anything but difficult to look at the six sigma computed execution cutoff to the particulars and/or prerequisites. This obliged all associations to characterize their prerequisites for each one methodology and every movement inside the procedure. Obviously, this was not the situation for most non-creation exercises. Accordingly, associations that embrace a Six Sigma System are constrained into a significant overhauling of their interior necessities and estimation framework. To fulfill this, we suggest a strategy called “Area Activity Analysis.”

Once the process variation and mean performance are compared to the requirements, most processes fail to meet the Six Sigma requirements. Many non-production processes fail to even meet a ±3 sigma performance level (3 errors per 1000). In many cases non-manufacturing process did not meet a ±1 sigma requirement (318 errors per 1000).

Six Sigma quality became popular immediately following Motorola winning the Malcolm Baldrige National Quality Award in 1988.

Although Motorola called its program “Six Sigma,” it only required that six sigma be applied to one point in time (Cp = 2) and allowed the process to perform at lower levels when the process drift is considered (Cpk). [3]

SIGMA LEVELS AND CORRESPONDING NUMBER OF ERRORS		
Sigma Level	**Errors Per Thousand Opportunities**	**Errors Per Million Opportunities**
1 sigma	317	317,310
2 sigma	45	45,500
3 sigma	2.7	2,700
3.5 sigma	0.465	465
4 sigma	0.063	63
4.5 sigma	0.0068	6.8
5 sigma	0.00057	0.57
6 sigma	0.000002	0.002

Figure 1.1

1.3) Using Sigma

Figure 1.2 is a histogram depicting the same information that is shown in Figure 1.1. By studying Figure 1.1, it is easy to see that six sigma is two errors per billion units processed, not the 3.4 errors per million that Motorola accepts for its Six Sigma quality level. There is a difference between the two because Motorola considers a ±1.5 sigma shift of the process average over time as part of its total specification. For example, consider a manufacturing process whose spec limit is equal to six sigma (Cp = 2). If the process average is off-center by 1.5 sigma, the maximum number of errors is 3.4 per million based upon the standard normal distribution table

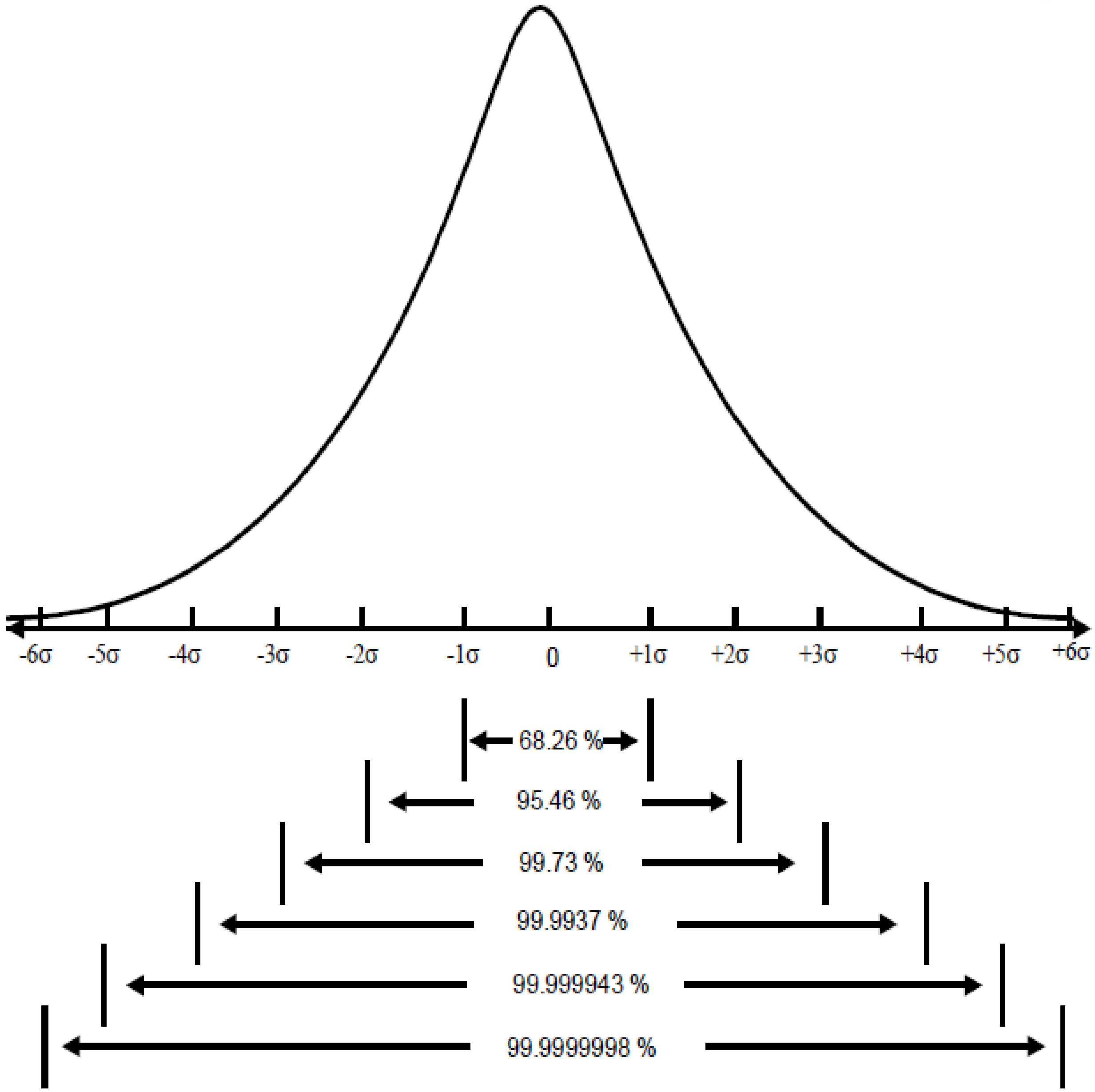


Figure 1.2

Figure 1.2 shows the effect on the process' capability to meet specification when the center point drifts over time. [7]

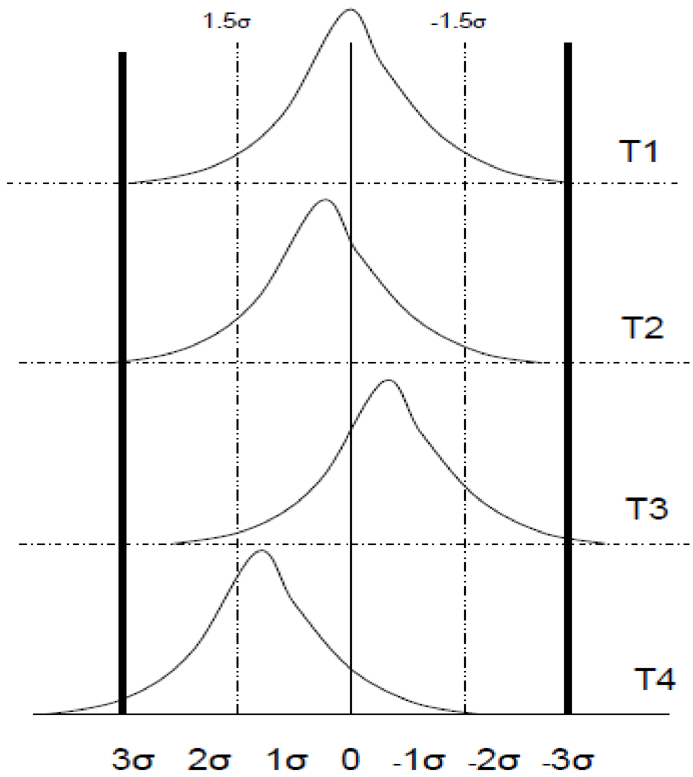


Figure1.3

You will take note of the center point of a conveyance will float despite the fact that from the single example computations for the circulation shape and width has not changed. Motorola contemplated this by subtracting ±1.5 sigma float/move in the process after some time. For instance, if a solitary example had its detail confines as equivalent to ±6 sigma when its mean was focused on the focal point of as far as possible, Cp would be ±6 sigma/±3sigma = 2. In the event that the long haul test mean floated ±1.5 sigma from the determination midpoint, the long haul process ability (Cpk) would be Cpk = (short term sigma value minus long-term drift) divided by 3 sigma

Calculation is Cpk = (±6 sigma - ±1.5 sigma) /3sigma = 1.5)

It is important to note that this effect can occur due to many factors. For example, it can occur due to changing operators and between different sets of equipment used in the same process to do the same activity. Equipment presents an additional problem because both the mean and the distribution can be different between equipment and fixtures built to the same specification. [12]

1.4) Error Opportunities

The Six Sigma idea is based upon slips every open door. This is a noteworthy movement from estimations like slips every unit, blunders every yield, mistakes every operation, and so forth. An opportunity is characterized as anything inside a thing, item, process, administration, or framework where a slip could happen that would neglect to meet the perfect condition according to the inward or outside client. Opportunities are the things that must be right to fulfill the following client; it is not the quantity of things that could happen.

Case in point, take the circumstance where an individual is in charge of inputting money related information into the records. For this situation, he/she would record the client's name, address, what they acquired and the expense. This would oblige he/she to record around 100 characters for every section. Expecting he/she performed 300 sections every day, that would mean he/she recorded 30,000 characters every day with 30,000 mistake opportunities. Figure 1.4 is the lapse rate based upon diverse sigma execution levels. [7]

Single Sample Sigma	Sigma with a ±1.5 drift	Percent Errors	Errors Per entry	Entry Errors Per day
1 sigma	-0.5	69.9	69.9	20,970.0
2 sigma	+0.5	30.9	30.9	9,270.0
3 sigma	1.5	6.7	6.7	2,010.0
4 sigma	2.5	0.6	0.6	180.0
5 sigma	3.5	0.02	0.02	6.0
6 sigma	4.5	0.00034	0.00034	0.1

Figure 1.4

1.5) Six Sigma Methodologies

Six Sigma has following two key Methodologies

1.5.1) DMADV: (Define, Measure, Analyze, Design, Verify)

- Design Methodology
- Utilize to re-engineering or design new process when existing process in not capable
- Design of brand new process

1.5.2) DMAIC: (Define, Measure, Analyze, Improve, Control)

- Process improvement methodology
- Projects focused on time/ cost/ quality improvement

1.5.3) DMAIC Methodology

1. **Define:** Select an appropriate project and define the problem, especially in terms of customer-critical demands.

2. **Measure:** Gain information about process performance and develop a problem statement.

3. **Analyze:** Analyze the causes of the problem and verify suspected root cause.

4. **Improve:** Identify actions to reduce defects and variation caused by root cause and implement selected actions, while evaluating the measurable improvement (if not evident, return to step one).

5. **Control:** Control the process to ensure continued, improved performance determine if improvements can be transferred elsewhere identify lessons learned and next steps. [4]

1.6) Introduction to Lean

What is Lean?
Lean is simply a method of streamlining a process

A Lean process:

- Is quicker
- Is more proficient and cost-effective
- Delivers adequate worth

Lean focuses on the removal of waste, which is defined as anything not necessary to produce the product or service.

One common measure is touch time—the amount of time the product is actually being worked on, or touched, by the worker. Frequently, lean's focus is manifested in an emphasis on flow.

There are five essential steps in lean:

1. Identify which features create value.
2. Identify the sequence of activities called the value stream.
3. Make the activities flow
4. Let the customer pull product or service through the process.
5. Perfect the process

Lean is a production practice with the key tenet of preserving value with less work. Operations that fail to create value for the end customer are deemed "wasteful." Eliminating waste and superfluous processes reduces production time and costs.

The seven wastes listed by Japanese founders Toyota are transport, inventory, motion, waiting, overproduction, over-processing and defects. The tools for implementation include value stream mapping, kanban pull systems and poka-yoke (mistake proofing).

Lean's mantra of "doing things better" leads many companies to view it from a cultural standpoint. Think of it like recycling – for it to work, it has to be more than an arbitrary process, and actually be engrained in society. For Lean to be successful, it has to permeate the business silos and receive universal backing amongst senior management and employees. [11]

1.7) Introduction to Lean Six Sigma

Lean and Six Sigma are often used in conjunction with one another in value chain improvement. Six Sigma process mapping does not distinguish between information flow and product material flow, because they all come under the process umbrella. The Lean discipline of value stream mapping leads many exponents to miss how information processing by departments can hinder the order to delivery cycle. Combining techniques makes it easier to measure and execute on lead times. [7]

1.7.1) **Benefits of Lean Six Sigma:**

- Increased customer and employee satisfaction
- Reduced costs
- Retained business
- Enhanced reputation
- Increased competitive advantage
- Improved staff morale

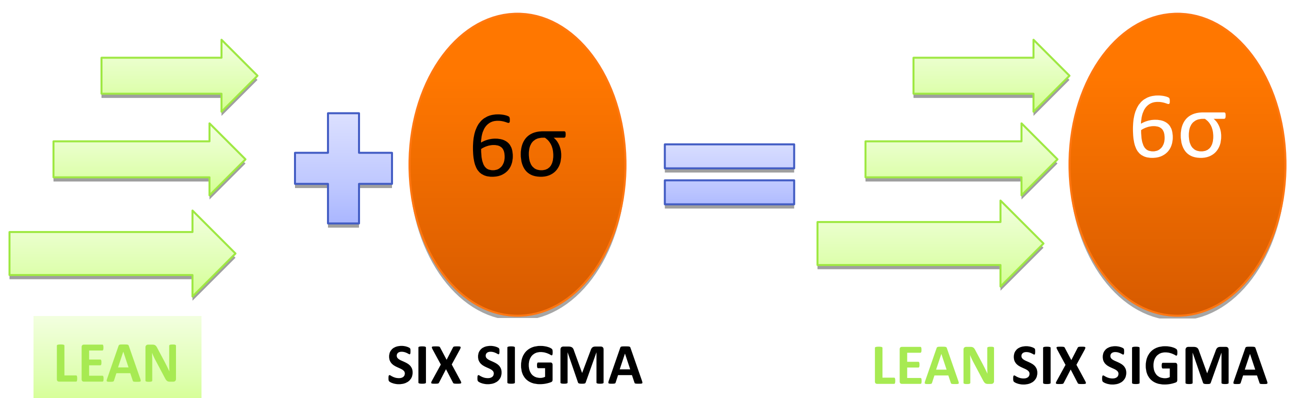


Figure1.

Lean reduces waste by streamlining a process & Six Sigma reduces defects by effectively solving problems. There for by combining Lean & Six Sigma we can solve problem and improve process in faster and more efficiently.

1.8) Tools for Lean Six Sigma

Tool Of Lean SIX Sigma

Define
- Project Charter
- SIPOC
- Value Added & Non–Value Added
- Process Mapng

Measure
- Data Collection Plan
- Histogram & Bar Chart
- P Chart

Analyze
- Pareto Chart
- Regression Analysis
- Cause And Effect Diagram

Improve
- Solution of Problem

Control
- Control Plan
- Control Charts

Chapter 2

Introduction to Project

2.1) Introduction

General trade materials and articles of clothing has accepted a basic part in the headway procedure of various countries and has also energized their blend into the world economy. In the Developed Countries, the approach of industrialization and ensuing prospering in a way launched with the mechanization of material era in the early nineteenth Century. In the Developing Countries, of course, the zone now include a basic spot with respect to its dedication to national yield, work and passages. Making countries as a social occasion, record for more than one an expansive segment of world tolls of materials and dress.

As the most recent WTO report (2006) states "In no other class of produced products do creating nations appreciate such a vast net trading position" as they do in the material segment. The worldwide material industry is prone to develop from USD309Bn to USD 856Bn. Pakistan has an enormous chance to benefit from a much bigger share of this development.

2.2) Information about Industry

Ayesha Knitwear is part of Ayesha Fabrics. Ayesha Fabrics imports yarn and produce and dye fabrics. The fabrics then send to Ayesha Knitwear to produce final products. The industry is producing garments for European and American Brands like American Eagle, Matrix, Synergies and T.I.S etc.

The garments manufactured in Ayesha knitwear are all style T-shirts, Uppers and Jackets for adults and children as per customer requirements. The industry is manufacturing around 50,000 garments per month.

2.3) Problem Statement

Ayesha knitwear is facing a problem of product rejection due to number of defects in the garment. The industry is manufacturing more garments than the demand to overcome the rejection problems hence making less profit. The industry instead of finding out the real cause of defects and the solution for defects to control rejection rate is just fulfilling the demand of customers by over production. The problem is the increase in the rejection rate of garments. Which is effecting the organization.

2.4) Objectives:

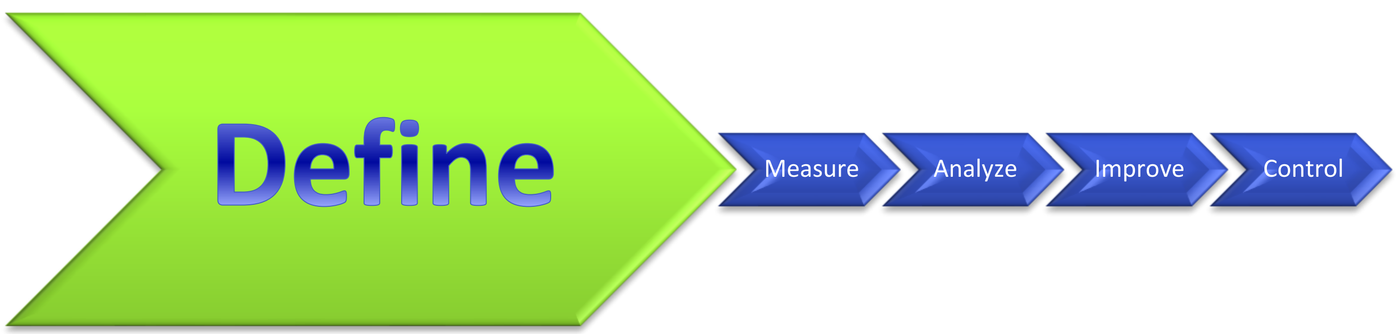
1. Improve the quality level
2. Reduction in the rejection rate
3. Reduction in the defects
4. Controlling the variation in the processes
5. Identifying the processes which lacks in quality and effecting the overall manufacturing
6. Providing proper road map to facility to achieve its goals towards Lean Six Sigma

2.5) Sewing Department

Our product is a simple t-shirt as shown in figure.

We will discuss all the operation in making this t-shirt. We will see all the loop holes in the process and all the quality operation happens in manufacturing this product.

Chapter 3



3.1) Introduction to Define Phase

Characterize is the first period of the DMAIC procedure of Six Sigma. In characterize stage we will disclose the issue technique to finish our task. Dismissal rate is imperative for commercial ventures. It impacts the benefit of an organization. In this contending business sector it is extremely hard to survive and on the highest point of it the dismissal rate it is exceptionally hard to keep up high benefits. It won't just diminish benefits additionally harm commercial enterprises notoriety. [2]

This is a quality related issue. All the rejected bit of garments happen in quality division. The quality monitor dismiss those pieces and the business needs to deliver new bit of garments set up of rejected pieces. Keeping in mind the end goal to do that the business uses additional time and assets.

The quality department has a very high denial rate of different products. The defects takes place during the moving of garments from different departments or during stitching. So as per circumstance we decide to take all the data of quality department of past one month and find out the defects behind the high denial rate.

We will visit industry at least two times a week to observe the process of manufacturing in stitching department. We will find out the possible causes for the deficiencies. We are using lean six sigma as a tools to eliminate the non-value added operation or process in both stitching and quality department.

3.2) Tools used in Define Phase

- Project Charter
- SIPOC Diagram
- Value Added & Non–Value Added
- Process Mapping

3.3) Project Charter

<table>
<tr><td colspan="4">Project Charter</td></tr>
<tr><td>Project: Implementation of Lean Six Sigma at Ayesha Fabrics to Reduce the Rejection Rate of Garments</td><td colspan="3">Team Members</td></tr>
<tr><td rowspan="2">Business Case:
Ayesha knitwear is facing a problem of product rejection due to which cost of product is increasing. So the purpose of project is to reduce the rejection rate to increase the profit & customer satisfaction.</td><td colspan="3">Sibghatullah
M.Aqib
M.Farhan Ali
M.Omer Ali Khan</td></tr>
<tr><td colspan="3">Project Advisor: Sir.Mohsin Raza</td></tr>
<tr><td>Problem Statement:
Increase in the rejection rate of garments is effecting the organization.</td><td colspan="3">Goal Statement:
Reducing the rejection rate by improving the existing process to increase the profit & customer satisfaction.</td></tr>
<tr><td rowspan="7">Project Scope:
The Define measure and analyze phase will be done by real data of industry but improve and control phase will not be implemented due to limitations. The improve phase will be suggested.</td><td>Timeline/ Phase</td><td>Start Date</td><td>End Date</td></tr>
<tr><td>Start Date</td><td>1st Aug 2014</td><td></td></tr>
<tr><td>Define</td><td>10 Aug 2014</td><td>30 Aug 2014</td></tr>
<tr><td>Measure</td><td>1 Sep 2014</td><td>15 Oct 2014</td></tr>
<tr><td>Analyze</td><td>16 Oct 2014</td><td>15 Nov 2014</td></tr>
<tr><td>Improve</td><td>1 Dec 2014</td><td>19 Dec 2014</td></tr>
<tr><td>Control</td><td>10 Jan 2015</td><td>1 Feb 2015</td></tr>
</table>

3.4) SIPOC

This is a process map that includes Suppliers, Inputs, Process, Outputs and Customers. Quality is judged based on the output of a process.

Table3.1 shows the SIPOC flow of the selected factory.

SIPOC Table

Top Management				
Supplier	Input	Process	Output	Customer
Garments buyers	Customer's product requirements, Quantity and due dates	Order review	Production Order	PPC
FID				
Supplier	Input	Process	Output	Customer
Top Management	Customer requirements and sample	Testing on Sample	Processing Report	PPC
Production Planning & Control				
Supplier	Input	Process	Output	Customer
Top Management	Production Date & Due Date	Raw mater & production calculation	Raw material quantity & lead time	All Departments
Storage Department				
Supplier	Input	Process	Output	Customer
PPC	Raw material Quantity & Quality	Procurement	Stored Item	Cutting department Sewing Department
CAD-CAM				
Supplier	Input	Process	Output	Customer
PPC FID	Production order FID Recommendation	Marker Plotting	Marker	Cutting Department

Cutting Department				
Supplier	Input	Process	Output	Customer
CAD-CAM Storage Department	Fabric Marker	Cutting of Fabrics	Fabric process	Sewing Department
Sewing Department				
Supplier	Input	Process	Output	Customer
Cutting Department	Cut Fabric	Sewing of Fabric	Stitched Garments	Washing Department
Washing/Dying Department				
Supplier	Input	Process	Output	Customer
Sewing Department	FID Recommendation Stitched garments	Washing Dying	Washed Garments	Finishing Department
Finishing Department				
Supplier	Input	Process	Output	Customer
Washing Department	Washed Garments	Finishing Garments	Finished Garments	Quality Control
Quality Department				
Supplier	Input	Process	Output	Customer
Finishing Department	Finished Garments Customer Requirements	Inspection	Accepted or Rejected Garments	Packing Garments
Packing Department				
Supplier	Input	Process	Output	Customer
Quality Control	Accepted Garments	Packing of Garments	Packed Garments in Box	Warehouse
Warehouse				
Supplier	Input	Process	Output	Customer
Packing Department	Packed Garments	Storing Boxes	Stored Items	PPC

Table 3.1

3.5) Process Map

The whole work will be done in stitching department and quality so only process maps of stitching department and quality department are created.

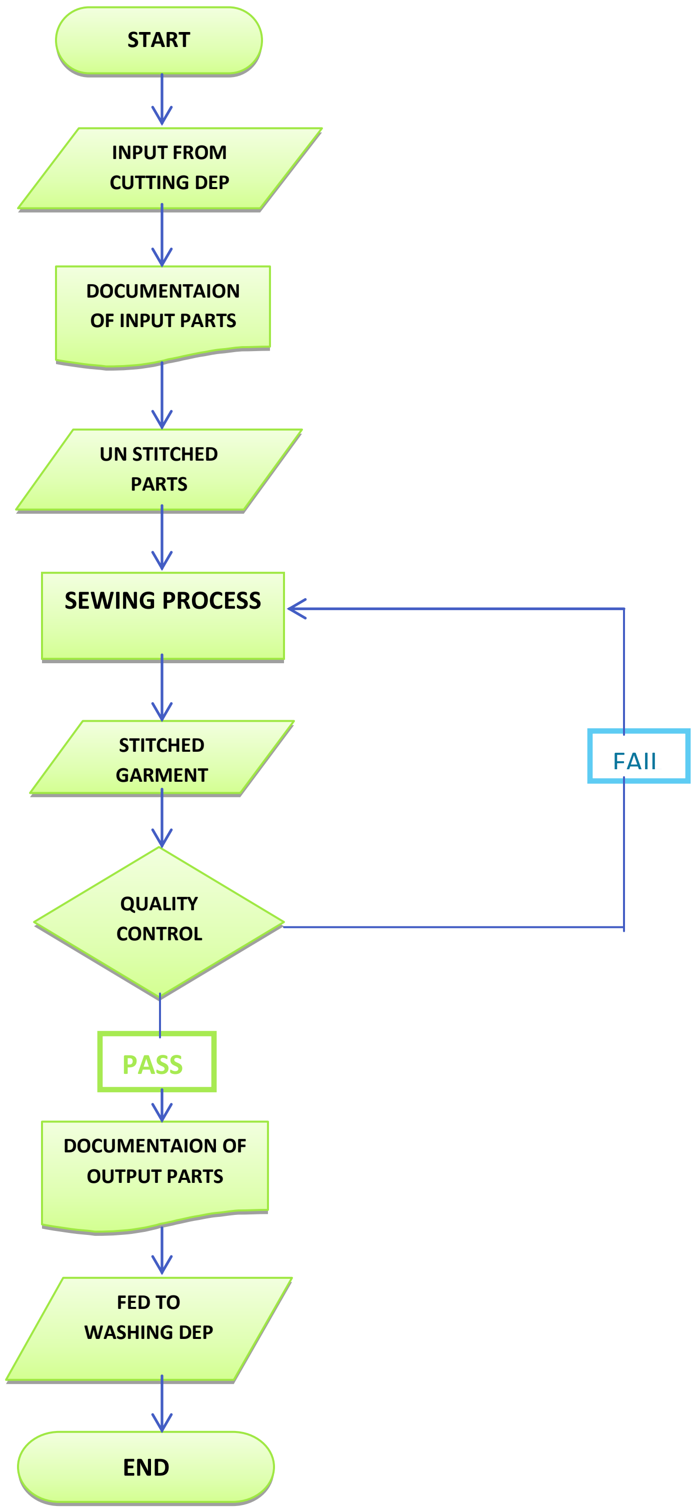


Figure3.2

3.6) Value Added & Non–Value Added

After constructing the value stream mapping, we try to find the value added activities and non-value added activities. After finding out the non-value activities we will try to eliminate them.

		Ayesha Fabrics	Shahkam Industry	
S.No	Process	Time/sec	Time/sec	Difference
1.	Placket Fusing Wide	10	7	3
2.	Placket Fusing Long	12	7	5
3.	Cuff Shanti	3.3	2	1.3
4.	Cuff Sleeve Attach	60	50	10
5.	Cuff Flat	4.3	4	0.3
6.	Placket prep	30	30	0
7.	Button Make	30	25	5
8.	Kaj Patti Make	20	15	5
9.	Kaj Patti Stop Stitch	12	10	2
10.	Bocs Stitching	30	25	5
11.	Placket Bocs Finish	30	20	10
12.	Collar Bent Tape Make	30	25	5
13.	Collar Make	30	28	2
14.	Collar Half Make	15	13	2
15.	Collar Half Clear	20	15	5
16.	Collar Bent Stop Stitch	30	31	-1
17.	Half Moon Size Attach	30	20	10
18.	Half Moon Attach	15	14	1
19.	Shoulder attach	10	10	0
20.	Half Moon Over Lock	10	7	3
21.	Shoulder Flat	60	60	0
22.	Bottom Flat	30	25	5
23.	Collar Prep	10	11	-1
24.	Collar Clear	30	25	5
25.	Collar Finish	30	26	4
26.	Sleeve Attach	15	14	1

27.	Arm mote Flat	30	22	8
28.	Side Went Prep	20	15	5
29.	Side Seam Over Lock	60	55	5
30.	Side vent Finish	60	45	15
31.	Side Vent Tokari Attach	30	20	10
32.	Front Bottom Label Attach	15	10	5
33.	Side Label Attach	60	50	10
	Total	**881.6**	**736**	145.6

Table3.3

We have done time study of swing department at Ayesha Fabrics and compare it with the Shahkam Industry whose swing operations are better than Ayesha Fabrics. So we find out that the Ayesha Fabrics swing department complete on shirt in 881.6 sec and Shahkam Swing department complete same shirt in 736 sec.

So Ayesha Fabric is 145.6 sec behind the Shahkam Industry. We will consider this 145.6 sec as non-value added activity which should be eliminated to compete the other industries.

3.6.1) Value Added Activity

- Transforms or shapes material or information or people
- And it's done right the first time
- And the customer wants it

3.6.2) Non-Value Added Activity – Necessary Waste

No value is created, but cannot be eliminated based on current technology, policy, or thinking

- Quality checking.
- Over Production.
- Record.

3.6.3) Non-Value Added Activity - Pure Waste

Consumes resources, but creates no value in the eyes of the customer

- Extra Quality inspection stations.
- Two separate stitching lines. (Line Balancing)
- Extra machines utilizing space.
- Interruptions
- Detours
- Backflows
- Waiting
- Scrap
- Stoppages

3.8) 7 Waste

The waste which we have find out in stitching department are as under:

The ‘Seven Wastes’ in Manufacturing

1. Overproduction

- Over production is done to cover the quality rejected parts.

2. Waiting

- The process time for each process is not balanced therefor at some stations worker had to wait for the product.

3. Processing

- Over processing is done on some stations as the worker are not well trained.

4. Motion

- Searching for tools
- Shifting WIP

5. Defects

- Defects were in large quantity
- Repairing defective parts
- Producing defective parts

6. Inventory

- Inventory was large due to large number of defects. To cover up defects inventory was used
- Work in process inventor

Chapter 4

4.1) Introduction To Measure Phase

Measure the current framework. Secure legitimate and solid measurements to help screen progress towards the goal(s) characterized at the past step.

The measuring stage tells about current circumstance of the business. The fundamental goal of the Measuring Phase is to get the precise and unique information to record the genuine execution of the methodology. [9]

At this phase, percentage of defects, existing DPMO (Defect per Million Opportunity) and Sigma Level of the selected factory

In measuring phase we composed the up-to-date data of the stitching department of the industry. The stitching department comprise of two lines which accomplish the same task. There were total 8 quality inspection lines which perform hundred percent inspection so there are 8 quality sheets per day .The quality inspector marks the quality check sheets on hourly basis. We composed the data of quality sheets of the past one month. The data we gathered was revised by us and we were able to identify NINE dissimilar defects which constantly occurred in nearly every check sheet. The check sheet and the nine defects are as under:

4.2)Tools used in Measure Phase

- Data Collection Plane
- Histogram & Bar Chars
- P Chart

4.3) Data Collection

Data is collect from the check sheets made at the quality department.

Ayesha Fabrics (Pvt)LTD.

Finishing Quality Report

(Super- Final Inspection)

CHECKER NAME : Lubna

W/O # KAP = 0/80
Style # Hood
Date 4-10-2014

TIME Defect Code	Oil Stain (326)	Skip (144)	Broken (332)	Open seam (176)	Hole (358)	Contamination (331)	Shaded Part-Variation (357)	Pleat (186)	Poor Press (376)	Total Inspect Gmts	OK Gmts	Total Faults	%
9:00 11:00	6	5	4	3	3					41	20	21	51.21
11:00 1:00	7	4	3	4	1					42	23	19	45.23
1:00 02:00	Lunch Time (Brake Time)												
02:00 04:00	6	3	5	4	3					44	23	21	47.72
04:00 06:00													
06:00 08:00													
G.Total													
Percentage													

Signature of supervisor

Signature of sQ.A MNGR

TYPES OF DEFECTS	Defects in Line#									
	1	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**Total**	**%age**
OIL STAIN	967	1873	1036	839	1499	1461	1200	1501	**10376**	29.6%
SKIP	807	961	736	1001	789	753	861	548	**6456**	18.4%
BROCKEN	771	651	868	659	770	591	869	989	**6168**	17.6%
CONTAMINATION	112	131	150	96	89	141	110	71	**900**	2.5%
SHADED PART-VARATION	126	127	165	99	130	120	135	110	**1012**	2.8%
OPEN SEAM	687	651	698	598	781	652	701	728	**5496**	15.8%
HOLE	449	551	351	450	448	356	541	446	**3592**	10.3%
PLEAT	86	87	96	56	101	80	91	95	**692**	2%
POOR PRESS	42	51	63	30	62	38	32	22	**340**	0.97%
TOTAL	**4047**	**5083**	**4163**	**3828**	**4669**	**4192**	**4540**	**4510**	**35032**	100%

Table4.1

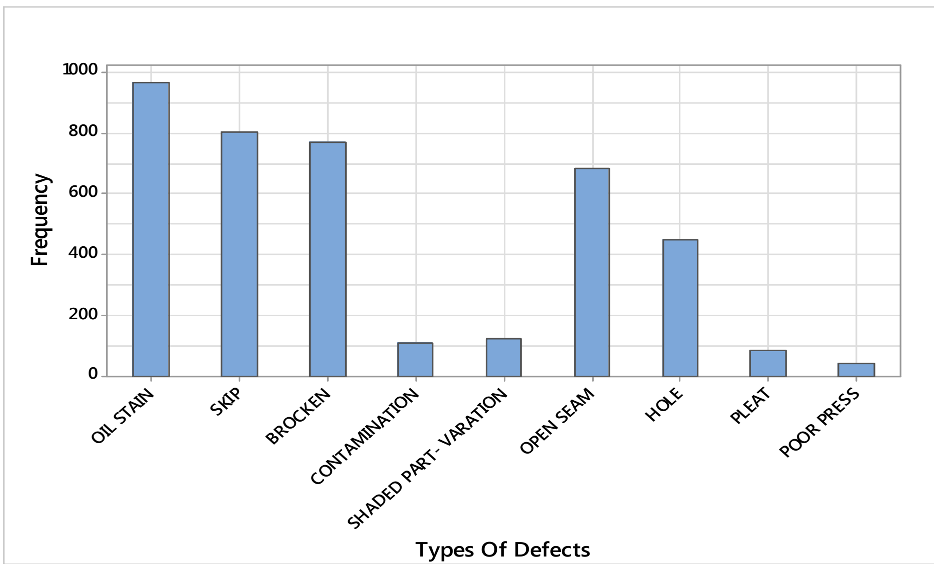
4.4) Histogram & Bar Chart

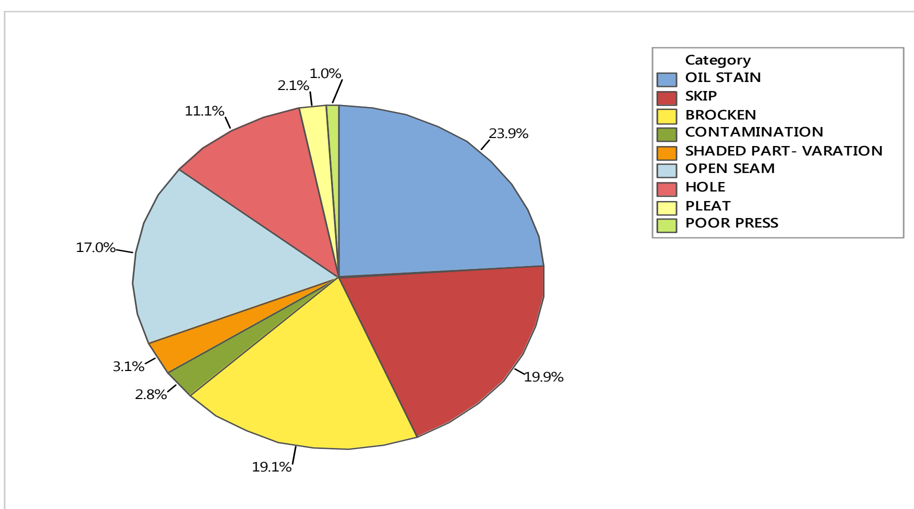
Histogram & Bar Chart is constructed to see where the majority of values falls in a measurement scale, and how much variation there is.

The chart were constructed by using MiniTab Software.

Histogram and bar charts were constructed so that we are able to discriminate that which defects arose the most and effected the system.

Line 1





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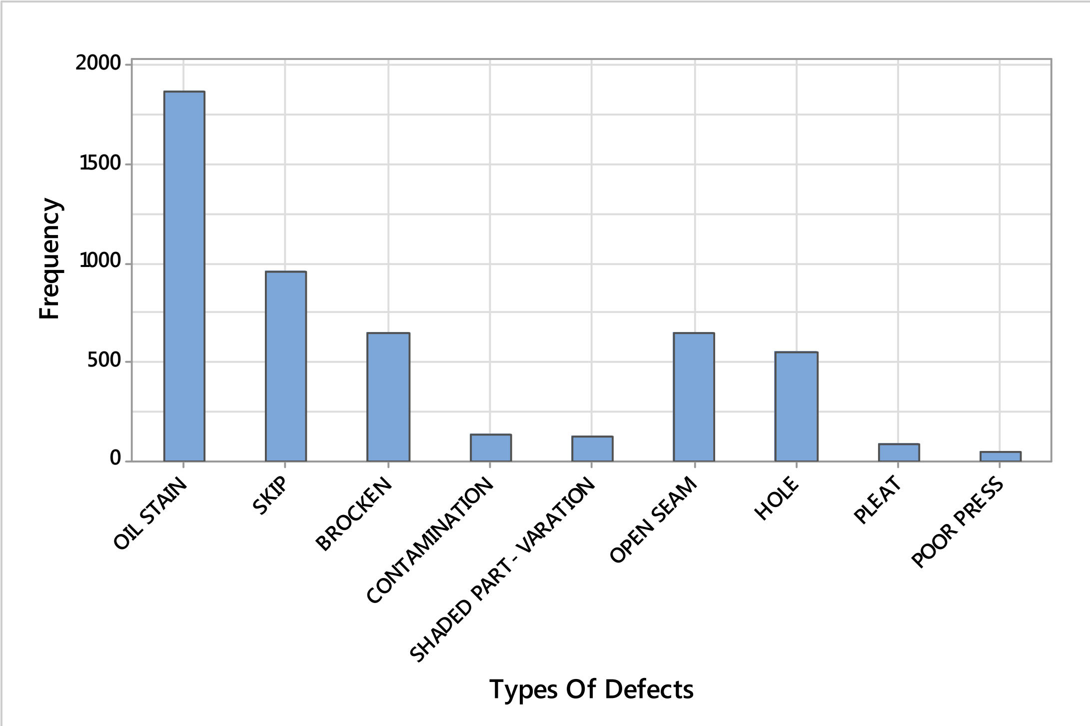
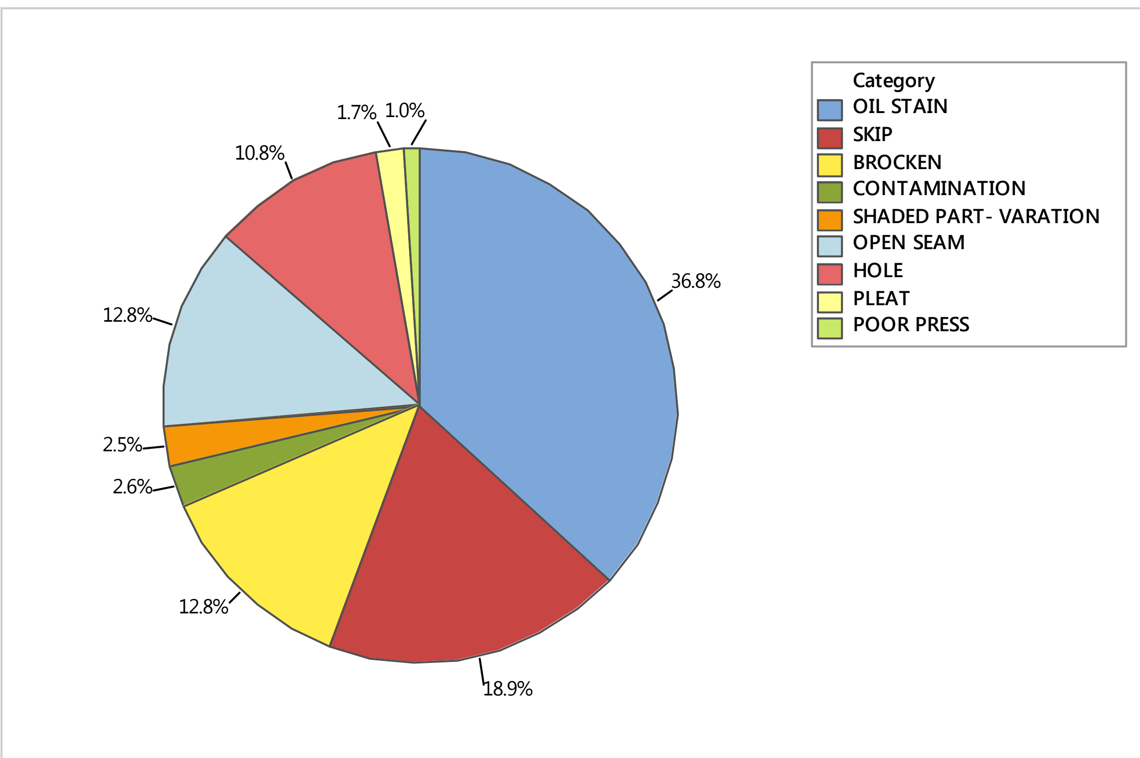

2000
1500
1000
500
0
Frequency
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects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OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
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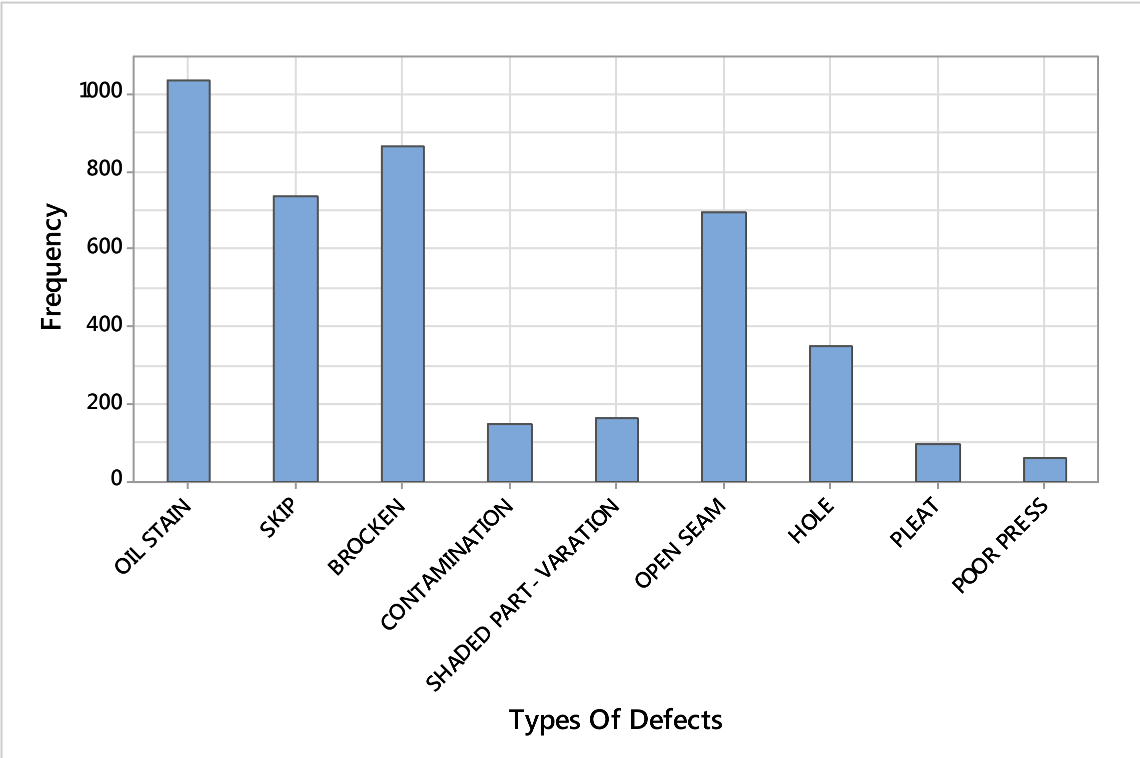
18.9%
12.8%
2.6%
2.5%
12.8%
10.8%
1.7%
1.0%

Line 3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600
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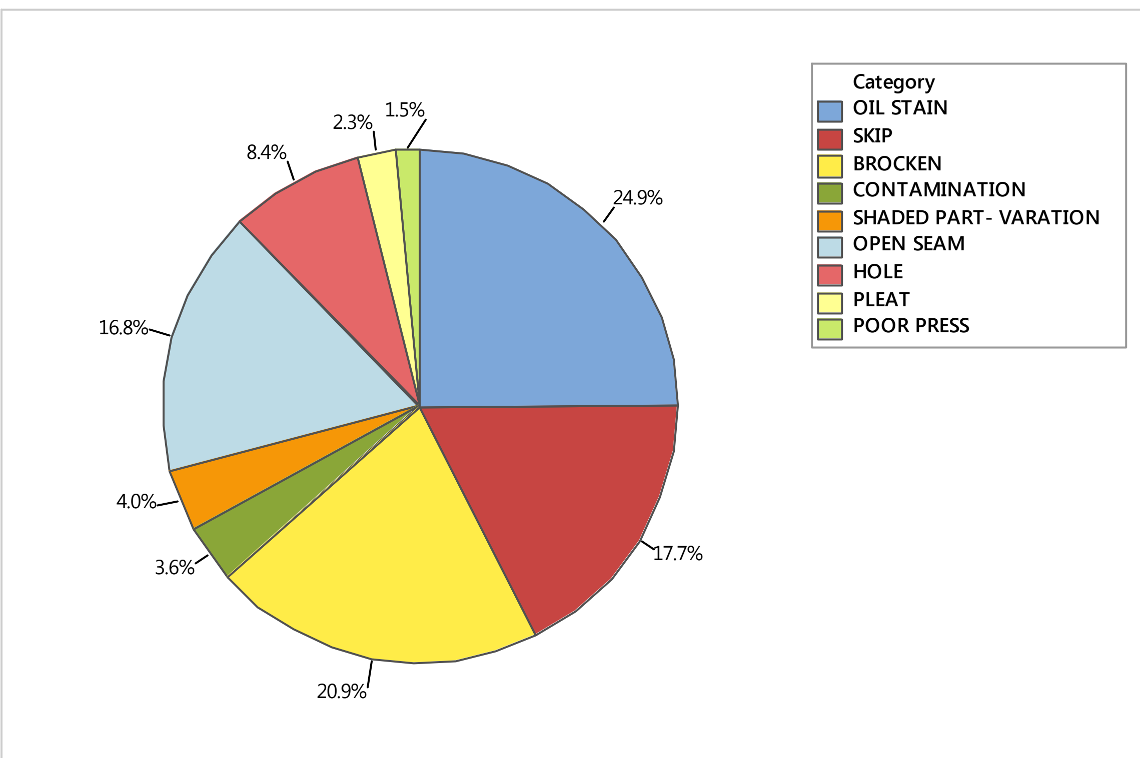
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects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SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
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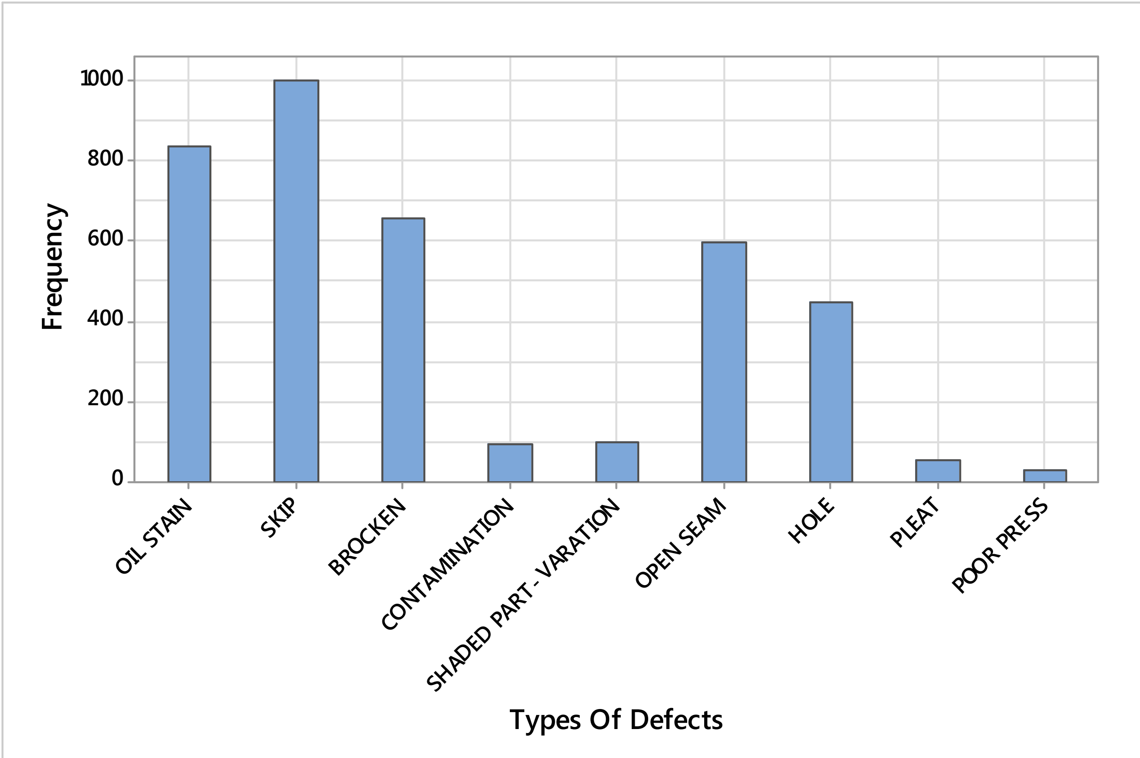
17.7%
20.9%
3.6%
4.0%
16.8%
8.4%
2.3%
1.5%

Line 4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600
400
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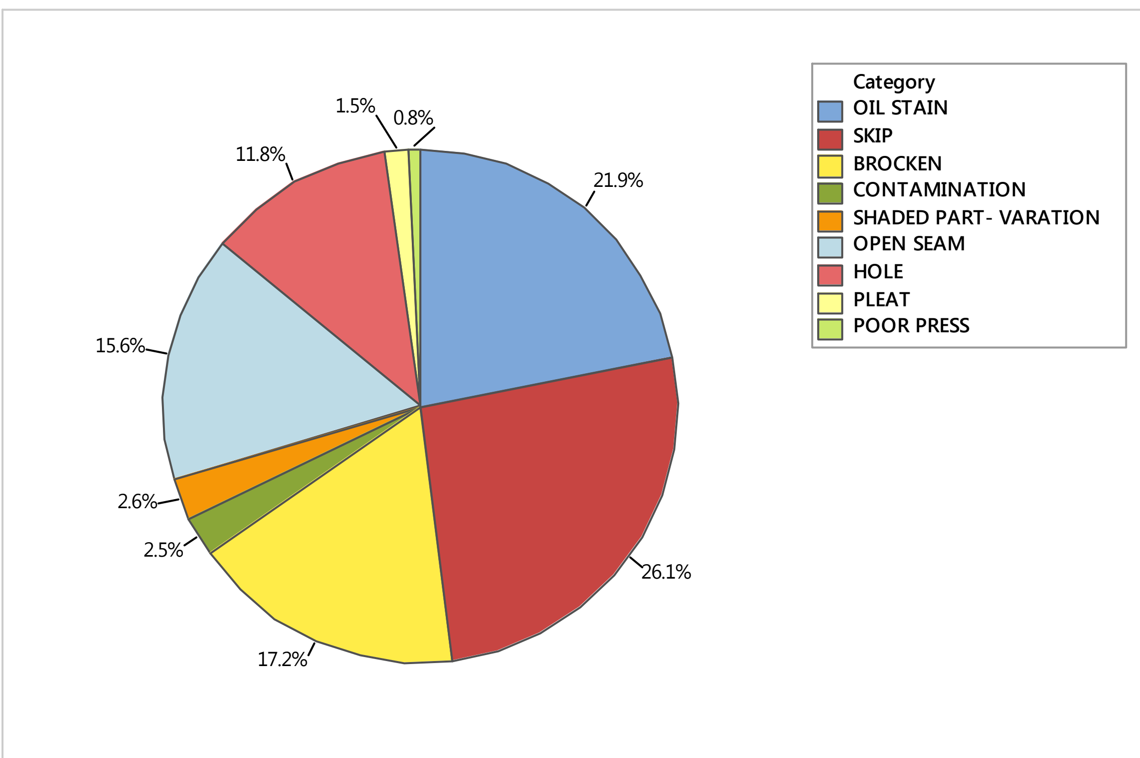
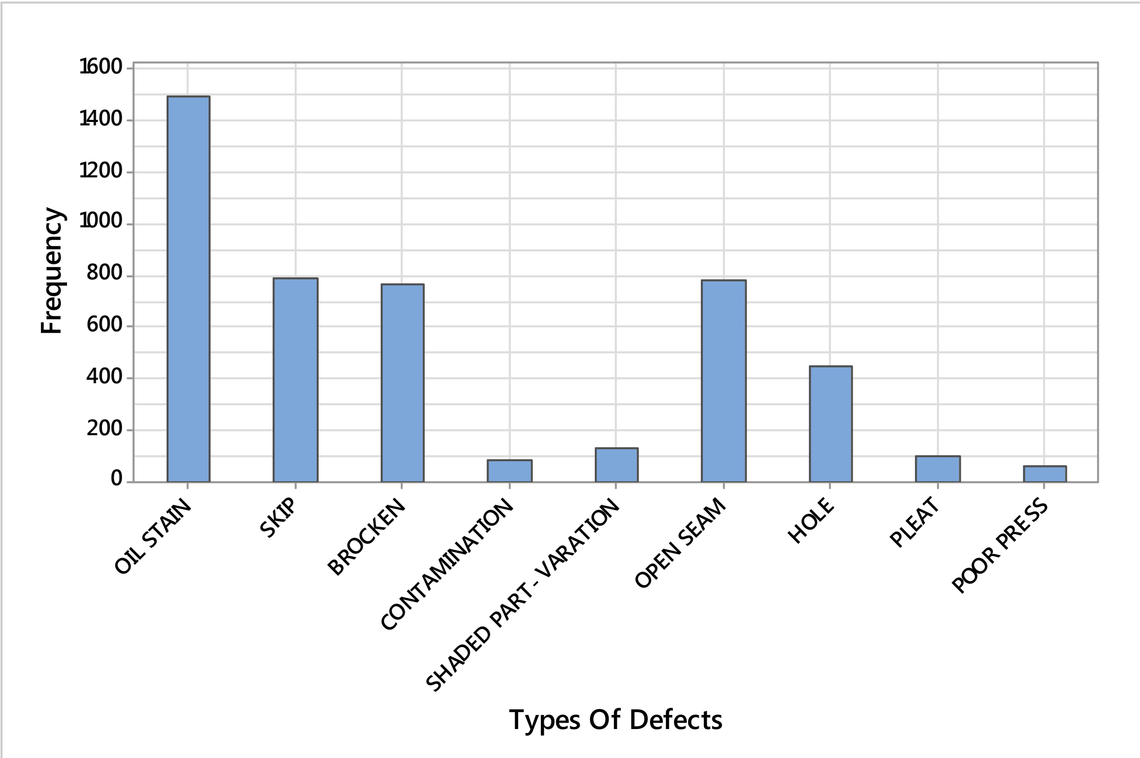
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects


21.9%
26.1%
17.2%
2.5%
2.6%
15.6%
11.8%
1.5%
0.8%
Category
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS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1200
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800
600
400
200
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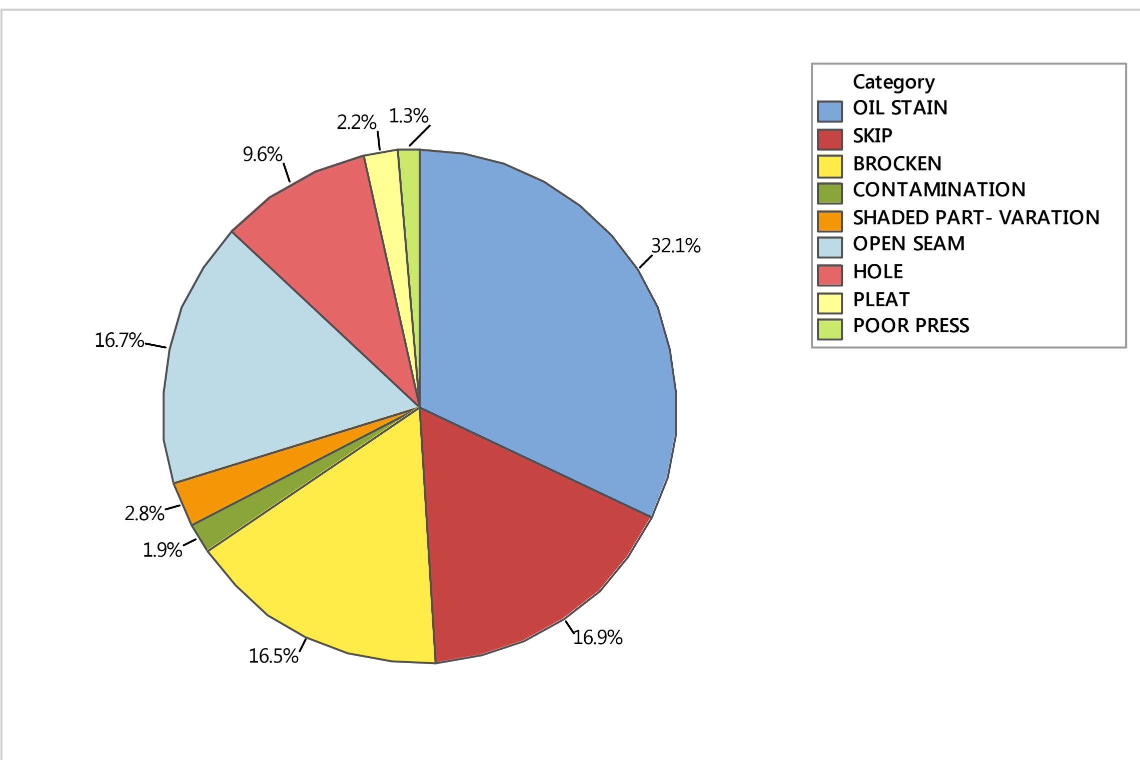
Frequency
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects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OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
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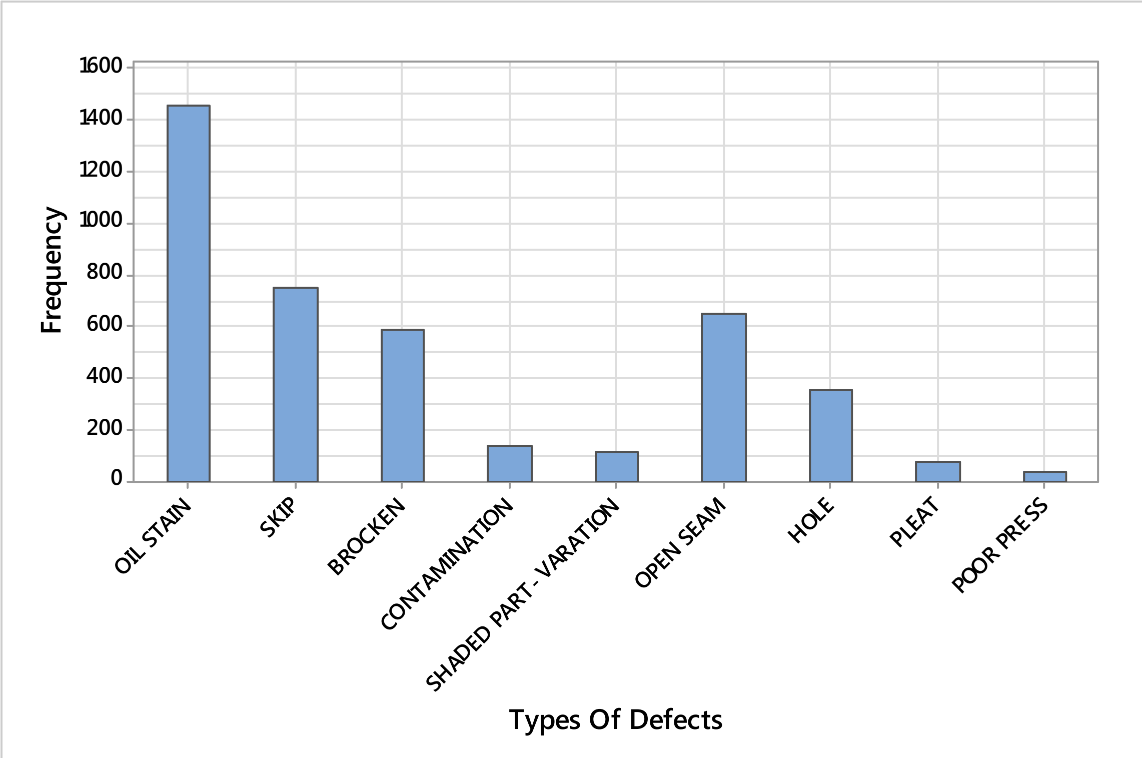
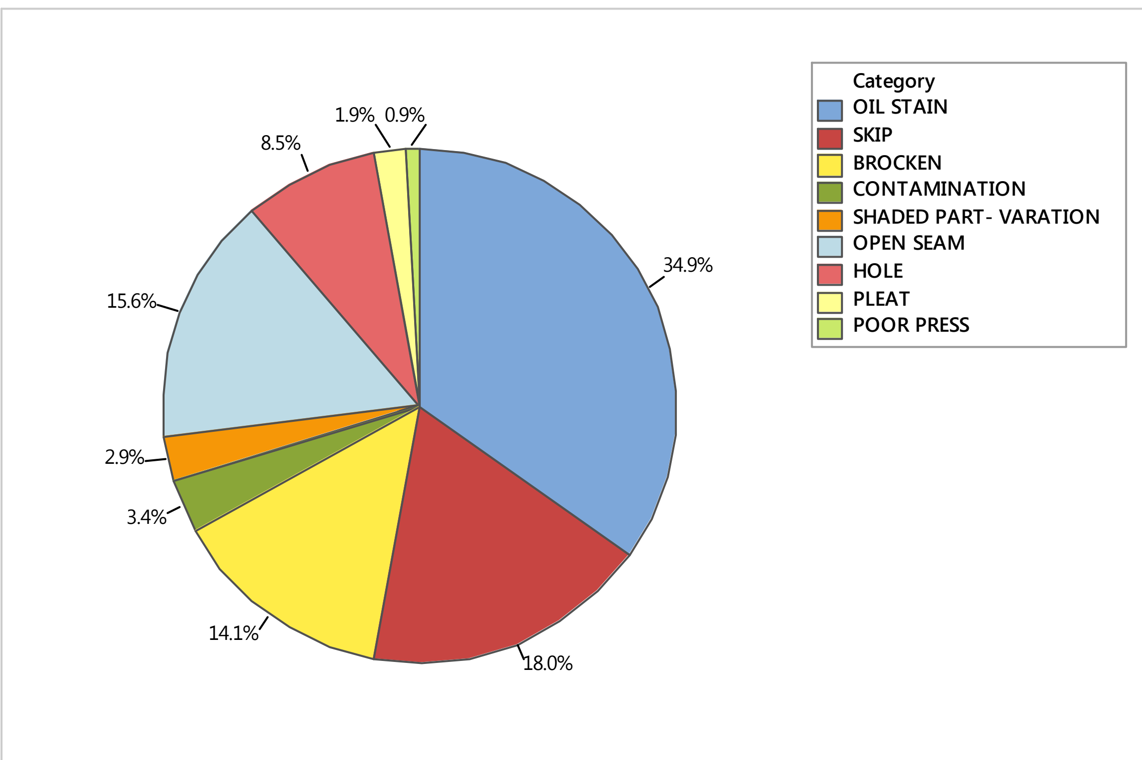
16.5%
1.9%
2.8%
16.7%
9.6%
2.2%
1.3%

Line 6

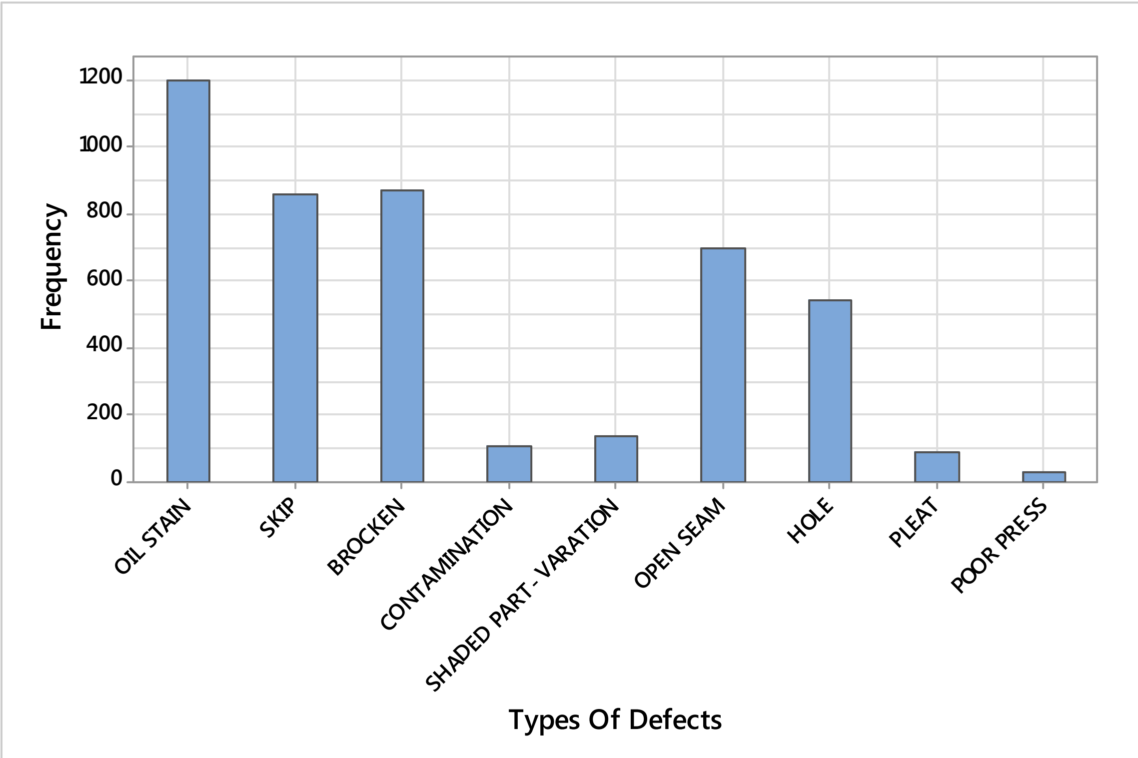


1600
1400
1200
1000
800
600
400
200
0
Frequency
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects



1.9%
0.9%
8.5%
34.9%
15.6%
2.9%
3.4%
14.1%
18.0%
Category
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS

Line 7



Frequency
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800
600
400
200
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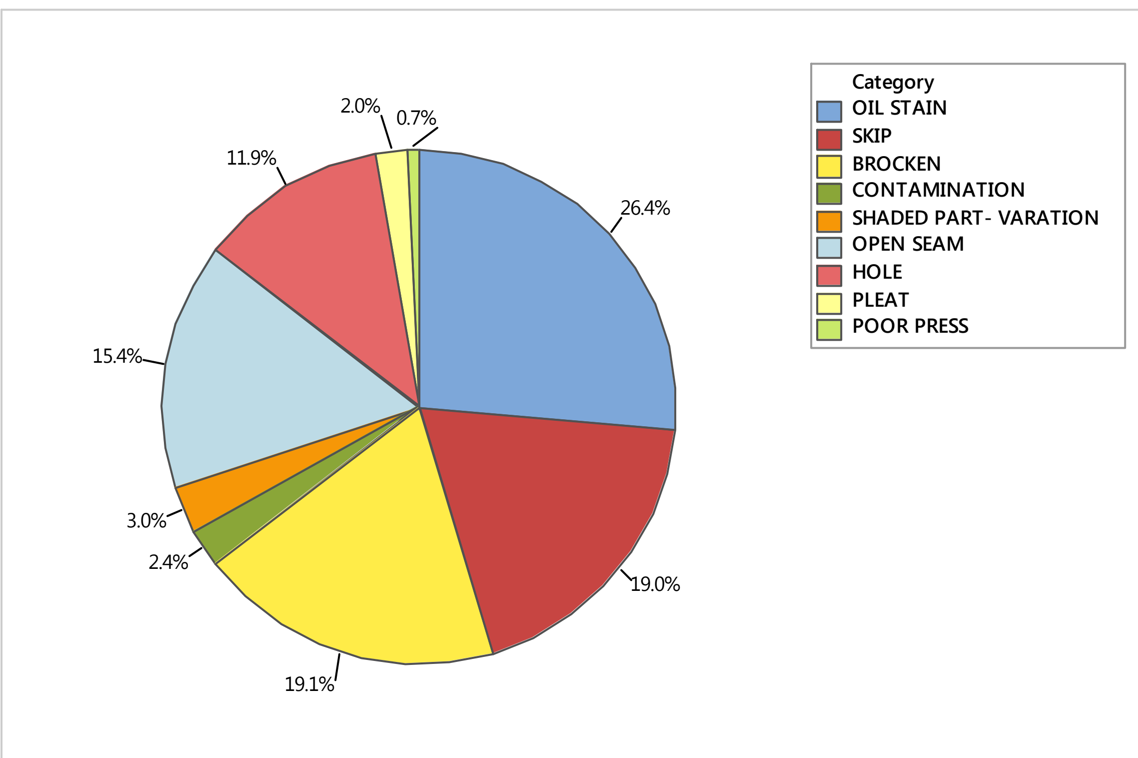
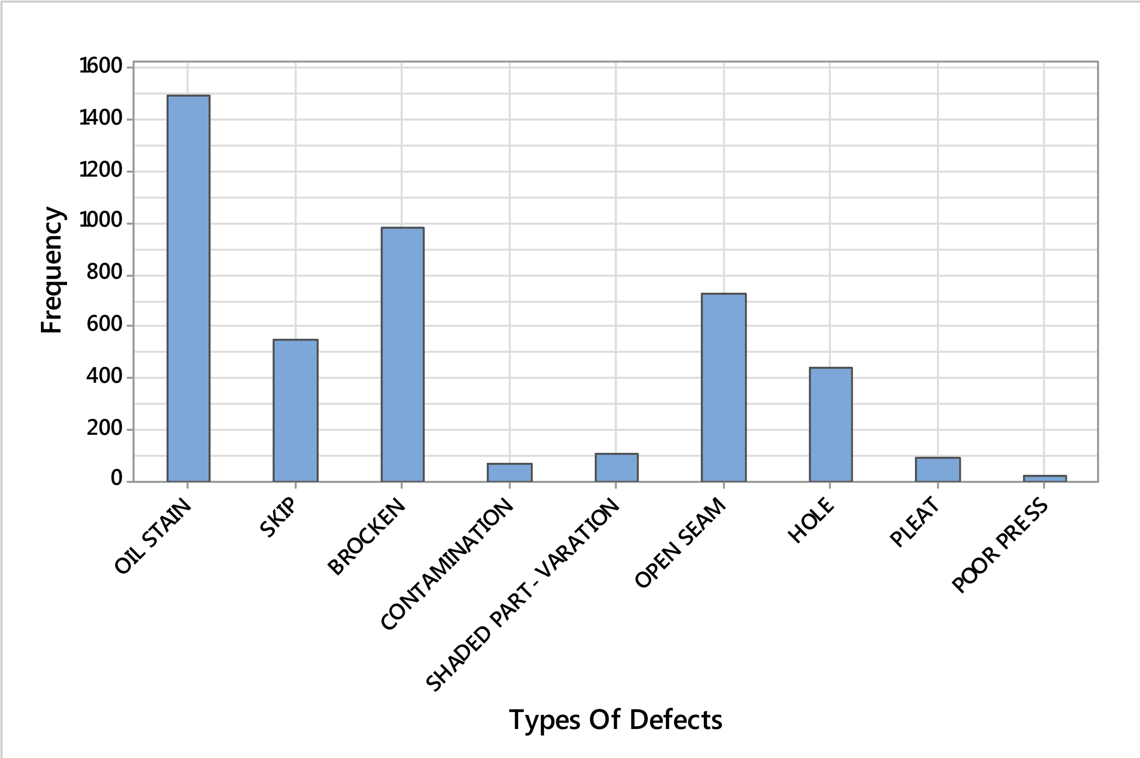
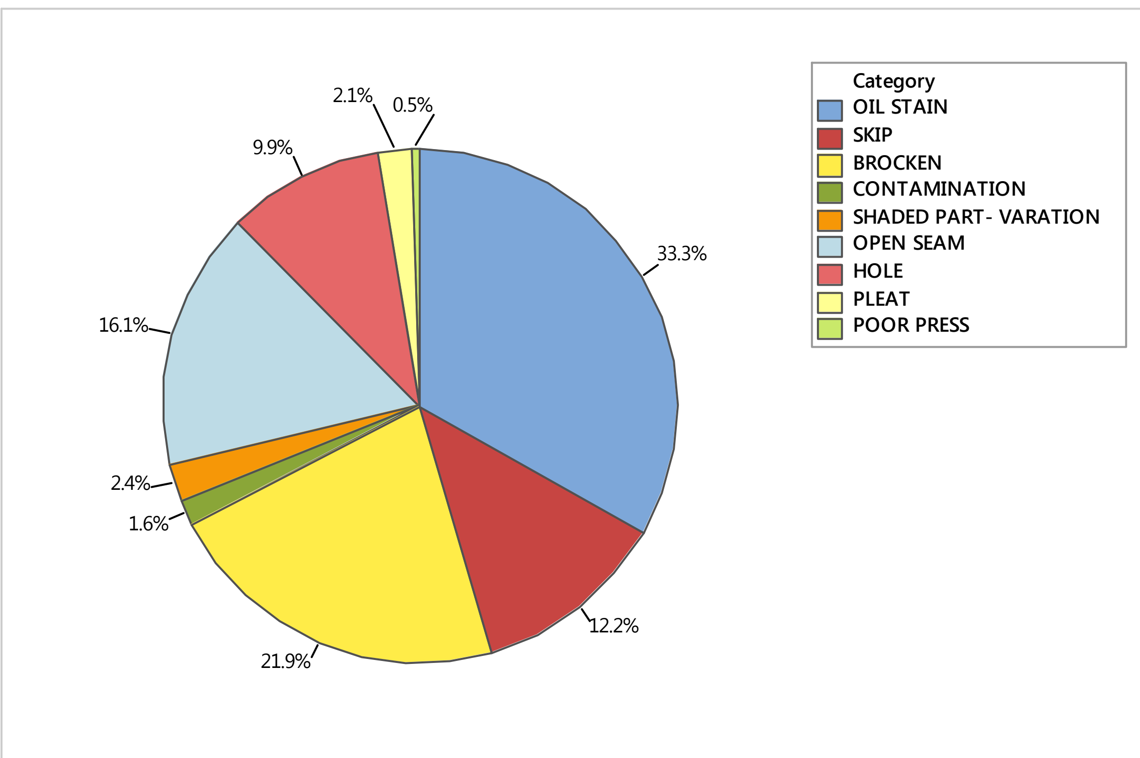
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects

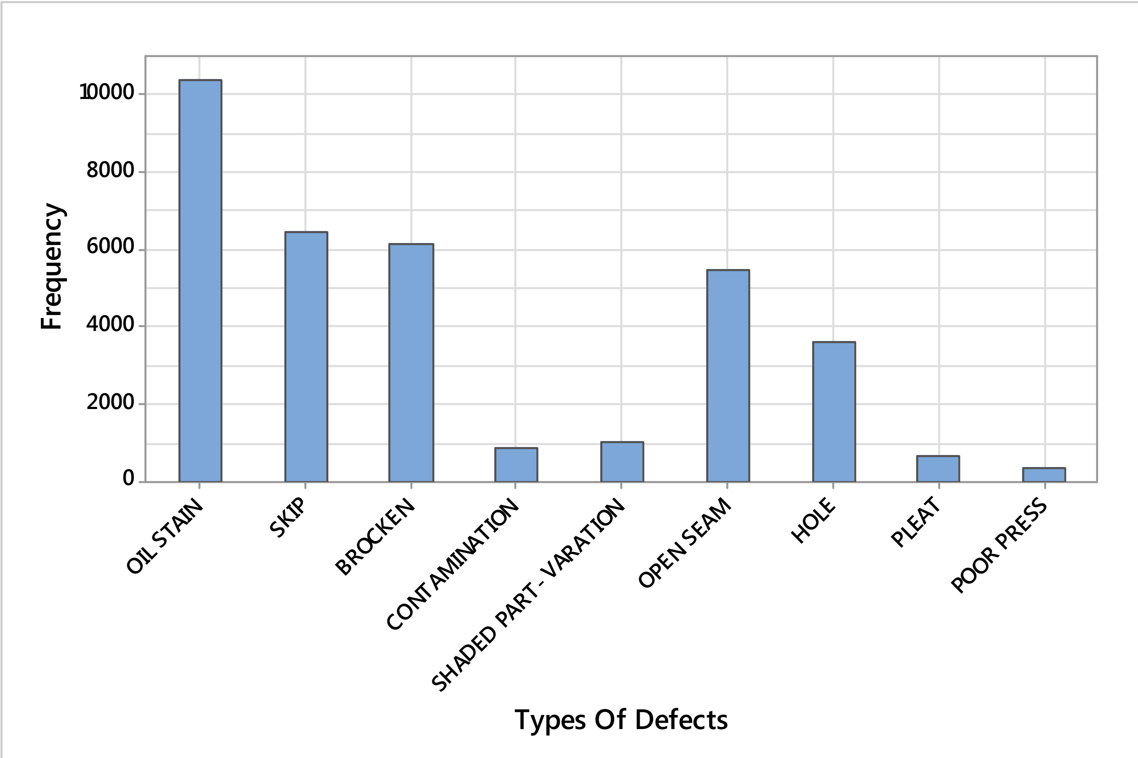


2.0%
0.7%
11.9%
26.4%
15.4%
3.0%
2.4%
19.0%
19.1%
Category
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS


Frequency
1600
1400
1200
1000
800
600
400
200
0
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects


2.1%
0.5%
9.9%
33.3%
16.1%
2.4%
1.6%
12.2%
21.9%
Category
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS

All Lines



Frequency
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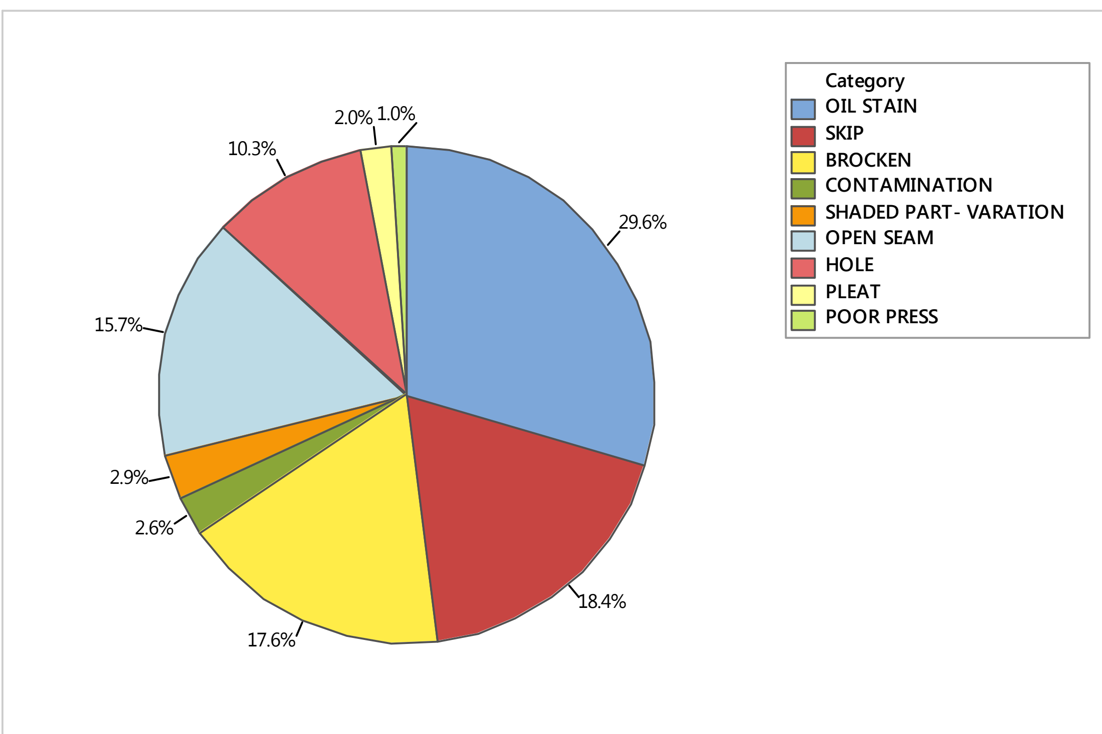
8000
6000
4000
2000
0
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART - VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
Types Of Defects



Category
OIL STAIN
SKIP
BROCKEN
CONTAMINATION
SHADED PART- VARATION
OPEN SEAM
HOLE
PLEAT
POOR PRESS
29.6%
18.4%
17.6%
2.6%
2.9%
15.7%
10.3%
2.0%
1.0%

4.6) Identification of the Base Line

From data shown above now we are now capable to calculate the sigma level.

Defect per Unit- DPU

DPU = $\frac{Total\ Number\ Of\ Defects}{Total\ Number\ Of\ Product\ Units}$

DPU = 35032 / 50672

DPU = 0.691

Total Opportunities – TO

Total Opportunities = $Total\ Number\ Of\ Product\ Units \times Opportunities$

Total Opportunities =50672 × 9

Total Opportunities = 456048

Defects Per opportunity – DPO

DPO = $\frac{Total\ Number\ Of\ Defects}{Total\ Opportunities}$

DPO = 35032/456048

DPO = 0.0768165

Defects per Million Opportunities – DPMO

DPMO = $DPO \times 1{,}000{,}000$

DPMO = 0.0768165× 1,000,000

DPMO = **76816.5**

From the calculations above and after it comparing it from the table shown below it is now learnt that sigma level is 2.95, which means that the success rate is approximately 92%

Now with the the help of data we are able to calculate sigma level, now we will be to analyze the liabilities by which the imperfections are being occured.

Sigma Quality Level Conversion Table

Yield	DPMO	Sigma	Yield	DPMO	Sigma	Yield	DPMO	Sigma
6.6%	**934,000**	**0**	**69.2%**	**308,000**	**2**	**99.4%**	**6,210**	**4**
8.0%	920,000	0.1	72.6%	274,000	2.1	99.5%	4,660	4.1
10.0%	900,000	0.2	75.8%	242,000	2.2	99.7%	3,460	4.2
12.0%	880,000	0.3	78.8%	212,000	2.3	99.75%	2,550	4.3
14.0%	860,000	0.4	81.6%	184,000	2.4	99.81%	1,860	4.4
16.0%	840,000	0.5	84.2%	158,000	2.5	99.87%	1,350	4.5
19.0%	810,000	0.6	86.5%	135,000	2.6	99.90%	960	4.6
22.0%	780,000	0.7	88.5%	115,000	2.7	99.93%	680	4.7
25.0%	750,000	0.8	90.3%	96,800	2.8	99.95%	480	4.8
28.0%	720,000	0.9	91.9%	80,800	2.9	99.97%	330	4.9
31.0%	**690,000**	**1**	**93.3%**	**66,800**	**3**	**99.977%**	**230**	**5**
35.0%	650,000	1.1	94.5%	54,800	3.1	99.985%	150	5.1
39.0%	610,000	1.2	95.5%	44,600	3.2	99.990%	100	5.2
43.0%	570,000	1.3	96.4%	35,900	3.3	99.993%	70	5.3
46.0%	540,000	1.4	97.1%	28,700	3.4	99.996%	40	5.4
50.0%	500,000	1.5	97.7%	22,700	3.5	99.997%	30	5.5
54.0%	460,000	1.6	98.2%	17,800	3.6	99.9980%	20	5.6
58.0%	420,000	1.7	98.6%	13,900	3.7	99.9990%	10	5.7
61.8%	382,000	1.8	98.9%	10,700	3.8	99.9992%	8	5.8
65.6%	344,000	1.9	99.2%	8,190	3.9	99.9995%	5	5.9
						99.99966%	**3.4**	**6**

MBG BUSINESS SERVICES
clarity momentum results

1

Lean Six Sigma

Chapter 5

5.1) Introduction To Analyze Phase

The objective of the break down stage is to experience the information to discover the underlying drivers of the issues and look for development opportunities. At the measure stage eight noteworthy sorts of imperfections were recognized and the focus of this eliminate is to discover all the potential reasons for those deformities.

Break down the framework to distinguish approaches to wipe out the hole between the current execution of the framework or methodology and the craved objective. Start by deciding the current gauge. Use exploratory and expressive information investigation to help you comprehend the information. Use measurable instruments to guide the investigation

In analyze phase we analyze our data by developing Pareto charts and see which defects are effecting the system the most. After analyzing from Pareto chart we will find out cause and effects of those defects Ishikawa Diagram.

5.2) Tools used in Analyze Phase

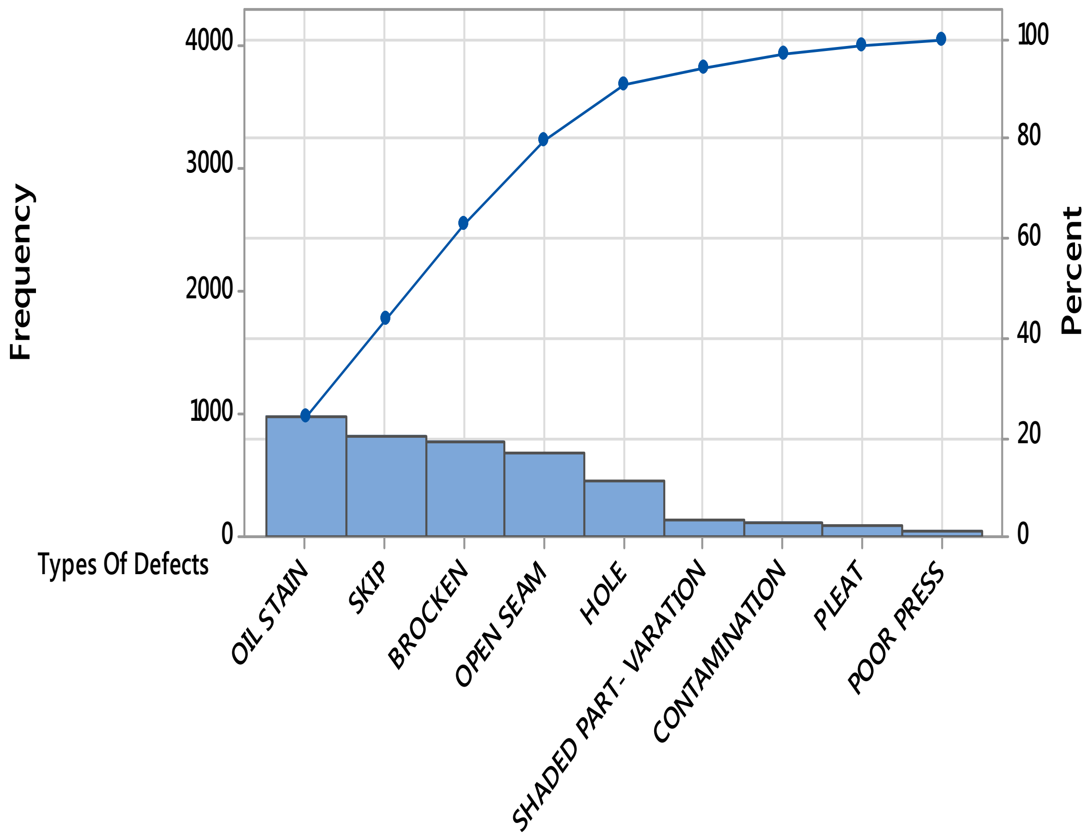
- Pareto Chart
- Regression Analysis
- Cause and Effect/Fishbone Diagram

5.3) Pareto Chart

Pareto Chart is used to graphically summarize and display the contribution of each type of defect. It is a bar graph. The lengths of the bars represent occurrence and are organized with longest bars on the left and the shortest to the right. In this way the chart visually shows which defects are more significant. By using Pareto Chart major types of defects were identified

The chart was constructed by using MiniTab Software.

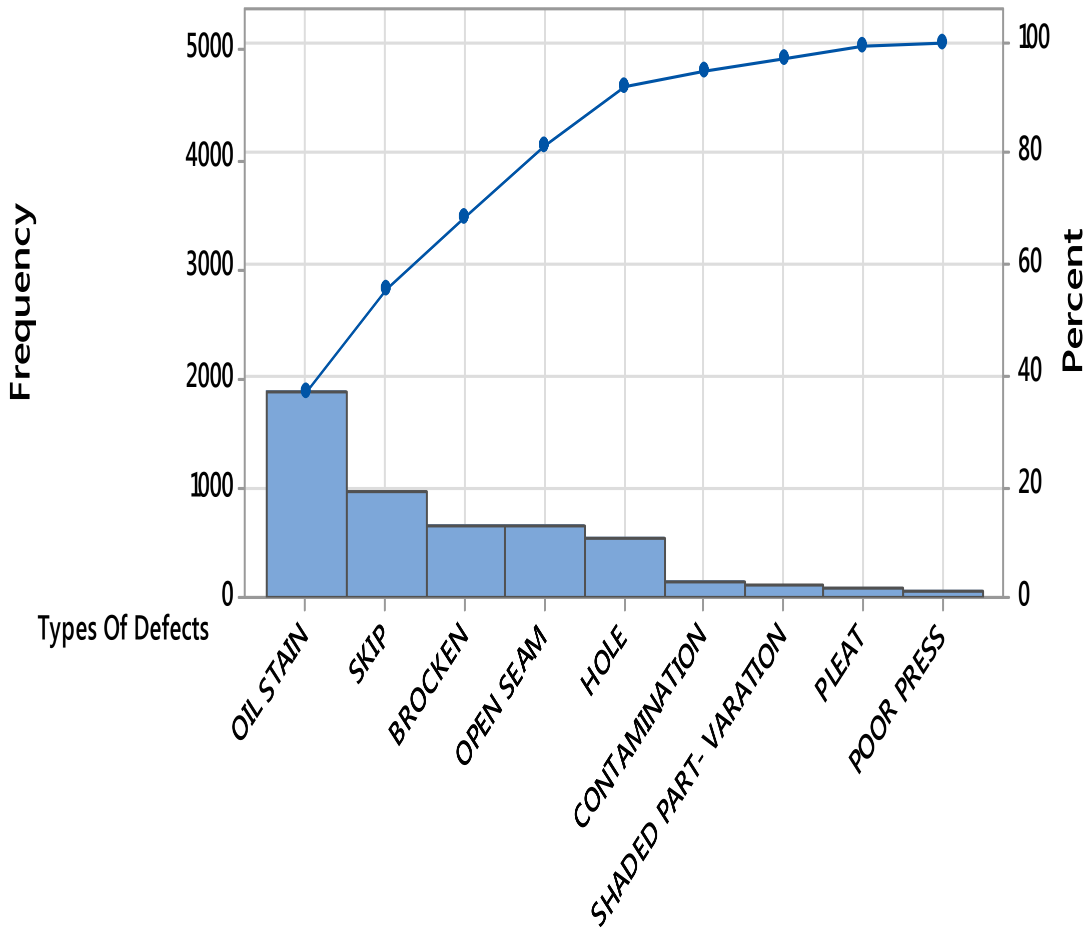
Pareto Table For Line #1



Frequency	967	807	771	687	449	126	112	86	42
Percent	23.9	19.9	19.1	17.0	11.1	3.1	2.8	2.1	1.0
Cum %	23.9	43.8	62.9	79.9	91.0	94.1	96.8	99.0	100.0

Table5.1

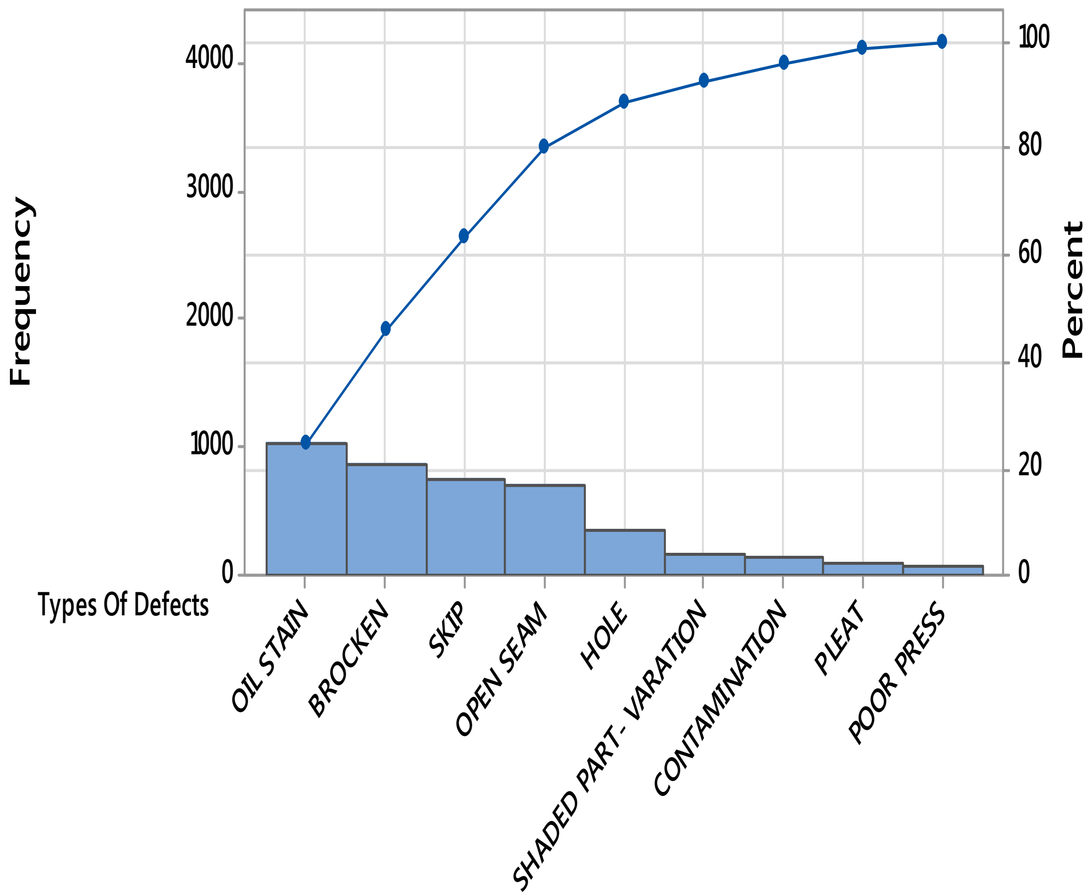
Pareto Table For Line #2



Frequency	1873	961	651	651	551	131	127	87	51
Percent	36.8	18.9	12.8	12.8	10.8	2.6	2.5	1.7	1.0
Cum %	36.8	55.8	68.6	81.4	92.2	94.8	97.3	99.0	100.0

Table5.2

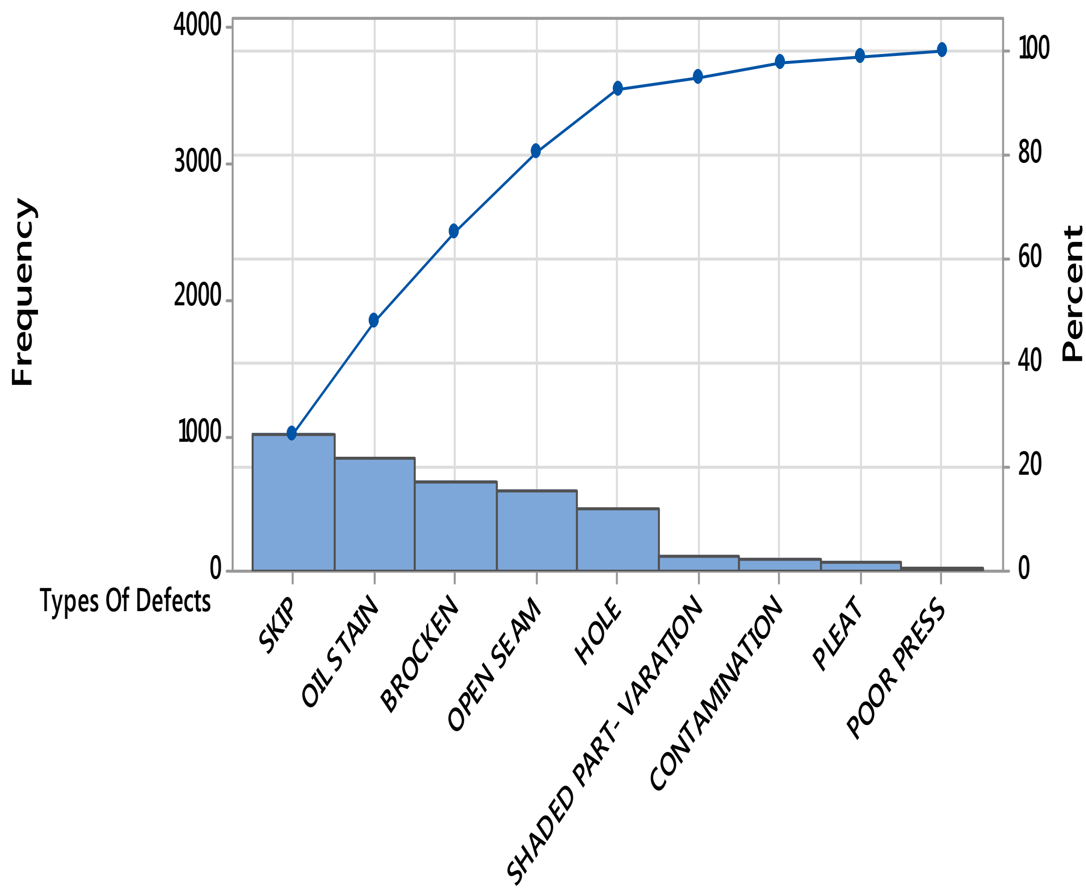
Pareto Table For Line #3



Frequency	1036	868	736	698	351	165	150	96	63
Percent	24.9	20.9	17.7	16.8	8.4	4.0	3.6	2.3	1.5
Cum %	24.9	45.7	63.4	80.2	88.6	92.6	96.2	98.5	100.0

Table5.3

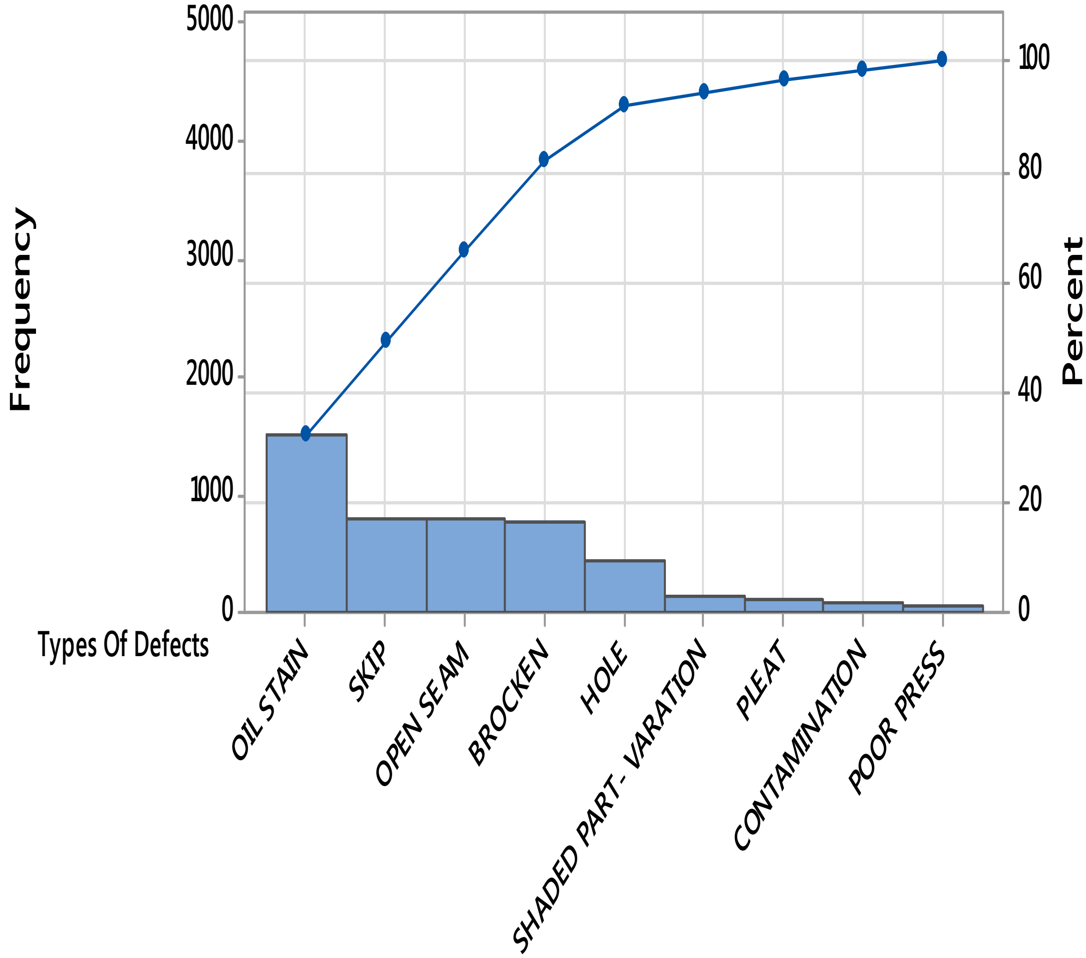
Pareto Table For Line #4



Types Of Defects	SKIP	OIL STAIN	BROCKEN	OPEN SEAM	HOLE	SHADED PART- VARATION	CONTAMINATION	PLEAT	POOR PRESS
Frequency	1001	839	659	598	450	99	96	56	30
Percent	26.1	21.9	17.2	15.6	11.8	2.6	2.5	1.5	0.8
Cum %	26.1	48.1	65.3	80.9	92.7	95.2	97.8	99.2	100.0

Table5.4

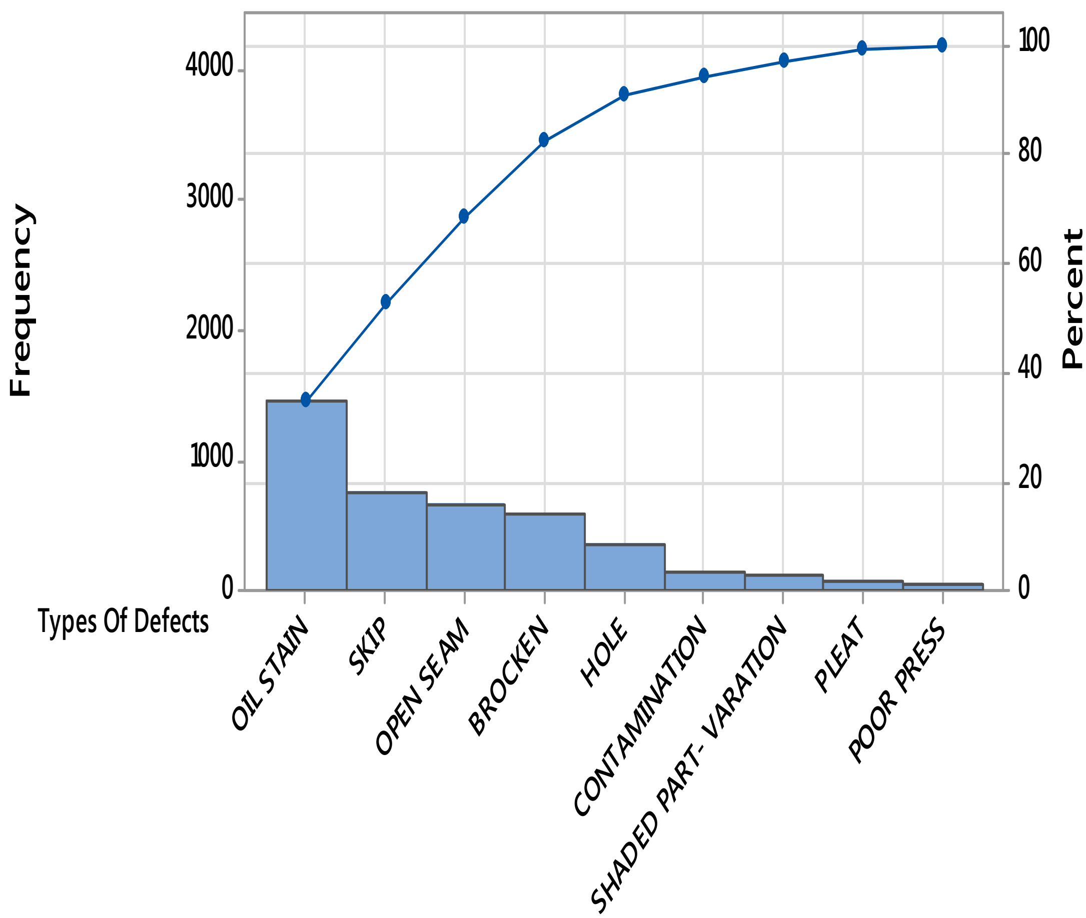
Pareto Table For Line #5



Frequency	1499	789	781	770	448	130	101	89	62
Percent	32.1	16.9	16.7	16.5	9.6	2.8	2.2	1.9	1.3
Cum %	32.1	49.0	65.7	82.2	91.8	94.6	96.8	98.7	100.0

Table5.5

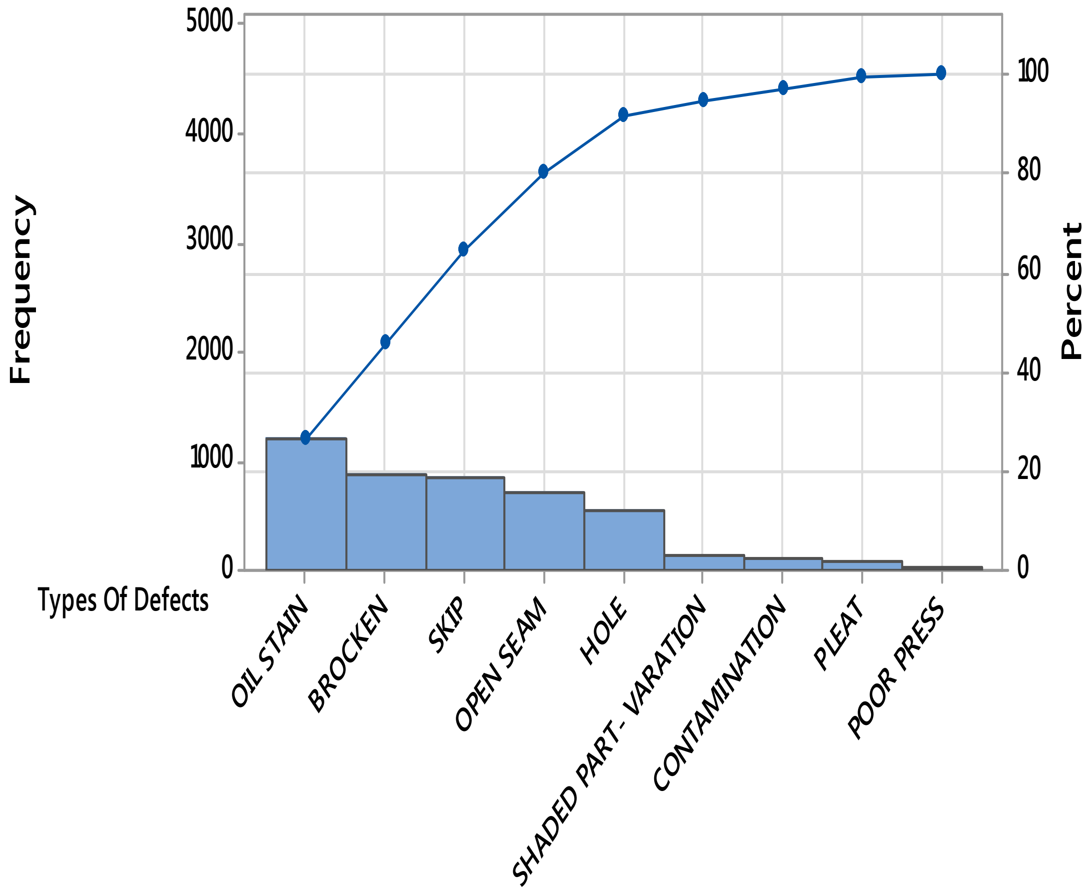
Pareto Table For Line #6



Frequency	1461	753	652	591	356	141	120	80	38
Percent	34.9	18.0	15.6	14.1	8.5	3.4	2.9	1.9	0.9
Cum %	34.9	52.8	68.4	82.5	91.0	94.3	97.2	99.1	100.0

Table5.6

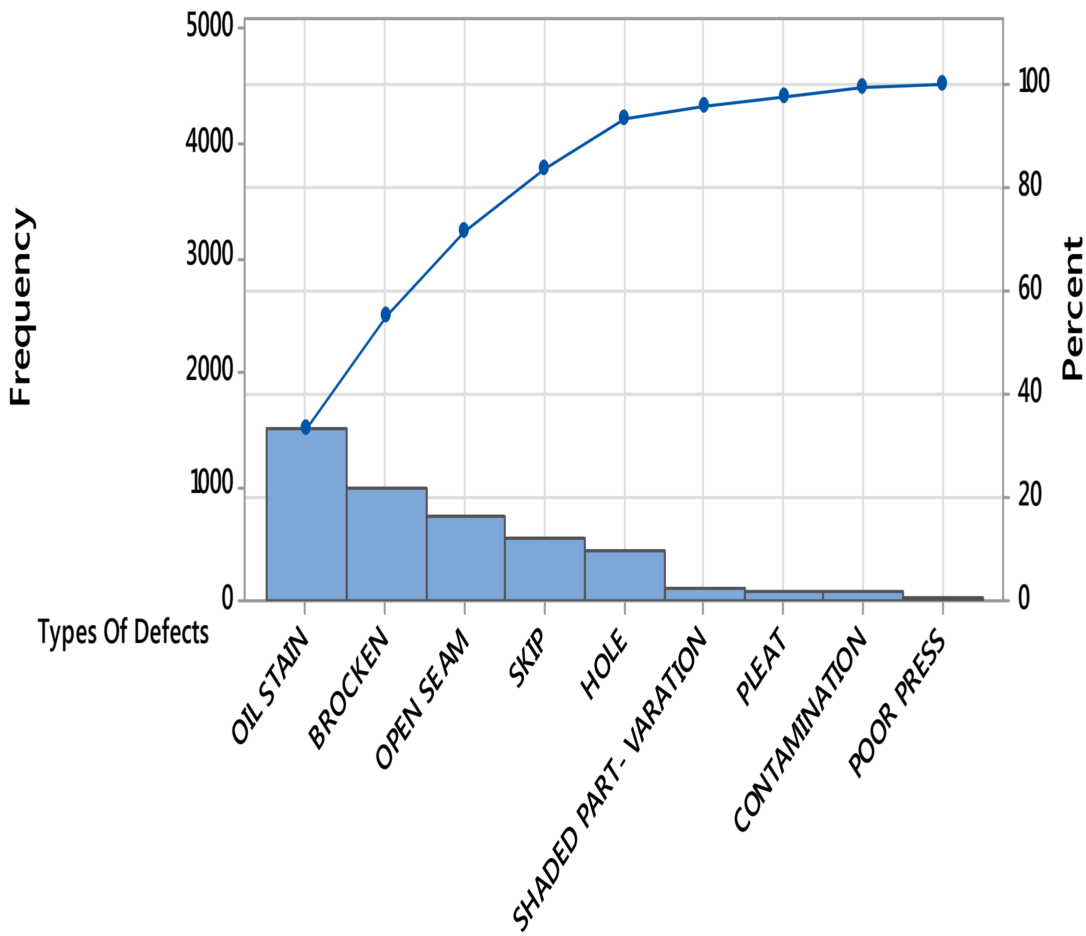
Pareto Table For Line #7



Frequency	1200	869	861	701	541	135	110	91	32
Percent	26.4	19.1	19.0	15.4	11.9	3.0	2.4	2.0	0.7
Cum %	26.4	45.6	64.5	80.0	91.9	94.9	97.3	99.3	100.0

Table5.7

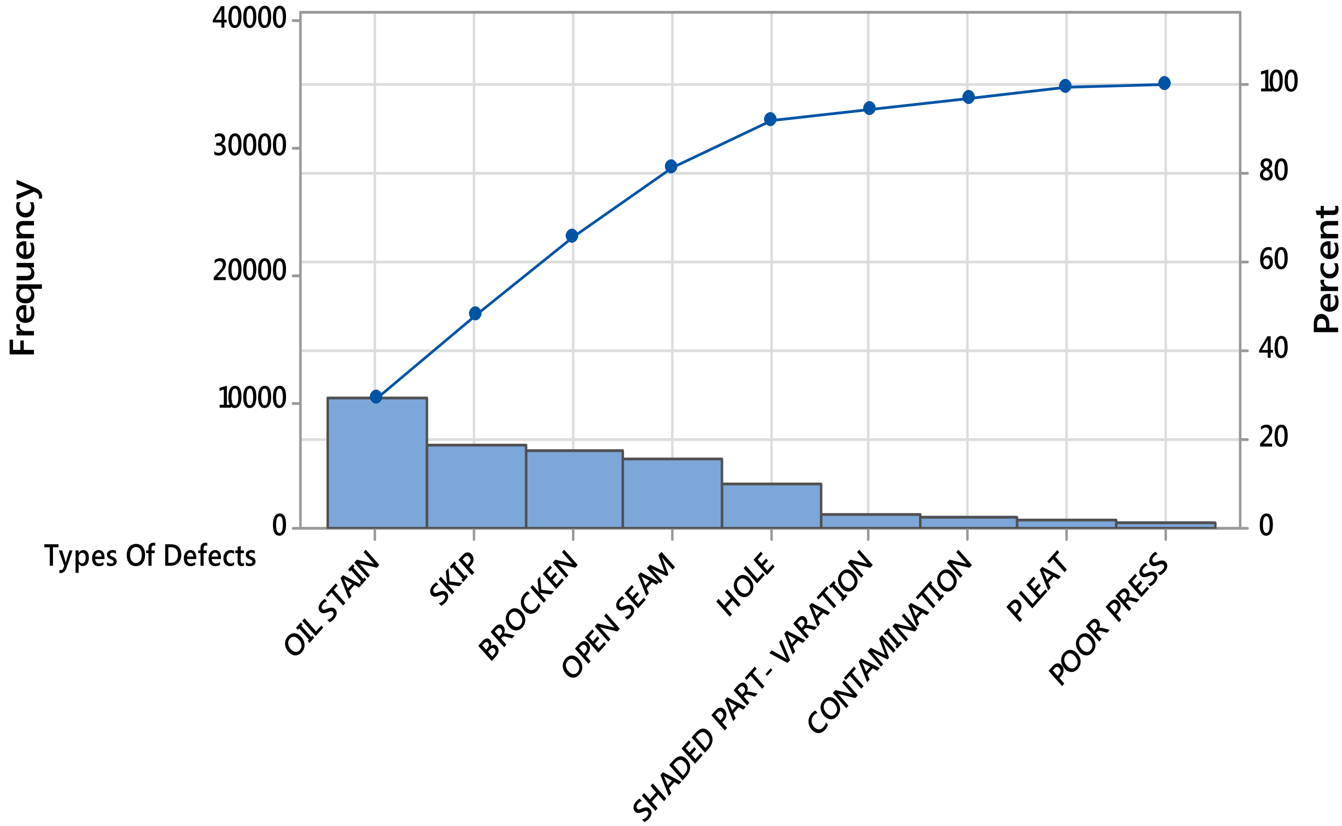
Pareto Table For Line #8



Types Of Defects	OIL STAIN	BROCKEN	OPEN SEAM	SKIP	HOLE	SHADED PART- VARATION	PLEAT	CONTAMINATION	POOR PRESS
Frequency	1501	989	728	548	446	110	95	71	22
Percent	33.3	21.9	16.1	12.2	9.9	2.4	2.1	1.6	0.5
Cum %	33.3	55.2	71.4	83.5	93.4	95.8	97.9	99.5	100.0

Table5.8

Pareto Table For All Line



Frequency	10376	6456	6168	5496	3592	1012	900	692	340
Percent	29.6	18.4	17.6	15.7	10.3	2.9	2.6	2.0	1.0
Cum %	29.6	48.0	65.7	81.3	91.6	94.5	97.1	99.0	100.0

Table5.9

5.3.1) Major Defects

From the Pareto Chart following major sewing defects identified

I. Oil Stain
II. Skip
III. Brocken

After making Pareto charts for an individual inspection line and all inspection line combined as shown in the charts above that three defects out of nine are responsible for effecting the system the most.

5.4) Re-Work Cost

5.4.1) Cost calculation For Oil Stain Removal

For the removal of stains Perclone & Solvent Oil is used:

1 Kg Perclone remove stains from Avg. 40 pieces & 1 Kg Solvent oil remove Stains from 8 pieces.

From total defects Avg. 15 % stains are removed by using Solvent Oil

1 Kg Perclone Cost= RS 150

1 Kg Solvent Oil Cost= RS 250

Oil Stains pieces per month=10376

2 Workers are used for removing stain by using Perclone & in same way 2 workers are used for moving stains by using Solvent oil & 1 worker is used for washing.

Avg. Salary of workers=12000

Calculation:

Oil stain removed by using Solvent Oil = 10376*0.15 = 1556.4 = 1557

Oil stain removed by using Perclone = 10376-1557 = 8819

Quantity of Percolnae required = 8819/40 = 220.5 kg

Cost of Perclone per month = 220.5*150 = **33075**

Quantity of Solvent Oil required = 1157/8 = 144.6 kg

Cost of Solvent Oil per month = 144.6* 250 = **36150**

Total Labor required = 2+2+1 = 5

Total Labor cost per month = 12000*4 = **60000**

Total overall cost for removing oil stains = 33075+36150+60000 = 129225 per month

5.4.2) Cost Calculation for Skip and Brocken

In one inch alteration for skip and Brocken defects Avg. 9 inch Yan is used. Average broken and skip stitch distance is 0.5 inch to 1inch, we will take 1 inch distance for calculation.

Total number of Brocken defects = 6168

Total number of Skip defects = 6456

In on Cone of Yan there is Avg. 7500 Inches

Cost of 1 Cone of Yan is = 600

Total workers for alteration = 3

Calculation:

Over all total number of defects = 6168+6456 = 12624

Required Yan for alteration = 12624*1*9 = 113616 inch

Total Cone of Yan required per month = 113616/75000 = 15.2

Total cost per month = 15.2* 600 = **9120**

Total Labor cost = 3*12000 = **36000**

Total overall cost due to Brocken and Skip = 9120+36000 = 45120 per month

Total overall cost for removing Oil Stains, Brocken and Skip = 129225+ 45120 = 174345/month

5.5) Brainstorming

Brainstorming is one of the most effective problem solving tools. The goal of this tool is to identify the issues, solutions and opportunities. In order to identify the potential causes of the defects and their respective solutions a Brainstorming session was arranged at the selected factory.

We found out the deffects by effecting the system by pareto charts. Now we will do brainstorming to find causes and effects for those cause.

In brainstorming sessions there were total eight members including us and workers from the industry. Detail about members is mention in table below. We held three brainstroming sessions of minimum of 30 minutes atleast.

Attendants at the Brainstorming Session

Attendants	Position at industry
Sibghatullah	-
M.Aqib	-
Farhan Ali	-
Omer Ali khan	-
Arshad	Supervisor
Khurram	Worker

5.5.1) Skipped Stitch

Stitches of swing thread partially skip and stitching is not performed completly. Caused by machine malfunction or excessive needle heat due to friction.

5.5.2) Broken Stitches

Often times the fault of wrong type of stitch for specific seam construction. Could be caused by excessive tightness in machine tensions.

5.5.3) Open Seams

Incorrect folder or poor operator technique. Sometime. results from poor selection of type of seam for fabric used or purpose of seam in garment.

5.6) Cause and effect diagram

Through brainstorming with sewing operators, line supervisors, end line quality inspectors, inustrial engineers and floor manager, various probable causes were recognized. The potential causes are then identified by online inspections and root cause analysis.

After doing intense sessions of brainstorming we were agreed on following causes and there effects.

Cause & Effect Diagram For Oil Stains

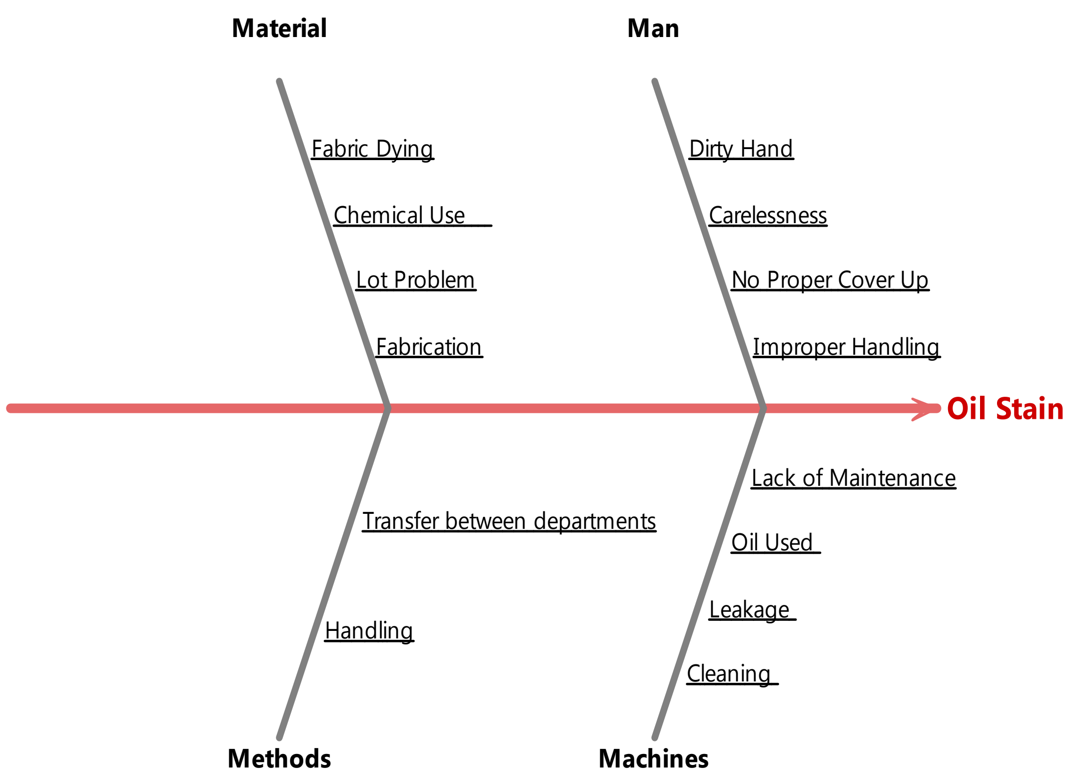


Figure5.10

Cause & Effect Diagram For Skip

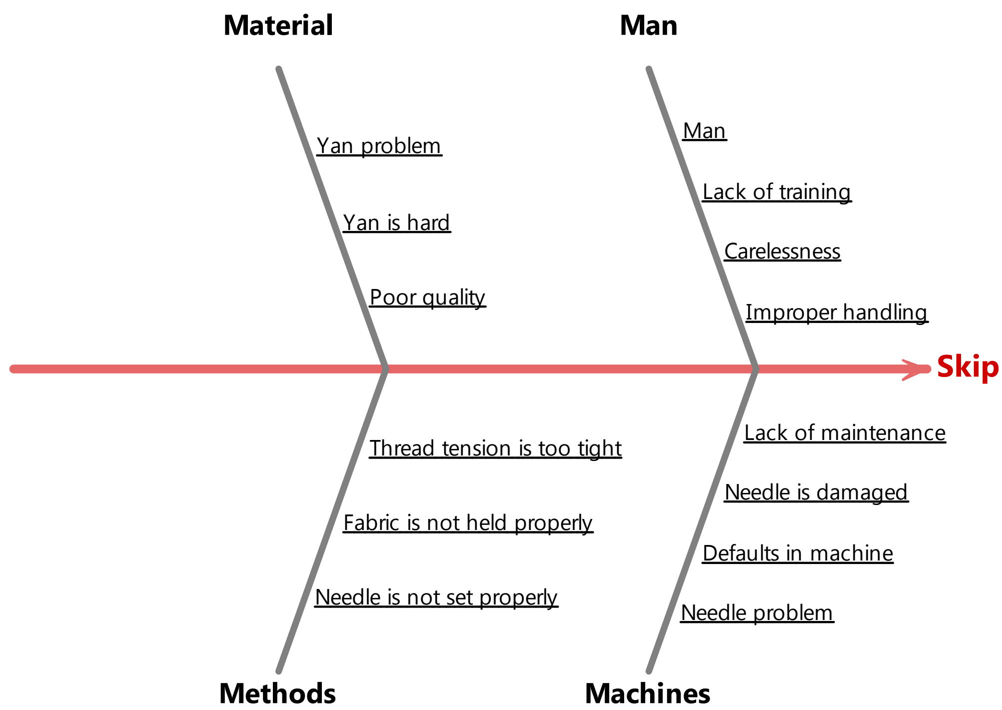


Figure5.11

Cause & Effect Diagram For Brokens

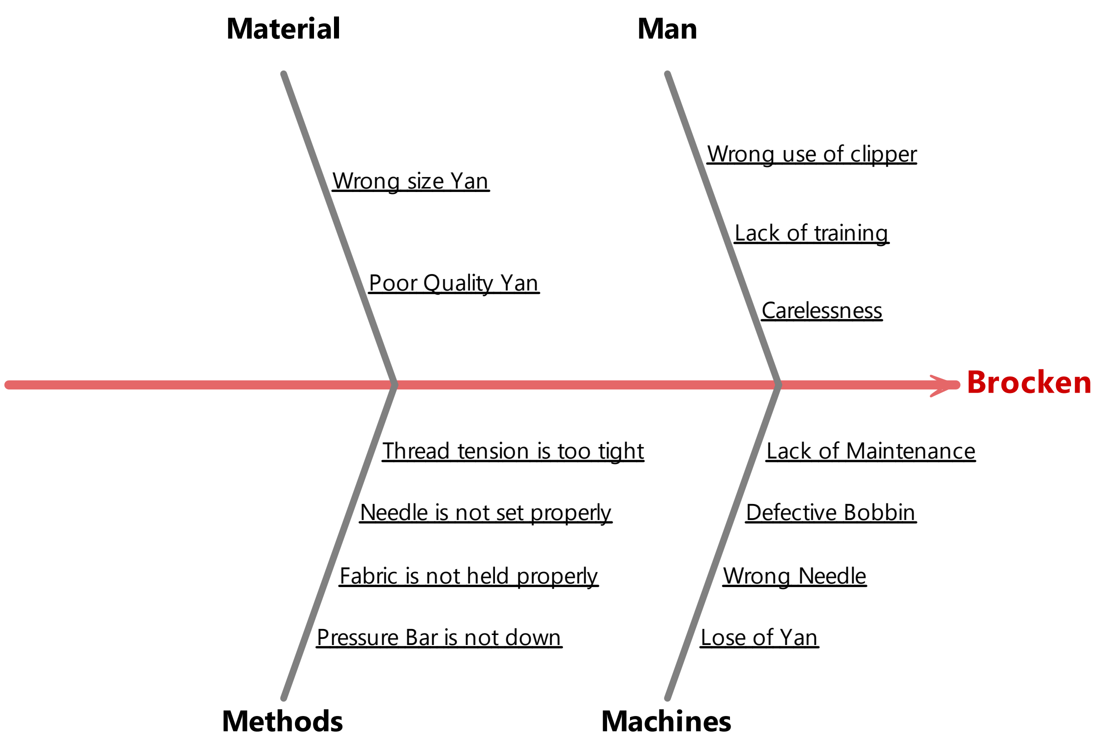


Figure5.12

Cause & Effect Diagram for All Major Defects

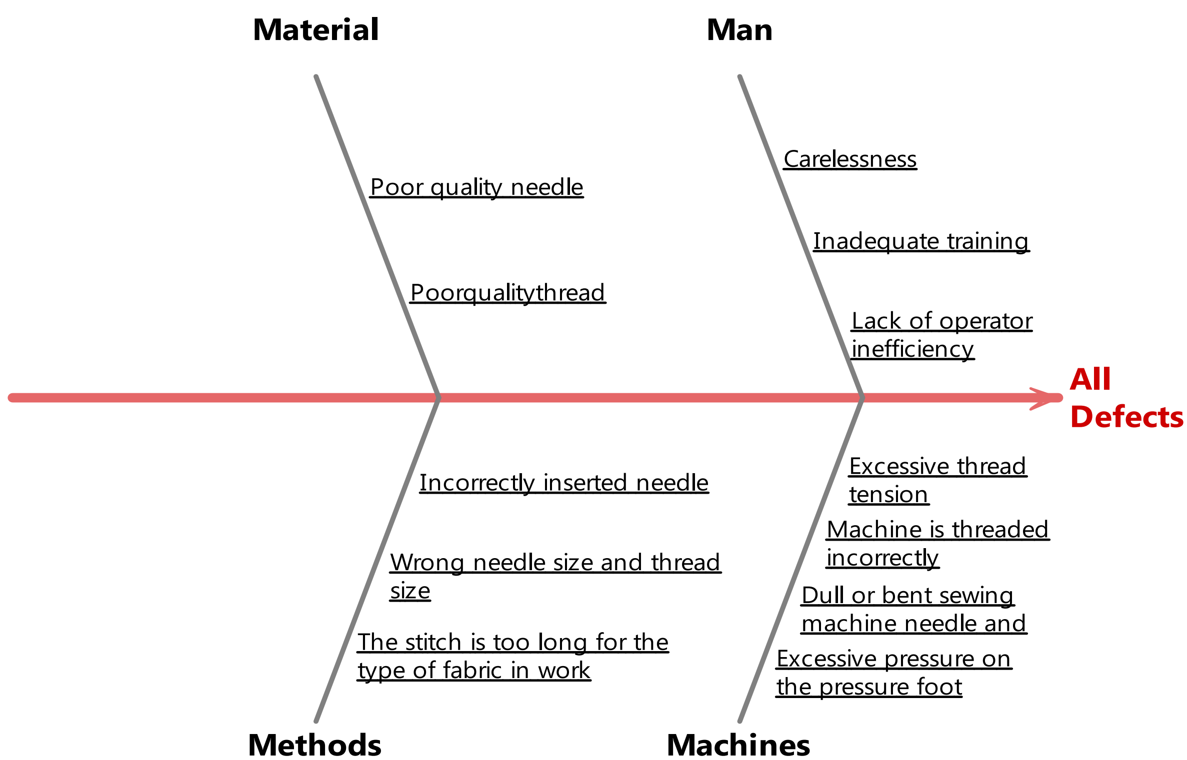


Figure5.13

5.7) Regression Analysis

Regression analysis is used to

- Predict the value of a dependent variable based on the value of at least one independent variable
- Explain the impact of changes by an independent variable on the dependent variable
- Regression analysis is simply the task of fitting a straight line through as scatter plot of cases that best fits the data.

We will see which factors (Man, Machine, Material, Method) are responsible in which quantity in the cause of defects.

Oil Stain	
Man	20%
Machine	30%
Material	20%
Method	30%
Total	100%

Table5.1

Skip	
Man	30%
Machine	50%
Material	10%
Method	10%
Total	100%

Table5.2

Broken	
Man	30%
Machine	40%
Material	10%
Method	20%
Total	100%

Chapter 6

6.1) Introduction To Improve Phase

The reason for the DMAIC Improve stage is to find an answer for the issue that the undertaking plans to address. This includes conceptualizing potential arrangements, choice of answers for test and assessing the consequences of the executed arrangements.

Enhance the framework. Be imaginative in discovering better approaches to improve, less expensive, or quicker. Utilization venture administration and other arranging and administration apparatuses to actualize the new approach. Use factual techniques to approve the change.

Areas	Causes	Suggested Solutions
Man	Carelessness	Improve supervision
	Inadequate training and operator inefficiency	Trained operators sufficiently
Machine	Machine is threaded incorrectly or excessive thread tension	Rethread machine and maintain proper thread tensions. Make sure the thread passes through the tension discs
	Dull or bent sewing machine needle and knife.	Replace the needle and knife with a new one.
	Excessive pressure on the presser foot	Lessen the pressure on the presser foot. Slacken both tensions.
Method	Incorrect size of the needle and thread for operation	The size of the needle and thread should be synchronized. Ensure both the needle and bottom (looper) positions are rightly fed by the correct thread type and size.
	Incorrectly inserted needle	Insert the needle on correct position. Check that the bobbin is wound correctly and no loose threads or loops sticking out.
	Comparatively long stitch for the type of fabric in work	Shorten the stitch length by means of the stitch regulator, especially when sewing fine fabrics.
Material	Poor quality thread	Use good quality thread.
	Poor quality needle	Use high quality needles from another brand. Needle should have high heat resistance capacity.

Table 6.1

6.2) Minimizing Thread Breakage & Skipped Stitches

1. Use a superior quality sewing string. This may incorporate heading off to a higher execution string intended to minimize sewing interferences.

2. Insure fitting machine support and sewing machine conformities

3. Make beyond any doubt sewing machines are appropriately kept up and balanced for the fabric and sewing operation.

4. Observe sewing administrators for right material taking care of methods

6.4) Minimizing Oil Stains

1. Worker should clean the workstation and machine at the start of shift and after break.

2. Worker should wear gloves when putting oil on machines during working.

3. The transporting material (bags) should be clean.

4. Worker make sure to wash their hands before start working.

5. Be careful in handling oil equipment during work.

6. Make sure that the machine don't leak oil.

6.5) Short term solutions

1. Replacement of dull or bowed sewing machine needles and blades with new ones. Embed the needles to the right position

2. Rethread the erroneously strung bobbins

3. Always utilize great quality string

4. Use legitimate fasten length (as little as could be expected under the circumstances) amid sewing

5. Carefully take after the checked line amid sewing

6.6) Long term solutions

1. Provide sufficient preparing to the administrator

2. Improve supervision

3. Change broken machine parts

4. Develop a fitting quality administration framework to brisk location and arrangement of the quality issues

6.7) Material flow and processing

The site's material stream is, at spots, disconnected, bringing about abundance transportation, work substance and developed lead times. There are a lot of chances exist to make better stream, to better synchronize forms with diminishment in WIP and additionally lead time. There are numerous chances to enhance stream and to move towards pull framework. There is no confirmation of any "pacing" component in the lines to calendar conveyance or handling desires.

Changes around there will oblige TOP: Takt time foundation, One piece flow usage and Pull Production.

6.8) Machine utilization

No significant setup time issues are seen in sewing lines. Lessening line setup time colossally is a future test, to give more adaptability to clients' prerequisites. No real machine usage issues are noted.

6.9) Quality

Revamp rates are high when contrasted with industry measures. Anomaly administration with brisk reaction time must be actualized first to diminish this revamp level. Change on supplier quality level is additionally an emotional concern in article of clothing industry. Quality gave at last client level is great yet this quality is created at high cost.

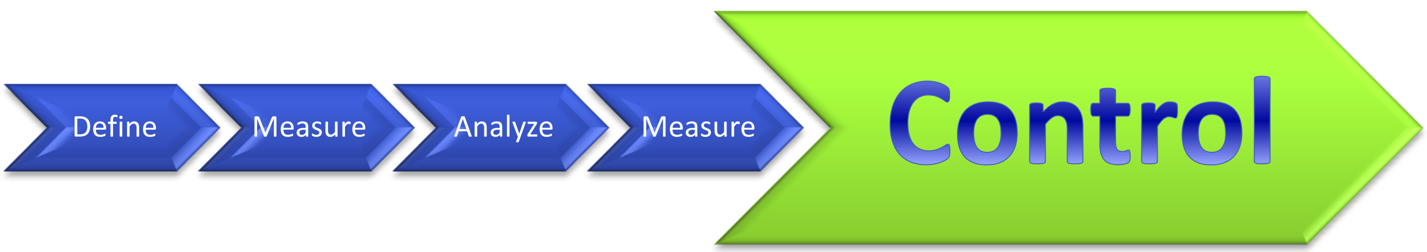
6.10) Sewing

There is constantly a test to run "One piece stream" rather than bunch with imbalanced operations. One piece stream will produce new open doors for development. Current "Hour by hour graph" does not exhibit the activities on variation from the norm administration to comprehend normal, hour by hour issues. In this way line administration including line administrator and generation official needs to assume the part of Lean pioneers and keep anomalous from getting to be typical.

6.11) Visual Management

There is no proof of visual control and visual administration all through the entire framework. Visual administration must be enhanced to see anomalies effortlessly in both creation zone and distribution centers. 5S is the first fundamental venture of making framework more visual and it is beneath typical in distribution center zones and in addition cutting and numbering. SQCD (Safety, Quality, Cost, and Delivery) loads up with satisfactory execution estimation, irregularity administration with snappy reaction time and additionally Kaizen daily papers must be set up. Brisk reaction time to critical thinking is a key achievement variable for representative's inspiration in Lean environment. This is a key element to support come about effectively and to move to the following steps.

Chapter 7



7.1) Introduction To Control Phase

After implementation of the solutions, the progressive outcomes were shared with the management. The main defects were recognized and partially reduced in amount. Now the challenge is to withstand the progresses and refining the system continuously. For this purpose a control plan is prepared.

7.2) Control Plan

The management needs to take initiative on the following obligatory activities to withstand the progresses after Six Sigma implementation.

i. Arrange training continuously for the garments operators on the issue of quality.
ii. Always use good quality threads, needles and other garment accessories.
iii. A sound incentive scheme should be taken for high quality performance.
iv. Preventing defects will be given more priority than correcting defects.
v. Strict quality control should be enforced in line.
vi. The organization should develop a proper Quality Management System.
vii. The management should give incentives for high quality performance.
viii. The focus should be on preventing defects rather than correcting defects.
ix. Tight quality controls should be enforced on those products coming from subcontractors.
x. Training the subcontractors on the importance of quality on continuous basis.

7.3) Acceptance Sampling

To reduce lot of time spending on quality inspection the organization should use Accepting Sampling

It is a form of inspection applied to lots or batches of items either before or after a process. The purpose of acceptance sampling is to decide whether a lot satisfied predetermined standards or not.

We have developed a Sampling Plan which should be used by organization to insure its quality standards strictly. It will also helped to reduce many inspection level which are being followed by the organization. After 100 % inspection this Sampling Plan should be used to insure quality.

Sampling Plan

Measurement type: Go/no go

Lot quality in percent defective

Lot size: 500

Use binomial distribution to calculate probability of acceptance

Acceptable Quality Level (AQL) 2

Producer's Risk (α) 0.05

Rejectable Quality Level (RQL or LTPD) 10

Consumer's Risk (β) 0.1

Generated Plan(s)

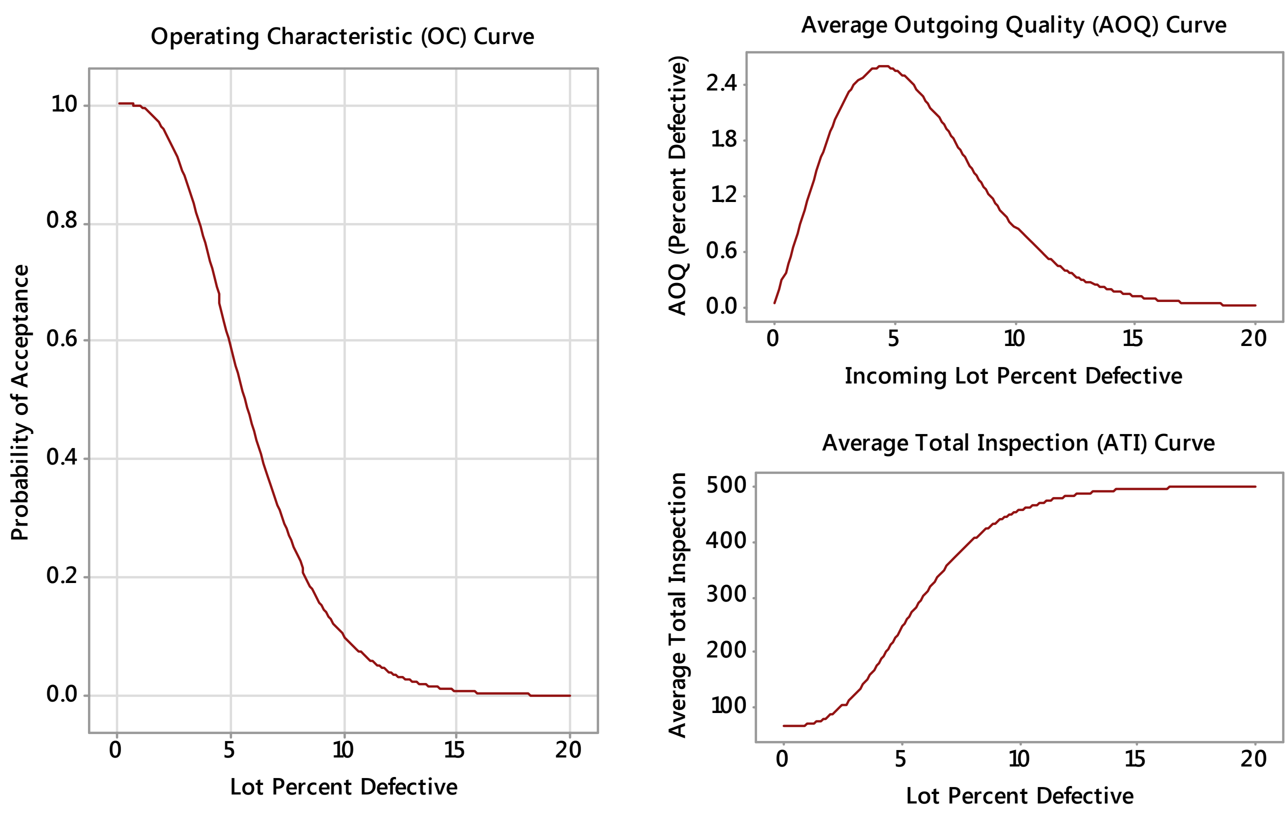
Sample Size 65

Acceptance Number 3

Accept lot if defective items in 65 sampled ≤ 3; Otherwise reject.

Percent Defective	Probability Accepting	Probability Rejecting	AOQ	ATI
2	0.959	0.041	1.668	83.0
10	0.100	0.900	0.866	456.7

Average outgoing quality limit (AOQL) = 2.601 at 4.484 percent defective.



Sample Size = 65, Acceptance Number = 3

Ayesha Fabrics (PVT) LTD

Finishing Inspector's Evaluation Report

Unit#: __________ P.O # ___________ Style: ____________ Customer: __________ Date: __________

Color: _____________ Product: ___________ Auditor# _____________

Sr. #	Inspector's Name	Lot Size/ Sample Size	AQL		No. Of Faults	Fault Type						Insp. Sign
			Acp	Rej								
1												
2												
3												
4												
5												
6												
7												
8												
9												
10												
11												
12												
13												
14												
15												
G. Total												

Code	Faults	Code	Faults	Code	Faults
200	KNITTING DEFFECT/ HOLE	206	PUCKRING PLEAT	212	PRINTING/EMBRIDORY
201	CREASE	207	RAW EDGE	213	STAIN
202	DARNING	208	SHADE	214	PRESSING
203	BROCKEN/SKIP	209	LABLE INCORRECT	215	POCKET H/LOW
204	OPEN SEAM	210	BUTTON/SNAP	216	ZIPP IN SECURE
205	NEEDLE HOLE	211	UNCUTT;LOOSE THREAD	217	OTHERS

Remarks: ____

Supervisor: __________________ Q.A MNGR: ________________________

Conclusion

After all the discussion we come to the conclusion that the industry can reduce its rejection rate by implementing small changes in their system. Prevention from oil stains are not difficult. If the industry management give little attention to the proposed points and implement them they can save a large sum of money that the industry is spending on removing defects.

Re-Cost analysis:

10376*0.5=5188

Oil stain remove by using solvent oil=5188*0.15=778.2=779

Oil stain remove by using perclone=5188-779=4409

Quantity of perclone required=4409/40=110.23=111kg

Cost of perclone=111*150=1650

Quantity of solvent oil required=779/8=97.37=98kg

Cost of sovent oil=98*250=24500

IF they reduce the defects to 50 percent then the labour will be half.

total labour cost=12000*3=36000

Total overall cost for removing oil=36000+24500+1650=62150 per month almost half.

As shown only if we control oil stains to only 50 percent we can save more than 50000 per month and if the industry manage to control oil stains more than 50 percent and reduce the no of defects of other highlighted factors than the money can reach more than 100000 per month.

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