Minimization of Defects in Garment during Stitching

Ms.N.S. Patil[1], Mr.S.S.Rajkumar[1], Ms.P.W.Chandurkar[2], Mr.P.P.Kolte[2].
[1] Pratibha Syntex Ltd. Pithampur, Indore.
[2] Centre For Textile Functions, SVKM'S, NMIMS, MPSTME, Shirpur.
pranjalichandurkar@gmail.com

Abstract

As the global economic condition changing in a rapid motion, generally in an industry more focus is given on profit margin, customer demand for high quality product and improved productivity. In this project sewing and finishing sections is to identify reworks so as to eliminate them for saving time, cost and improved product quality. In the Apparel Manufacturing Industry, main raw material is fabric; others are different types of trimming and accessories. Operational wastages in the Apparel manufacturing process are top surface Rework, printed label rework, knitting fault, dying fault, cutting fault, sewing fault rework, pinhole rework, fabric rework, Improper fly shape, and other reworks.

Key Words: DHU %, fabric defects, Garment defects.

I. Introduction

In garment manufacturing, it is usual few rejected garments after shipment. Reason, most of the manufacturers believe that garments are soft goods and non-repairable defect may occur due to low quality raw materials or faulty process or employee casual behaviour. However, factory must have check points to control over this issue. There is no ready-made solution that can reduce rejection percentage overnight. Each order is unique. But this project works suggest how to handle this issue and bring down rejection rate to minimum. As see a lot of rejected garment after shipment. Most of the organization termed these garments as rejected because those garments can't be by any means. Reworks in the garments industry is a common works that hampers the smooth production rate and focus poor quality products having an impact on overall factory economy. [1-4]

II. Literature Review

In the modern area of the textile technology we are well aware about the minimization of the defect in the garment industry. The basic needs for productivity increase in the sewing department. We have to control the productivity by keeping the intension on the minimization of the defect in the sewing department through the actual taking the supervising& strict operating condition to be followed.

Type of Faults Affecting the DHU%

1. Wrong stitching, 2) Turnout stitch Hole, 3) Machine cut, 4) Thick place, 5) Spots or stain 6) oil stain7) Colour stain 8) Dirt stain.

1. Quality Check Points in Departments [6]

Table No.1 Quality check points in all Departments

Fabric Store	100% fabric inspection
Trim & accessories	Trims inspection
Cutting Room	Marker checking Cut parts checking or audit Bundle inspection
Printing and Embroidery	100 % inspection of printing panels 100% inspection of embroidery
Sewing Department	Inline check point (a critical operation) Roaming checking (Random checking) End of Line checking (100%) Audit of checked pieces
Finishing department	Initial & final finishing inspection

D.H.U. – IT stands for Defect per Hundred Units. It means number of defects found or detected per 100 garments. This is also known as DHU (Defects per Hundred Units).

1. Defects per Hundred Units and
2. Percent Defectives

$$\text{DHU \%} = \frac{\text{Total no.of defects}}{\text{Total no of pieces}} X100$$

$$\text{Percent Defectives} = \frac{\text{Defective Pieces}}{\text{Total pieces}} X100$$

1.1 Measure D.H.U.

To measure DHU of any process, one needs to record number of total pieces checked and number of total defects are detected in the inspected garments. It is number of defects not the defective garments. One defective garment may have more than one defect. Like a checker found broken stitch, a whole and raw edges in shirt. Here checker found one defective shirt but the defective shirt contains 3 defects. Once you have record of the following information of a lot you can measure DHU of that lot using above formula.

1.2 Acceptable Quality level: [13-16]

Lot or Batch size

This means total how many pieces inspector is going to check or inspect. (If you have been offered a shipment of 600 pieces order quantity, the batch size of this shipment will fall under 501 to 1200 pieces (Code-J)

Sample size Code letter

This code is indicative a range of batch size. (Code 'G' means your lot size range is from 151 pieces to 280 pieces.

Sample size

It means that how many pieces will be picked up for inspection from the total offered pieces (Batch).

Ac (Accepted): The number in this column denotes that if the inspector finds up to that many defective pieces the shipment will be accepted by buyer.

Re (Rejected): On the other hand number in this column denotes that if the inspector finds that much defective pieces or more than the listed number, the shipment will be rejected (or asked to the manufacturer for 100% inspection and re-offer for final inspection) by buyer.

1.3 Fabric Quality Check

Fabric is checked 100 % or randomly for various defects like -weaving defect holes, printing/dyeing defects, water crease marks, colour variations etc. Factories generally follow 4-point system for fabric inspection for woven as well as knits fabrics.

1.4 Trim Quality check

All trims are checked for durability & performance. All trims are attached correctly using proper attachment methods. Ribbons ends are heat sealed. Trim materials are checked to perform consistently with the base fabric performance with no differential shrinkage.

1.5 Cutting quality checks

Shade variation in cut bundles is being controlled. Other important quality aspects that are taken care are like – using of pattern according to fabric shrinkage, controlling fabric skew or torque, all plaids, horizontal/vertical stripes are given extra care so as to match the stripes. Light weight fabrics are relaxed to avoid measurement error while stitching.

1.6 Stitching quality checks

Quality is checked whether garment construction meets with the buyer requirement like garment measurement, stitching quality, seam quality, trims and label are attached correctly.

1.7 Finishing & Washing

All the garments are given sufficient time to relax and dry thoroughly prior to packing to avoid foul smelled. Thread cutting, ironing, spotting and other finishing processes are done under strict quality control measures. 100% garments are checked for - Correct labelling, hangtag positioning and carton marking, Correct ratio packing, quantity check in each carton as per the packing instruction. All the packed garments are inspected 2.5AQL quality audit before forwarding goods to the buyer's Q.A. team. [3-5]

III. Material And Method

1. Buyer: - Pico
2. Style: - Men under garments
3. Suppliers- Pratibha Syntax Pvt. Ltd.
4. Shade: - Grey H+R
5. Fabric type: -Knitted fabric1X1 Rib
6. Size: - S, M, XL, XXL
7. SAM:-2.39
8. No. of Operators:-12
9. Mixing:-60\40- Cotton\Elastin Fabric
10. Fabric GSM:-175

2.1 Data before Trail

In experimental work we have collected day wise DHU%.

Table No. 2 Ten Days' Data Report before Trail

Style: - MENS TRUNK				
Serial No	Days	Total No. of Defects	Total Check Pieces	Total DHU %
1	Day 1	187	2370	7.8%

2	Day 2	159	2250	7%
3	Day 3	165	2200	7.5%
4	Day 4	184	2050	8.9%
5	Day 5	207	2200	9%
6	Day 6	174	2250	8%
7	Day 7	102	1300	7.8%
8	Day 8	187	2650	7%
9	Day 9	125	1800	6%
10	Day 10	141	750	7%
Total	Total Defects =1621		Total Piece=19820	

- Defects per Hundred Units and
- Percent Defectives

$$\text{DHU \%} = \frac{\text{Total no. of defects}}{\text{Total no of pieces}} X100$$

$$\text{Percent Defectives} = \frac{\text{Defective Pieces}}{\text{Total no of pieces}} X100$$

$$\text{DHU \%} = \frac{1631}{19820} X100$$

$$\text{DHU \%} = 8.\%$$

For analysis the DHU% in above data the DHU% are not controlled so to minimize the DHU% we take a corrective action that is we change the sewing machine setting like reset tensioner, time synchronisation during stitch formation, awareness in operators about physical properties of fabric which help to reduce DHU%. So that changing effects in DHU% are as follows.

2.2 After Study Data

Style: - MENS TRUNK.

Table No. 3 Ten Days' Data Report after Trail

Buyer :- PICO				
Serial No	Day	Total No. of Defects	Total Check Pieces	Total DHU %
1	Day 1	97	2250	4%
2	Day 2	159	3250	5%
3	Day 3	105	2900	6%
4	Day 4	109	1950	6%
5	Day 5	186	3250	6%
6	Day 6	174	3250	5%
7	Day 7	182	3000	6%
8	Day 8	77	2100	4%
9	Day 9	118	3500	3%
10	Day 10	85	1900	4%
Total	Total Defect =1292		Total Piece=30600	

$$\text{DHU \%} = \frac{\text{Total no.of defects}}{\text{Total no of pieces}} X100$$

$$\text{Percent Defectives} = \frac{\text{Defective Pieces}}{\text{Total no of pieces}} X100$$

$$\text{DHU \%} = \frac{1292}{30600} X100$$

$$\text{DHU \%} = 4\%$$

2.3 Day Wise Data of Top Five Defects before trail

Table 4. Day wise data of top five defects before trail

Sr.No.	Defects/Day	1	2	3	4	5	6	7	8	9	10	Total
1	Other	55	58	58	67	50	50	24	50	44	21	477
2	Up Down	17	37	33	30	34	20	00	15	03	11	200
3	Measurement	29	18	18	15	28	00	22	42	19	2	193
4	Puckering	19	00	02	34	51	44	14	05	19	00	188

5	Skip Stitch	52	33	34	14	37	36	24	7	18	00	256

2.4 Day Wise Data of Top Five Defects before trail

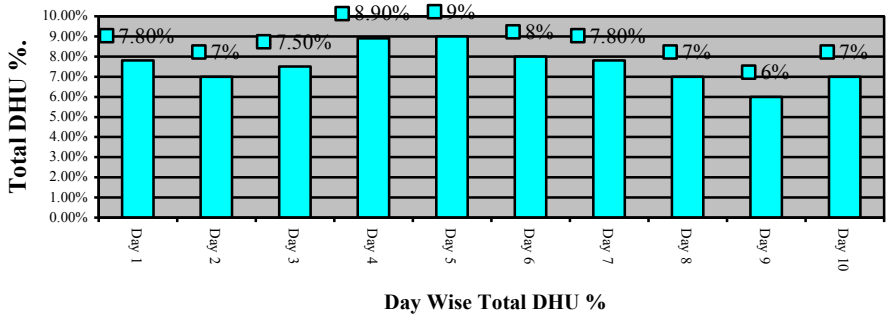
Table 5. Day wise data of top five defects after trail

Sr.No	Defects/Day	1	2	3	4	5	6	7	8	9	10	Total
1	Other	26	29	58	22	40	40	51	26	26	16	334
2	Up Down	13	20	08	23	33	28	24	06	10	00	141
3	Measurement	13	16	20	07	17	21	23	08	11	00	136
4	Puckering	03	06	00	05	00	00	00	05	10	03	32
5	Skip Stitch	19	15	38	13	08	06	02	11	14	07	133

We change the sewing machine settings like reset tensioner, time synchronisation during stitch formation, awareness in operators about physical properties of fabric which help to reduce DHU%.

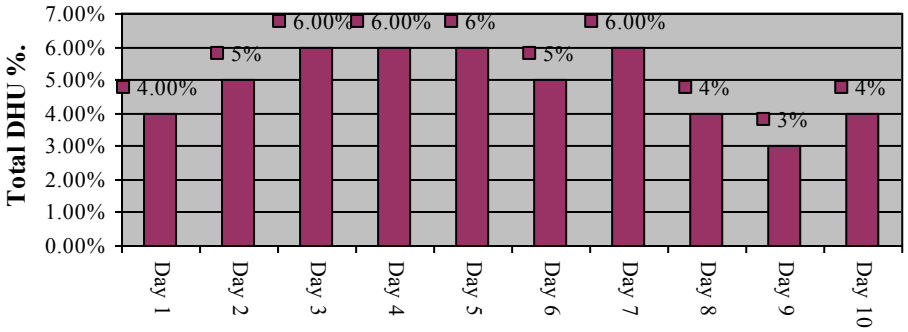
IV. Results and Discussion

Graph No.1 Day Wise Total DHU% Report



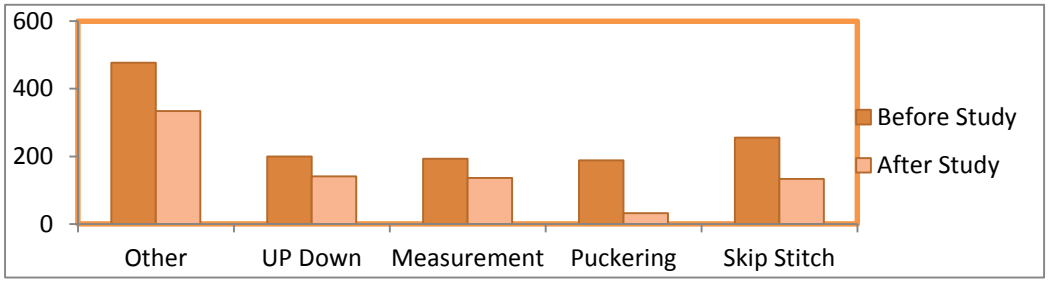
Graphically shows day wise garment rejection % due to various reasons like skip stitches, up down, stains, puckering and measurement and other defects because of these defects total DHU is 8% which is higher than normal range.

Graph No.2 Day Wise Total DHU% after report



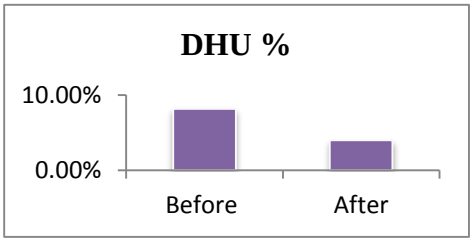
Graphically shows day wise garment rejection % after corrective action, which reduces the defecst rate in top five defects like Skip Stitches, Puckering, Measurement, up down, other defects so it help to reduced DHU % .

Graph No. 3 Top Five Defects



This graph shows defects like other, up down, measurement problem, puckering and skip stitches were more before trail due to problems in sewing machine setting like tensioner, time synchronisation during stitch formation, awareness in operators about physical properties of fabric.

Graph No. 4 DHU% before and After



We change the sewing machine setting like reset tensioner, synchronisation in loopformation during stitching , awareness in operators about physical properties of fabric which help to reduce DHU%.As per this graph overall DHU of before trail are 8% and after carried out experimental work it can be reduce by 4%. Overall DHU of after trail are 4%.

Conclusion

The suggestive tools developed in article cover a comprehensive series of aspect in minimizing reworks in the sewing section of apparel industries by ensuring quality. Good quality increase the value of a product or service, establishes brand name, good reputation for garment exporter, which in turn result into consumer satisfaction, high sales and foreign exchange for the country. In mind 1% defective product for an organization is 100% defective for the customer who buys that defective product. The study clearly indicate that eliminating non – productive activities like reworks in the apparel industries time as well as cost are saved by ensuring quality production which have an important impact on overall factory economy. Before experimental work overall DHU are 8% and after the changing roller setting in machine which was responsible for more no. of faults in garment. After corrective action overall DHU are 4%.

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