Faculty of Engineering

Department of Textile Engineering

Study on Non Productive Time (NPT) of T-Shirt Manufacturing

Course code: 4214   Course title: Project (Thesis)

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A thesis submitted in partial fulfillment of the requirements for the degree of **Bachelor of Science in Textile Engineering**

Apparel Manufacturing Technology

Spring-2019

Letter of Approval

2 May 2019

To

The Head

Department of Textile Engineering

Daffodil International University
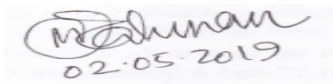
102, Shukrabad, Mirpur Road, Dhaka 1207

Subject: Approval of Project Report of B.Sc. in TE Program

Dear Sir

We are just writing to let you know that this project report titled as **"Study on non-productive time (NPT)of T-Shirt Manufacturing"** has been prepared by the student bearing ID 162-23-4714, and 162-23-4713 is completed for final evaluation. The whole report is prepared based on the proper investigation and interruption through critical analysis of empirical data with required belongings. The students were directly involved in their project activities and the report become vital to spark of many valuable information for the readers.

Therefore it will highly be appreciated if you kindly accept this project report and consider it for final evaluation.

Yours Sincerely

[signature]
02.05.2019

Md. Mominur Rahman

Assistant professor

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Daffodil International University

DECLARATION

We are hereby declare that the work which is being presented in this thesis entitled, **"Study on non-productive time (NPT) of T-Shirt Manufacturing"** is original work of my own, has not been presented for a degree of any other university and all the resource of materials uses for this thesis have been duly acknowledged.

_____

Name: Md. Alamin

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This is to certify that the above declaration made by the candidate is correct to the best of my knowledge.

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ACKNOWLEDGEMENT

At first we would like to thank Allah, Because he is one and only who gives us strength and ability to make this report ,after that I want to thank our parents for their excellence to give us a beautiful life, we also highly thankful to our well wishers

We are very much thankful to our teachers, lab assistant, register sir, co coordinator's and all the employers of daffodil international university ,we are highly delighted to express our regards and gratitude to honorable head PROF,Dr .MD.Mahbhul Hogue for providing his best support for us

Special thank goes to our supervisor Md Mominur Rahman and prof Dr SM Mahbhub Ul Haque Majumder, honorable pro vc , daffodil international university for his unforgettable help, we are really lucky to get that person,

Thesis is and academic function of the daffodil international university which increase the confidents of our knowledge, thus thesis course aims to make students skilled enough to stand out successfully in competitive job market, we also thank those person who give me the opportunity to use their materials,

Finally we would like to acknowledge that we remain responsible for the errors which doubtless remain in the following report.

ABSTRACT

NPT in Industrial Engineering term is Non-Productive Time. The time that is spent by an operator without producing any garment (standard minutes) like 'set up time' is called nonproductive time. This is the major problem of low production of garments manufacturing. In this thesis we have try to collect some data and how to improve productivity. We have find out the possible non-productive time (NPT) for sewing and other department, and captured the non-productive time (NPT) different type of problem. This thesis we have show the comparison of sewing section and other department. We have realize the major non-productive time continuously. If proper work has been done of NPT we can achieve proper production and minimize the higher cost of production.

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CHAPTER-1

INTRODUCTION

1. Introduction

NPT in Industrial Engineering term is Non-Productive Time. Time that is spent by an operator without producing any garment (standard minutes) like 'set up time' is called non-productive time. In garment production Non-productive time is measured to analyze how much standard time is lost due to machine down time. Lost time is recorded to show management a reason for low production in a particular day or lower line efficiency. Here are few example of lost time.

1.1 Background of the study

This research work was geared towards determining the factors that contribute to Non Productive Time (NPT) in geothermal drilling. Further, the research sought to find out the contribution of equipment breakdown to Non Productive Time, How geological challenges aid Non Productive Time, ways in which operations planning contribute to Non Productive Time, and how decision making contribute to Non Productive Time. The parameters of interest observed included; completion depth, drilling duration, well location, well design, casing design, drill rig capacity, and number of staff in the rig. A sampling frame of 32 wells was developed. The results of the study revealed enormous amount of Non Productive time associated with geothermal drilling operations in Menengai Geothermal Project. It showed that the average total Non-Productive Time is 62%, while 38% of the total drilling duration is productive time. Operations planning was the biggest contributor of Non Productive time at 41%, equipment breakdowns contributed 12%, geological challenges 8%, and decision 1%. The study provided recommendations that should be undertaken in order to cut down Non Productive Time. (Ngosi Reuben , Omwenga Jane 2015)

1.2 Objective of the Project

The objective of this report are given below

1. To find out the reason of non-productive time (NPT)
2. To know the different non- productive time (NPT)
3. To know the way of minimize the non-productive time (NPT)

1.3 Importance of the thesis

Researcher: In this thesis report we are trying to show a monthly NPT time, a researcher can take as a reference from it. Researcher can use the term that we used it in this report to find out the NPT time for different style.

An general person can learn something from this report, how NPT time occurred, what time of impact or disadvantages occurred during sewing for all NPT time.

Factory employee : NPT time is part of different style operation and factory employee can apply the term that how can the overcome the NPT time for better production capacity.

Student can learn from this report what is NPT time? How many NPT time occurred in different section like (sample section, cutting section, sewing section, printing section, and embroidery section)

1.4 Limitation of the thesis

1. Due to confidentially, the factory restricts disclosing some important data.

2. All the concerns personal of the office have not been interview.

3. The duration of the internship is limited and not over two months.

4. Due to workers strike we are not collecting the data properly because factory environment is not good for working.

CHAPTER-2
LITERATURE SURVEY

2.1 Flow Chart of the NPT

Study about the Non Productive Time

↓

Select Manufacturing Organization for Implementation the Study

↓

Visiting the Industry and Visual Observation

↓

Select an Operational Section

↓

Prepare a Data Sheet for a specific product style

↓

Analysis of Current state by Calculating value added and non-value added time

↓

Identifying the area of Non-productive time before Root Cause Analysis

↓

Identifying Root Cause of Non-productive activities

↓

Applying Root Cause analysis process for Non-productive Activities

↓

Due to Less Cost and Improve the Productive time after apply this project

↓

Conclusions and Recommendations

2.1.1. Non Productive time

Check out the Labor Worksheet below. An important consideration when determining the burdened cost of labor is the difference between the hourly pay you give an employee and the hours that they actually work producing income. When you add up all of the hours for paid vacations (one week, 40 hours), holidays (five days, 40 hours), paid time while attending training programs or trade events (10 hours total), as well as attending company meetings (2 hours, every other week, or 50 hours annually), where will that money come from if you're not charging for it in your estimated labor costs.

We have discussed four major non- productive time (NPT)

1. Waiting for work,
2. Cutting delay,
3. Alteration and re- work in production line and
4. Line setting

1. Waiting for work

It means in a line operators sit idle due to no feeding from previous operators.

Poor line balancing, operator absenteeism, quality issues.

It is also observed that due to non-approval of trims makes operator to wait for a long time.

2. Cutting delay

All operators may sit idle or few operators at the back sit idle for feeding next lay.

Insufficient fabric to cut and load, Pending fabric approval to cut, delay in cutting, less cutting capacity or poor cutting plan.

3. Alteration or Re- work

When required stitch quality is not made at first time, garment parts needs to open and stitch it again. This task is called repair work or alteration.

Operator stitched a defective seam and garment has been given back to him for alteration.

Shade variation in different component of the same garment and need to change parts,

Operators are sitting idle due to no feeding, so they are given to do repair work for other style or alteration for same style,

4. Line setting

Frequent change of styles due to small order run increase efficiency losses. It is observed that 4-7 styles are loaded in a month to a line.

Due to shipment pressure or poor planning, sometime line supervisors need to stop line without finishing current style and a new style is loaded without prior planning and resources. These cause major loss of standard time.

Factories run single style to all lines in floor and end style in all lines at the same day. In this situation line setting is happened at the same time which needs extra setting time than normal line setting

Inadequate fabric for the style – lines need to stop and other style is loaded until fabric is sourced and cut.

Line setting time can be reduced by better planning and line supervisors and engineers work proactively.

2.1.2. Productivity Improvement Techniques

Productivity improvements mainly needed in the apparel industry. Every manufacturer and factory owners should want to improve their productivity. They always try to get new idea or techniques to increase their high productivity and profit also.

Here I will represent some basic productivity improvement techniques that are widely used in the apparel industry for increasing garments production.

1. Technology based

2. Employee based

3. Material based

4. Process based

5. Product based

6. Management based

1. Technology based

A.Computer Aided Design (CAD), Computer Aided Manufacturing (CAM), and Computer Integrated Manufacturing System (CIMS):

CAD refers to design of products, processes or systems with the help of computers. The impact of CAD on human productivity is significant for the advantages of CAD

(a) Speed of evaluation of alternative design

(b) Minimization of risk of functioning

© Error reduction

2. Employee based

(a) Financial and non-financial incentives at individual and group level

(b) Employee promotion

© Job design, job enlargement, job enrichment and job rotation.

(d) Worker participation in decision making

(e) Quality circles (QC), Small Group Activities (SGA)

(f) Personal Development

3. Material based

(a) Material Planning and Control

(b) Purchasing, Logistics.

4. Process based

(a)Methods engineering and work simplification

(b)Job design, Job evaluation, Job safety

5. Product based

(a) Value analysis and value engineering

(b) Product diversification

© Standardization and simplification

(d)Reliability engineering

(e) Product mix and promotion

6. Management based:

(a) Management style

(b) Communication in the organization

(d) Motivation

2.1.4. Production Sequence of Basic T-Shirt

Shoulder Join

↓

Thread Cut

↓

Shoulder Top Stitch

↓

Care Label Attach

↓

Sleeve Join

↓

Neck Piping

↓

Thread Cut

↓

Back Neck Piping

↓

Back Neck Top Stitch & Loop Attach

↓

Neck Tack Unstitch

↓

Neck Tack Closing

↓

Side Seam Join

↓

Sleeve Hem

↓

Thread Cut

↓

Bottom Hem

↓

Thread Cut

↓

Measurement & Sticker Remove
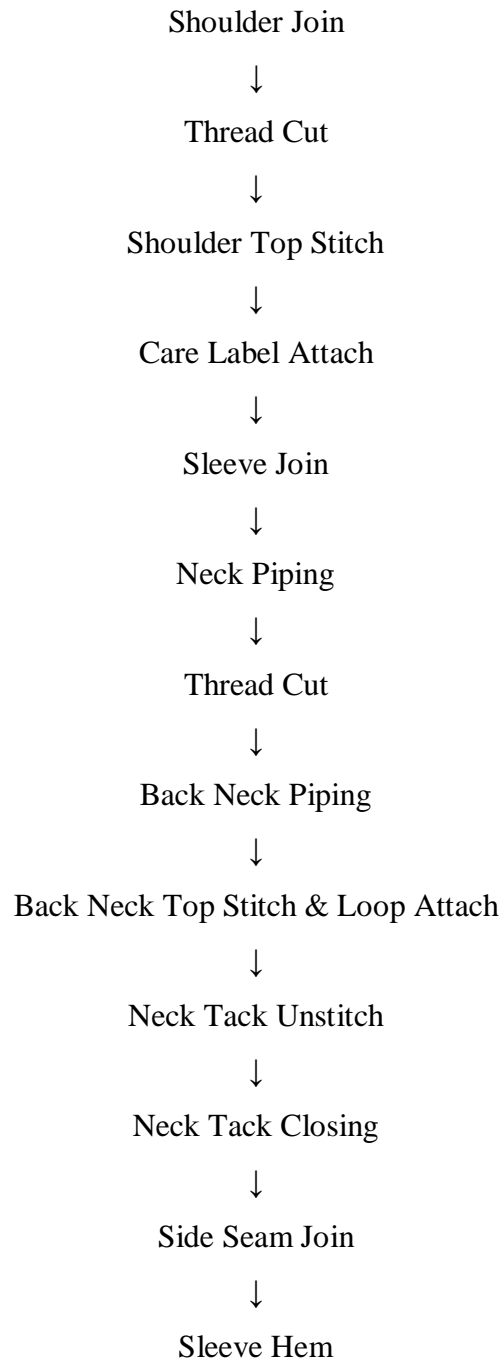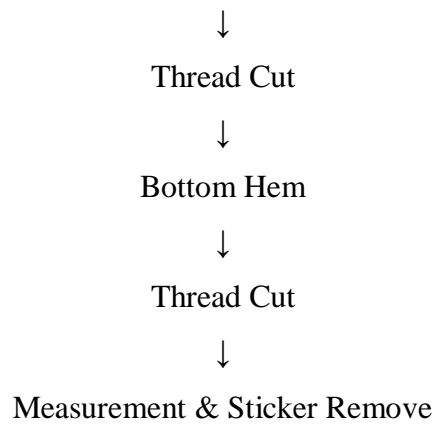
2.1.4. All Sewing process & finishing picture For Basic T-Shirt

Shoulder Seam Join

Label Attached   Sleeve Join

Neck piping

Stitch Opening

Neck Tack

Neck Tack Close

Measurement &Thread Cut   Side Seam Join

Body Hem   Sleeve Hem

Neck Piping Thread Cut   Thread Cut

Check &Sticker Remove   Inspection

Interlining Make   Ironing & Measurement

Folding & Carton   Loop Attached

Complete Basic T-Shirt

In a garments industry sewing and finishing section involves with garments washing, checking, final inspection, ironing, folding and, packing, etc. We are just trying to show process of sewing, finishing, checking and final inspection section.

CHAPTER-3

EXPERIMENTAL DETAILS

3.1. Non Productive Time (NPT) for T-Shirt

NPT is an industrial engineering term, during t shirt operation that is spent by an operator without producing any t shirt like set up time for operation is called non- productive time for t shirt, non- productive time means analyze how much standard time is lost due to personal fatigue, machine problem etc., so in that way we can find out non- productive time for t shirt.

3.1.1 Details of product

(a) **Details of order:** Identity: 00020898-00, Buyer name: New Yorker, Order Number: OM820218, Style Number: FBS1934,Qty (Pcs) : 97200.

Fabric Details: Body Fabric: 60%Cotton 40% poly S/Jersey, Wash: N/A, GSM: 160, Category: N/A

(b) Art Work

This is the art work for complete t-shirt with measurement.
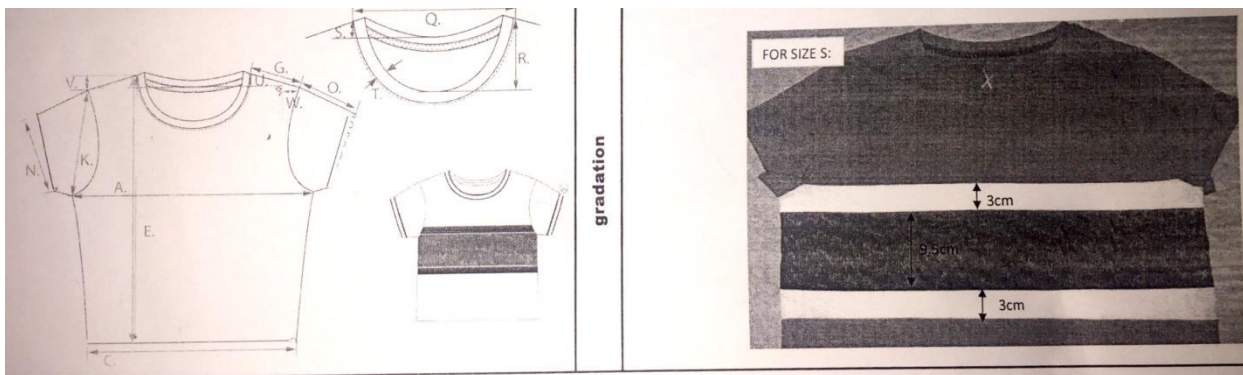
Figure: 3.1.1

(C) Measurement:

MEASUREMENTS / SIZES		XXS	XS	S	M	L	XL	Tolerance in cm
measurement chart women's T-Shirt								NEW YORKER
DATE: 23.01.2019	ARTICLE: 02.02.105.0205 NEW			ORDER: 820218				Tolerance in cm
SUPPLIER: Exp. Europe								
A. 1/2 chest at armhole	2	43.5	45.5	47.5	49.5	51.5	53.5	+/- 1
C. 1/2 bottom	2	43	45	47	49	51	53	+/- 1
D. seam height at bottom	0	1.2	1.2	1.2	1.2	1.2	1.2	+/- 0
E. body length (from hsp)	1	51	52	53	54	55	56	+/- 1
G. shoulder length (excl. piping)	0.5	8	8.5	9	9.5	10	10.5	+/- 0,5
K. armhole (measured straight)	1	17	18	19	20	21	22	+/- 0,5
N. 1/2 sleeve opening (measured along hem)	0.5	13.5	14	14.5	15	15.5	16	+/- 0,5
O. sleeve length	0.5	13.5	14	14.5	15	15.5	16	+/- 0,5
forearm length	0	3.5	3.5	3.5	3.5	4	4	+/- 0,5
P. Piping height at sleeve opening	0	2	2	2	2	2	2	+/- 0
Q. neck width (incl. piping)	0.5	19.5	20	20.5	21	21.5	22	+/- 0,5
R. front neck drop (excl. piping)	0.5	7	7.5	8	8.5	9	9.5	+/- 0,5
S. back neck drop (excl. piping)	0	1.6	1.6	1.6	1.6	1.6	1.6	+/- 0,5
T. piping height at neckline	0	2	2	2	2	2	2	+/- 0
U. set in position (from hsp)	0.5	14.5	15	15.5	16	16.5	17	+/- 0
V. shoulder drop	0.2	1.6	1.8	2	2.2	2.4	2.6	+/- 0

It's a measurement chart, this chart show as different types of measurement for t-shirt. Point of measurement. For making a apparel pattern a complete garment consummate measurement guidelines must be needed .At times only base measurement is not enough for equip this, measurement specification comes from the buyer to get the actual size and each part of the garment.

(e) Complete Garments picture

Figure 3.1.2: Complete T-Shirt

3.1.2. Report of NPT of Sewing Section (One Week)

Table 3.1.2. This table is show that date wise non- productive time (NPT) for sewing section.

SL.NO	Category	Responsible Dept.	Code	1	2	3	4	5	6	Lost Hour
				Date Wise Non Productive Minute						
1	Supervision Problem	Sewing	SP	530	0	0	0	0	0	8.83
2	Re-Work	Sewing	RW	0	0	0	0	0	0	0
3	Manpower Crisis	Sewing	MC	360	0	0	0	0	0	6
4	Style Change Delay	Sewing	SCD	0	0	0	540	0	0	9
5	Deduct Hour	Sewing	DH	0	0	0	0	0	0	0
	Total Lost Hour			14.83	0	0	9	0	0	28.66

Here is the table of non-productive time (NPT) for six days sewing, where we can find out the five major category non- productive time (NPT) problems. Those problems occurs daily, for that reason it's create a obstacle for high growth production capacity. If we can decrease the non-productive time (NPT) instantly during production it will be a good solution for those problems.

3.1.2. This graph is show that code wise Non Productive Time (Sewing)

In this graph we are just trying to show which non -productive time (NPT) is more or less. The points shown here are supervision problem, re-work, manpower crisis, style change delay, deduct hour by pointing out these we can decrees this issue for future.

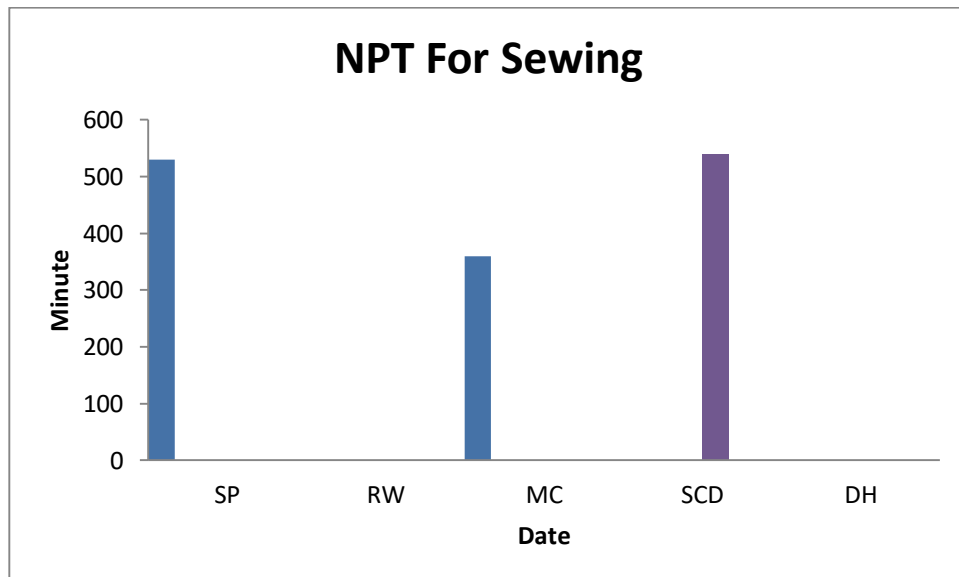### 3.1.3 Report of NPT of Other Department (One Week)

Table: 3.1.3 This table is show that date wise non- productive time (NPT) for other section.

Sl	Category	Responsible Dept.	Code	Date Wise Non Productive Second						Lost Minute
				1	2	3	4	5	6	
1	Machine Break Down	Maintenance	MB	75	1840	884	456	170	551	66.23
2	Decision Making Delay	Quality	DMD	0	0	0	0	0	0	0
3	Quality Checking Delay	Quality	QCD	0	0	0	0	0	0	0
4	Machine Delay	Maintenance	MD	1640	0	540	1320	0	0	58.33
5	Cutting Mistake	Cutting	CM	0	0	0	0	0	0	0
6	Fabric Approval Delay	Quality	CD	0	0	0	0	0	0	0
7	Cutting Delay	Cutting	FAD	0	0	0	0	0	0	0
8	Fabric Delay	Store	FB	0	0	0	0	0	0	0
9	Color Shading	Quality	CS	0	0	0	0	0	0	0
10	Print Mistake	Printing	PM	0	0	0	0	0	0	0
11	Print Delay	Printing	PD	0	0	0	0	0	0	0
12	Print Approval Delay	Quality	PAD	0	0	0	0	0	0	0
13	Embroidery Delay	Embroidery	ED	0	0	0	0	0	0	0
14	Embroidery Mistake	Embroidery	EM	0	0	0	0	0	0	0
15	Accessories Delay	Supply Chain	ACD	2400	1440	1320	0	0	440	93.33
16	Input Supply Delay	Supply Chain	ISD	10680	0	3510	0	0	5400	326.5
17	Power Failure	Administration	PF	0	22554	406	51895	4460	0	1321.91
18	Salary Payment Effect	Administration	SPE	0	0	0	0	0	0	0
19	Approval Delay	Quality	APD	0	0	0	0	0	0	0
20	Technical problem	Technical	TP	0	0	0	0	0	0	0
21	Pattern Mistake	Technical	PTM	0	0	0	0	0	0	0
22	Re-Feeding	Planning	RF	0	0	0	0	0	0	0
23	Others	Other	OTS	0		0	40	0	250	4.83
	Total Lost Hour			4.09	7.17	1.85	18.91	1.28	1.84	31.10

Here we can see that different types of NPT problems occurred in other department. Where we can find out the five major category non -productive time (NPT) problems. Those problems occurs daily, for that reason it's create a obstacle for high growth production capacity. We have to stop the accidental NPT problems otherwise it will decrease the production growth.

3.1.3 This graph is show that code wise Non-Productive Time (Other Department)
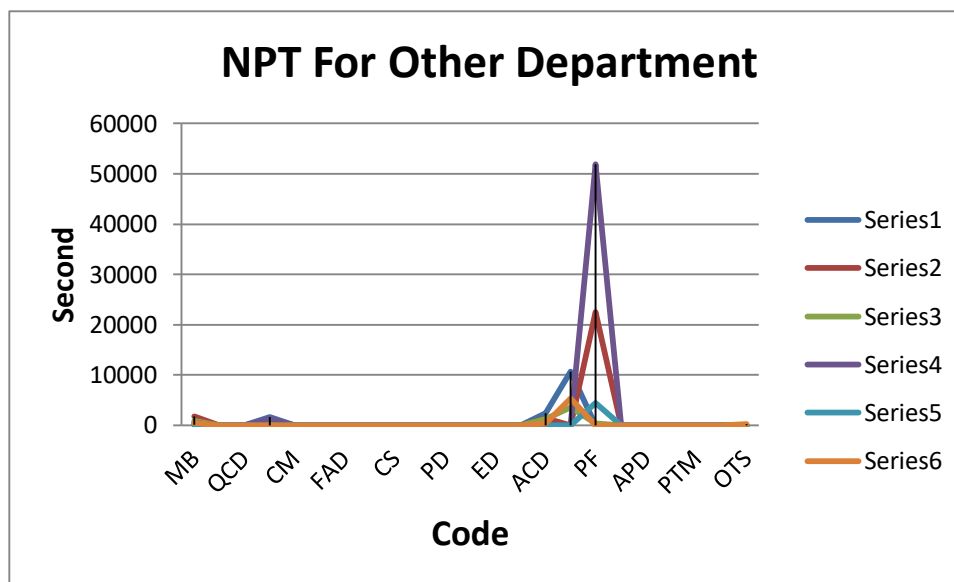
NPT For Other Department

The points shown here are maintenance, quality, cutting, store, printing , embroidery, supply chain, administration, technical, planning, others by pointing out these we can decrees this issue for future .In this graph we are just trying to show which non- productive time (NPT) is more or less.

3.2 Non Productive Time (NPT) for T-Shirt

NPT is an industrial engineering term, during t shirt operation that is spent by an operator without producing any t shirt like set up time for operation is called non- productive time for t shirt, non- productive time means analyze how much standard time is lost due to personal fatigue, machine problem etc., so in that way we can find out non- productive time for t shirt.

3.2.1 Details of product

(a) Details of order, Identity: 00020895-00, Buyer name: Mustang, Order Number: 110-30009168, Style Number: 1007796SSN-1912, Qty (Pcs) : 3134

(b)Fabric Details: Body Fabric: 100% Cotton CTN S/Jersey, Wash: Normal wash, GSM: 140, Category: C/B, Yarn count: 30/1

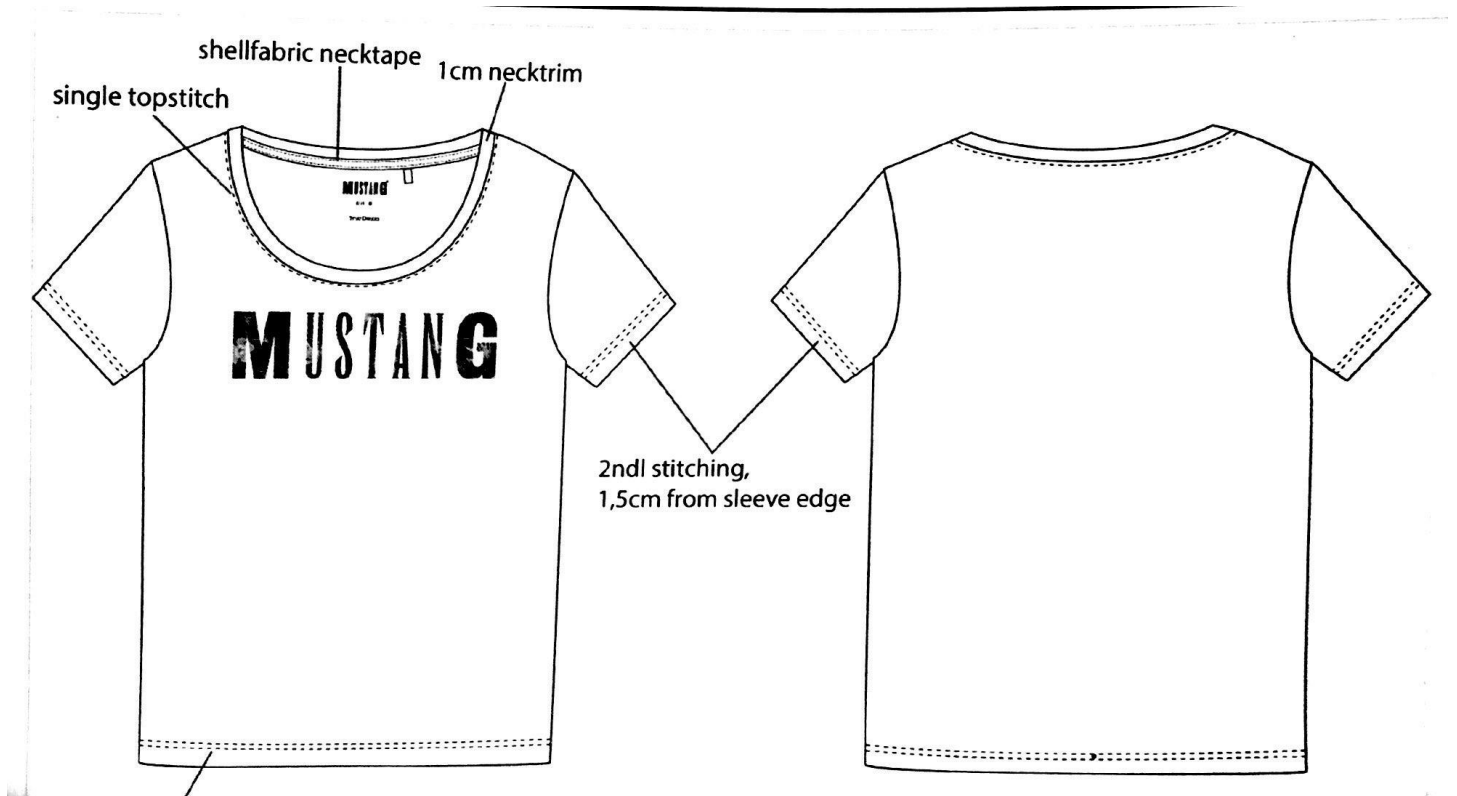(c) Art Work: This is the art work for complete t-shirt with measurement.

single topstitch
shellfabric necktape
1cm necktrim
2ndl stitching, 1,5cm from sleeve edge
MUSTANG

Figure: 3.2.1

© Measurement

Dim	Description	Length	XS	S	M	L	XL	Tol (-)	Tol (+)
B	front body length from HPS		62.00	64.00	66.00	68.00	70.00	-1.00	1.00
V	back length CB		57.00	59.00	61.00	63.00	65.00	-1.00	1.00
C1	shoulder width, seam to seam		37.50	39.00	40.50	42.00	43.50	-1.00	1.00
ab1	position across back from HPS		12.00	12.00	12.00	12.00	12.00	0.00	0.00
ab	across back		36.20	38.00	39.80	41.60	43.40	0.00	0.00
af1	position across front from HPS		15.00	15.00	15.00	15.00	15.00	0.00	0.00
af	across front		33.40	35.00	36.60	38.20	39.80	0.00	0.00
A1	1/2 chest width 2cm below armhole		46.00	49.00	52.00	55.00	58.00	-1.00	1.00
M	1/2 bottom width		48.00	51.00	54.00	57.00	60.00	-1.00	1.00
E	sleeve length from shoulder		9.20	10.00	10.80	11.60	12.40	-0.50	0.50
IA	1/2 sleeve opening		15.00	16.00	17.00	18.00	19.00	-0.50	0.50
D	armhole height straight		18.60	19.50	20.40	21.30	22.20	-0.50	0.50
O	neck width, seam to seam		21.50	22.00	22.50	23.00	23.50	-0.50	0.50
F	front neck drop HPS to CF neck seam		12.50	13.00	13.50	14.00	14.50	-0.50	0.50

Displaying 1 - 14 of 19 results.   Units: CM   Grading Display: Absolute

Points of measurement are used to specify the measuring points of a garment product, it's very important to indicate the measured location at given points of product.

(d) Complete Garment Picture

Figure: 3.2.2

3.2.2 Report of NPT of Sewing Section (One Week)

Table 3.2.2 This table is show that date wise non -productive time (NPT) for sewing section.

SL.NO	Category	Responsible Dept.	Code	Date Wise Non Productive Minute						Lost Hour
				1	2	3	4	5	6	
1	Supervision Problem	Sewing	SP	0	0	0	0	0	0	0
2	Re-Work	Sewing	RW	0	0	0	0	0	0	0
3	Manpower Crisis	Sewing	MC	0	0	0	0	0	0	0
4	Style Change Delay	Sewing	SCD	0	0	0	0	0	0	0
5	Deduct Hour	Sewing	DH	0	0	0	0	0	0	0
	Total Lost Hour			0	0	0	0	0	0	0

According to this chart there is null non -productive time are found on the basis of 2nd week

## 3.2.3 Report of NPT of Other Department (One Week)

Table: 3.2.3 This table is show that date wise non -productive time (NPT) for other section.

SL.NO	Category	Responsible Dept.	Code	Date Wise Non Productive Second						Lost Minute
				1	2	3	4	5	6	
1	Machine Break Down	Maintenance	MB	140	927	62	23	25	1096	37.88
2	Decision Making Delay	Quality	DMD	0	0	0	0	0	0	0
3	Quality Checking Delay	Quality	QCD	0	0	0	0	0	0	0
4	Machine Delay	Maintenance	MD	0	0	0	0	0	0	0
5	Cutting Mistake	Cutting	CM	0	0	0	0	0	0	0
6	Fabric Approval Delay	Quality	CD	0	0	0	0	0	0	0
7	Cutting Delay	Cutting	FAD	0	0	0	0	0	0	0
8	Fabric Delay	Store	FB	0	0	0	0	0	0	0
9	Color Shading	Quality	CS	0	0	0	0	0	0	0
10	Print Mistake	Printing	PM	0	0	0	0	0	0	0
11	Print Delay	Printing	PD	0	0	0	0	0	0	0
12	Print Approval Delay	Quality	PAD	0	0	0	0	0	0	0
13	Embroidery Delay	Embroidery	ED	0	0	0	0	0	0	0
14	Embroidery Mistake	Embroidery	EM	0	0	0	0	0	0	0
15	Accessories Delay	Supply Chain	ACD	0	0	0	0	0	0	0
16	Input Supply Delay	Supply Chain	ISD	3600	19560	4200	0	0	12120	658

17	Power Failure	Administration	PF	4368	0	0	0	7720	9732	363.66
18	Salary Payment Effect	Administration	SPE	0	0	0	0	0	0	0
19	Approval Delay	Quality	APD	0	2820	0	0	0	0	47
20	Technical problem	Technical	TP	0	0	0	0	0	0	0
21	Pattern Mistake	Technical	PTM	0	0	0	0	0	0	0
22	Re-Feeding	Planning	RF	0	0	0	0	0	0	0
23	Others	Other	OTS	0		0	0	0	0	0
	Total Lost Hour			2.25	6.46	1.18	0	2.15	6.36	18.44

Here we can see that different types of NPT problems occurred in other department. Where we can find out the five major category non -productive time (NPT) problems. Those problems occurs daily, for that reason it's create a obstacle for high growth production capacity. We have to stop the accidental NPT problems otherwise it will decrease the production growth.

3.2.3. This Graph is show that code wise Non-Productive Time (Other Department)
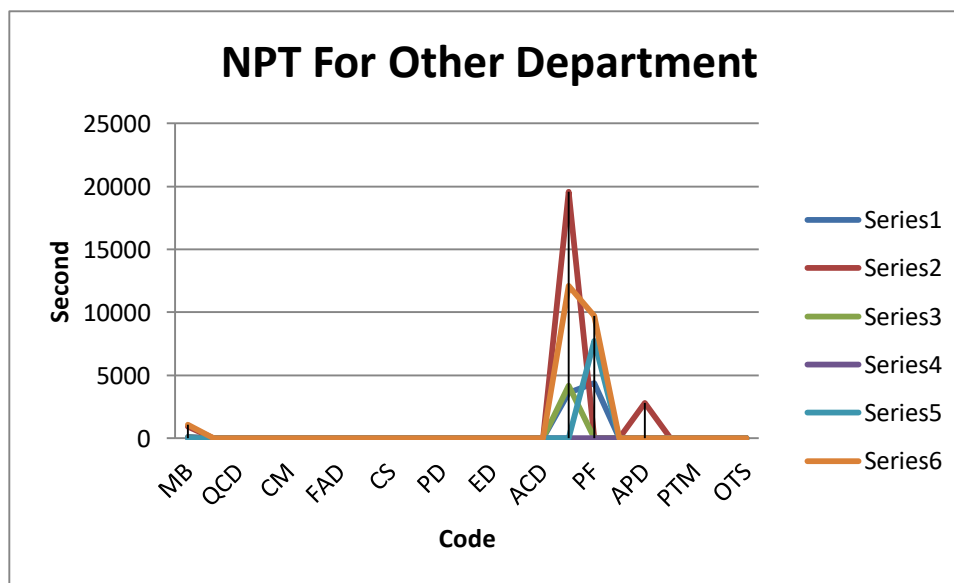
The points shown here are maintenance, quality, cutting, store, printing , embroidery, supply chain, administration, technical, planning, others by pointing out these we can decrees this issue for future .In this graph we are just trying to show which non- productive time (NPT) is more or less.

3.3 Non Productive Time (NPT) for T-Shirt

NPT is an industrial engineering term, during t shirt operation that is spent by an operator without producing any t shirt like set up time for operation is called non- productive time for t shirt, non- productive time means analyze how much standard time is lost due to personal fatigue, machine problem etc., so in that way we can find out non- productive time for t shirt.

3.3.1 Details of product

(a) **Details of order,** Identity: 00020911-00, Buyer name: Mustang, Order Number: 110-30009359, Style Number: 1008302SSN-1912, Qty (Pcs): 13535

(b) **Fabric Details:** Body Fabric: 100% Cotton CTN S/Jersey, Wash: Pigment wash, GSM: 160, Category: C/B, Yarn count: 30/1

(c) Art Work

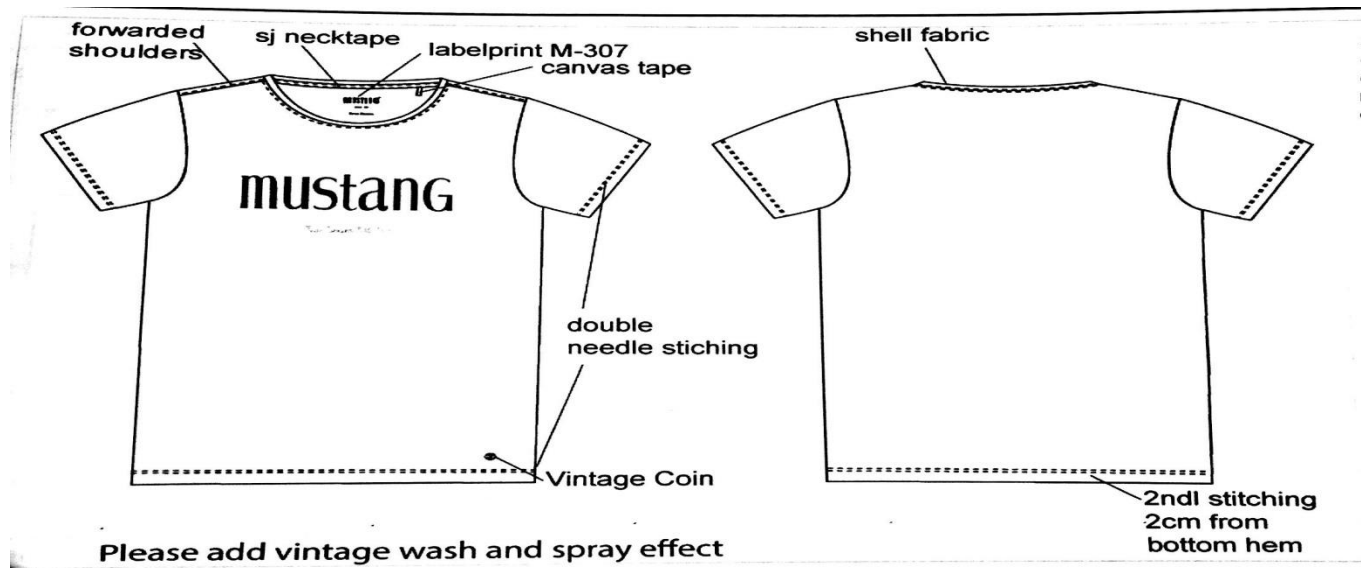This is the art work for complete t-shirt with measurement.

Figure: 3.3.1

(C) Measurement

Dimensions

Dim	Description	Length	S	M	L	XL	2XL	3XL	Tol (-)	Tol (+)
B	front body length from HPS		70.00	72.00	74.00	76.00	78.00	80.00	-1.00	1.00
C1	shoulder width, seam to seam		42.00	44.00	46.00	48.00	50.00	52.00	-1.00	1.00
VS	forwarded shoulder		1.50	1.50	1.50	1.50	1.50	1.50	0.00	0.00
ab1	position across back from HPS		15.00	15.00	15.00	15.00	15.00	15.00	-0.50	0.50
ab	across back		40.50	43.00	45.50	48.00	50.50	53.00	-0.50	0.50
af1	position across front from HPS		15.00	15.00	15.00	15.00	15.00	15.00	-0.50	0.50
af	across front		37.50	40.00	42.50	45.00	47.50	50.00	-0.50	0.50
A1	1/2 chest width 2cm below armhole		48.00	52.00	56.00	60.00	64.00	68.00	-1.00	1.00
M	1/2 bottom width		47.00	51.00	55.00	59.00	63.00	67.00	-1.00	1.00
D	armhole height straight		22.00	23.00	24.00	25.00	26.00	27.00	-0.50	0.50
E1	short sleeve length from shoulder		20.50	21.00	21.50	22.00	22.50	23.00	-0.50	0.50
Do	1/2 sleeve width 2cm below armpit		17.50	18.50	19.50	20.50	21.50	22.50	-0.50	0.50
IA	1/2 sleeve opening		16.00	17.00	18.00	19.00	20.00	21.00	-0.50	0.50
O	neck width, seam to seam		17.50	18.00	18.50	19.00	19.50	20.00	-0.50	0.50

Displaying 1 - 14 of 20 results.   Units: CM   Grading Display: Absolute

It's a measurement chart, this chart show as different types of measurement for t-shirt. Point of measurement. For making a apparel pattern a complete garment consummate measurement guidelines must be needed .At times only base measurement is not enough for equip this, measurement specification comes from the buyer to get the actual size and each part of the garment.

(e) Complete Garments picture


Figure 3.3.2: Complete T-Shirt

3.3.2 Report of NPT of Sewing Section (One Week)

Table 3.3.2 This table is show that date wise non- productive time (NPT) for sewing section.

SL.NO	Category	Responsible Dept.	Code	Date Wise Non Productive Minute						Lost Hour
				1	2	3	4	5	6	
1	Supervision Problem	Sewing	SP	0	100	0	900	86	0	18.1
2	Re-Work	Sewing	RW	0	0	0	0	0	0	0
3	Manpower Crisis	Sewing	MC	1080	0	0	0	0	0	18
4	Style Change Delay	Sewing	SCD	0	0	0	0	0	0	0
5	Deduct Hour	Sewing	DH	0	0	0	0	0	0	0
	Total Lost Hour			18	1.66	0	15	1.4	0	36.1

According This Chart These supervision problem, re-work, manpower crisis, style change delay, deduct hour these NPT on the Basis of One Week.

3.3.2 This graph is show that code wise Non Productive Time (Sewing)
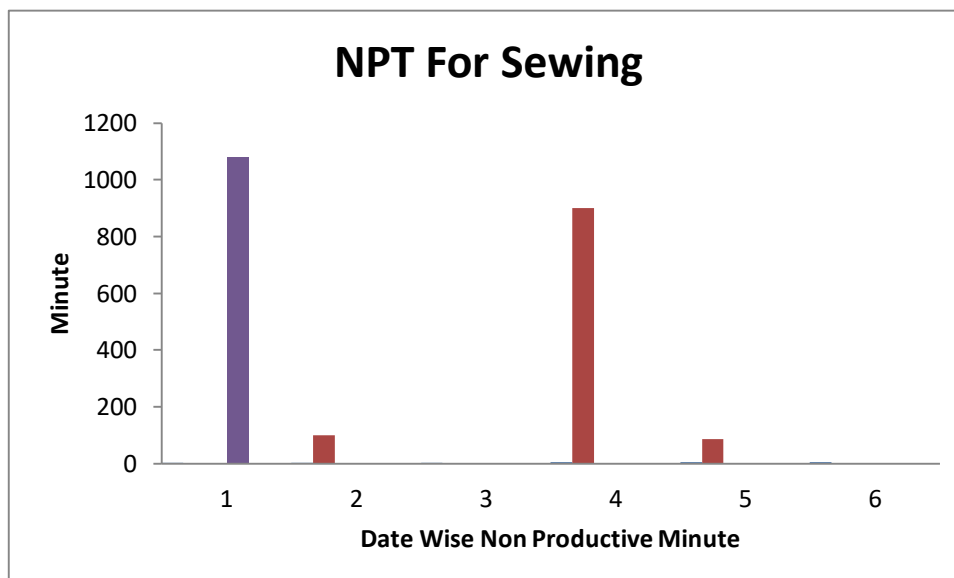
According to this graph it shows that problem occurred continuously we can decrees this issue for future.

3.3.3 Report of NPT of Other Department (One Week)

Table: 3.3.3 This table is show that date wise non- productive time (NPT) for other section.

SL	Category	Responsible Dept.	Code	Date Wise Non Productive Second						Lost Minute
				1	2	3	4	5	6	
1	Machine Break Down	Maintenance	MB	0	0	0	0	86	0	1.43
2	Decision Making Delay	Quality	DMD	0	0	0	900	0	0	15
3	Quality Checking Delay	Quality	QCD	0	0	0	0	0	0	0
4	Machine Delay	Maintenance	MD	0	0	0	1320	0	0	22
5	Cutting Mistake	Cutting	CM	0	0	0	0	0	0	0
6	Fabric Approval Delay	Quality	CD	0	0	0	0	0	0	0
7	Cutting Delay	Cutting	FAD	0	0	0	0	0	0	0
8	Fabric Delay	Store	FB	0	0	0	0	0	0	0
9	Color Shading	Quality	CS	0	0	0	0	0	0	0
10	Print Mistake	Printing	PM	0	0	0	0	0	0	0
11	Print Delay	Printing	PD	0	0	0	0	0	0	0
12	Print Approval Delay	Quality	PAD	0	0	0	0	0	0	0
13	Embroidery Delay	Embroidery	ED	0	0	0	0	0	0	0
14	Embroidery Mistake	Embroidery	EM	0	0	0	0	0	0	0
15	Accessories Delay	Supply Chain	ACD	0	0	0	960	3600	0	76
16	Input Supply Delay	Supply Chain	ISD	6240	2640	0	55140	2250	13680	1332.5
17	Power Failure	Administration	PF	0	0	8040	5951	1048	0	250.65
18	Salary Payment Effect	Administration	SPE	0	0	0	0	0	0	0
19	Approval Delay	Quality	APD	0	0	0	0	0	0	0
20	Technical problem	Technical	TP	0	0	0	0	0	0	0
21	Pattern Mistake	Technical	PTM	0	0	0	0	0	0	0
22	Re-Feeding	Planning	RF	0	0	0	0	0	0	0
23	Others	Other	OTS	0		0	0	2880	0	48
	Total Lost Hour			1.73	0.73	2.23	17.85	2.74	4.8	29.09

Here we can see that different types of NPT problems occurred in other department. Where we can find out the five major category non- productive time (NPT) problems. Those problems occurs daily, for that reason it's create a obstacle for high growth production capacity. We have to stop the accidental NPT problems otherwise it will decrease the production growth.

3.3.3 This graph is show that code wise Non-Productive Time (Other Department)
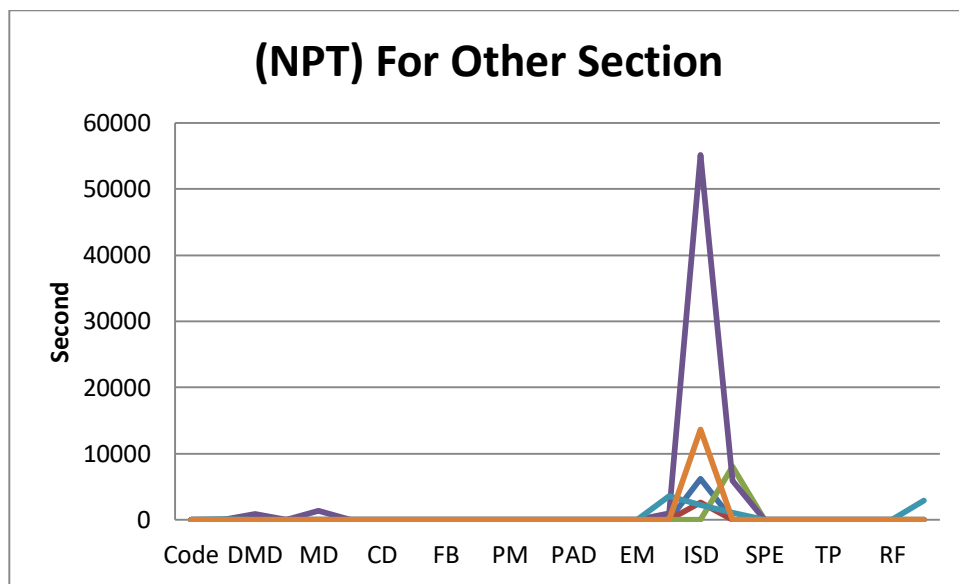
The points shown here are maintenance, quality, cutting, store, printing , embroidery, supply chain, administration, technical, planning, others by pointing out these we can decrees this issue for future .In this graph we are just trying to show which non- productive time (NPT) is more or less.

CHAPTER-4

Discussion of Results

4.1 Comparison of NPT of sewing section for different product (One Month)

4.1 This table is show that comparison of different non-productive time.

Buyer Name	NEW YERKER		MUSTANG		MUSTANG	
Problem Name	Problem Name	Total Hour	Problem Name	Total Hour	Problem Name	Total Hour
1	Super vision problem	8.83	Super Vision problem	0	Super Vision problem	18.1
2	Re-work	0	Re-work	0	Re-work	0
3	Manpower crisis	6	Manpower crisis	0	Manpower crisis	18
4	Style change delay	9	Style change delay	0	Style change delay	0
5	Deduct delay	0	Deduct delay	0	Deduct delay	0
Total Hour		23.83	Total Hour	0	Total Hour	36.1

Here we are showing comparison of NPT of sewing section for different product, Three different product NPT problem are occurred during sewing and also showing how many hours are delay for those problem. According to this chart products problem are same but their delaying hours are different.

4.1.1 Major Problem name and Solution in Sewing Section

4.1.1 This table is show that major problem for sewing section

Problem Name	Solution
Needle broken or machine breakdown	• Use lubricating oil it can reduce the causes of needle broken tendency • To proper utilize the needle size which can reduce the causes of needle broken. • If we can setup the actual rpm of machine it will create a vital solution of reducing causes of needle broke • Calculate the actual performance rating of operator which can easily find out the potentiality of operators, for that reason it can decrease the causes of needle broken
Absent or manpower crisis	• To insure all the operators that there payment distribute within first week of the month.
Supervision problem	• To insure the factory medical service always available. • Try to communicate with good manner. • Develop factory environment like working place.
Re-Work	• Take carefully to work. • Should be required experience operators.

Style Change Delay	• Waiting for work done and to maintain proper line balancing

NEW YERKER	MUSTANG	MUSTANG

4.2 Comparison of NPT of other section for different product (One Month)

4.2. This table is show that comparison of different type of style and different type of non-productive time.

Problem Name	Total Minute	Problem Name	Total Minute	Problem Name	Total Minute
Machine Breakdown	66.23	Machine Breakdown	37.88	Machine Breakdown	1.43
Decision Making Delay	0	Decision Making Delay	0	Decision Making Delay	15
Quality Checking Delay	0	Quality Checking Delay	0	Quality Checking Delay	0
Machine Delay	58.33	Machine Delay	0	Machine Delay	22
Cutting Mistake	0	Cutting Mistake	0	Cutting Mistake	0
Cutting Delay	0	Cutting Delay	0	Cutting Delay	0
Fabric approval Delay	0	Fabric approval Delay	0	Fabric approval Delay	0
Fabric Delay	0	Fabric Delay	0	Fabric Delay	0
Color Shading	0	Color Shading	0	Color Shading	0
Print Mistake	0	Print Mistake	0	Print Mistake	0
Print Delay	0	Print Delay	0	Print Delay	0
Print Approval Delay	0	Print Approval Delay	0	Print Approval Delay	0
Embroidery Delay	0	Embroidery Delay	0	Embroidery Delay	0
Embroidery Mistake	0	Embroidery Mistake	0	Embroidery Mistake	0
Accessories Delay	93.33	Accessories Delay	1318.5	Accessories Delay	76
Input Supply Delay	326.5	Input Supply Delay	658	Input Supply Delay	1332.5
Power Failure	1321.91	Power Failure	363.66	Power Failure	250.65
Salary Payment Effect	0	Salary Payment Effect	0	Salary Payment Effect	0
Approval Delay	0	Approval Delay	47	Approval Delay	0
Technical Problem	0	Technical Problem	0	Technical Problem	0
Pattern Mistake	0	Pattern Mistake	0	Pattern Mistake	0
Pattern Mistake	0	Pattern Mistake	0	Pattern Mistake	0
Others	0	Others	0	Others	48
Total Hour	31.10	Total Hour	18.44	Total Hour	29.09

Here we are showing comparison of non- productive time (NPT) of other section for different buyer and different style , Three different product NPT problem are occurred during many department and also showing how many hours are delay for those problem. According to this chart products problem are same but their delaying hours are different.

4.2.1 What are the ways to Improve Productivity in Garment Production
→Proper lay-out and line balancing.

→Developing the operator's skill through advanced training.

→Conducting motion study production study and hourly operator's capacity check.

→Target setting is must be sustainable for worker because of target achieve and higher production.

→Improve the floor space utilization.

→Trying to without any fault work must be done.

→Trying to workers personal fatigue and personal allowance should be less than previous time.

→To improve workers efficiency and fulfill the individual operation target.

→Low performance machine is not acceptable.

→To improve the salary, health, safety, and factory environment.

→ Giving rewards and awards prize to productivity or working based.

→Rectified the worker compliance.

→To insure the higher and skillful maintenance and better understanding between the worker and staff.

→Equipment productivity, equipment down time and plan capacity should be well need to know.

→Worker motivation.

→Use work aids, attachments, guides, correct pressure foots and folders

→Feed fault free and precise cutting to line

→Using auto timer sewing machine

CHAPTER-5

Conclusions

5.1. Conclusion

  At fist we are find out the possible non-productive time (NPT) for sewing and other department, and capture the non-productive time (NPT) different type of problem. This thesis we are show the comparison of sewing section and other department. We are realize the major non-productive time continuously. If we proper work on

NPT we should achieve our proper production and minimalize the higher cost of production. This thesis is concluded as-

- In sewing section there is the most number of problem is supervision problem.
- From total non-productive time of 59.93 hour, supervision problem is 26.84 hour and manpower crisis, re-work, style change delay, deduct hour is 33.09 hour.
- If those problem did not happened then more than 11986 pcs of production would have been.
- Comparison of different product for other department, there are many problem of other department most number of problem is power failure, input supply delay, machine breakdown.
- Total non-productive time is 78.63 hour.
- If this problem did not happened then more than 15726 pcs of production would have.
- Follow up the everyday NPT report at least one or two month, summarize the report by every style.

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Study on Non Productive Time (NPT) of T-Shirt Manufacturing

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Submission date: 13-May-2019 05:29PM (UTC+0600)
Submission ID: 1129652268
File name: Non_Productive_Time_NPT_of_T-Shirt_Manufacturing_4713,_4714.pdf (2.94M)
Word count: 6611
Character count: 36204

Study on Non Productive Time (NPT) of T-Shirt Manufacturing