SMV Distribution of Double Layer Men's Shorts on the basis of Time Study: An Authentic Mode of Operation Breakdown for Industrial Bulk Production

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Abstract

The production system of apparel manufacturing industry depends on different factors. Among these operation break down and SMV (standard minute value) distribution play vital role on the productivity depending on lead time to dispatch the product. To cope up with this situation shorten production cycle time in the garment industry is being an emergence. Sometimes labors are forced physically and mentally to perform their task within undefined time. In this study an approach to experimental knowledge based roadmap is presented for men?s shorts sewing line production. A details description of workstations sequence, machine and man allocation based on SMV are described. Reasonable SMVs is calculated by time study for producing shorts. Hourly target is also defined with normal efficiency as well as set up a well-balanced sewing line in manufacturing process. A standard may be maintained in the apparel industry to obtain maximum productivity by using the operation break down properly. The outcome of this observation is to synchronize workstations and to minimize SMV as the sense of productivity improvement.

Index terms—

1 Introduction

he ready-made garment (RMG) sector is the lifeblood of Bangladesh economy achieving higher export growth every year. The sector is now the largest contributor not only to overseas trade but also to the national economy. Bangladesh textiles and RMG industry comprises 1,55,557units -1,48,000 handlooms units, 3,284 mechanized primary textile units, 5150 export-oriented readymade garments manufacturing units and 273 garments washing-dyeing units. The sector is a major foreign exchange earner for Bangladesh contributing 77 percent to the country's net T Baggies, Bermuda shorts, Boardshorts, Boxer shorts, Cargo shorts, Jorts, Cut-offs short etc. are used by men. Women use Boyshorts, Bun huggers, Culottes, Daisy Dukes, Dolphin shorts, Hotpants, Short shorts, Skorts etc. most [5].

To make shorts industrially about 44 operations are needed. Some of these are performed by helper manually and rest of operations is completed by the operator with help of machine.

Assembly Lines are used in high production situations where the work to be performed can be divided into small tasks and tasks assigned to the workstations on the line. Key advantage of using manual assembly line is specialization of labor. By giving each worker a limited set of tasks to do repeatedly [6].

A standard method is needed to get the maximum productivity by using the assigned time properly. The job is broken down into parts and the parts are timed. The parts are known as Element. Contents of each element should be homogeneous as possible. If the element is shorter, two or more should be combined into one [7]. In assembly line balancing, allocation of jobs to machines is based on the objective of minimizing the workflow among the operators, reducing the throughput time as well as the work in progress and thus increasing the productivity. Sharing a job of work between several people is called division of labor. Division of labor should be balanced equally by ensuring the time spent at each station approximately the same. Each individual step

in the assembly of product has to be analyzed carefully, and allocated to stations in a balanced way over the available workstations. Each operator then carries out operations properly and the work flow is synchronized. In a detailed work flow, synchronized line includes short distances between stations, low volume of work in process, precise of planning of production times, and predictable production quantity [8].

Standard minute value is the standard time, to complete any given task by using best possible methods at standard level of performance. To estimate SMV we have to analyze the garment carefully and check different factors that affect the SMV. SMV of a product varies according to the work content or simply according to number of operations, length of seams, fabric types, stitching accuracy needed, sewing technology to be used etc.

Standard minutes (SMV) of few basic products have been listed down with its SMV range according to work content variation [9].

Breakdown is a listing of the content of a job by elements. A garment consists of some parts& some group of operations. Breakdown means to writing down all parts & all process/operation after one another lying with the complete garment according to process sequence. It is a must to write down the estimated SMV & type of machine beside each &every process [10].

Work study is a generic term for method study and work measurement which are used in the Examination of human work in all its contexts and which lead systematically to the Investigation of all the factors which affect the efficiency and economy of the situation being reviewed, in order to effect improvement **??**11].

Therefore, garment production needs properly rationalized manufacturing technology, management and planning [12]. Performance rating is the process during which the time study engineer compares the performance of the operator under observation with his own concept of normal performance. The concept of normal performance must be such that the time standards set from it and must be within the capacity of the majority of workers in the enterprise [13].

Line balancing is the allocation of sewing machine according to style and design of garment. It depends of that what type of garment we have to produce [14].

An experimental investigation for the distribution of SMV for each and every operation require for making a men's and provides a clear and details concepts for determining line balancing, machine requirements, man power allocation for setting a definite target within a reasonable efficiency.

2 II.

3 OBJECTIVES OF THE STUDY

The main objective of this study is to form a sequential list of all the elements (operation breakdown) in sewing line involving with producing double layer shorts as well as distributing Standard minute value for every element (tasks) of this job. Besides, following issues are concerned: To draw a clear job flow chart of making shorts, to determine the manpower and machine allocation, to define a way to minimize SMV and maximize productivity and to set up a balanced sewing line practically.

4 III.

5 METHODOLOGY

A study was carried out in the garments Industry named Ehsan Garments Ltd. Located at Tongi, Gazipur, Dhaka, Bangladesh and Moonlight Garments Ltd. Located at Tongi, Gazipur, Dhaka, Bangladesh. We attempted this study for proper utilization of man and machine.

6 a) Analysis of particular Garment (designed double layer shorts)

Generally, two different types of fabric are used for double layer shorts. For our study we took 100% polyester single jersey fabric (width-58-60", weight-120gsm, technique-knitted) as lining fabric and ricehole mesh fabric (width58-60", 140gsm, warp knitted) as shell (outer) portion. As such type of shorts is used as nightwear, ready for the gym, walking fit wear, athletic fit The investigation occurred for M size garments consisting with 32-34" waist and 8" inseam. Calculated Production/Hour @ target efficiency = 60/Operation SMV @ target Efficiency Calculated Machine number = (SMV @ target efficiency * Hourly production target/60) ? Last of all a table form summary of required number of machine was drawn to achieve hourly production target.

7 d) Time study

In order to balance the sewing line as well as to increase the efficiency of the line, at first a detailed work and time study was carried out to find the task durations.

However, the time required to complete a task depends on a lot of factors such as the task, the operator, the properties of fabric and sub materials, working environment, quality level of the product, the hour of the day, psychology of the operator etc.

8 Result and Discussion

9 a) Operation breakdown sheet and time study sheet

The following table denotes the operations breakdown (elements) sheet and number of required machines.

10 A. Line balancing Chart

Line balancing is the allocation of sewing machine according to style and design of garment. Line balancing Chart is such type of tool that indicates how a sewing line balanced. It describes every workstation and required time for completing individual task in sequence with the cooperation of Basic pitch Time (BPT).

The line balanced according to our calculated SMV for the double layer men's shorts we found the following Line Balancing Chart:

11 Fig.2. Line balancing Chart

The time consumption of every workstation is nearly about to BPT and that means the chances of bottleneck are reduced.

12 B. Discussion

During our investigation, we found few hours that failed to achieve our estimated target and bottleneck has risen up. The reason of this problem was listed out in bellow:

V.

13 Conclusion

This study on operation break down and SMV distribution of men's shorts is on the basis of time study for bulk production in industry. It is very important and critical task in an apparel production industry. In practice we may use more or less machines, man power, raw materials and other resources for want of proper balance of tasks and as well as the prior precise apparel industry. Thus it would reduce the all kinds of wastes and consume least resources i.e. man, machine, materials, money, etc. It will definitely help us to come the main goal of an industry that is making maximum profit.

By this study, we have described the whole job of making double layer short broken down into elements. This study was going on with experienced and non-experienced machine operators and helpers. The environment kept in standard for Bangladesh. It is suggested that to get better productivity all the people involved with production should be experienced and standard environment of workstations should maintain properly. According to our elements (operation) bulletin we also designed a line layout concerned with the SMVs sheet that taken by direct time study. Line balancing chart indicates succeed of the established line.

To [1] [2]

[1] © 2017 Global Journals Inc. (US)

[2] Year 2017 G © 2017 Global Journals Inc. (US) position

Figure 1: G

1

4 Year 2017 XVII Issue I Version I	NO	OPERATION
	1 2 3 4 5 6	Back rise join lining part Care label attach to back part Front rise join lining part Back + front part matching lining part Side seam join lining part Side pocket bag close
( ) Volume G Journal of Researches in Engineering Global	7 8 9 10 Pocket bag join to body Pocket pair matching & thread cut Front rise join Shell part Pocke	
	20 Side seam join position iron	
	21 Shell part mark &fitting	
	22 Lining part & shell part matching	
	23	Lining part join to shell part w/belt position
	24 Body turning	

Figure 2: Table 1 :

2

	SI No	M/c	OP id no.	Process name	TIME(Second) T-1	T-2	T-3	T-4	T-5	Avg. time	B.T. with allowance	S.M
	1	OL	100	Back rise join lining part	15	16	15	14	15	15	18	0.30
	2	SNL	348	Care label attach to back part	12	12	12	12	11	12	14	0.23
	3	OL	321	Front rise join lining part	12	14	15	13	14	14	16	0.27
Year	4	H	323	Back + front part matching lin-	13	14	15	13	14	14	16	0.28
2017	5	OL	370	ing part Side seam join lining part	26	27	25	24	25	25	30	0.50
6	6	OL	A-	Side pocket bag close Pocket pair	15	14	15	14	16	15	18	0.30
XVII	7	H	52	matching & thread cut Front rise	12	16	14	12	13	13	16	0.28
Is-	8	OL	B-81	join Shell part Pocket join posi-	15	14	16	16	15	15	18	0.29
sue I	9	H	174	tion mark Pocket bag join to body	14	15	12	15	13	14	16	0.28
Ver-	10	SNL	277	Pocket join position corner cut	46	44	48	43	47	46	54	0.90
sion	11	H	24	Pocket opening 1/4 top stitch Side	14	14	15	13	12	14	16	0.28
I ( )	12	SNL	339	Pocket fixed tack Pocket w/belt	33	34	35	32	33	33	39	0.65
Vol-	13	SNL	152	position tack Sticker remove Back	29	26	23	25	24	25	30	0.50
ume	14	SNL	358	rise join shell part Back + front	12	13	15	11	14	13	16	0.28
G	15	H	352	part matching shell part Side seam	12	10	13	12	14	12	15	0.25
Jour-	16	OL	367	join shell part	15	11	10	12	13	12	15	0.25
nal	17	H	138		15	12	12	15	13	13	16	0.26
of	18	SNL	361		39	37	35	39	40	38	45	0.75
Re-			142									
searches												
in												
En-												
gi-												
neer-												
ing												
Global	19	OL	173	Side seam join position over lock	31	27	28	26	25	27	33	0.55
	20	IRN	317	Side seam join position iron	13	10	16	12	14	13	16	0.28
	21	H	373	Shell part mark & fitting	12	14	13	13	14	13	16	0.28
	22	H	316	Lining part & shell part matching	13	9	12	9	11	11	13	0.22
	23	SNL	327	Lining part join to shell part w/belt	41	39	37	37	38	38	45	0.75

Figure 3: Table 2 :

8 Year 2017

10 15 20 25 18 14 16 16 18 18 18 16 20 15 15 16 16 16 1515

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0 5 1 2 3 4 5 6 7 8 9 1011121314151617181920212223242526272829

? Lack of skilled operator ? Improper supervising of sewing line ? Machine break down ?

Figure 4:

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