International Journal of Science, Environment and Technology, Vol. 2, No 6, 2013, 1361 – 1369
ISSN 2278-3687 (O)

APPLICATION OF INDUSTRIAL ENGINEERING TECHNIQUE FOR BETTER PRODUCTIVITY IN GARMENTS PRODUCTION

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Abstract: The paper comparing the productivity and efficiency before and after applying the Industrial engineering technique. This is true today Millions of dollars are wasted each and every day in organization, through lack of awareness of this need to constantly improve productivity. Most of it can be stopped. By using method, time, capacity and production study, it is possible to improve productivity while reducing wastage. Two important attributes have been considered, one is possible standard method for each process and another is considerable time. Time study took to record the actual individual capacity of each worker. The time has been recorded to make each process for each and every worker to find out the optimum number of operator and helper, type of machines, basic and standard pitch time and individual capacity. To find out the (standard minute value) S.M.V, process wise capacity has been calculate.
Keywords: Industrial Engineering, Breakdown method, works study.

1. Introduction

In earlier days clothing was only a basic necessity, used to cover the body and to protect from the climatic changes. Over the time people became concerned about the comfort of wearing and also the durability of the product. Garments began to be made with different fabrics to suit the climatic conditions and thus the requirement of seasonal wears emerged. But most of the garments looked similar with no much constructional/style. When people started having social gatherings, they began to think about having a unique look, which would reflect their life style.

Engineering is difficult to boil down into a simple definition, but for our purpose here let's use the following:

Engineering - a science by which the properties of matter and the sources of energy in nature are made useful to man. Now let's go one step farther and define Industrial Engineering. Let's define Industrial

- The best way to do something
- The time required to do it
- The way to measure results

*Received Oct 29, 2013 * Published December 2, 2013 * www.ijset.net*

The basic objectives of Industrial Engineering are:

- Improving operating methods and controlling costs.
- Reducing these costs through cost reduction programs.

The aim of IE department is to provide specialized services to production departments, such as methods improvement, time study, and Job evaluation and merit rating and to head new projects if required [1].

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 [5].

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 [8].

2. EXPERIMENTAL

2.1 Breakdown method and Plan layout

2.1.1 Breakdown Method

Operation Bulletin

Buyer:MAC	Style:G3048A			Item: Girl's PJ set			TURAG GARMENTS		Sketch
Total (SMV)		3.97	Theoritical output	227	Line Forecast	190	Days Tgt Production	1905	
Machine/Operator (SMV)	M/C	3.28	Lowest OutPut	190	No. of Operators	12.00	Plan Tgt Production	1360	
Manual (SMV)	M	0.69	Bal.Eff(%)	84%	No.of A.O.P	3.00	Plan Eff(%)	60%	
Working time(Minutes)		600	Pcs/Man	12.70	Total Plan Manpower	15	Pitch Time	0.26	

Sl	Operation Description	Manual/ M/c	Folder/Attach.	SMV	TAM	OP/ AOP		Tgt/Hr	Tot.Tgt/Hr	Var.	Operation Request
						Req.	Alot.				
1	Match back & front part	M		0.24	0.24	0.76	1	250	250	60	
2	1st shoulder join with tape	O/L		0.25	0.25	0.79	1	240	240	50	
3	Mark for label & cut extra edge	M		0.24	0.24	0.76	1	250	250	60	
4	Label join	P/M		0.17	0.17	0.54	1	353	353	162	
5	Neck piping	F/L		0.28	0.28	0.89	1	214	214	24	
6	2nd shoulder join	O/L		0.26	0.26	0.83	1	231	231	40	
7	2nd shoulder open & close tack	P/M		0.28	0.28	0.89	1	214	214	24	
8	Slv hem	F/L		0.54	0.54	1.71	2	111	222	32	
9	Side seam	O/L		0.63	0.63	2.00	2	95	190	0	
10	Slv open & close tack	P/M		0.6	0.60	1.90	2	100	200	10	
11	Body hem	F/L		0.27	0.27	0.86	1	222	222	32	
12	Trim & aside	M		0.21	0.21	0.67	1	286	286	95	
Total				3.97		12.60	15				

Eff.Level	Prod./Hr	8 Hr. Prod.	9 Hr. Prod.
20%	45	363	408
30%	68	544	612
40%	91	725	816
45%	102	816	918
50%	113	907	1020
55%	125	997	1122
60%	136	1088	1224
65%	147	1179	1326
70%	159	1270	1428
75%	170	1360	1530
80%	181	1451	1632

P/M	O/L	F/L	CSM	B/H	B/S	B/T	AOP	Total
4	4	4	0	0	0	0	3	15

Ratio	OP	1
	:	
	AOP	0.25

Table1: Operation Bulletin / Breakdown

Operation Bulletin/ Breakdown Of Turag

Tar

Item: **g/H**

Kids t- **r=3**

7/7/2013 shirt **85**

Buyer: MAC **Style: B3061B**

	Operation	M/C		SMV	Ttl SMV	TAM	Op.	Hel.	Target/HD/Hr	TTL Target	Target Variance	Theoritical Output	UCL	LCL
1	Back & front match	M		0.24		0.24		2	250	500	115	458	544	371
2	Shoulder join with tape	O/L		0.39		0.43	3		140	420	35	458	544	37

													1
3	Neck rib tack & fold	P/M		0.3		0.30	2		200	400	15	458	544	371
4	Neck join	O/L		0.27		0.28	2		212	423	38	458	544	371
5	Back neck tape attach & cut	F/L		0.26		0.27	2		220	440	55	458	544	371
6	Back neck tape close with label	P/M		0.42		0.46	3		130	390	5	458	544	371
7	Sleeve match with body	M		0.24		0.24		2	250	500	115	458	544	371
8	Mark for shoulder drop	M		0.27		0.27		2	222	444	59	458	544	371
9	Sleeve join	O/L		0.52		0.55	3.5		110	385	0	458	544	371
10	Side seam	O/L		0.64		0.67	4.5		89	402	17	458	544	371
11	Body turn & sticker remove	M		0.29		0.29		2	207	414	29	458	544	371
12	Sleeve hem	F/L		0.4		0.44	3		136	409	24	458	544	371
13	Bottom hem	F/L		0.35		0.30	2	2	202	403	18	458	544	371
TOTAL SMV				**4.59**		**4.74**	**25**	**10**						

Tables 2: Operation Bulletin/ Breakdown Turag

OP : HEL	**1**	**:**	**0.40**

TOTAL OP: 25

TOTAL HEL: 10

TOTAL MANPOWER: 35

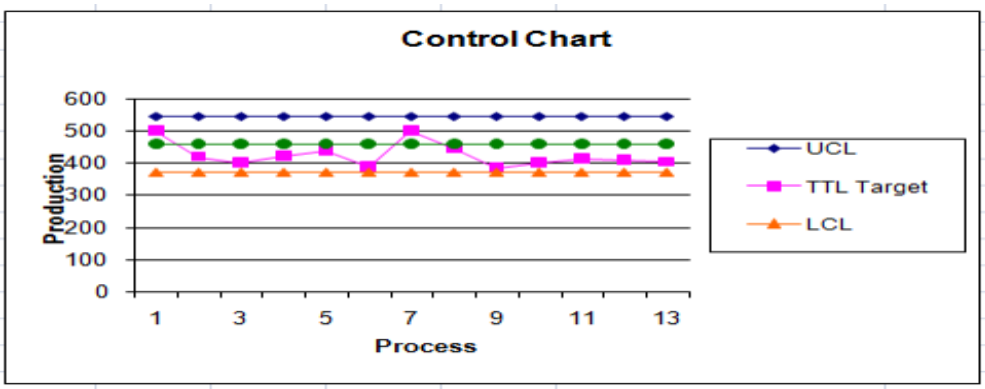

Figure (1): Control Chart

2.1.2 Plan Layout

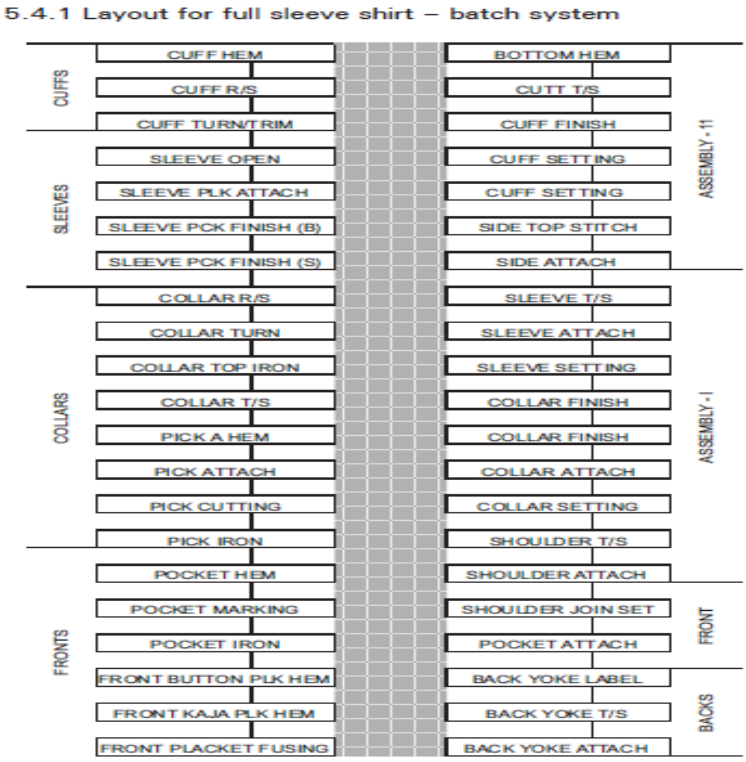

Figure (2): Layout for full sleeve Shirt

Given that these conditions are fulfilled, the synchro system can be very efficient.

Advantages:

1. Labours of all levels, i.e., unskilled, skilled, semi-skilled labours, are involved in this system where the operations are broken into small simple operation. Hence the cost of labour is very cheap.

2. Here the quantity of each component is checked during the individual operation itself, so the quality is good.

3. The components are moved in bundles from one operation to next operation, so there is less chance for confusion like, lot mix-up, shade variation, size variation, etc.

4. Specialization and rhythm of operation increases productivity.

5. As the WIP is high in this system, it is a stable system. Because of the buffer, the breakdown, absenteeism, balancing of line, change of style can be easily managed.

6. An effective production control system and quality control system can be implemented. (a) Time study, method study techniques; (b) Operator training programme; (c) Use of material handling equipments, such as centre table, chute, conveyor, trolley, bins, etc.

7. Bundle tracking is possible, so identifying and solving the problems becomes easy (Ramesh Babu, 2006).

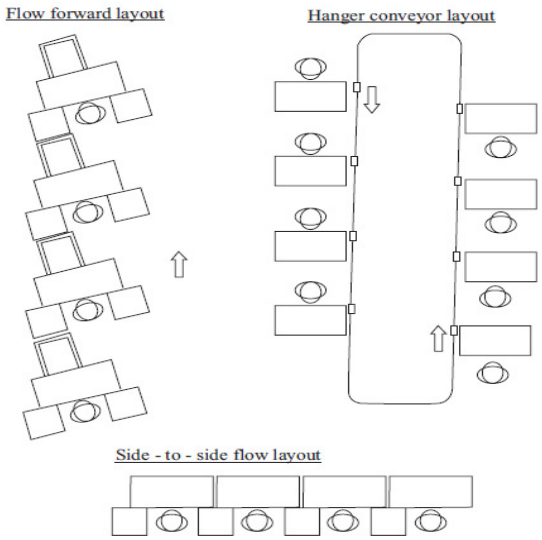

Figure (3): Flow forward and side-to-side flow layouts

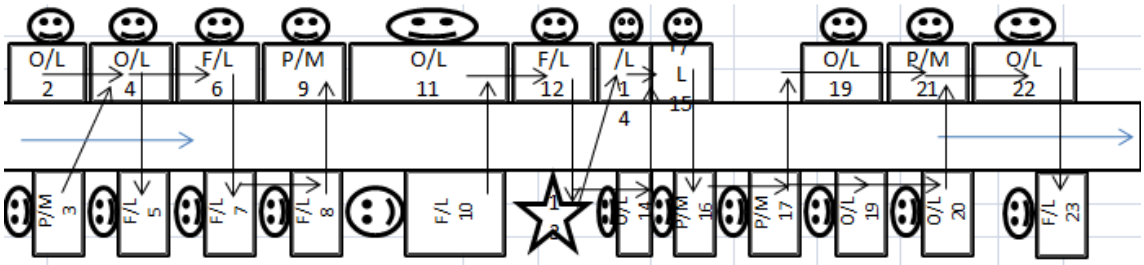

Figure (4): Zigzag layout

2.2. Work Study

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.

$$\text{Performance rating} = \frac{\text{Observed performance}}{\text{Normal performance}} \times 100$$

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.

Person	Observed Time	Rating (%)	Basic Time
A	0.20	100	0.20
B	0.16	125	0.20
C	0.25	80	0.20

Performance rating graph:

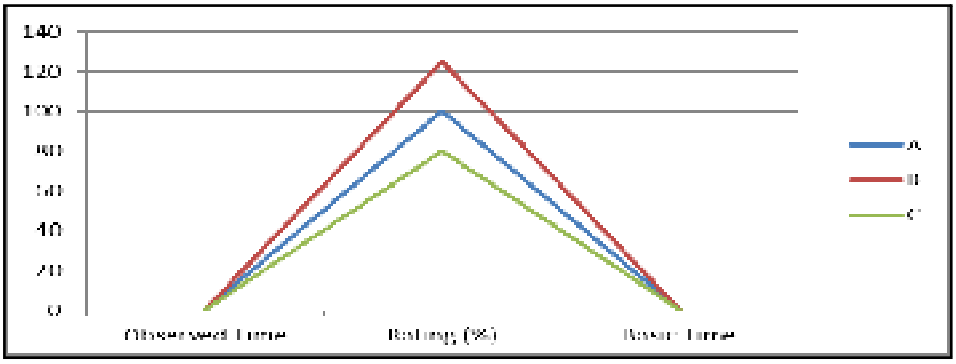

Figure (5): Performance rating graph

From the above chart:

A is standard worker, B is a fast worker and C is a slow worker

Finally, we show some real examples of work study or its effectiveness in our report:

Status of Workstudy Department

Factory	Factory Rating (%)	Workstudy department Rating (%)	Status of Workstudy Department	Groups
1	41	10	Not present	B
2	43	16	Not present	B
3	62	61	Operational	A
4	70	66	Operational	A
5	61	54	Operational but not satisfactory	B
6	42	33	Not present	B
7	50	29	Not working properly	B
8	52	47	Being established	B
9	55	17	Not present	B
10	56	33	Not present	B

The workstudy departments in factories 5 and 7 are operational but ineffective.

Figure (6): Status of work study department

Benefits of work study department:

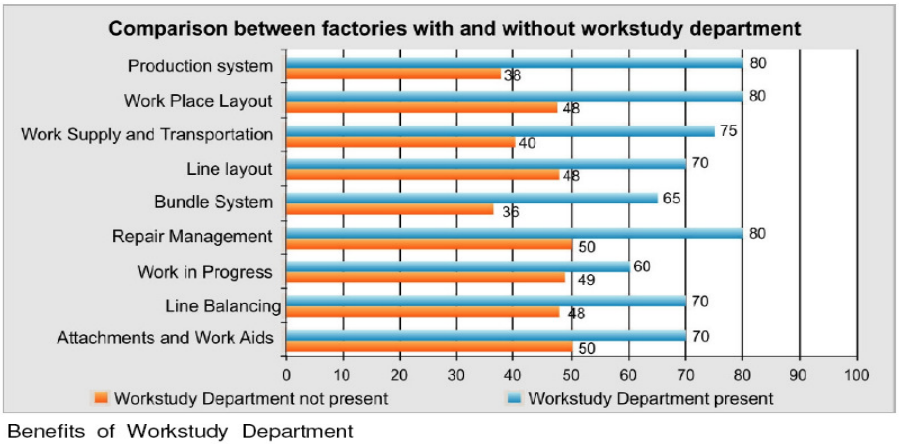

Figure (7): Benefits of work study department

Looking at the comparison shown below it is obvious that group A factories are more productive than the group B factories. This fact is further strengthened when the overall factory survey results are compared. The factories in group A have a combined score of 62% for overall performance whereas factories in group B achieved a score of only 48%

3. Conclusion

Industrial engineering is an important and essential part of any Garments Industry. One of the aims of any production system is to make total production time as minimum as possible. This automatically reduces inventory cost to a minimum. Sub-assembly system provides many opportunities to economies on temporary storage and transportation space and time. No definite answer can be given as to which is the best, as it depends on garment style, specifications, machinery and manpower and manufacturing policies. It gives us an opportunity to compare the theoretical knowledge with practical facts and thus develop our knowledge and skills. This project also gives an opportunity to enlarge knowledge of textile administration, production planning, procurement system, production process etc. to adjust with the industrial life.

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