INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Analysing the Production Rate after the Implementation of ALB in Garment Industries

P. Sankarakarthikeyan [1], N. Ranjith[2], K. Prabha Kumari[3]

[1, 3]Assistant Professor, NIFT-TEA College of Knitwear Fashion, Tirupur
[2]Final Year Student, Department Of Apparel Manufacturing and Merchandising

Abstract: In the Manufacturing sector the Line balancing is an effective tool to improve the throughput of assembly line while reducing bottleneck, cycle time. Line balancing is the problem of assigning operation to workstation along an assembly line, in such a way that assignment is optimal in some sense.
This project mainly focuses on improving overall efficiency of single model assembly line by reducing the bottleneck activities, cycle time and distribution of work load at each work station by line balancing, using line balancing techniques mainly work sharing method .Line balancing is one of the method. Which is help to leveling the work load across the work station, remove bottleneck station, remove excess capacity in the manufacturing line and optimal resources are being used to meet the customer requirements on time.
If manufacturing line is not balanced properly and will leads to Short supply as against customer demand then the manufacturer has to pay heavy penalty or loss of business with customer will happen. Prevent this kind of situation, Manufacturing line to be balanced in effective manner on the line balancing parameters like grouping of the workstation, leveling of work load, remove bottleneck station, remove excess capacity, remove excess work in progress, Effetely use no of manpower utilization ,man movement, material movements, Space utilization, manufacturing lead time, Throughput analysis ,customer demand. In this paper, we have implemented the various line balancing parameter to balance the line and results were discussed
Keywords: assembly line balancing, work station.

I. INTRODUCTION

Assembly line defines that manufacturing technique in which a product is carried by some form of mechanized conveyor among stations at which the various operations necessary to its assembly are performed. It is used to assemble quickly large numbers of a uniform product.
Originally, assembly lines were developed for a cost efficient mass production of standardized products, designed to exploit a high specialization of labour and the associated learning effects .In the another hand when we used assembly line balancing (ALB) this makes efficient flow-line systems available for low volume assembly-to-order production and enables modern production strategies like mass customization. There are many different types of assembly line systems some common variations include the classic automated intermittent and lean manufacturing models.

A. Primary Objective
To implement the ABL techniques in tirupur garment industry to improve the production

B. Secoundry Objective
1) To decrease unit production cost to improve productivity
2) To analyse the operational time
3) To calculate the cycle time for the individual
4) To determine the labor efficiency by time and motion study
5) To ensure smooth flow of production
6) To reduce rework percentage
7) To upscale the quality of the product

II. BENEFITS OF ASSEMBLY LINE BALANCING

The benefits of assembly line balancing may be classified into two categories as represented here. Technical benefits -Minimizing the number of workstations for a given cycles. -Minimizing the cycle time for a given number of numbers of workstations. -Minimizing the balance delay (or) maximizing the balancing efficiency. -Minimizing the total idle time. -Minimizing the overall facility or line length. Assembly line Balancing Objectives.
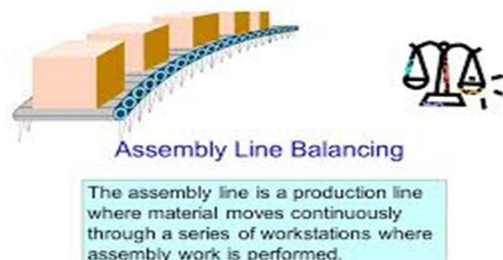

Fig.No.1

The main objective of line balancing is to distribute the task evenly over the work station and lime balancing aims at grouping the facilities or workers in an efficient pattern in order to obtain an optimum or most efficient balance of the capacities and flows of the production or assembly processes. Adeppa 297 The aim of this is to minimizing workloads and workers on the assembly line while meeting a required output the most important objective of the assembly line balancing problem is to design an assembly line with the maximum balancing efficiency (be) or with the minimum balance delay. The aims and objectives of the present study are as follows:- -To reduce production cost and improve productivity.

1) *Customer Task Time{labour take time}:* Customer task time is defined as the ratio between the planned operational time per the customer demand [customer task time =available work time /daily demand

A. ALB Effeciency
ALB EFFECIENCY= (TOTAL STATION LINE TIME/CYCLE TIME x NO OF WORK STATIONS) x 100%

B. Operational Time Study Before ALB
In the construction of a single basic garment the line consists of IB work stations
To complete the whole garment

Sweing Operations

S.NO	DESCRIPTION	TASK TIME(min)
1	Main label tack	0.51
2	Shoulder attach	0.51
3	Shoulder placket attach	0.84
4	Shoulder placket tack	0.84
5	Neck binding	0.50
6	Shoulder placket tack	0.65
7	Sleeve gathering	1.05
8	Sleeve hemming(right)	0.69
9	Sleeve hemming(left)	0.69
10	Sleeve attach (left)	1.62
11	Sleeve attach(right)	1.62
12	Side seam close with care label	1.35
13	Side seam close	0.60
14	Bottom hemming	0.81
15	Sleeve tack & neck tack	1.20

By the way of time needed before balancing takes nearly 12.76 min to complete the garment

Task Precedence After Line Balancing

STATION	TASK ASSIGNED	TASK DESCRIPTION	TASK TIME (MIN)
1	7	SLEEVE GATHERING	0.51
	1	MAIN LABEL TACK	0.51
2	8	SSLEEVE HEMMING	0.84
3	2	SHOULDER ATTACH	0.84
4	3	SHOULDER PLACKET ATTACH	0.50
	4	SHOULDER PLACKET TACK	0.65
5	5	NECK BINDING	1.05
	6	SHOULDER PLACKET TACK	0.69
6	9	SLEEVE ATTACH(RIGHT)	0.69
	10	SLEEVE ATTACH (LEFT)	0.69
7	12	SIDE SEAM CLOSE WITH WASH CARE LABEL	0.80
8	11	SIDE SEAM CLOSE	0.70
9	13	BOTTOM HEMMING	0.60
10	14	SLEEVE TACK	1.00
11	15	NECK TACK	0.50

III. INTERPRETATION

The table shows operation line balancing chart after the line balancing process and the operator cycle times have been increased providing the work stations workers with the extra operation and the idle times of the worker was reduced and to improve the productivity .Thus in the operation before ALB handled by 17 workers and after the balancing line the operations handled 11 workers it shows that the worker efficiency reduced by 40%

Line balancing efficiency (to-be) = 75%

IV. CONCLUSION

From the study it is understood that by applying the new work station design will improve the productivity significantly. In this study the lean manufacturing tools and techniques were studied and used. The problem of batch processing existed is addressed by using the single piece movement. Thus by converting long assembly line into work cells, the assumed worker multitasking seems to be effective as well as communication between operators is fast and accurate the other benefits observed are the flexibility of rework reduction and online packing. As discussed above the production time of garment has been reduced from 5.18 to 3.90 minutes .operators reduced from 4 to 18 .Assembly line balancing efficiency has been increased from 42% to 73.5% also productivity increases by 23% Productivity -To determine number of feasible workstation. -To identify the location of bottleneck and eliminate them. -To determine machinery and equipment according to assembly mechanism. -To equally distribute the workloads among workmen to the assembly line. -To optimize the production functions through construction of mix form of automation assembly and manual assembly. -To minimize the total amount of idle time and equivalently minimizing the number of operators to do a given amount of work at a given assembly line speed.

REFERENCES

[1] M. Fathi, M. J. Alvarez, V. Rodríguez (2011) "A new heuristic approach to solving u-shape assembly line balancing problems type-1" World academy of science, engineering and technology vol: 5 2011-11-25 \

[2] Naveen Kumar & Dalgobind Mahto(2013) "Assembly Line Balancing: A Review of Developments and Trends in Approach to Industrial Application" Global Journal of Researches in Engineering Industrial Engineering Vol 13 Issue 2 Version 1.0

[3] V. P. Jaganathan (2014) "Line balancing using largest candidate rule algorithm in a garment industry: a case study". International journal of lean thinking, issue 1 December 2014.

[4] James C. Chen (2014) "Assembly Line Balancing Problem of Sewing Lines in Garment Industry" Proceedings of the 2014 International Conference on Industrial Engineering and Operations Management Bali, Indonesia, January 7 – 9, 2014.

[5] PATRICK R. MCMULLEN1 and PETER TARASEWICH2 (2003) "Using ant techniques to solve the assembly line Balancing problem" IIE Transactions (2003) 35, 605–617 [6] Dr. Poornima G. Naik Girish

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 ⓦ (24*7 Support on Whatsapp)