International Journal of Recent Engineering Research and Development (IJRERD)
ISSN: 2455-8761
www.ijrerd.com || Volume 02 – Issue 06 || June 2017 || PP. 132-137

Productivity Improvement through MOST Technique In Assembly Line At Medium Size Manufacturing (MSM)

Ratnesh Gedam [1], Prof. Yogesh Agrawal [2]
[1] *Sagar Institute of Research & Technology Excellence,*
[2] *Sagar Institute of Research & Technology Excellence,*

Abstract: In A Medium Size Manufacturing Enterprise (MSME) for automated and manual assembly lines, which can be applied equally well to single, multi- and mixed-product assembly lines with either deterministic operation times or stochastic operation times. The methodology starts from a suitable assembly system selection and thereafter decides suitable cycle times, parallel workstation requirements, and parallel line implementation for the type of assembly system being selected. An economical number of workstations are decided with the aid of workstation combining options depending upon the factual information provided. The end result is the detailed design of a manufacturing assembly line.

Keywords: MOST, Established Standard Time, Most sheet, Line balancing of engine process, Measurement time method

1. Introduction

Work measurement is a systematic procedure for the analysis of work and determination of time required performing key tasks in processes, it is typically based on time standards for manual tasks. The release of the Methods Time Measurement (MTM) system in the 1940s was an important step forward in predictive work measurement. It is defined as `a procedure which analyses any manual operation or method into the basic motions required to perform it.MTM assigns to each motion a

predetermined time standard which is determined by the nature of the motion and the conditions under which it is made.

One of the major problems in applying MTM to manufacturing operations is that it is extremely tedious and time consuming, since a work analyst must observe and document each movement in great detail. In addition, such an approach generates large amounts of data which must be managed. The development and release of the MOST in the 1960s alleviated many of these problems, since it is much simpler and more efficient. It classifies all human movements into three basic categories, and the description of each category is done by assigning values to only a few standard parameters. It is the latest work measurement technique that can be easily implemented and practically maintained to not only estimate the standard time but also improve methods and maximize the resource utilization.

MOST Methodology: MOST is the latest work measurement technique that can be easily implemented and practically maintained to estimate the standard time and also improve methods which maximize the resource utilization. It was originally developed by H. B. Maynard & Company Inc. and has three versions Basic MOST for the activities between 20 sec to 2 min, Mini MOST for the activities shorter than 20 sec, and Maxi MOST for the activities above 2 min. MOST focuses on three types of object movements Such as General Move, Control Move, and Tool Use which are briefly explained hereunder

2. Methodology

Maynard Operating Sequencing Technique (MOST)

1. Important Component of MOST

2. Types of Sequence

1. Important Component of MOST

Takt is a German word meaning "Conductors Baton". Takt time matches the pace of the manufacturing process to customer demand. each manufacturing process works to the takt.

$$\text{Takt} = \frac{\text{Total time available}}{\text{Total customer demand}}$$

2. Types of Sequence

Sequence models represent the sequence of events that occurs when an object is moved or a tool is used. Predefined sequence models represent different types of activities.

- **General Move (moved freely through space):-**
  spatial displacement of an object. The object follows an unrestricted path through the air.
- **Controlled Move (movement restricted; attached or in contact):-**
  The movement of objects along a controlled or restricted path
- **Tool Use (using common hand tools): -**
  Combination of General Moves and Controlled Moves

GENERAL MOVE PHASES:

Sequence models are structured into phases used to describe the action performed. Each of the predefined sequence models has a different set of phases.

Example:

- Pick up a marker that is three steps away on the floor and lay the marker aside on the flip chart.

Phase:	Get	Put	Return
	How did I GET The marker?	How did I put The marker?	Did return?

Parameters: -

Phases and sequence models are built using letters called parameters.

GET	PUT	RETURN
A B G	A B P	A

A = Action Distance
B = Body Motion
G = Gain Control
P = Placement

Time Calculation: -

To arrive at the time for the step:

- Sum the index values.
  6 + 6 + 1 + 6 + 0 + 1 + 0 = 20 (Refer data sheet page no. 53-56)
- Multiply by a factor of 10 to get time value (in Basic MOST).
  20 x 10 = 200 TMU

CONTROLLED MOVE PHASE

Get	Move/actuated	Return
ABG	MXI	A

Parameters

A = Action Distance
B = Body Motion
G = Gain Control
M = Move Controlled
X = Process Time
I = Alignment

Table:1 DRESSING LINE ASSEMBLY FLOW

Op. no.	Operation description	Most time	
		sec	min
1	Loading engine over conveyer, Timer belt tension checking.	30.6	0.51
2	Timer front cover top, front cover bottom tightening	57.96	0.966
3	Fitment of hose pipes	20.16	0.336
4	Fitment of clutch plate assembly	79.92	1.332
5	Attachment of manual gear	68.4	1.14

6	Tightening of manual gear box (Base Manual)	56.52	0.942
7	Alternator mount bracket fitment and Alternator fitment & belt tightening	64.08	1.068
8	Cat con bracket, Silencer bracket , clutch cable bracket fitment	65.16	1.086
9	Cat con with heat shield fitment. A mount fitment, B mount fitment.	67.32	1.122
10	"Rotate block by 180 deg AC compressor bracket fitment AC compressor fitment"	78.48	1.308
11	ALL ENGINE DRESSING OPERATIONS	588.6	9.81
	TOTAL DRESSING LINE ASSEMBLY TIME	**1177.2**	**19.62**

Table:2- DRESSING LINE ASSEMBLY FLOW

Operation no.	**Operation description**	**Most time**	
		sec	min
1	Loading engine over the conveyor Timer belt tension checking Timer front cover tightening	56.16	0.936
2	Timer front cover bottom tightening	22.32	0.372
3	Rotate block by 90 deg to bring inlet manifold side in front Fitment of hose pipes and fuel lines Rotate block by 90 deg to bring engine rear side in front CVT driven pulley attachment	56.88	0.948
4	Fitment of clutch plate assembly CVT End Gear Box fitment	107.6	1.794
5	Attachment of manual gear box CVT Driven pulley Tightening CVT Driver Pulley Fitment &Tightening	103	1.716
6	Tightening of manual gear box CVT Belt mounting, installation bolt tightening and tensioning CVT front cover attachment	92.88	1.548
7	CVT Front cover tightening Rotate block by 90 deg AC compressor bracket fitment	56.88	0.948
8	Alternator belt tension checking, Oil level checking, Oil sump drain plug torque check, Oil plug bolt torque check, head cover bolt check, damper pulley bolt check, blanking of openings,	59.4	0.99
9	Visual Inspection, History card filling, Loading on despatch trailer	55.8	0.93
	TOTAL DRESSING LINE ASSEMBLY TIME	**610.92**	**10.182**

Table:3- DRESSING LINE ASSEMBLY FLOW

Op. no.	Operation description	Most time	
		sec	min
1	Loading of Engine on Conveyor, Timer belt tension checking, Timer front cover tightening	56.52	0.942
2	Rotation of block by 90 deg, Fitment of hose pipes and fuel lines, Driven CVT pulley attachment	56.88	0.948
3	CVT Driven pulley tightening, CVT Driver pulley fitment & tightening, CVT belt mounting on driver pulley, attachment of driver pulley installation bolt	57.96	0.966
4	Driven pulley adjustment for belt tightening, CVT front cover attachment	39.6	0.66
5	CVT front cover tightening, Alternator fitment, Belt tensioning	57.6	0.96
6	Alternator belt tension checking, Oil level checking, Oil sump drain plug torque check, Oil plug bolt torque check, Head cover bolt check, Damper pulley bolt check, Blanking of openings,	59.4	0.99
7	Visual Inspection, History card filling, Loading on dispatch trailer	55.8	0.93
	TOTAL DRESSING LINE ASSEMBLY TIME	**383.76**	**6.396**

Table:4- DRESS ING LINE ASSEMBLY FLOW

Op. no.	Operation description	Most time	
		sec	min
1	Loading of Engine on Conveyor, Timer belt tension checking, Timer front cover tightening	56.52	0.942
2	Rotation of block by 90 deg, Fitment of hose pipes and fuel lines, Driven CVT pulley attachment	56.88	0.948
3	CVT Driven pulley tightening, CVT Driver pulley fitment & tightening, CVT belt mounting on driver pulley, attachment of driver pulley installation bolt	57.24	0.954
4	Driven pulley adjustment for belt tightening, CVT front cover attachment	39.6	0.66
5	CVT front cover tightening, Alternator fitment, Belt tensioning	57.6	0.96

6	Alternator belt tension checking, Oil level checking, Oil sump drain plug torque check, Oil plug bolt torque check, Head cover bolt check, Damper pulley bolt check, Blanking of openings,	59.4	0.99
7	Visual Inspection, History card filling, Loading on dispatch trailer	55.8	0.93
	TOTAL DRESSING LINE ASSEMBLY TIME	**383.04**	**6.384**

3. Result & Discussion

DRESSING LINE ASSEMBLY FLOW REDUCING TIME ANALYSIS TABLE

Sr.No.	SHEET NUMBER	DESCRIPTION	SEC.	MIN.
1	SHEET-1	DRESSING LINE ASSEMBLY FLOW	1177.2	19.62
2	SHEET-2	DRESSING LINE ASSEMBLY FLOW	610.92	10.182
3	SHEET-3	DRESSING LINE ASSEMBLY FLOW	383.76	6.396
4	SHEET-4	DRESSING LINE ASSEMBLY FLOW	383.04	6.384

Reduction of Workstations

Sr.No.	SHEET NUMBER	DESCRIPTION	NO. OF WORK STATION
1	SHEET-1	CYLINDER HEAD ASSEMBLY FLOW	11
2	SHEET-2	CYLINDER HEAD ASSEMBLY FLOW	9
3	SHEET-3	CYLINDER HEAD ASSEMBLY FLOW	7
4	SHEET-4	CYLINDER HEAD ASSEMBLY FLOW	7

4. CONCLUSION

We will obtain below out come after completed engine assembly line with the help of Myrald Operating Sequencing Techniques and Delmia Process Engineer. time of the hole engine assembly line is below the 52 sec and the some station time above the 52 sec two operator is added or some other solution given and done the work. MOST and line balancing of assembly line some problem is solved below side –

- Reduces process time of the product
- Reduction of workstations
- Decreased work-in-progress inventory
- Shortening of lead time
- Reduction of capital and operating costs

5. REFERENCE

[1]. Wild, R. (1975). Work organization, a study of manual work and mass production, New York: Wiley.
[2]. Bard, J. F. (1989). Assembly line balancing with parallel workstations and dead time. International Journal of Production Research, 27 (6), 1005-1018
[3]. Genaidy, A. M., Mital, A., and Obeidat, M. (1989). The validity of predetermined motion time systems in setting production standards for industrial tasks, International Journal of Industrial Ergonomics, vol.3, no.3, pp.249-263,
[4]. Womack, J., Jones, D., and Roos, D. (1990). The Machine that changed the world. Rawson Associates, New York. Garg, S., Vrat, P., and Kanda, A. (1994). Work Culture in JIT environment. Productivity, 35,463–466.
[5]. Genaidy, A. M., Agrawal, A., and Mital, A.(1990) Computerized predetermined motion-time systems in manufacturing industries, Computers & Industrial Engineering, vol.18, no.4, pp.571-584