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ANALYSIS OF MOST TECHNIQUE FOR ELIMINATION OF IDEAL TIME BY SYNCHRONIZATION OF DIFFERENT LINES

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ABSTARCT— The paper is with the intention to provide awareness of particular work measurement technique called 'Maynard Operation Sequence Technique' essential for planning and controlling operation. The objective of any work measurement technique is to reduce the work content and effort thereby improving the productivity of the Process. It is a method of analysing work that is easy to learn, simple and effective to apply and extremely efficient for method development and time generation. This technique can be applied anywhere where the motion of people or objects have to be dealt with. For e.g in automobile and many other industries where a large no. of oprerotors and technicians work, their motion can be analyzed carefully so that by applying this technique the productivity is increased. This is done by eliminating the idle time of operators while working and synchronizing the amount of work content among operators such that the effort is reduced and the productivity is increased. It was applied at Maruti Suzuki india ltd. As it employs a large work force so as to practically apply this technique and see the results. It was successfully implemented in the industry and excellent results were achieved

***Keywords*—Idle time, Most, Productivity.**

I. Introduction

Maynard Operation Sequence Technique (MOST) is a predetermined motion time system that is used primarily in industrial settings to set the standard time in which a worker should perform a task. To calculate this, a task is broken down into individual motion elements, and each is assigned a numerical time value in units known as time measurement units, or TMUs, where 100,000 TMUs is equivalent to 1 hour. All the motion element times are then added together and any allowances are added, and the result is the standard time. It is a much easier to use form of the older and now less common Methods Time Measurement technique, better known as MTM.

A. Background to MOST

Dr H B Maynard was the leader of the team that developed MTM (Methods-Time Measurement), the base system on which almost all synthetic work measurement systems have been developed. Kjell B Zandin later developed an accurate system that is both easy to apply and can quickly produce consistent results using this proven MTM data.

II. Methodology

It can be applied to any type of work for which a method can be defined and described. MOST was designed to be much faster than other work quantification techniques because of its simpler structure. It groups together into predefined sequences the basic motions that frequently occur. MOST uses a

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structured approach, it develops structured data; it is a progressive technique. The technique is thoroughly proven, highly respected and used around the world. MOST is a powerful analytical tool to measure every minute spent on a task.

A. The Purpose of Work Measurement

Method study is the principal technique for reducing the work involved, primarily by eliminating unnecessary movement on the part of material or operatives and by substituting good methods for poor ones. Work measurement is concerned with investigating, reducing and subsequently eliminating ineffective time, that is time during which no effective work is being performed, whatever the cause.

Work measurement, as the name suggests, provides management with a means of measuring the time taken in the performance of an operation or series of operations in such a way that ineffective time is shown up and can be separated from effective time. In this way its existence, nature and extent become known where previously they were concealed within the total.

B. The Uses of Work Measurement

Revealing existing causes of ineffective time through study, important though it is, is perhaps less important in the long term than the setting of sound time standards, since these will continue to apply as long as the work to which they refer continues to be done. They will also show up any ineffective time or additional work which may occur once they have been established. In the process of setting standards it may be necessary to use work measurement:

(a) To compare the efficiency of alternative methods. Other conditions being equal, the method which takes the least time will be the best method.

(b) To balance the work of members of teams, in association with multiple activity charts, so that, as nearly as possible, each member has a task taking an equal time to perform.

(c) To determine, in association with man and machine multiple activity charts, the number of machines an operative can run.

(d) To provide information on which the planning and scheduling of production can be based, including the plant and labour requirements for carrying out the programme of work and the utilisation of available capacity.

(e) To provide information on which estimates for tenders, selling prices and delivery promises can be based.

(f) To set standards of machine utilisation and labour performance which can be used for any of the above purposes and as a basis for incentive schemes.

(g) To provide information for labour-cost control and to enable standard costs to be fixed and maintained.

It is thus clear that work measurement provides the basic information necessary for all the activities of organising and controlling the work of an enterprise in which the time element plays a part. Its uses in connection with these activities will be more clearly seen when we have shown how the standard time is obtained.

C. Various techniques of work measurement

The following are the principal techniques by which work measurement is carried out:

1. Time study
2. Activity sampling
3. Predetermined motion time systems
4. Synthesis from standard data
5. Estimating
6. Analytical estimating
7. Comparative estimating
8. MOST

Of these techniques we shall concern ourselves primarily with MOST.

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III. Selection Criteria of MOST technique for production and assembling in automobile sector.
As compare to other techniques, the benefits of MOST are:-
• reduce costs
• reduces paperwork
• improve productivity
• streamline operations
• easy to learn and use
• quickly identifies inefficient methods
• provides consistent results/standards
• gives accuracy to within ± 5% with a 95% confidence level
• can be applied to any method-defined manual task
• reduces the time required for data development
• can be applied largely from memory
• applicable for every type of industry
• dedicated range of software products
• encourages method development and improvement

IV. Implementation of MOST technique for production and assembling in automobile sector.

A. Procedure

The main Process Steps of Carrying Out Work Measurement are as follows :

1. Obtain and record all available information about the job, the worker and the surrounding conditions likely to affect the execution of the work.
2. Record the complete description of the method, break it down into elements.
3. Measure with a stopwatch and record the time taken by the worker to perform each element of the operation.
4. Assess the rating of the worker.
5. Extend the observed time to "basic time" by factorizing the actual time (observed time) by the assessed rating.
6. Determine the allowances (e.g. personal allowances, relaxation allowances, allowances for the working conditions etc) to be made over and above the "basic time" for the operation.
7. Apply those allowances on the "basic time".
8. Thus, determine the "standard time" for the operation.

B. Data Analysis

Terminology used:-

Normal time- Normal Time is the time required by a qualified worker, working at a pace that is ordinarily used by workers to complete a task by following a prescribed method and without interruptions. The result of a MOST analysis is normal time.

Actual time- It is the time taken by the operator to do the work.

Idle time- It is time period in which the operator is idle and has no work to do.

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Station (#) - It is an area where a particular part is produced. For e.g for a door to be produced completely it has to undergo various stations where the different parts are produced.
The practical analysis of the case study was done by applying the technique on the production lines of Maruti Suzuki India ltd. It was applied on the door production line which involved a large number of operators and data was taken and properly analyzed.

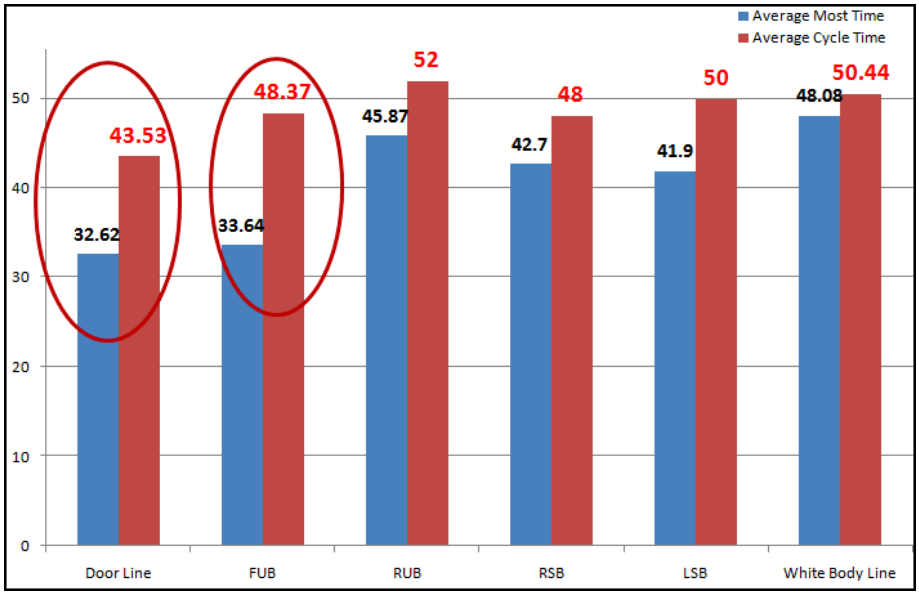

Fig. 1 Graphical representation of door line

This graph gives us an overview of normal time vs actual time for the full door line.

Below is the tabular representation of normal vs actual time.

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S. No.	Station No	Normal Time(sec)	Actual Time(sec)
1	#7120	40.03	44
2	#7160	27.25	42
3	#7110	33.41	53
4	#7330	13.82	44
5	#7310	56.45	60
6	#7360	26.5	34
7	#7760	41.47	46
8	#7720	31.97	57
9	#7110	47.23	56
10	#7510	36.53	48
11	#7520	35.42	52
12	#7560	36.58	38

Now some of the stations are discussed where a considerable amount of time, effort was saved and Productivity was increased.

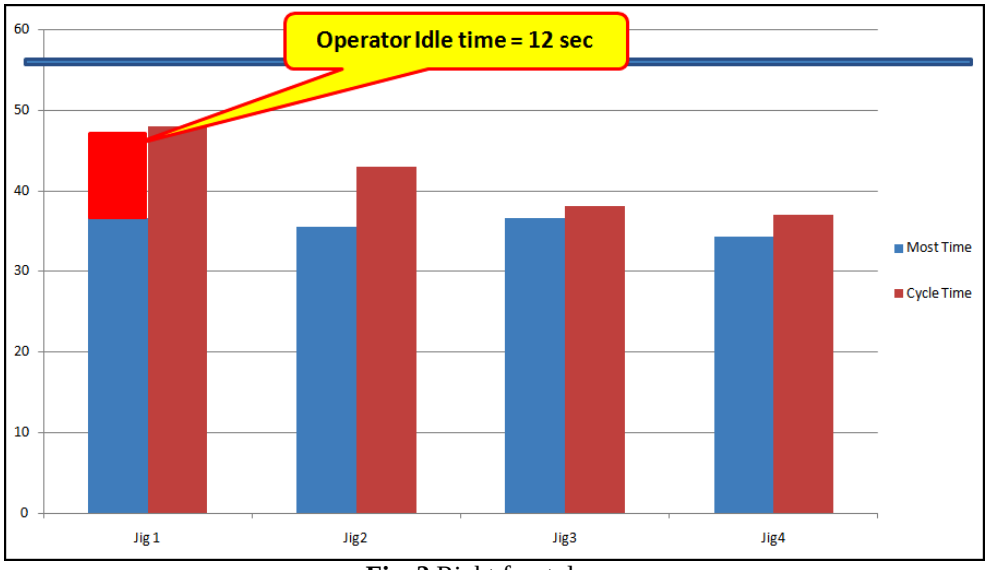

Fig. 2 Right front door

As seen from the graph an idle time of 12 sec was eliminated and a manpower of 3 people was saved.

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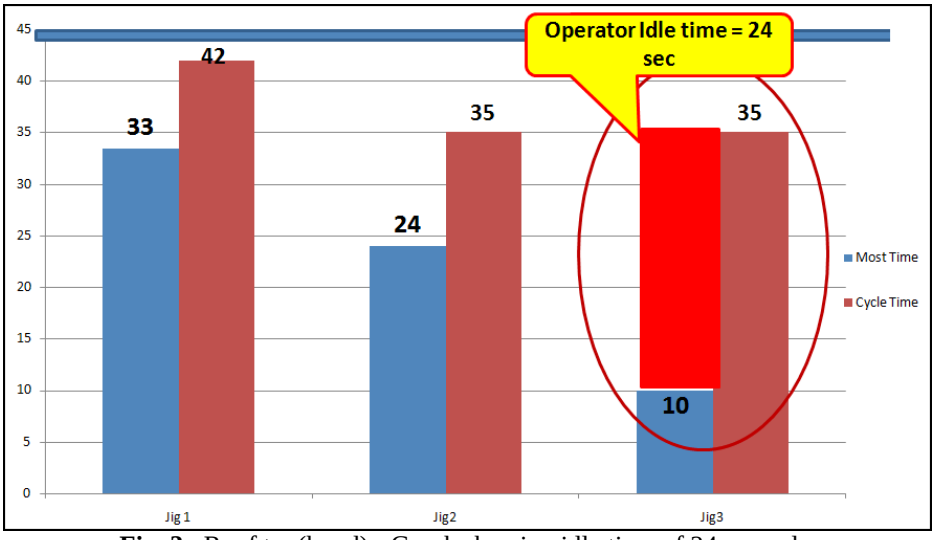

Fig. 3 Roof top(hood) - Graph showing idle time of 24 seconds.

As there is a lot of idle time there is a large scope for improvement. A gravity transfer system was implemented to eliminate this.

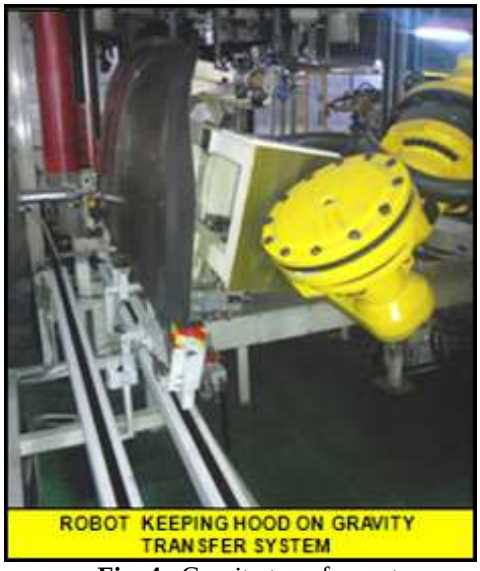

Fig. 4 Gravity transfer system

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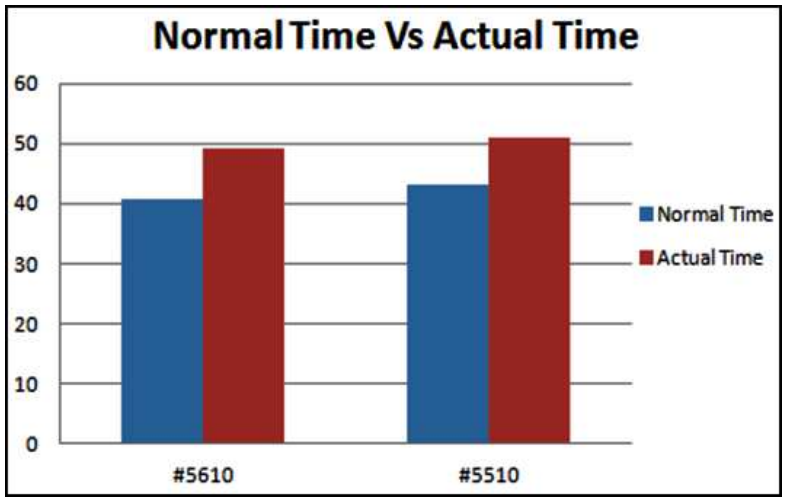

Fig. 5 Graph plotted between normal vs actual time in left side body.

The idle time was eliminated by this technique.
The MOST technique was applied on many other stations eliminating idle time time but these were some of the major stations where tremendous results were achieved.

V. Results and Conclusions

A lot of manpower, time and effort was saved and productivity was increased.
A total manpower of 12 is saved per day by implementation of new layout of door line.

- Salary of 1 operator= Rs. 30,000
- Salary of 12 operators = Rs. 12*30,000*12

= Rs. 43.20 lacs could be saved annually by considering the above analysis in the case study mentioned in this paper. Thus with the help of MOST method it is possible to achieve major times reduction in the manufacturing of the products. . MOST nearly gives non-machining time reduction of 60 to 65 %. With the help of this method it is also possible to get the production time of the products before its actual manufacturing starts. This helps in the production planning.
The case study was successfully implemented in the industry thereby increasing the productivity and confirming the importance of work measuring techniques like MOST in industries. It is a simple, easy and an efficient technique without any initial investment which gives tremendous results**.**

VI. Future Scope

Worldwide popularity of MOST -Training of hundreds of people in the MOST technique in the industry is being already done. It can be applied in wide range of industries, including banks, local authorities, retail, postal services, light assembly, public sector, warehousing, admin, electronics, transport infrastructure, aircraft, distribution, engineering, call centers. The MOST technique, its systems family and the powerful suite of software are products that have been developed with essential elements of good management in mind: to improve competitiveness, profitability, productivity - in short, to help you save time, money and effort.

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