iJRASET
International Journal For Research in
Applied Science and Engineering Technology

INTERNATIONAL JOURNAL FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Volume: 9 **Issue:** V **Month of publication:** May 2021

DOI: https://doi.org/10.22214/ijraset.2021.34761

Maynard's Operation Sequence Technique for different Companies: Case Study

Gajanan Pathak [1], Pankaj Baghele[2], Prof. P. R. Vaidya[3], Prof, R. S. Bharsakade[4], Prof. S. S. Kuber[5], Prof. S. V. Patil[6]

[1, 2, 3, 4, 5, 6]*Department of Industrial Engineering, Vishwakarma Institute of Technology, Savitribai Phule Pune University, Pune, India.*

Abstract: In today's competitive world market, manufacturers face more tough challenges and are pressured to find ways for productivity improvement wherever possible in the entire supply chain. To give competition to other business under the current global situation, a company needs to reduce or eliminate the idle and downtime of operations and improve the current working methods. Improve profit is the primary goal of any manufacturing industry. The successes of the sector depend on its productivity. This productivity decreases because of deficiency in previous standard time for activities carried out by operators/labours, non-value-added activities involved and the ineffective methods, and imbalance in the material flow. This paper highlights a methodology developed for standardization in the process activities in different production industries and research and development departments using Maynard's Operation Sequence Technique. (MOST) Due to high uncertainty in demand, it is challenging to meet the demand with existing supply. In this situation, industrial engineering (IE) techniques are used to resolve the existing manufacturing situation and identify the potential for increased productivity. MOST (Maynard Operation Sequence Technique) is a good work measurement technique that allows better productivity and Resource Optimization. The main objective of the MOST method is to reduce the work content and improve the productivity of the process.
Keywords: Maynard's Operation Sequence Technique (MOST), Work-Study, Productivity Improvement, Non-Value Added Activities (NVA), Time Study.

I. INTRODUCTION

In today's world, the business has become large differentiated and too aggressive in securing its market share because of competition and advanced technology. In addition, with the introduction of another product by competitors, each consumer's behaviour is so different; hence it has become even more challenging to keep track of consumer's choices. Consequently, all businessmen are trying hard to find out how to fulfil consumer needs with more pressure to meet customer demand.[1] However, failure to satisfy customer demand is not very unusual in the manufacturing industries, which may be due to differentiated reasons, including material allocation and utilization problems. In these aggressive/competitive manufacturing industries, there are most mass-production industries. In the manufacturing industry, profitable growth is ensured by progressively increases in productivity.[2] Work measurement is the analysis of the work and determination of the time required for the specific process.[3] The lean manufacturing method is widely accepted as it helps fulfil customer demand on time by assigning limited resources and maximizing their usage. However, establishing a poor manufacturing environment is not an easy task as the companies need to find and eliminate all the possible wastes from their production lines. A predetermined motion time system (PMTS) is frequently used to set labour hour rates in the industry by quantifying the time required to perform specific tasks. Maynard Operation Sequence Technique (MOST) is a pre-established motion and time study used in various industrial companies to set the standard time a worker/operator should perform a task. The use of the tool is analyzed through a separate activity sequence model that permits the analyst to go along with the movement of a hand tool through a standard sequence event that is a mixture of two basic sequence models. A task is tumbledown into individual motion elements to find out this, and each is assigned a numerical time value in units well known as time measurement units. Physics states that work is the product of force and distance (W = f x d) or work the displacement of a mass or object. Physics says that work is the product of force and distance (W = f x d) or work removing a group or entity.[4] No Rating System as required in Time Study can be applied to any method-defined manual work. However, for the great majority of work, there is a usual denominator from which work can be studied, the displacement of objects. Work measurement is a drive used to plan, organize, estimate costs, and evaluate performance. There are various tools and techniques known as lean tools to identify and eliminate non-value-added activities. As a result, the bottleneck workstations and non-value-added activities act as vital to acquire the company's aim. NVA activities do not add value to the product, but the authority has to pay. Non-value-added activities are an essential factor for any manufacturing industry. So, it is necessary to identify and remove the bottleneck and non-value-added activities.[5]

II. LITERATURE SURVEY

As part of carrying out lean manufacturing ideology, the work and time measurement techniques assist the manufacturer in increasing productivity by explaining the proper working method and standard time, maximizing resource utilization, and assisting in distributing the workload between the workstations, Etc. One of the most traditional methods used in the industries for calculating the typical project time is the Methods-Time Measurement (MTM), developed in 1948 for dividing the operations into basic motions (Genaidy et al., 1989). Through a case study, the authors have described the usefulness of this system named Talk MOST and how it can present as the best tool that lessens the analysis time and simplifies time standards. MOST show a comfort of the uninteresting of analysis and decreases the workload of controlling a more amount of data while other MTM techniques still suffer from the same problems. In other words, it is a pre-established motion time method that has goals to define the standard time of performing the work. As an outcome of their case study, the writer superintends to retain 18% of working time and interpret a new set of reduced standard time. Belokar et al (2012) executed MOST to improve the efficiency and cost potency of the work and decrease worker's exhaustion by recognizing and minimizing the Non-Value Added (NVA) activities. The proposed Work measurement is an organized procedure for the analysis of work and calculation of time required performing main tasks in processes, and it is based on time standards for manual tasks.[5] The MOST analysis is a comprehensive study of an operation consisting of one or many methods step and corresponding sequence models and appropriate parameter time and the total average time for the process or suboperation. It is looking forward to the VSM framework to help the development teams reduce the PD lead-time by 50%. They research and talk about the objective and associated problems with the product development process for a case study unit of a Gas Turbine manufacturer. Consequently, they have been possible to decrease the production cycle time to serve the higher level of demand with lower takt time maintaining the current status of the workforce. They suggest changes will decrease the lead time for the design stage, thus reducing the overall PD lead time by 50%. Therefore, this Research utilized the Ergonomics of the work-study and MOST as the time study method. Mehvish Jamil shows up a procedure prosper for regularity in the process activities by using Maynard's Operation Sequence Technique and minimizing all the workers' tiredness by using human factors. Thus, this Research is used for human factors as a work-study and Maynard Operation Sequence Technique (MOST) as the time study method. The main aim is to fulfil the Optimization of the system with a combination of MOST and Ergonomics [4]. Tarun Kumar Yadav uses a technique that starts from a suitable assembly system selection. After that, decides convenient cycle times, parallel workstation requirements, and parallel line implementation for the type of assembly system being selected. They suggested that Work measurement is a systematic procedure for the analysis of work and determination of the time required to perform critical tasks in processes. It is typically based on time standards for manual tasks.

III. BASIC MOST

Several problems have been identified by analyzing the undertaken case of sewing section in a garment, including improper capacity planning. The non-value-added activities were increased and affected the whole assembly line due to the absence of pre-defined standard time, working methods, unplanned working distance, an imbalance in the material flow, Etc. Hence, the competitive advantages in the undertaken sewing line can be brought into the system by the proper use and selection of body motion, balancing workflow, and optimizing layout body motion of the operator. Hence, to increase the line efficiency and the production rate of the undertaken case study, the MOST technique is implemented to identify the bottlenecks and NVA added production line activities and set time standards. The basic MOST technique constitutes the general move, control move, and tool use process.[6]

A. General Move

General move describes the spatial movement of more than one object. Under manual control, the object follows a clear path through the air if it is in contact. Restricted by or attached to another entity during the move.

The General Move Sequence Model is not applicable. Such a move will be defined later in the Controlled Move activity.

The general move follows a fixed sequence of sub-activities as shown below:

1) Go with one or two hands a distance to an object either directly or in conjunction with body motions or steps.
2) Gain manual control of the object.
3) Move the object a distance to the point of placement, either directly or in conjunction with body motions or steps.
4) Place the object in a temporary or final position.
5) Return to the workplace.

International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

In MOST" activity sequence models are made up of various parameters. These parameters are ordered in a sequence model consisting of series of letters organized in a logical sequence. The sequence model states the events or actions that always occur in a specified order when one object moves from one location to another.[7]

The model identifies the sub-activities included in the five-step pattern shown in the table:

TABLE I
Sequence Model

Activity	Sequence Model	Parameter
General Move	A B G A B P A	A= Action Distance B= Body Motion G= Gain control P= Placement
Controlled Move	A B G M X I A	M= Move Controlled X= Process Time I= Alignment
Tool Use	A B G A B P A B P A	F= Fasten L= Loosen C= Cut S= Surface Treat M= Measure R= Record T= Think

Parameter definition of the general move is listed below:

1) *Action Distance:* This variable is used to analyze all spatial actions of the fingers, hands or feet, either carrying an object, hands are free.
2) *Body Motion:* This variable is used to analyze either vertical motions of the body or the actions necessary to overcome an obstruction to body movement.
3) *Gain Control:* This variable is used to analyze all manual motions (mostly finger, hand and foot) employed to obtain total manual control of an object and release the thing after placement. The G parameter may include one or more short move motions whose objective is to gain complete control of the object before moving to another location.
4) *Placement:* This variable is used to analyze actions at the final stage of an object's displacement to align, orient and engage the thing with another object before control of the object is relinquished.

B. Controlled Move

Controlled move describes the manual displacement of an object over a 'controlled' path. That is. The object's movement is restricted in at least one direction by contact or attachment to another. The nature of the work demands that the thing be deliberately moved along a specific or controlled path. Similar to the General Move Sequence Model, the Controlled Move Sequence Model follows a fixed sequence of sub-activities identified by the following steps:

1) She/he reached with one or two hands a distance to the object, either directly or in conjunction with body motions or steps.
2) Gain manual control of the object
3) Move the object over a steady path (within reach or with steps)
4) Allow time for a machine process to occur
5) Align the object following the move Controlled or after the Process Time.
6) Return to the workplace.

These six sub-activities form the basis for the activity sequence describing the manual displacement of an object over a steady path. The sequence model takes the form of a series of letters (parameters) representing each of the various sub-activities of Controlled Move.[8]

A B G M X I A

where:

A= Action Distance

B = Body Motion

G = Gain Control

M = Move Controlled

X = Process Time

I = Alignment

Only three new parameters are introduced in Controlled Move. The A B and G parameters were discussed with the General Move Sequence Model and remain unchanged, so other parameter definitions are listed below:

a) *Move Controlled:* This variable is used to analyze all manually guided movements or actions of an Object over a steady path.
- *Process Time:* This variable is used to account for the time for work controlled by electronic or mechanical devices or machines, not by manual actions.
- *Alignment:* This variable is used to analyze manual actions following the Move Controlled or after Process Time to achieve the alignment of objects.

A Controlled Move is performed under one of three conditions:

- The object is restrained by its attachment to another thing, such as a button. Lever. Door or crank.
- It is controlled during the Move by the contact it makes with the surface of another object, such as pushing a box across a table.
- The object must be moved on a steady path to accomplish the activity such as folding a cloth, coiling a rope, winding a spool or moving a balanced item or avoiding a hazard, such as electricity, sharp edges or running machinery.

If the object can be moved freely through space and remain unaffected by any of these conditions, its movement must be analyzed as a General Move

C. Tool Use

Manual work is not always performed with the hands alone. The use of tools extends the strength and capabilities of the hands through leverage. Even though much mechanization has occurred in the industry, a large and critical portion of work remains literally 'in the worker's hands because of the MOST's desirability. Work Measurement Technique applies to all manual labour. Since the analysis of the frequent use of specific tools through a series of General and Controlled Moves could take additional time and result in inconsistent applications, a third manual sequence model was developed-the Tool Use, Sequence Model. The Tool Use Sequence Model is comprised of phases and sub-activities from the General Move Sequence Model, along with specially designed parameters describing the actions performed with hand tools or, in some cases, mental processes required when using the senses as a tool.[9]

The Sequence Model Tool Use follows a fixed sequence of sub-activities, which occur in five phases:

1) *Get Tool or Object:* Reach with hand a distance to an object directly with body motions and steps or gain manual control of the tool or object.
2) *Put Tool or Object in Place:* Move the tool or object a distance to where it will be used directly or in conjunction with body motions or steps and place the device or object in position for use.
3) *Tool Action:* Apply number or extent of Tool Actions.
4) *Put Tool or Object Aside:* Retain the tool or object for further use (hands and fingers are of course always retained), toss or lay the tool aside, return the tool to its original location 01 move it to a new location for disposition, either directly or in conjunction with body motions or steps.
5) *Return:* Return to the workplace.

Tool use sequence model

A B G A B P T A B P I A

"T" in the sequence model ('Tool Action' phase) is provided for the insertion of one of the following Tool Action parameters. These parameters, which refer to the specific tool being used, are as follows:

F = Fasten
L = Loosen
C = Cut
S = Surface Treat
M = Measure
R = Record
T = Think

IV. TIME UNIT USED IN MOST

The time measurement unit (TMU) is used as a time unit for MOST analysis,[5] which is converted to the minute by using the following Table:

Table II
Time Measurements Unit

1 TMU= 0.00001 Hour	1 Hour= 100,000 TMU
1 TMU= 0.0006 Minute	1 Minute= 1667 TMU
1 TMU= 0.036 Second	1 Second= 27.8 TMU

A typical MOST work sequence code would look like this:

A_{10} B_6 G_3 A_6 P_3 A_0

Step – 1 Adds up all the subscript numbers

10+6+3+6+3+0= 28 (the subscript is the MOST index value)

Step – 2 multiple the sum of the index by 10. This answer gives the TMU equivalent 28 x 10 = 280 TMU

Step – 3 Convert to time in seconds 280U *0.036 seconds = 10.08 seconds.

V. METHODOLOGY

This section will present the research methodology used in this study. This study uses to analyze work contain shift and process-wise. The study conducted this study in different companies like manufacturing tool kit bags and pharmaceutical companies to develop products. So, we are doing a comparative study of both the companies.

A. MOST Approach

We applied MOST to calculate general information, shift information, MOST analysis and shift analysis. The manufacturing company produced around 100 bags and around 200 belts for attaching to the belt, so we did MOST to calculate efficiency of labours. For developing product

We are analyzing scientist work shift wise and calculate work with a stopwatch, we find the way to improve workflow, and we calculate each moment with the help of MOST analysis.

The MOST analysis of both the companies is given below:

The author conducted this study in different companies like manufacturing tool kit bags and pharmaceutical company to develop the product. So, we are doing a comparative study of both the companies.

We applied MOST to calculate general information, shift information, MOST analysis and shift analysis.

For this study, the selected industry Author is taken, four labourers. For explaining the MOST analysis, a short explanation is given below:

Sr. No	Activity Description	GM/ CM/	Sequence Model																								Total TMU	FREQ UANC	Grand TMU	TIME IN MIN
	ROUTINE WORK																													
1	MOVE 10-15 STEPS, OPEN DOOR, MOVE 10-15 STEPS	CM	A	24	B	0	G	0	A	24	B	0	P	0	A	0	M	6	X	0	I	0	R	0	T	0	54		540	0.3240
2	SEAT ON CHAIR, STAND, MOVE 10-15 STEPS	CM	A	24	B	6	G	0	A	0	B	6	P	0	A	0	M	0	X	0	I	0	R	0	T	0	36		360	0.2160
3	GRAPS ROLLED MATERIAL, MOVE 20-25 STEPS, PLACE ON ROLLER	GM	A	42	B	0	G	3	A	0	B	0	P	6	A	0	M	6	X	0	I	6	R	0	T	0	63		630	0.3780
4	PULL MATERAIL ON TABLE ,MOVE 10-15 STEPS, TURN, MOVE 10-15 STEPS	GM	A	24	B	3	G	0	A	24	B	0	P	0	A	0	M	6	X	0	I	3	R	0	T	0	60		600	0.3600
5	MOVE 15-20 STEPS, GRAPS GAUGE, GRAPS SCISSORS, TURN, MOVE 15-20 STEPS	GM	A	32	B	0	G	6	A	32	B	0	P	0	A	0	M	0	X	0	I	0	R	0	T	0	70		700	0.4200
6	MOVE 15-20 STEPS, GRAPS PENCIL, TURN, MOVE 15-20 STEPS	GM	A	32	B	0	G	3	A	32	B	0	P	0	A	0	M	0	X	0	I	0	R	0	T	0	67		670	0.4020
7	GRAPS GAUGE, BEND, PLACE GAUGE, GRAPS PENCIL, BEND, TAKING MEASUREMENT	TU	A	0	B	3	G	6	A	0	B	0	P	3	A	0	M	0	X	0	I	0	S	620	T	0	632		6320	3.7920
8	MOVE 10-15 STEPS, GRAPS GAUGE, BEND, PLACE GAUGE,	GM	A	24	B	3	G	3	A	0	B	0	P	3	A	0	M	0	X	0	I	0	R	0	T	0	33		330	0.1980
9	GRAPS PENCIL, BEND, TAKING MEASUREMENTS	TU	A	0	B	3	G	3	A	0	B	0	P	0	A	0	M	0	X	0	I	16	S	640	T	0	662		6620	3.9720
10	TURN, MOVE 10-15 STEPS , PLACE GAUGE, PLACE PENCIL ON TABLE	GM	A	24	B	0	G	0	A	0	B	0	P	6	A	0	M	0	X	0	I	0	R	0	T	0	30		300	0.1800

Fig.1 MOST formulating

B. *Case Study-1*

Summary analysis of four labours and explained below with different charts such as column charts and pie chart

	Particulers / Labour	Bhau Kamble	Pratik Jadhav	Ashok Lohar	Tukaram Ahire
Genral Information	Department	Production	Production	Production	Production
	Designation	Labour 1	Labour 2	Labour 3	Labour 4
	Shift	Genral	Genral	Genral	Genral
Shift Information	Estimated Time (Min)	540.00	540.00	540.00	540.00
	Breaks (Min)	90.00	90.00	90.00	90.00
	Effective Working Time (Min)	450.00	450.00	450.00	450.00
MOST Analysis	Work content (Min)	334.54	276.46	377.62	334.45
	Movement (A)	9.51	13.73	28.53	20.82
	Body Motion (B)	0.14	0.14	2.22	2.10
	Grasping (G)	0.85	0.89	2.7	2.34
	Placement (P)	5.91	1.23	4.4	3.99
	Move controlled (M)	0.64	0.64	2.11	1.93
	Process Time (X)	0.00	0	0.00	0.00
	Alignment (I)	3.08	3.08	9.30	8.63
	Tool Use (T)	53.09	46.93	43.01	34.26
	Clocked Activity ©	33.01	49.68	41	53.57
shift Analysis	Time Wasted	115.46	173.54	72.00	115.59

Fig.2 MOST Analysis

As listed in the above fig.2, the estimated time for all workers is 540 minutes, a break of 90 minutes and effective working time is given for all the workers, and it is calculated through MOST analysis. Also calculate MOST analysis in detail i,e, Movement(A), Body Motion(B), Grasping(G), Placement(P), Move Controlled(M), Process Time(X), Alignment(I), Tool Use(T), Clocked Activity and Time Wasted. so, we are taken only major activities to understand the MOST through different charts:

	Bhau Kamble	Pratik Jadhav	Ashok Lohar	Tukaram Ahire
Breaks (Min)	90.00	90.00	90.00	90.00
Work content (Min)	334.54	276.46	377.62	334.45
Time Wasted	115.46	173.54	72.00	115.59
Estimated Time (Min)	540.00	540.00	540.00	540.00

Fig.3 MOST Summary

In the above table, the MOST summary is shown, i.e. breaks given to all workers, work content is done by all workers, time wasted by all workers and estimated time given to all workers. To understand summary easily chart is given below:

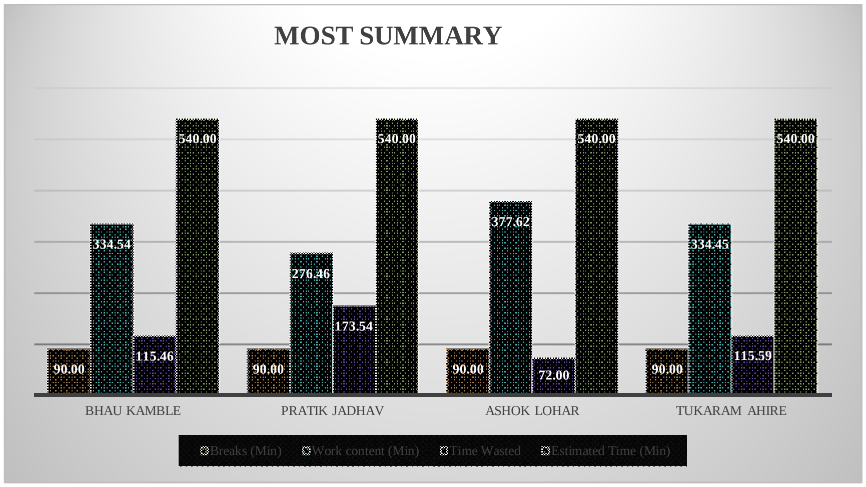


Chart.1 MOST Summary

Now we are taken the average of Fig.3. MOST summary to calculate average work done by the workers

Breaks (Min)	90.00
Work content (Min)	330.77
Time Wasted	119.15
Estimated Time (Min)	540.00

Fig.4 Average of MOST analysis

The average of work content and time wasted is shown above in the table, and for a simple way of understanding, the chart is shown below:

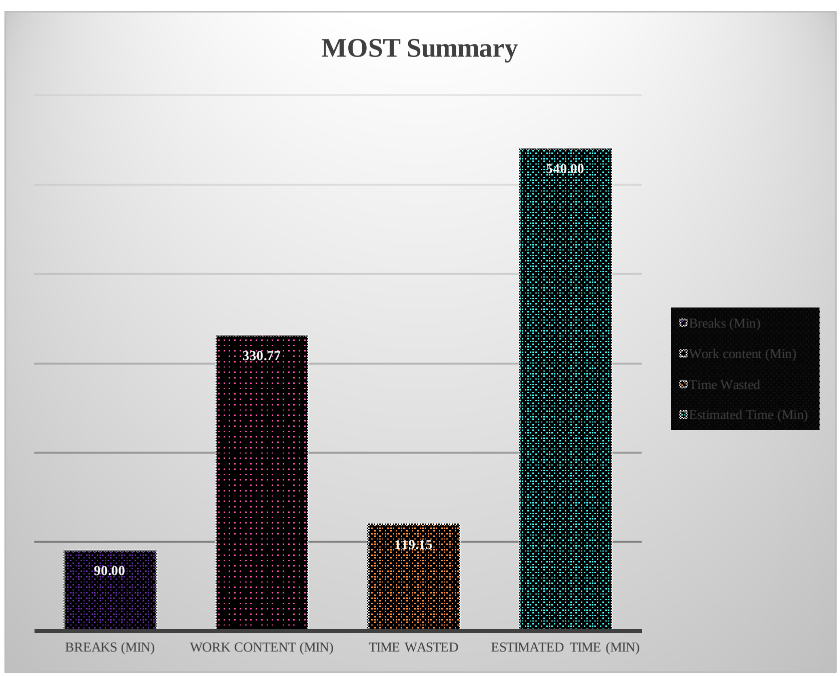


Chart.2 Average of MOST Analysis

ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

Now the final step is to determine the percentage and average value of each activity for a better understanding of each step, and also, we understand the average time taken for each activity like Movement, Placement, Grasping, Etc. The final table of activities and its graph is shown below:

Particulars \ Labour	Bhau Kamble	Pratik Jadhav	Ashok Lohar	Tukaram Ahire	Average	percentage
Department	Production	Production	Production	Production		
Designation	Labour 1	Labour 2	Labour 3	Labour 4		
Shift	Genral	Genral	Genral	Genral		
Estimated Time (Min)	540.00	540.00	540.00	540.00	540.00	100.00
Breaks (Min)	90.00	90.00	90.00	90.00	90.00	16.67
Effective Working Time (Min)	450.00	450.00	450.00	450.00	450.00	83.33
Work content (Min)	334.54	276.46	377.62	334.45	330.77	61.25
Movement (A)	9.51	13.73	28.53	20.82	18.15	3.36
Body Motion (B)	0.14	0.14	2.22	2.10	1.15	0.21
Grasping (G)	0.85	0.89	2.7	2.34	1.70	0.31
Placement (P)	5.91	1.23	4.4	3.99	3.88	0.72
Move controlled (M)	0.64	0.64	2.11	1.93	1.33	0.25
Process Time (X)	0.00	0	0.00	0.00	0.00	0.00
Alignment (I)	3.08	3.08	9.30	8.63	6.02	1.12
Clocked Activities	33.01	49.68	41.00	53.57	44.32	8.21
Tool Use (T)	53.09	46.93	43.01	34.26	44.32	8.21

Fig.5 Final table of Activities

From the above table, we can distinctly see that the percentage for effective working time is 61.25%. The above MOST analysis we arrange in the pie chart. It shows the total work contains by MOST analysis. And it is average work contain all scientist did. The chart is given below

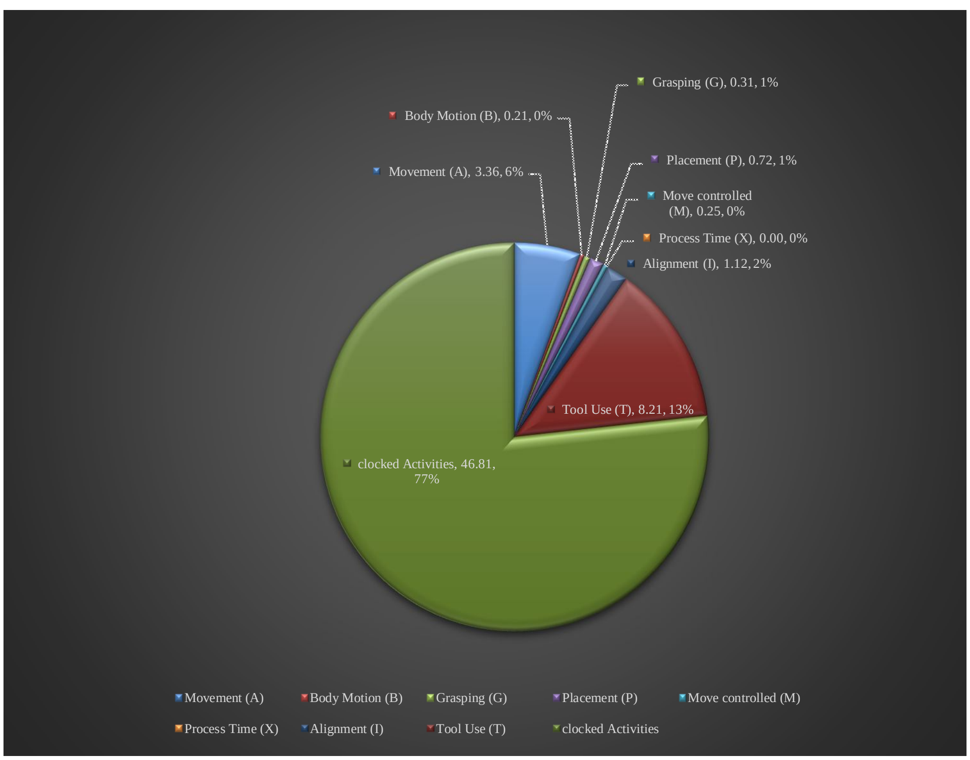


Chart.3 Pie Chart of Average Work Content

C. Case Study-2

MOST was designed to be much efficient than conventional work measurement techniques such as time study. Through this method, the standardized gauging and motion time are allocated using the Basic MOST. In that study Author doing the MOST Method study. And doing all analysis and calculation

	Particulars / Analyst	Aakash Barik	Vijay Deshmukh	Nikhil Shinde	Seema Jadhav	Mahesh Dare	Ajay Kankate	Revansiddha Batwal	sunil mahindrakar	Ganesh Bhakre
Genral Information	Department	Wet lab	Wet lab	GC lab	Wet lab	Wet lab	GC lab	GC LAB	GC LAB	HPLC LAB
	Designation	Sci-1	Sci-2	Sci-1	Sci-2	Sci-2	Sci-1	Sci-2	Sci-1	Sci-1
	Shift	Genral	Genral	B Shift	B shift	B shift	B shift	B shift	Night shift	Night Shift
Shift Information	Shift Time (Min)	540.00	540.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00
	Breaks (Min)	90.00	60.00	60.00	60.00	80.00	60.00	60.00	30.00	30.00
	Effective Working Time (Min)	450.00	480.00	420.00	420.00	400.00	420.00	420.00	450.00	450.00
MOST Analysis	Work content (Min)	313.29	353.10	325.11	316.72	306.32	359.66	296.90	377.14	380.25
	Movement (A)	26.45	46.85	30.31	35.57	29.93	36.19	36.19	20.82	19.12
	Body Motion (B)	2.74	3.64	3.55	1.93	9.20	7.31	7.31	2.19	3.53
	Grasping (G)	8.99	4.64	4.94	4.71	11.23	3.87	3.87	5.10	4.68
	Placement (P)	11.92	2.52	3.94	7.90	15.30	1.66	1.66	8.30	4.82
	Move controlled (M)	8.08	3.24	20.15	14.83	3.13	3.69	3.69	3.88	3.77
	Process Time (X)	14.83	33.30	10.63	8.90	71.13	10.84	10.84	5.96	14.10
	Alignment (I)	5.38	2.34	0.22	0.23	15.36	1.98	1.98	1.48	1.19
	Tool Use (T)	78.52	9.20	32.30	64.04	76.76	39.31	39.31	83.94	98.38
	Clocked Activity ©	151.57	205.54	204.58	139.34	73.75	252.63	252.63	208.11	210.37
	Compoter work	131.13	86.530	184.10	115.20	58.85	220.86	210.33	182.11	191.73
	Discussion	12.46	67.904	20.47	20.52	11.70	19.21	8.94	22.72	11.06
	Phone call	7.97	21.88	5.65	3.60	3.20	12.56	4.00	3.27	7.56
shift Analysis	Time Wasted	136.71	126.90	94.89	103.28	93.68	60.34	107.98	72.10	69.75
	% Time wasted (of shift time)	41.99	34.61	32.27	34.02	35.76	25.69	39.17	21.27	20.78
	% Time wasted (of Effective working time)	25.32	26.44	19.77	21.52	23.42	14.37	25.41	15.02	14.53

Fig.6 MOST Analysis

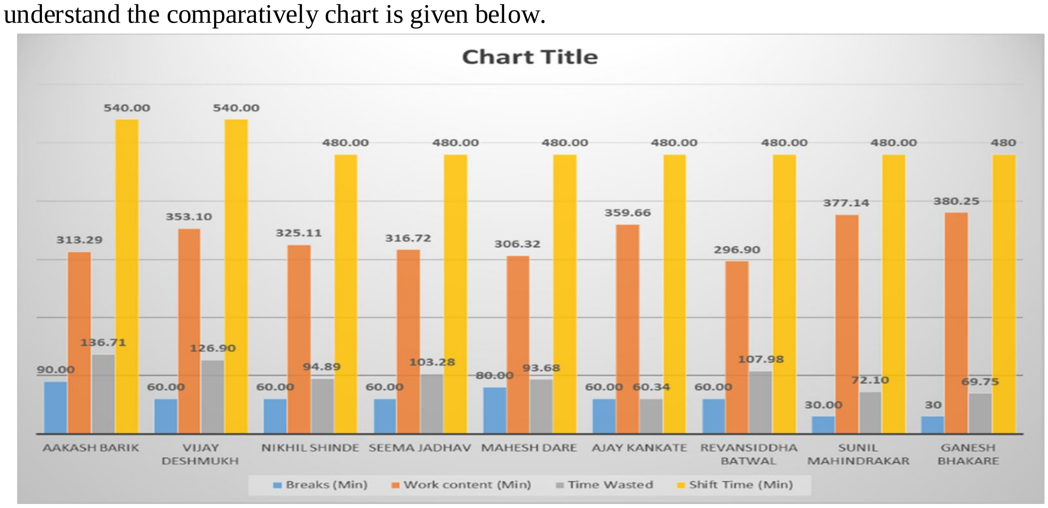
The above figure explain MOST Techniques used to measure the time and motion of shift process, there are mainly four-category such as general information, shift information, most analysis, shift analysis

We have to collect a total of nine samples of the scientist as different shift wise as well different designation. We are focusing on MOST analysis, and we have doing sub-categories, i.e. in detail, i.e. Movement(A), Body Motion(B), Grasping(G), Placement(P), Move Controlled(M), Process Time(X), Alignment(I), Tool Use(T), Clocked Activity and Time Wasted. In clocked activity, we have included three sub-categories, i.e. computer work, discussion and phone call so, we are taken only major activities to understand the MOST through different charts:

	Aakash Barik	Vijay Deshmukh	Nikhil Shinde	Seema Jadhav	Mahesh Dare	Ajay Kankate	Revansiddha Batwal	Sunil Mahindrakar	Ganesh Bhakare
Breaks (Min)	90.00	60.00	60.00	60.00	80.00	60.00	60.00	30.00	30
Work content (Min)	313.29	353.10	325.11	316.72	306.32	359.66	296.90	377.14	380.25
Time Wasted	136.71	126.90	94.89	103.28	93.68	60.34	107.98	72.10	69.75
Shift Time (Min)	540.00	540.00	480.00	480.00	480.00	480.00	480.00	480.00	480

Fig.7 MOST Summary

In above table show, the MOST summary is a result of the study we have got work to contain, and it is the purpose of the study. To compare and understand the comparatively chart is given below.



International Journal for Research in Applied Science & Engineering Technology (IJRASET)
ISSN: 2321-9653; IC Value: 45.98; SJ Impact Factor: 7.429
Volume 9 Issue V May 2021- Available at www.ijraset.com

Chart.4 MOST Summary

For the average value of work contains, we have calculated the average study; they are given below in fig.4.3.3.

	Average
Breaks (Min)	58.89
Work content (Min)	336.50
Time Wasted	96.18
Shift Time (Min)	493.33

Fig.8 MOST Average Summary

The average of work content and time wasted is shown above in the table, and for a simple way of understanding, the chart is shown below:

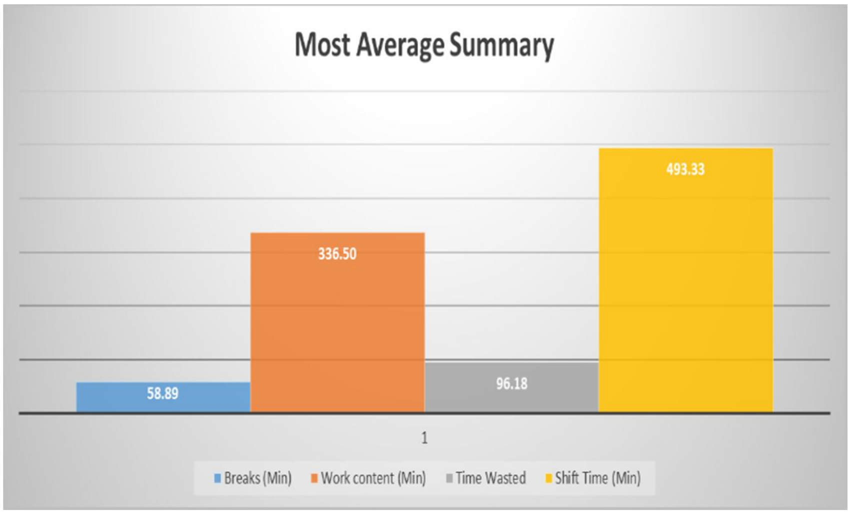


Fig.5 MOST Average Summary

The final step is to determine the percentage and average value of each activity for a better understanding of each step. Also, we understand the average time taken for each action like Movement, Placement, Grasping, Etc. The final table of activities and its graph is shown below:

	Perticulars / Analyst	Aakash Barik	Vijay Deshmukh	Nikhil Shinde	Seema Jadhav	Mahesh Dare	Ajay Kankate	Revansiddha Batwal	sunil mahindrakar	Ganesh Bhakre	Average
Genral Information	Department	Wet lab	Wet lab	GC lab	Wet lab	Wet lab	GC lab	GC LAB	GC LAB	HPLC LAB	
	Designation	Sci-1	Sci-2	Sci-1	Sci-2	Sci-2	Sci-1	Sci-2	Sci-1	Sci-1	
	Shift	Genral	Genral	B Shift	B shift	B shift	B shift	B shift	Night shift	Night Shift	
Shift Information	Shift Time (Min)	540.00	540.00	480.00	480.00	480.00	480.00	480.00	480.00	480.00	493.33
	Breaks (Min)	90.00	60.00	60.00	60.00	80.00	60.00	60.00	30.00	30.00	58.89
	Effective Working Time (Min)	450.00	480.00	420.00	420.00	400.00	420.00	420.00	450.00	450.00	434.44
MOST Analysis	Work content (Min)	313.29	353.10	325.11	316.72	306.32	359.66	296.90	377.14	380.25	336.50
	Movement (A)	26.45	46.85	30.31	35.57	29.93	36.19	36.19	20.82	19.12	31.27
	Body Motion (B)	2.74	3.64	3.55	1.93	9.20	7.31	7.31	2.19	3.53	4.60
	Grasping (G)	8.99	4.64	4.94	4.71	11.23	3.87	3.87	5.10	4.68	5.78
	Placement (P)	11.92	2.52	3.94	7.90	15.30	1.66	1.66	8.30	4.82	6.45
	Move controlled (M)	8.08	3.24	20.15	14.83	3.13	3.69	3.69	3.88	3.77	7.16
	Process Time (X)	14.83	33.30	10.63	8.90	71.13	10.84	10.84	5.96	14.10	20.06
	Alignment (I)	5.38	2.34	0.22	0.23	15.36	1.98	1.98	1.48	1.19	3.35
	Tool Use (T)	78.52	9.20	32.30	64.04	76.76	39.31	39.31	83.94	98.38	57.97
	Clocked Activity ©	151.57	205.54	204.58	139.34	73.75	252.63	252.63	208.11	210.37	188.72
	Compoter work	131.13	86.530	184.10	115.20	58.85	220.86	210.33	182.11	191.73	153.43
	Discussion	12.46	67.904	20.47	20.52	11.70	19.21	8.94	22.72	11.06	21.66
	Phone call	7.97	21.88	5.65	3.60	3.20	12.56	4.00	3.27	7.56	7.74
shift Analysis	Time Wasted	136.71	126.90	94.89	103.28	93.68	60.34	107.98	72.10	69.75	96.18
	% Time wasted (of shift time)	41.99	34.61	32.27	34.02	35.76	25.69	39.17	21.27	20.78	31.73
	% Time wasted (of Effective working time)	25.32	26.44	19.77	21.52	23.42	14.37	25.41	15.02	14.53	20.64

Fig.9 The final table of Activities

The above MOST analysis we arrange in the pie chart. It shows the total work contains by MOST analysis. And it is average work contain all scientist did. From the above table, we can distinctly see that the percentage for adequate working time is 77.45 %. The chart is given below

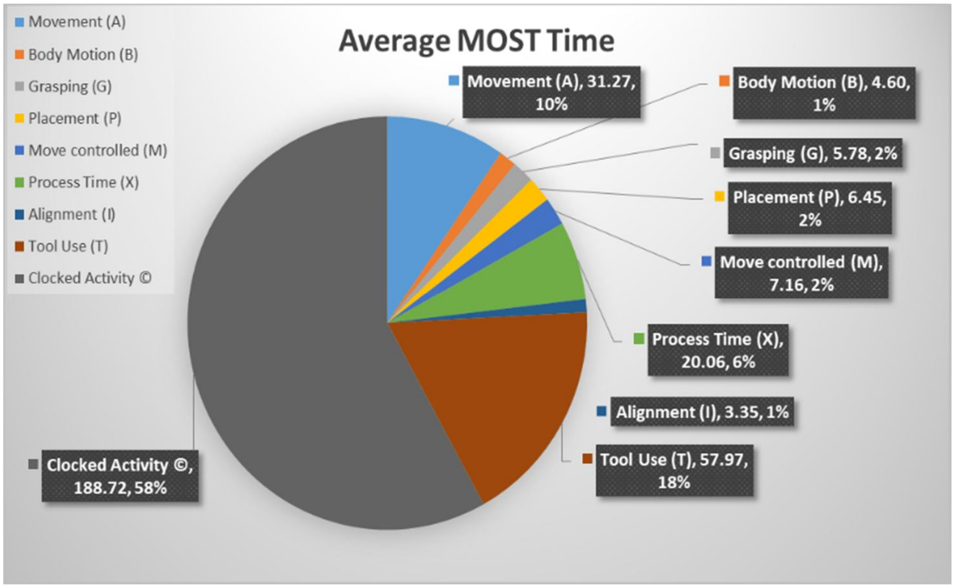


Chart.6 Pie Chart of Average work contain

VI. CONCLUSION

It is conspicuous that to sustain in this competitive industrial environment, a company needs to reduce idle and downtime, improve the working methods, standardize the time, and upgrade the overall capacity planning, and in this respect, the MOST can play a vital role.

In this Research, a possible way of improving productivity with the help of MOST analysis. Before applying the MOST technique in a company doesn't know about their efficiency of employees. After the MOST application, they knew about the efficiency of employees, after giving them a suggestion for what are the causes behind them.

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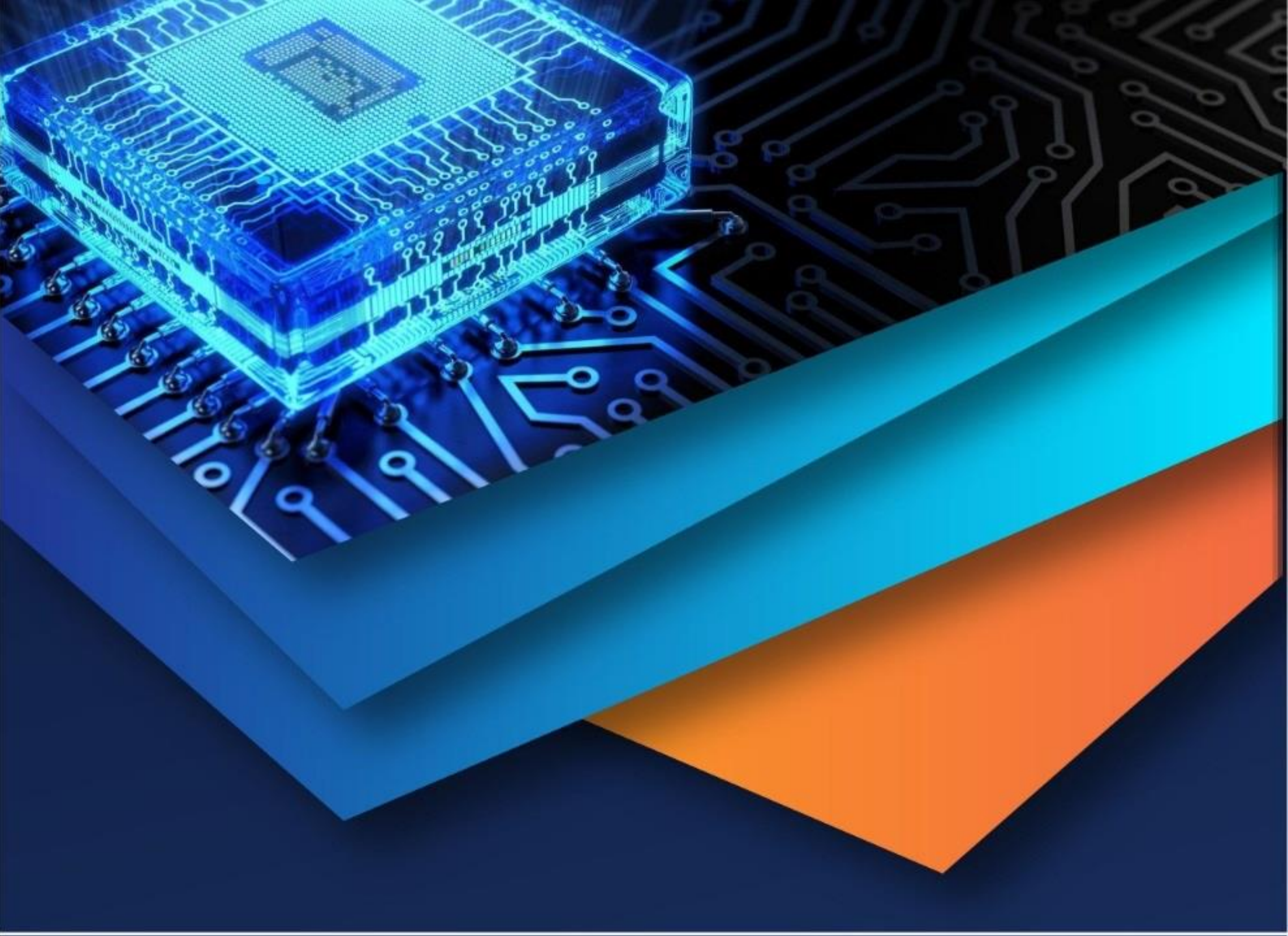

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