Application of Maynard Operation Sequence Technique (M.O.S.T) at Tata Motors and Adithya Automotive Application Pvt Ltd. Lucknow for Enhancement of Productivity-A Case Study

By Mr. Ankit Mishra, Mr. Vivek Agnihotri & Prof. D. V. Mahindru

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Abstract- There are millions of jobs and everyone feels that his/her job is unique to them, their product and finally to their organization. But the fact remains that all the jobs are just combinations of 19 basic motions that are used to perform any task. The productivity is key to survival of any organizations and hence profitability. The productivity is defined as "Optimum Utilization of Available Resources". To achieve productivity of the highest order, The consumption of all the resources viz Men, Material, Machine, Money and Methodology" have to be optimized. There are primarily three methods of determining the "Standard Time" in which a worker should perform a task:

i) Maynard Operation Sequence Technique (M.O.S.T) is a predetermined motion time system that is used primarily in industrial settings to get the standard time in which a worker should perform a task.

ii) Time Study is a traditional Work Measurement technique which is involved to calculate the time of the operation in an assembly line with the help of instrument (Stopwatch).

iii) Taylorism, System of scientific management advocated by Fred W. Taylor. In Taylor's view, the task of factory management was to determine the best way for the worker to do the job, to provide the proper tools and training, and to provide incentives for good performance. He broke each job down into its individual motions, analyzed these to determine which were essential, and timed the workers with a stopwatch. With unnecessary motion eliminated, the worker, following a machinelike routine, became far more productive.

GJRE-B Classification : *FOR Code: 090299*

APPLICATIONOFMAYNARDOPERATIONSEQUENCETECHNIQUEM.O.S.TATTATAMOTORSANDADITHYAAUTOMOTIVEAPPLICATIONPVTLTDLUCKNOWFORENHANCEMENTOFPRODUCTIVITYACASESTUDY

Strictly as per the compliance and regulations of :

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In the present work, comparative case study of the "M.O.S.T." and "Traditional Time Study" was carried out for Fitment of particular parts at M/S Adithya Automotive Application Pvt Ltd. Lucknow and Assembly Line-3 at Tata Motors Ltd, Lucknow and there was appreciable decrease in time taken by M.O.S.T. in accomplishment of task in both the cases.

A total decrease of 16.8% was observed in M/S Adithya Automotive Application Pvt Ltd. Lucknow and 32.2% in Assembly Line-3 at Tata Motors Ltd, Lucknow with the application of M.O.S.T.as compared of Traditional Time Study.

From the above analysis, it is concluded that M.O.S.T Study has a clear advantage over the traditional time Study and higher productivity can be achieved by application of M.O.S.T.

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I. INTRODUCTION

a) M.O.S.T

Maynard Operation Sequence Technique (M.O.S.T) is a predetermined motion time system that is used primarily in industrial settings to get the standard time in which a worker should perform a task. M.O.S.T is probably the fastest and most effective work evaluation technique available. The objective of M.O.S.T. is to quantify work content by evaluating it in terms of what all work involves - the movement of objects. For example securing a nut with a spanner, typing, opening a drawer, writing with a pen. It 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. M.O.S.T. is a powerful tool because it uses a structured approach, it develops structured data; it is a progressive technique. The technique is thoroughly proven, highly respected and used around the world. It makes the analysis of work a practical, manageable and cost effective task.

b) Time Study

i. Definition

Time Study is a Work Measurement technique which is involved to calculate the time of the operation in an assembly line with a help of instrument (Stopwatch). It is also known as method for establishing employee productivity standards in which:

- a complex task is broken into small, simple steps,

- the sequence of movements taken by the employee in performing those steps is carefully observed to detect and eliminate redundant or wasteful motion, and

- precise time taken for each correct movement is measured.

From these measurements production and delivery times and prices can be computed and incentive schemes can be devised. Generally appropriate only for repetitive tasks, time and motion studies were pioneered by the US industrial engineer

Frederick Winslow Taylor (1856-1915) and developed by the husband and wife team of Frank Gilbreth (1868-1924) and Dr. *Lillian Gilbreth (1878-1972).*

ii. *Taylorism*

Taylorism, System of scientific management advocated by *Fred W. Taylor.* In Taylor's view, the task of factory management was to determine the best way for the worker to do the job, to provide the proper tools and training, and to provide incentives for good performance. He broke each job down into its individual motions, analyzed these to determine which were essential, and timed the workers with a stopwatch. With unnecessary motion eliminated, the worker, following a machinelike routine, became far more productive.

In the present work, comparative case study of the **"M.O.S.T." and "Traditional Time Study"** was carried out for Fitment of particular parts at M/S Adithya Automotive Application Pvt Ltd. Lucknow and Assembly Line-3 at Tata Motors Ltd, Lucknow and there was appreciable decrease in time taken by M.O.S.T. in accomplishment of task in both the cases.

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II. DESCRIPTION

a) *Work Centres*

i. M/S Adithya Automotive Application (AAA Pvt Ltd.) Pvt Ltd. Lucknow.

ii. Assembly Line-3 at Tata Motors Ltd, Lucknow.

Adithya Automotives Application Pvt Ltd.

b) *About Aaa Pvt Ltd Lucknow*

Adithya Automotives Application Pvt Ltd. is a joint venture of Tata Motors Adithya Automotives Application Pvt Ltd engaged in production of Tipper bodies under it and has been working for the last 5 years.

Fitments Studied under the Plant are:

i. Oil Hanger bracket fitment

ii. Oil hose pipe fitment

iii. Wiring harness clamping

i. *Study*

After Studying the Fitment and video it was found that Actual and theoretical values of work content were as follows (Refer attachments Aditya-1 and Aditya-2).:

MOST ESTIMATION SHEET

			PSD	DELMIA
PLANT -	Adhitya Automotives Pvt. Ltd , Lucknow	SHOP -		LINE -
MODEL NAME -	LPS 3518 (Tipper Body)	CYCLE CONTENT(SEC) 626.00 / WORK CONTENT(SEC) 626.60		DOCUMENT NUMBER -
VEHICLE CODE -		DOCUMENT OWNER - ANKIT KR. MISHRA		DATE - 7/4/2014

Operation	Datacard Number/Activity number	Sub Operations / Elements Description	MOST sequence	Freq.	Divide Freq.	Men	Off-Line/On-Line	Cycle Time (SEC)	Work Content (SEC)
Fitment - S/A Of Oil Hanger Bkt									
S/A of Oil Hanger Bkt (New Process)	New Process	S/A of Oil Hanger bkt						81.00	81.00
	1	Move 3-4 steps, bend Arise 50% occ,grasp bkt,put on table	G A6 B3 G1 A1 B0 P1 A0	1.00	1.00	1	1	6.00	6.00
	2	move 3-4 steps, bend and arise 50%(occ.),grasp rubber tube	T A6 B3 G1 A0 B0 P0 A0	1.00	1.00	1	1	10.00	10.00
	3	return 3-4 steps, disengage cover by 3 times push pull	C A6 B0 G3 M3 X0 I0 A0 (31 3)	1.00	1.00	1	1	18.00	18.00
	4	move within reach, disengage both rubber tube ,put one another tube at the table	G A1 B0 G3 A1 B0 P1 A0	1.00	1.00	1	1	6.00	6.00
	5	move within reach ,bend & arise 50%occ., grasp the oil tank hanger bkt,place the tube at the bkt with	G A1 B3 G1 A1 B0 P3 A0	2.00	1.00	1	1	18.00	18.00
	6	move within reach ,grasp the rubber tubes ,adjust it at the bkt by 20 times push-pull	G A1 B0 G1 M3 X0 I0 A0 (28)	2.00	1.00	1	1	172.00	172.00
	7	move 1-2 steps ,bend & arise 50%occ. ,putr the bkt at the table ,return 3-4 steps	G A0 B0 G0 A3 B3 P1 A6	1.00	1.00	1	1	13.00	13.00
Fitment - Hose Pipe Fitment									
Hose Pipe Fitment (New Process)	New Process	Hose pipe fitment						72.30	72.30
	1	Move 8-10 steps, bend & arise 50% occ.,grasp hose pipe,return 8-10 steps ,place its one end at the oil	G A16 B3 G1 A16 B0 P3 A0	1.00	1.00	1	1	39.00	39.00
	2	move within reach,grasp the nut of the hose pipe tight it by 20 wristy action	T A1 B0 G1 A1 B0 P0 A0 F42 A0 B0 P0 A0	1.00	1.00	1	1	45.00	45.00
	3	move within reach,bend & arise 50% occ.,grasp the second end of hose pipe place it in tipping	G A1 B3 G1 A1 B0 P3 F42 A0 B0 P0 A0	1.00	1.00	1	1	51.00	51.00
	4	move 5-7 steps ,bend & arise 50%occ,grasp the wrench,return 5-7 steps.	G A10 B3 G1 A10 B0 P0 A0	1.00	1.00	1	1	24.00	24.00
	5	move within reach ,place wrench at the nut of hose pipe,tight it by 8 wrist action	G A1 B0 G0 A1 B0 P3 F24 A0 B0 P0 A0	2.00	1.00	1	1	58.00	58.00
Fitment - Wiring Harnness Clamping									
Wiring Harness Clamping (New Process)	New Process	Wiring harness Clamping						473.30	473.30
	1	Move 8-10 steps,bend & arise 50%occ., grasp the 20 clamps, put it at the tool box	G A16 B3 G1 A1 B0 P1 A0 (20) (20)	1.00	1.00	1	1	60.00	60.00
	2	return 8-10 steps,bend & arise 50%occ. ,put the tool box at ground	C A0 B0 G0 A16 B3 P1 A0	2.00	1.00	1	1	19.00	19.00
	3	move 1-2 steps , bend & arise 50%occ.,grasp a clamp,place it around the wiring harness with	C A3 B3 G1 A1 B0 P3 A0	20.00	1.00	1	1	220.00	220.00
	4	move within reach,bend & arise 50% occ.,grasp the bolt,place it at the bkt with adjustment	G A1 B3 G1 A1 B0 P3 A0	20.00	1.00	1	1	180.00	180.00
	5	move within reach,bend &arise 50%occ.,grasp a plain washer &nut,place it at the bolt with	G A1 B3 G1 A1 B0 P3 A0 (2) (2)	20.00	1.00	1	1	260.00	260.00
	6	move within reach ,grasp the nut ,tight the nut by 8 finger spins.	C A1 B0 G1 A1 B0 P0 F10 A0 B0 P0 A0	20.00	1.00	1	1	260.00	260.00
	7	move 8-10 steps ,get the nut runner & socket return 8-10 steps,bend &arise 50%occ. ,place the socket at	G A3 B6 G3 A3 B6 P3 A0	1.00	1.00	1	1	44.00	44.00
	8	Move 1-2 steps, Bend & arise 50%occ., align nut runner at one nut if the clamp with >12 inch	G A16 B0 G3 A16 B3 P3 A0 (2)	20.00	1.00	1	1	240.00	240.00
	9	tight the nut by nut runner (process time 5sec each)	G FRQ. PTUSEC5 SIMO	20.00	1.00	1	1	100.00	100.00
	10	move 8-10 steps , disengage socket from nut runner,put it at the table ,return 8-10 steps	G A16 B0 G3 A1 B0 P1 A16 (2)	1.00	1.00	1	1	37.00	37.00

Adithya Automotives Application Pvt. Ltd.		
FITMENT NAME	ACTUAL VALUE (By Time Study) (secs)	THEORETICAL VALUE (By M.O.S.T) (secs)
Sub-assembly oil tank Hanger bkt.	109	81
Hose pipe fitment	81.2	72.3
Wiring harness clamping	563	473

Thus It was found that M.O.S.T Study at Adithya Automotives Applications was much accurate and it was being validated by shop owner.

Total Work Content By Most Study Was 626 Secs.

Total Work Contet By Time Study Was 753.2 Secs.

The data was physically taken and was validated by the employees directly involved in the production shop.

III. CONCLUSION

This Clearly shows that Work content calculation by M.O.S.T Study has a clear difference from work content of time Study. According to which the production can be better judged by M.O.S.T study and higher production rate can be achieved.

*The Values of Work Content Can be Seen From Appendix

a) Result

The total decrease in time by M.O.S.T study is

$$= \frac{753.2 - 626}{753.2} \times 100$$

$$= 16.8\ \%$$

This Shows that the M.O.S.T study is the best study to be implemented for calculation of Work content. As, it Optimizes time which is required in assembling of parts and thus enhancing productivity.
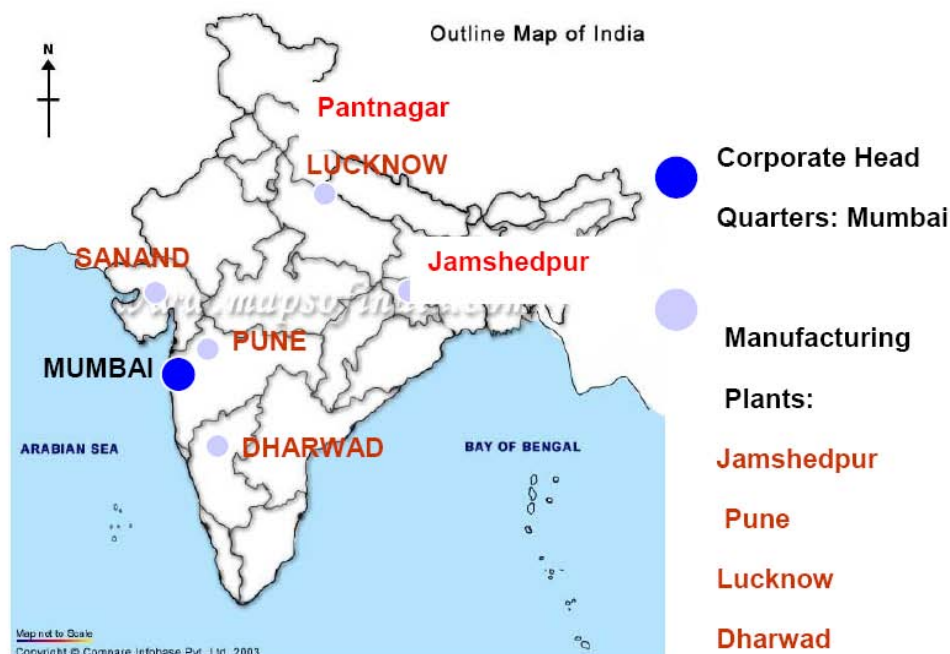
We saved total 127.2 secs, Saving time and hence Saving Money. This finally leading to new method to improve our production. So, for the best result we must use M.O.S.T.

IV. TATA MOTORS

a) About The Tata

Established in 1945, Tata Motors is India's largest and only fully integrated automobile company.

Locations

- *Infrastructure*

In light of Company's aggressive growth plans, it is currently in expansion phase and production at Lucknow would grow many-fold in near future. The expansion shall be in there as of painting, welding, vehicle assembly & testing and utility services, driven by latest technology.

i. *Assembly Unit*

Lucknow Plant started with the assembly of Medium Commercial Vehicles (MCVs) to meet the demand in the Northern Indian market. However, in 1995, the unit started manufacturing bus chassis of Light Commercial Vehicles (LCVs) and SUMOs. The facilities for manufacturing the spare parts were set up and started supply of Crown wheel & pinion (CWP) in 1994. Subsequently, G-16 & G-18 Gear Parts started in 1998. With the availability of G-16 gear parts manufacturing facility, the Plant also started assembly of G-16 Gear Box to meet in-house requirement for SUMO vehicles in the year 2000.Now TATA Motors Lucknow has started assembling of CNG MCV`s to meet the consumers demand. TATA Motors is also producing Rear Engine CV`s.
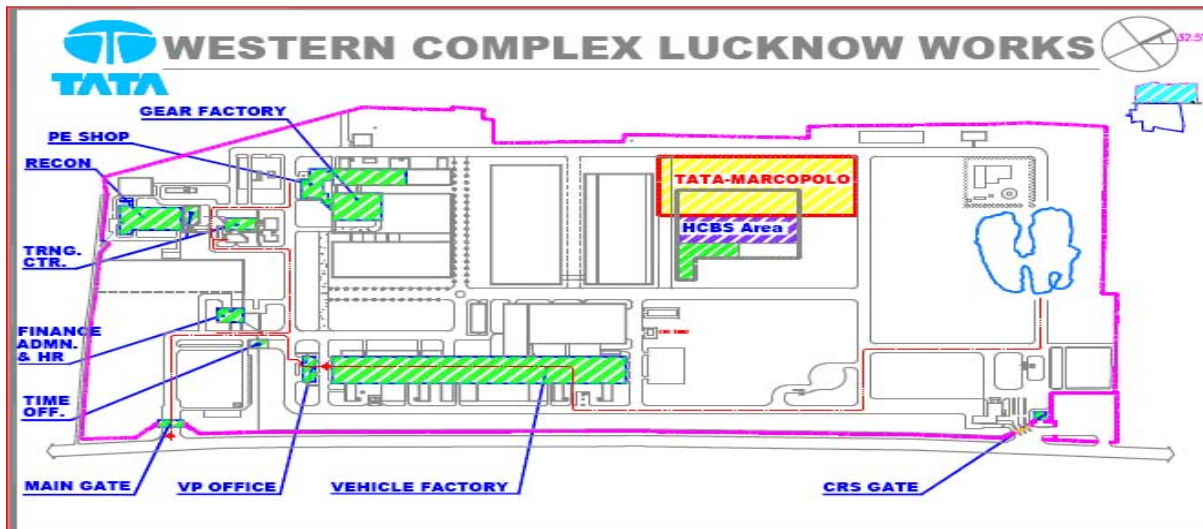
ii. *Study (Refer attachments Tata Motor-1 and Tata Motors 2).:*

Fitment - AIR TANK MTG BKT (Station - 1)

Fitment of Air tank Mtg Bkt (LH side) (New Process)

#	Element	Method	MOST Sequence																		Freq				Time	
New Process	**Procurement of Air tank Mtg Bkt.**																									**0.30**	**0.30**
1	Move 8-10 steps, Collect 2 bkt, Move 8-10 steps, Bend	G / FRQ. / SIMO	A 16	B 0	G 3 (2)	A 16	B 3 (2)	P 3 (2)	A 0													1.00	1.00	1	1	0.30	0.30
New Process	**Loose fitment of Air tank Mtg Bkt**																									**1.63**	**1.63**
1	Bend 50% occ, Grasp 3 bolts	G / FRQ. / SIMO	A 1	B 3	G 1 (3)	A 0	B 0	P 0	A 0													1.00	1.00	1	1	0.04	0.04
2	Bend 50% occ, Get Bkt, Place the three bolts on bkt	G / FRQ. / SIMO	A 1	B 3	G 3	A 1	B 0	P 3 (3)	A 0													1.00	1.00	1	1	0.10	0.10
3	Bend 50% occ, Place the bkt on frame with	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													1.00	1.00	1	1	0.07	0.07
4	Bend 50% occ, collect 3 washers, place them on bolts	G / FRQ. / SIMO	A 1	B 3	G 3 (3)	A 1	B 3	P 3 (3)	A 0													1.00	1.00	1	1	0.16	0.16
5	Bend 50% occ, Collect nut from tool box, Position	T / FRQ. / SIMO	A 1	B 3	G 3	A 1	B 0	P 6 (2)	A 0	F 10	A 0	B 0	P 0	A 0					3.00	1.00	1	1	0.54	0.54
6	Bend 50% occ, grasp three bolts and get the bkt.	G / FRQ. / SIMO	A 1	B 3	G 3 (2)	A 1	B 0	P 3 (3)	A 0													1.00	1.00	1	1	0.12	0.12
7	Bend 50% occ, Place bkt on frame with precision.	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													1.00	1.00	1	1	0.07	0.07
8	Bend 50% occ, Collect 3 nuts & 3 washers from tool	T / FRQ. / SIMO	A 1	B 3 (6)	G 3 (6)	A 0	B 0	P 6 (3)	A 1 (3)	F 10 (3)	A 0	B 0	P 0	A 0					1.00	1.00	1	1	0.53	0.53
New Process	**Tightening of Air tank Mtg Bkt.**																									**1.42**	**1.42**
1	Move 8-10 steps, Get runner & socket, Move 8-10	G / FRQ. / SIMO	A 16	B 0	G 3 (2)	A 16	B 0	P 3	A 0													1.00	1.00	1	1	0.25	0.25
2	Bend 50% occ, Position runner on nut	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													3.00	1.00	1	1	0.22	0.22
3	Tightening process 6 sec	Proc. Time (TMU)	166.6666667																			3.00	1.00	1	1	0.30	0.30
4	Bend 50% occ, Position runner on nut	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													3.00	1.00	1	1	0.22	0.22
5	Tightening process 6 sec	Proc. Time (TMU)	166.6666667																			3.00	1.00	1	1	0.30	0.30
6	Move 8-10 steps, Disengage socket from runner, Put	G / FRQ. / SIMO	A 1	B 0	G 3	A 16	B 0	P 3	A 0													1.00	1.00	1	1	0.14	0.14

Fit of Air tank Mtg. Bkt RH Side (New Process)

#	Element	Method	MOST Sequence																		Freq				Time	
New Process	**Procurement of Air tank Mtg Bkt.**																									**0.30**	**0.30**
1	Move 8-10 steps, Collect 2 bkt, Move 8-10 steps, Bend	G / FRQ. / SIMO	A 16	B 0	G 3 (2)	A 16	B 3 (2)	P 3 (2)	A 0													1.00	1.00	1	1	0.30	0.30
New Process	**Loose fitment of Air tank Mtg Bkt**																									**1.63**	**1.63**
1	Bend 50% occ, Grasp 3 bolts	G / FRQ. / SIMO	A 1	B 3	G 1 (3)	A 0	B 0	P 0	A 0													1.00	1.00	1	1	0.04	0.04
2	Bend 50% occ, Get Bkt, Place the three bolts on bkt	G / FRQ. / SIMO	A 1	B 3	G 3	A 1	B 0	P 3 (3)	A 0													1.00	1.00	1	1	0.10	0.10
3	Bend 50% occ, Place the bkt on frame with	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													1.00	1.00	1	1	0.07	0.07
4	Bend 50% occ, collect 3 washers, place them on bolts	G / FRQ. / SIMO	A 1	B 3	G 3 (3)	A 1	B 3	P 3 (3)	A 0													1.00	1.00	1	1	0.16	0.16
5	Bend 50% occ, Collect nut from tool box, Position	T / FRQ. / SIMO	A 1	B 3	G 3	A 1	B 0	P 6 (2)	A 0	F 10	A 0	B 0	P 0	A 0					3.00	1.00	1	1	0.54	0.54
6	Bend 50% occ, grasp three bolts and get the bkt.	G / FRQ. / SIMO	A 1	B 3	G 3 (2)	A 1	B 0	P 3 (3)	A 0													1.00	1.00	1	1	0.12	0.12
7	Bend 50% occ, Place bkt on frame with precision.	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													1.00	1.00	1	1	0.07	0.07
8	Bend 50% occ, Collect 3 nuts & 3 washers from tool	T / FRQ. / SIMO	A 1	B 3 (6)	G 3 (6)	A 0	B 0	P 6 (3)	A 1 (3)	F 10 (3)	A 0	B 0	P 0	A 0					1.00	1.00	1	1	0.53	0.53
New Process	**Tightening of Air tank Mtg Bkt.**																									**1.42**	**1.42**
1	Move 8-10 steps, Get runner & socket, Move 8-10	G / FRQ. / SIMO	A 16	B 0	G 3 (2)	A 16	B 0	P 3	A 0													1.00	1.00	1	1	0.25	0.25
2	Bend 50% occ, Position runner on nut	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													3.00	1.00	1	1	0.22	0.22
3	Tightening process 6 sec	Proc. Time (TMU)	166.6666667																			3.00	1.00	1	1	0.30	0.30
4	Bend 50% occ, Position runner on nut	G / FRQ. / SIMO	A 1	B 0	G 1	A 1	B 3	P 6	A 0													3.00	1.00	1	1	0.22	0.22
5	Tightening process 6 sec	Proc. Time (TMU)	166.6666667																			3.00	1.00	1	1	0.30	0.30
6	Move 8-10 steps, Disengage socket from runner, Put	G / FRQ. / SIMO	A 1	B 0	G 3	A 16	B 0	P 3	A 0													1.00	1.00	1	1	0.14	0.14

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Operation	Datacard Number/ Activity number	Sub Operations / Elements Description	Type	MOST Sequence	Freq.	Divide Freq.	Men	Off-Line/ On-Line	Cycle Time (MIN)	Work Content (MIN)
Fitment - S/A OF FUEL TANK MTG BKT (Station - 0)										
S/A of Fuel Tank Mtg Bkt	New Process	Paste anobond on rubber pad							4.34	4.34
	1	MOve 5-7 steps, Grasp 3 rubber pad, Place rubber pad on stand (Wtih adjustment)	G	A 10 B 0 G 1 A 1 B 0 P 3 A 0 (FRQ: 3, 3, 3)	1.00	1.00	1	1	0.15	0.15
	2	Get anobond bucket, drop anobond on rubber pad(6-9steps).	C	A 1 B 0 G 3 M 24 X 0 I 0 A 0	2.00	1.00	1	1	0.34	0.34
	3	grasp brush, Paste anobond (Push/Pull 3-4 Steps)	C	A 1 B 0 G 1 M 10 X 0 I 0 A 0	3.00	1.00	1	1	0.22	0.22
	4	Place brush (lay aside)	G	A 0 B 0 G 0 A 1 B 0 P 1 A 0	1.00	1.00	1	1	0.01	0.01
	5	Grasp rubber pad, Move 1-2 steps, Bend, Place rubber pad on mtg bkt	G	A 1 B 0 G 1 A 3 B 6 P 3 A 0	3.00	1.00	1	1	0.25	0.25
	6	Push pull rubber pad on bkt by hand from pasting (1-2 steps)	C	A 1 B 6 G 1 M 6 X 0 I 0 A 0	3.00	1.00	1	1	0.25	0.25
	7	Move 1-2 steps, Bend, Get supporting bkt, Move 1-2 steps, Bend, Place bkt (with adjustment)	G	A 3 B 6 G 3 A 3 B 6 P 3 A 0	3.00	1.00	1	1	0.43	0.43
	8	Move 16-20 steps, Bend & sit, Grasp bolt, Move 16-20 steps, Bend, Place bolt (with adjustment)	G	A 32 B 16 G 1 A 32 B 6 P 3 A 0 (FRQ: 3, 3, 3)	1.00	1.00	1	1	0.66	0.66
	9	Move 21-26 steps, Grasp locking nut, Move 21-26 steps,	G	A 42 B 0 G 1 A 42 B 0 P 0 A 0 (FRQ: 3)	1.00	1.00	1	1	0.52	0.52
	10	Bend, Place locking nut (with adjustment)	G	A 0 B 0 G 0 A 3 B 6 P 3 A 0	3.00	1.00	1	1	0.22	0.22
	11	Move 1-2 steps, Get plier, Bend & sit, place plier (with adjustment)	G	A 3 B 0 G 3 A 3 B 16 P 3 A 0 (FRQ: 3, 3, 3)	1.00	1.00	1	1	0.43	0.43
	12	Tight nut with 4 times (amr stroke) by plier	T	A 0 B 0 G 0 A 0 B 0 P 0 A 0 F 24 A 0 B 0 P 0 A 0	3.00	1.00	1	1	0.43	0.43
	13	4 taps on nut (for adjusting) (wrist action) by plier	T	A 0 B 0 G 0 A 3 B 10 P 0 A 0 F 6 A 0 B 0 P 0 A 0	3.00	1.00	1	1	0.34	0.34
	14	Stand, Move 1-2 steps, Place plier (lay aside)	G	A 1 B 10 G 0 A 3 B 0 P 1 A 0	1.00	1.00	1	1	0.09	0.09
Fitment - S/A of SILENCER HANGER BKT (Station - 0)										
S/A of Silencer Hanger Bkt (New Process)	New Process	S/A of silencer hanger bkt							1.42	1.42
	1	Move 5-7 steps, bend & sit, Grasp bolt & washer, Place washer in bolt	G	A 10 B 16 G 1 A 1 B 0 P 3 A 0 (FRQ: 2)	1.00	1.00	1	1	0.19	0.19
	2	Move 5-7 steps, collect washer & nut, Move 5-7 steps, Bend & sit, Place washer & nut (with adjustment)	G	A 10 B 0 G 3 A 10 B 16 P 3 A 0 (FRQ: 2)	1.00	1.00	1	1	0.27	0.27
	3	Grasp bkt & rubber gromet, washer, Place bkt, rubber gromet & washer	G	A 1 B 0 G 1 A 1 B 0 P 3 A 0	3.00	1.00	1	1	0.11	0.11
	4	Grasp another bkt, Washer & nut, Place bkt, Wsaher & nut (with adjustment)	G	A 1 B 0 G 1 A 1 B 0 P 3 A 0 (FRQ: 3, 3, 3, 3)	3.00	1.00	1	1	0.32	0.32
	5	Tight nut with 18 -20 finger spins	T	A 0 B 0 G 0 A 1 B 0 P 0 A 0 F 24 A 0 B 0 P 0 A 0	3.00	1.00	1	1	0.45	0.45
	6	Place bkt (aside)	G	A 0 B 0 G 0 A 1 B 0 P 3 A 0	3.00	1.00	1	1	0.07	0.07

TATA MOTORS LIMITED		
FITMENT NAME	ACTUAL VALUE By Time Study (mins)	THEORETICAL VALUE By MOST (mins)
Fuel tank mtg. bkt.	10 .1	4.34
Air tank mtg. bkt.	5.2	3.68
Silencer mtg. bkt.	4.37	5.31

Thus, It was found that M.O.S.T Study at TATA MOTORS LTD, Lko was much accurate and efficient to measure work and it was being validated by shop owner.

Total Work Content by M.O.S.T Study was 13.33 Mins.

Total Work Contet by Time Study was 19.67 Mins.

*The Values of Work Content Can be Seen from Appendix

- Result

The total decrease in time by M.O.S.T study is

$$= \frac{19.67 - 13.33}{19.67} \times 100$$

$$= 32.2\ \%$$

b) *Analysis of Results*

From the above study carried out at M/s Adithya Automotives Application Pvt Ltd. And Tata Motors Lucknow it found that Work content calculation by M.O.S.T Study has a clear difference from work content of time Study.

V. CONCLUSION

This Clearly shows that the standard manhours can be better calculated by the application of M.O.S.T.