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Productivity Enhancement Using Method Study

Sahil Rajendra Bavdhankar[1], Rushikesh Yuvraj Patil[2], Pramod Suresh Patangaray[3]

[1,2,3]U.G. Student, Department of Mechanical Engineering, KIT's College of Engineering, Kolhapur, Maharashtra, India

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Abstract - *This research paper emphasizes on the method study technique and its importance in organization for increasing productivity. Method study helps the organization to achieve competitive edge. The motion analysis was done using two-handed process chart and the new improved way utilizing both hands effectively was identified .This project throws light on the concept that by utilizing the capacity within your organization, you can increase the profit. The capacity was increased from 5928 components to 6200 components by optimum utilization of available resources. This increased the profit of the company by 1,01,728Rs per month.*

Key Words: **Method study, Productivity, Two-Handed Chart, Capacity, Profit, Recording, Optimum**

1. INTRODUCTION :

Work study involves time study and method study. Method study is a very much preferred approach for improving the productivity of any company. Any organization runs for profit so, identifying the improvements and implementing it at the lowest cost possible is very important. Any method of doing the work which will improve the quality of the product or reduce the cycle time will place the organization to another level. To achieve competitive edge, it is necessary to evolve continuously and improve the quality of the product at the same cost or reduce the cost for same quality. Many parameters hamper the quality of the final product being produced. Proper and critical analyses of the parameters which are increasing the cycle time, reducing the quality of product should be done. All the non-value added activities can be eliminated by innovation of new techniques. Many organizations are lagging behind because of not following proper methodology for quality control and reducing rejection rate. The organization can excel and earn more profit by making the loading and unloading time to zero and thus enhancing the capacity of the particular organization. Capacity can be enhanced by using the available resources within the organization effectively .There are numerous factors which affect productivity like economic, human. Human factors affect largely, so it is necessary to design the work system such that it will be comfortable for human and will result in minimal fatigue of an employee. Many people need to study and understand the principles of motion economy and thus apply those principles which will lead to smooth flow of materials within different work centers and it will eliminate the delays between the different operations

The method study technique helps to achieve all the factors affecting the productivity and make you understand the root cause for your problem easily.

1.1 Problem Identification:

The monthly order for the company to machine the components is 6000. Operations 10 , 20, 30 to machine the component on both the sides are carried out separately on two VMC machines . This reduces the number of components machined as well as it leads to increase in cycle time. This method of doing the work leads to underutilization of available resources within the organization.

Fig.1 Engine Bracket (Top view)

Fig.2 Engine Bracket (Bottom view)

1.2 Objectives :

1. To study the existing method of doing the work.
2. To understand why this method is only employed for doing the work.
3. To understand and implement possible alternative.
4. To improve the productivity of organization by developing and installing improved method of doing work.
5. To increase the profit of the organization by optimum utilization of available resources.

1.3 Future Scope :

6. To eliminate the non-value added activities.
1. To simplify the operations.
1. To make the effective utilization of men ,material and equipment's.

2. Method Study :

The main aim of doing method study is to study and understand the existing method of doing the work and developing more efficient and effective method leading to more profit , reduced cycle time , minimal material handling , improved workplace design , better working conditions ,lesser worker fatigue.

The method study technique involves following steps:

1. Selection of job :

As any activity demands the human effort , time as well as money , so one should be thoughtful before selecting any job for method analysis. Selection of proper job will give higher profit to organization and the time and efforts invested by the workers will be justified.

2. Recording Techniques :

Table 1. TWO HANDED CHART (BEFORE) :

Description	Symbol	Symbol	Description
IDLE	D	⇨	Reach for the cast component
IDLE	D	○	Grasp the component
IDLE	D	⇨	Reach to fixture
IDLE	D	○	Place it on the fixture
Hold the cast component	▽	⇨	Reach for the spanner
IDLE	D	○	Grasp the spanner
IDLE	D	⇨	Carry to fixture
IDLE	D	○	Tighten the component to the fixture
IDLE	D	⇨	Spanner to table

Table 2. Summary :

Symbol	⇨	○	▽
Frequency (LEFT HAND)	5	4	-
Frequency(RIGHT HAND)	-	-	1

Table 3. TWO HANDED CHART (AFTER) :

Description	Symbol	Symbol	Description
Reach for spanner	⇨	⇨	Reach for the cast component
Grasp the spanner	○	○	Grasp the component
To machine	⇨	⇨	Carry the cast component
Hold the spanner	▽	○	Place the component to fixture
Transfer the spanner to right hand	⇨	○	Grasp the spanner
Hold the component	▽	○	Tighten the component using spanner to the fixture
		⇨	Spanner to table

Table 4. Summary :

Symbol	⇨	○	▽
Frequency (LEFT HAND)	3	4	-
Frequency(RIGHT HAND)	3	1	2

3. Critical Examination :

The critical examination of all recorded information is carried out.

Table 5. Multiple Activity Chart

	Operator Description	T	S	Machine	T	S
0.6	Load Job	0.6		IDLE		
0.65	Cycle start	0.05		IDLE		
5.05	IDLE			Machining	4.4	
5.35	Unclamping	0.3		IDLE		
5.45	Air Gun	0.1		IDLE		
5.48	Keeping in tray	0.03		IDLE		

Table 6. Summary

Subject	CYCLE	Time Working cycle	Percentage Utilization
OPERATOR	5.48	1.08	19.7
MACHINE	5.48	4.4	80.29

3.1 Present Method

The worker used to initially use only right hand for lifting of the job as well as lifting and carrying the spanner to fixture keeping the left hand idle for most of the time.

3.2 Proposed Method

The workers both hands were effectively utilized by using left hand for grasping and holding the spanner while the right hand was utilized for handling of component.

4. Develop

By studying all the operations, working pattern anew method of machining the component is found.

When operation 10, 20, 30 are carried on single VMC machine .

Table 7. Traditional Method

OP	OP	OP
10	20	30

Operation Time = 4+5.5+2

= 11.5 minutes

For One Shift of 8 hrs :

8 hours = 440 min(working time) + 40 min (break)

Therefore,

Total Components Machined =440/11.5

= 38.26

= 38 components

For 3 Shifts:
38 components*3=114 components

For a month:
114*26 = 2964 components

As the company utilizes 2 machines and the operations 10, 20, 30 are carried separately on both the VMC machines the total components machined per month will be 5928 components.
But, the company is having the demand for around 60000 components which can't be fulfilled.

So, the proposed solution is that by carrying the OP 10 on one VMC and the OP 20 and 0P 30 on another machine , the number of components machined can be increased.

OP
10

OP	OP
20	30

For 1 shift :
440/5.5= 80 components
For 3 shifts = 240 components per day
For a month = 240*26
=6240 components

5. Results and Discussions:

Table 8. Comparison of present method and Proposed method

Present Method	Proposed Method
Two VMC machine are used simultaneously and both of them operate all the operations 10, 20,30	Two VMC machines are used simultaneously, utilizing effectively by splitting the operation 10 on one VMC and Operation 20, 30 on the other VMC.
This method used to machine only 5928 components per month.	This method machined 6200 components per month
This method machined only 98% of the total components required.	Split operation method machines 103% of the total components required.
The two VMC machines were under-utilized because of traditional method	Split operation method utilizes both the VMC machines to the best of their capacity.
The available resources like machine, manpower were not utilized effectively.	The available were resources were utilized optimally and the machining demand of the component was fulfilled by split operation method

5.1 Increased Productivity:

Components machined by split operation Method – Components machined by traditional method
=6200-5928
=272 components
272 components more were machined using Split operation method.

5.2 Increased Profit:

Table 9. Profit comparison

Profit gained by traditional method	Profit gained by proposed method
Cost per job*total components machined =374*5928 =22,17,072 Rs	Cost per job*total components machined = 374*6200 =23,18,800 Rs

6. CONCLUSIONS :

1. The optimum utilization of resources available within the organization can lead to increased profit which will ultimately increase the productivity.
2. This study emphasizes that the method study technique can replace the method of doing the work by more efficient, effective method
3. The capacity of organization can be enhanced by focusing efforts in right direction.
4. There is always a scope of improvement in any process or method ,so all the parameters should be critically examined.

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BIOGRAPHIES :

Mr. Sahil Rajendra Bavdhankar.
Under Graduate Student,
Department of Mechanical Engineering,
KIT's College of Engineering, Kolhapur.

Mr. Rushikesh Yuvraj Patil.
Under Graduate Student,
Department of Mechanical Engineering,
KIT's College of Engineering, Kolhapur.

Mr. Pramod Patangaray.
Under Graduate Student,
Department of Mechanical Engineering,
KIT's College of Engineering, Kolhapur.