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# **Impact of Method Study to Accelerate Productivity in Automobile Industry: A Case Study**

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**ABSTRACT:** Increasing Productivity is an important aspect for any organization to survive and to achieve competitive edge especially in manufacturing sector. This study deals with increasing the productivity in an automobile industry. In the case organization the production department has some non value adding procedures which result in increasing the delay period and cause extra effort by the workers and therefore leads to high cost of the product. The purpose of this study is to identify improvement area inside the production department for enabling the industry to increase its productivity. Identified areas were analysed using method study principles. Improvement has been achieved through reducing travel time by locating new space for the off-loading site near the production department and also by simplifying and combining the two processes involved in the activity of modifying the processes. Increase in productivity and commensurate increase in the profit is calculated and it is observed that improvement is required.

**KEYWORDS:** Productivity, Automobile Industry, Method Study, Material Handling Equipments, Industrial engineering techniques.

## **I. INTRODUCTION**

The automotive industry in India is one of the largest in the world with an annual production of 23.37 million vehicles in FY-2014-15, following a growth of 8.68 percentages over the last year. The automobile industry accounts for 7.1 percent of the country's gross domestic product (GDP). India is also a prominent auto exporter and has strong export growth expectations for the near future. In 1897, the first car ran on an Indian road, an embryonic automotive industry emerged in India in 1940s. Hindustan Motors was launched in 1942, long time competitor Premier in 1944, building GM and fiat products respectively. (Reference [https://en.wikipedia.org/wiki/ Automotive\\_industry\\_in\\_India](https://en.wikipedia.org/wiki/Automotive_industry_in_India)). Recent competition in auto industry of India due to operations of almost all world class car manufacturers made it compulsory to increase production as well as productivity.

### **Definition of Productivity:**

Productivity is a measure of how well a production unit uses its resources. Productivity is measured as units of output per unit of input. Productivity is typically represented by some version of the following equation:

$$\text{Productivity} = \text{Output} / \text{Input}$$

Where, output includes all of the goods and services produced and sold and input includes all of the materials, services, machinery usage, and efforts expended in the production of the outputs.

### **Definition of Material handling**

Material handling can be defined as "Art & science of conveying, elevating, positioning, transporting, packaging, and storing of materials starting from the time, the raw material enters the gate and goes out of the gate in the form of finished products it is handled at all stages within companies boundaries such as within and between raw material stores, various section of production department machine to machine and finished product.(Reference [https://en.wikipedia.org/wiki /Material handling](https://en.wikipedia.org/wiki/Material_handling))



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### II. LITERATURE REVIEW

Literature review performed in order to put the theoretical background needed for this case study in context. It is necessary to find out what literatures that exist and already is known within the area of the study. Moreover it is of interest to investigate methods and research strategies that already has been applied in order to avoid any replication of things that already exist. A literature review can also supply the researcher with theoretical backgrounds that is relevant of the specific area of interest.

Duran C. Centindere A.(2015) used to implement work and time study technique for earth energy glass manufacture company they worked upon the location of mold room subject to the work and time study forces the molder walk for meters during the days and this applies also to the machine operator who comes and collects the ready molds.

This causes the molder and machine operator to get tired easily and decreases work productivity. This problem is to be eliminated by relocating the mold room at a place closer to the machine. If the mold room is relocated, the walking distance will be minimized and both the molder and machine operator shall be more productive, and this will indirectly improve productivity throughout the business. The machine operator removes the molds from the machine and leaves them on mold pan next to it. The molds are kept on these pans for several minutes. If the mold room can be closer to the machine, the operator will directly put the molds into the caustic boiler and the work area will have a 30-minute waiting period advantage. A mold has a waiting period of 85 minutes, excluding the workmanship times. If the mold room is relocated, this period will be down to 55 minutes. The molds are taken out of the furnace at the final step of process and they are cooled down for 15 minutes.

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Bahale, Deshmukh (2014) used to improve material handling efficiency by discovered the problem areas, like lack of space in different areas of the company and also lack of appropriate equipment for material handling.

Parthiban P., Raju. R (2014) used to implement method study principle in a shoe making industry to improve work procedure and proper utilization of machine and material by reducing number of work stations, transportations, combining the operations, and reducing the worker's fatigue.

Singh (2012) used work study technique to improve productivity he had worked on "To improve productivity by using work study and designed a fixture in small scale industry". The purpose of this research is to improve production capabilities for small scale industry and this research focused on the company, which produce Stay vane of Francis turbine.

This research used work study technique to improve work process in company which produced stay vane of francis turbine and the research objectives were to identify problems in the production process and improved it in terms of production time, number of process and production rate by proposing an efficient work process to company. This research used systematic observation, flow process and stopwatch time study as research methodology. Pro-E model software used for model testing and develop new model. They concluded that the improvement of work process was executed by eliminating and combining of work process, which reduces production time, number of process and space utilization.

Khalid (2011) used time study technique to improve productivity he had worked on "Productivity improvement of a motor vehicle inspection station using motion and time study technique" this research was carried out at the motor vehicle periodic inspection (MVPI) station to improve and enhance the bottleneck inspection point by using different application to reduce the inspection time.

The main problem of this research was an inspection point (No.1) which consumed more time in comparison with the other inspection point. Accordingly, this inspection point increases the flow time in the inspection lanes. This research investigated and searched for possible solutions and alternatives aimed at achieving the objectives using some tools from motion and time study and ARENA software to stimulate and predict the changes expected to occur in the inspection lanes. They had concluded that the overall, the suggested alternatives yielded an expected improvement of 174.8% in the production capacity.

Most of the manufacturing industries are currently encountering a necessity to respond to rapidly changing customer needs, desires and tastes. They have experienced an unprecedented degree of change in the past, involving drastic changes in management approaches, product and process technologies, customer expectations, supplier attitudes as well as competitive behaviour (Ahuja, Kamba and Choudhary, 2008).The performance and competitiveness of manufacturing companies is dependent on the reliability and productivity of their production facilities (Coetzee, 1997;



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Madu, 2000; Fleischer, Weismann and Nigge schmidt, 2006). Productivity of an organization expresses to which extent it extracts the output from the given input. Inputs can be labour skills, technology and innovations etc. In order to achieve world-class performance, more and more companies are undertaking efforts to improve quality and productivity and reduce costs (Butler A. Letza S.R. and Neale B. 1997).

### III. PROBLEM STATEMENT

Productivity is essentially the effect in which a company or economy can transform resources into goods, potentially creating more from less. Increased productivity means greater output from the same amount of input. This is the value added process that can effectively raise living standards through decreasing the monetary investment in everyday necessities. So the productivity improvement has very important place in the industry and it can be raised through various methods like Method Study, Material Handling efficiency, T.P.M., T.Q.M. etc. Higher productivity means a firm's production of its products is more desirable or more expected according to the consumer's demand. But there is always a chance to raise the productivity from the current situation and it can be done by improving some methods, implementing new techniques, removing unwanted work procedures and maintaining them.

### IV. OBJECTIVES OF THE STUDY

Following are the main objectives of the study:

- The aim of the research is to improve the productivity of an automobile industry by improving material handling efficiency.
- To improve the productivity with the help of Method Study.
- To compare the effectiveness of a company because its yield is directly related to the effectiveness and efficiency of production.
- To find out the shortcomings in the material flow from the off-loading site to the production department.
- To know about the general problems and feedback of customers with the help of a survey.
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### V. METHODOLOGY

The objective of the present study is to improve the productivity in an automobile industry by using method study principles. Method Study is the first of the two main divisions of work study and is concerned with the way in which work is done. Method study is essentially used for finding better ways of getting work done. It is a technique which will reduce cost. The philosophy of method study is that: - "There is always a better way of doing a job" and the tools of method study are designed to systematically arrive at this better way of doing a job.

### VI. STEPS INVOLVED IN METHOD STUDY

Following steps are used in Method Study-

- **Select:** concern area (work to be studied).
- **Record:** all the relevant facts about the present method.
- **Examine:** the facts critically and in ordered sequences, using the techniques best suited to the purpose.
- **Develop:** the most practical, economic and effective method having due regard to all contingent circumstances.
- **Define:** the new method so that it can always be identified.
- **Install:** the method as standard practice.
- **Maintain:** the method by regular routine checks.

A questionnaire is prepared and a survey is done among 40 employees of the production department. It is found that there is some unnecessary time consumed by travelling of raw material from the off-loading site to the production department. The actual distance of the off-loading site to the production department is approximately 25 meters. Fig. 3 shows the plant layout and the way through which raw material is carried.

Following Table- 4 shows the consumption of time by travel through manual trolley in a single shift.

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**Table - 1 Time required by manual trolley in a single shift**

Condition	Activity	Travel	Time Consume
Before Implementation	Material travelling time to the production department for a single machine in a single day	40 kg EcoPaxx Bio based Polyamide raw material travels 4 times in a day	20 min. X 4 times= 80 min. in a day

**VII. ANALYSIS AND INTERPRETATION**

The above table depicts that non value adding activities are conducted everyday within company, often the same work can be done by using more simple and less complicated tools which will save money, time and extra efforts of the workers. Planning these processes will ensure a company to avoid overwork because more simple work could perform the task. Initially finished product (i.e. Engine cover) is kept directly on the pallet then trolley. From the Simplification principle of **Material Handling** “Simplify handling by eliminating, reducing or combining unnecessary movements of equipment” and by Unit load principle:- “product is to be handled in a unit load”, will reduce the time. Both of these principles has implemented by fixing to the pallet upon the trolley and then finished product directly kept upon the pallet-trolley combination used for transport to other department. It is reduced worker's fatigue and time consumption.

**VIII. RESULTS AND DISCUSSIONS**

The purpose of the study is to decrease the inefficient problems of material handling. First step is done by carrying the survey of worker, assistant manager, and supervisor of production department. From the space utilization principle of material handling which is “It should utilize maximum space of cubic capacity of the ware house racks and overhead conveyors that maximize space utilization”, the result of step one was the development of new location of off loading site which should be near to the production department. In next step gathered data is analysed.

**IX. CONCLUSIONS**

The study is been concluded as, The process can be improved based on method study, work procedure and proper utilization of machine and material and also by reducing material handling. After questionnaires and survey it was found that lean manufacturing concept is being used in an industry which is traditional and very old, and method study principle was not used in the production department so present study has aim to implement method study principle by reducing material handling. Study contains two aspects:

**[A] By reduce travelling time:** All raw material ( which is Bio based EcoPaxx 410) gets off loaded in the opposite side of the production department and consumption of time to carry the raw material from off loading site to the production department through manual trolley in one round was approximately 20 minutes because of distance was approximately 25 meter and it travels around 4 times in one shift so total consumption of time was approximately 80 minutes in one shift which was more than adequate so it is improved by locating new space for off loading site near to the production department at a distance of 7 meter. So it is found that total time consumption of time to travel is reduced by 32 minutes in one shift.

**[B] By simplify the process or by reducing non value adding activities:-**

In the production department certain non value adding activities were also taking place like initially worker was putting finished product directly upon pallet then upon trolley due to solidify to the product, it was taking approximately 27 minutes of putting 3 to 5 products first upon pallet than upon trolley it is improved by applying material handling principle which is Unit Load Principle which states that “Product is to be handled in an unit load” So pallet is fixed upon trolley because its dimensions was accurately to be fitted that's why now worker is capable to put finished



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product directly upon pallet-trolley combination. It is found that total time consumption is reduced by 15 minutes. After implementing the principles of material handling it is found that productivity is improved. Following Table 9 shows the productivity comparison in between existing method and method study.

### **REFERENCES**

1. Coetzee, (1997); Madu,( 2000); Fleischer, Weismann and Niggenschmidt, (2006) "Development of Maintenance Function Performance Measurement Framework and Indicator" International Journal Production Economics, Vol.-4,No.-39, pp.- 1016-2010.
2. Duran C., Centindere A.(2015); "Productivity Improvement by Work and Time Study Technique for Earth- Energy Glass Manufacture Company", Procedia Economics and Finance, 4<sup>th</sup> World Conference on Business Economics and Management, pp.-109-113.
3. McCunn, P. (1998); "The Balanced Scorecard", The Eleventh Commandment, Management Accounting", December, Vol.- 6, No.- 25 pp.- 34-36.
4. Nuslund, Dag (2008); "Lean Six Sigma and Lean Sigma; Fads or real process improvement method", Business Process Management Journal, Vol.-14, No.-3, pp.- 269-287.
5. Parthiban P., Raju. R (2014); "Productivity improvement in shoe making industry by using method study",IOSR Journal of Mechanical Engineering and Civil Engineering (IOSR-JMCE), Vol.-2278-1684, No.-2320-334, PP.-01-08.