

Ramp up Productivity of Lower Excavator Assembly Line By Work Study Technique

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ABSTRACT: In today's competitive world industrialisation has taken Great space in our life. As effect of globalisation competition among industries are increased and all industries striving to produce component or provide service with shorter Span of time to Customer with higher quality. The productivity is main concern for organisation to stay in market. This paper presents a case study which focuses on productivity improvement of multimodal excavator assembly line by using productivity improvement technique, work study. In the case study firstly, the current assembly process is analyses using time study and method study tool. Secondly the cycle time for each work station is calculated and most time-consuming activity in assembly process is selected as bottleneck of station. Thirdly to find the solution which will meet the customer demand. Finally, to implement the new process which will help to achieve desire output.

Keywords - Assembly line, Cycle time, Excavator, Productivity improvement, Work study

I.INTRODUCTION

Productivity is important for every organisation to earn profit and compete in market. Generally, the productivity is ratio of output to the input. In other word productivity is defined as producing maximum output with minimum input. Output means number of item produces and inputs are various resources employed like Man, Machine, Money etc. Productivity of an organisation can be increase by doing right thing at right time with effective use of available resources purpose of increase productivity is to produce good earning, to give higher wages to employees, to reduce manufacturing cost which will benefit the customer. Hence to solve problem which impact productivity has Paramount importance. There are many ways to solve problem related productivity they are Cycle time reduction, Set up time Reduction, Elimination of waste. [1]

Organisation are facing fierce competition due to globalisation. Many manufacturing organisations are implementing Work study tools to help eliminate waste and increase productivity. According to many researcher, work study is best way to ramp up productivity by reducing or eliminating time consuming activity which do not contribute in actual output. Work study is best way to increase profitability of an organisation by producing more output. [2]

1.2 Objective of study

- I. Minimize excess man power.
- II. Minimize production time.
- III. Improve the production method.
- IV. Minimize efforts.
- V. Improve ergonomics.

1.3 Work Study

Work study is defined as examination of human work and method implied for process by using time study and method study technique. It systematically investigates all factors which effects on the efficiency and output of the process. Actually, Work study scrutinize work done in organization and its aim to find out best way to utilize available resources. It also helps to determine standard time required to complete the work. [3] Work study generally classified in two areas.

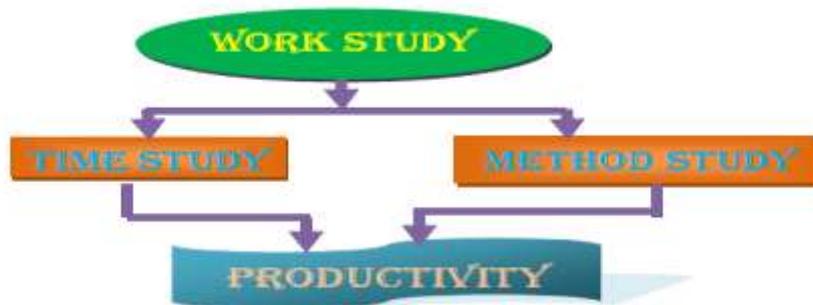


Fig.1 Work study methods

1.4 Method Study

Method study aims to find out best method to do work hence sometimes it's also called as work method design. It does systematic investigation of existing method in order to find out and install efficient method which will produce output at lower cost than existing cost. Method study involves following steps

1. **Select** the work and define the objective
2. **Record** the information about existing method
3. **Examine** the recorded event critically and find the bottleneck
4. **Develop** the new method which will cope up the need
5. **Install** the new method and make it as standard practice

1.5 Time study

Time study will find out the allowed time to complete the job by the procedure selected through Method study. It defined as different technique used to measure and establish standard time taken by qualified worker to complete the job. Time taken by worker is calculated through many observations. While setting standard time various allowances are also considered. [4]

II.PROBLEM DEFINITION

A. The problem considered in this paper is multi model excavator assembly line. Currently the organization producing 20 excavators per day. Considering increase customer demand, they need to ramp up their productivity by 50 % to meet customer demand.

B. For Higher model organization need separate assembly line so the paper also emphasized to integrate assemblies of all model in single line.

III.DISCUSSION

The main goal of this paper is to increase the productivity of lower assembly line. By conducting work study at all five station we have found out bottleneck in every station.

In 1st and 3rd stage the lower frame is symmetrical but due single hoist on existing EOT crane the workers are able to work on only one side. While working on one side workers on other side are idle. So, in this stage by installing one extra hoist on crane the cycle time can be reduce by 15 min.

In 2nd stage lots of time is required to assemble the swing bearing over lower frame this time can be reduced by using pneumatic guns and torque wrenches. There is also need to install track and trolley for material movement from one stage to another stage.

In 4th stage for piping and tightening the bolt it takes 90 min so by differentiating this stage into three stages we can improved the productivity of this stage.

In 5th stages track chain is assembling with lower frame. In this stage due to increase weight of lower assembly it is not possible to lift it with crane so by using hydraulic arrangement shown in Fig2. we can assemble all model in same assembly line. Here also needed to install hoist on EOT crane. So that worker can place both track chain on ground simultaneously.

IV.RESULT

The productivity of assembly shop is increased by 50% whereas the utilization of manpower increased by 8 % and cycle time is reduced from 45 min to 30 min. The organization will save cost substantially.

V.FIGURES



Fig.2 Hydraulic system for up and down movement

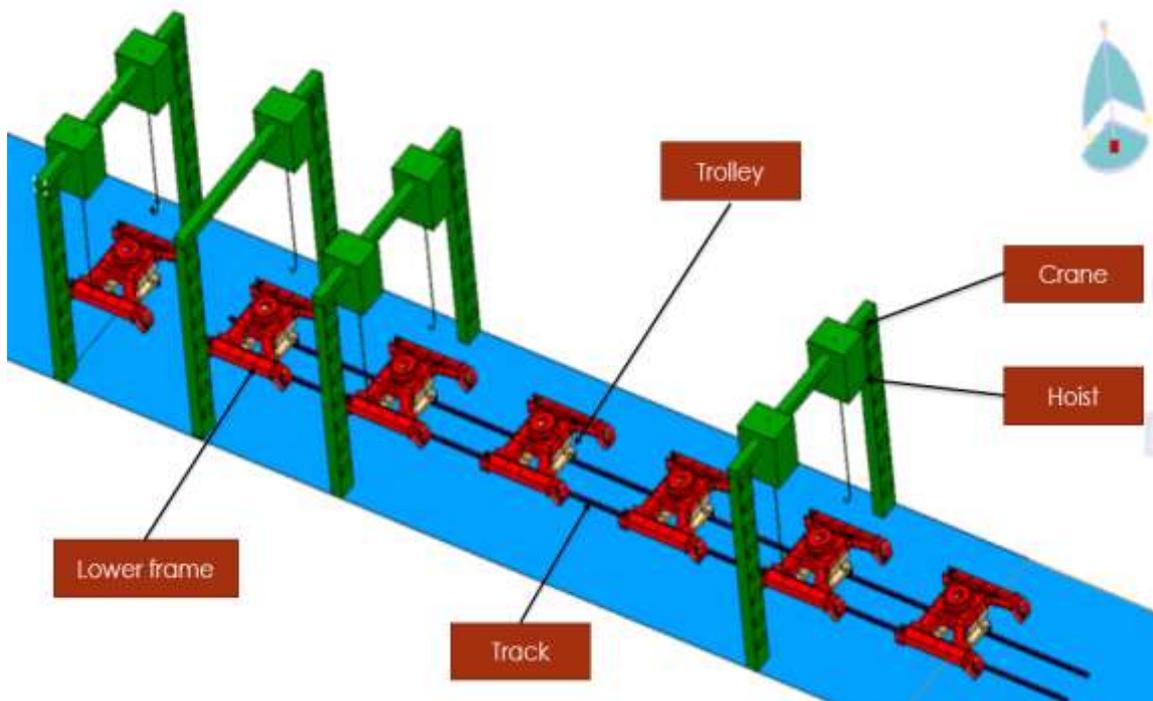


Fig.3 Modified lower excavator assembly line

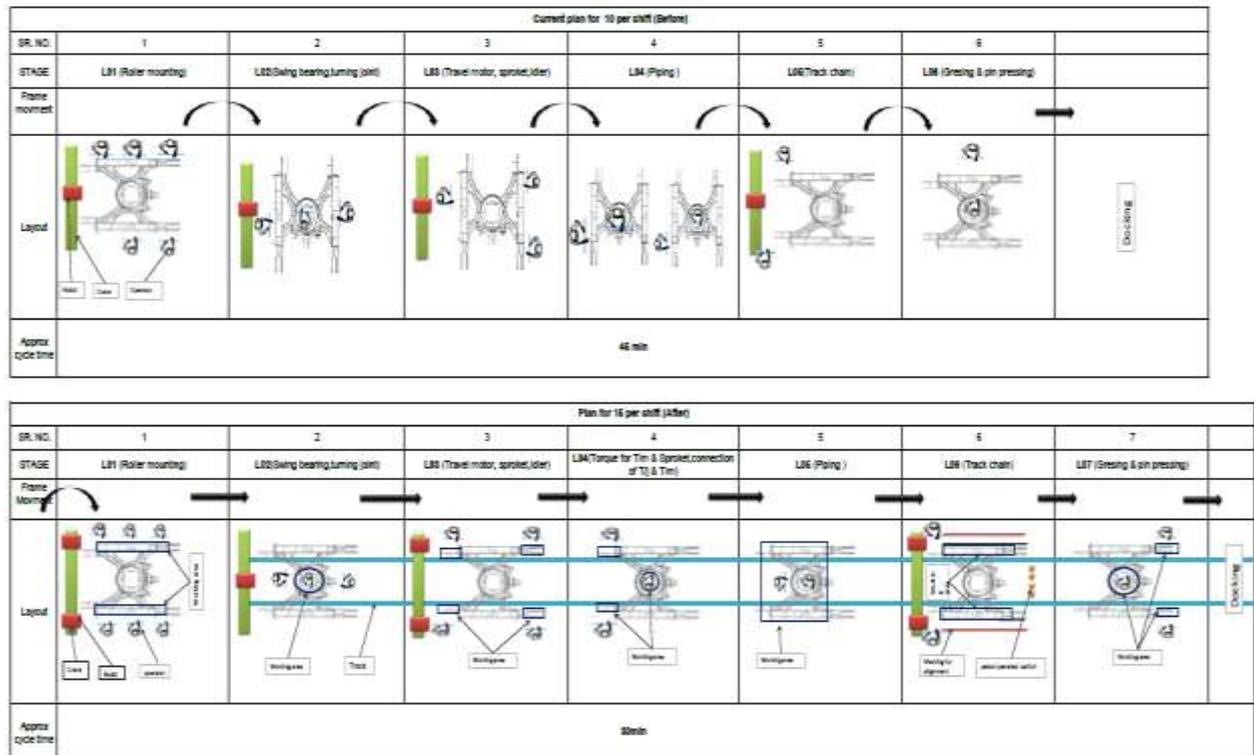


Fig.4 Assembly line (Before and After)

VI. CONCLUSION

Productivity ramp up is an important concern in heavy industry. The profit obtain on product is depend on productivity of an organization. The paper shows way of finding bottlenecks of assembly process. By implementing Time study and method study and established new effective method for particular assembly process productivity can be increased. The efficiency of assembly line is the key point to increase productivity of product.

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