

# Enhance the Capacity of Outer Tube Machining Cell

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**Abstract** - In today's fast growing competitive world, it is important to constantly sustain & improve, be it a manufacturing or service industry sector. Quality with quantity is a main characteristic which helps a industry stay in the competition. Technology has taken leaps of development lately and this has brought about an increase in the customer demands. The main aim is to study the current capacity, analyze it to find areas of improvement and make an improvement proposal to meet the forecasted increase in demand. This presents the current performance of outputs and capacity of the plant calculated using continuous data collected in shop floor. In each workstation the processing time is different and the longest time consumption workstation will be identified as a bottleneck workstation. The identified bottleneck station will be analyzed to reduce the processing time which increases production rate.

**Key Words:** Jig & Fixture, Bottleneck analysis, Enhance Production

## 1. INTRODUCTION

In the present period of globalization, enterprises are receiving new technology and methods to create products to compete and survive in the market. The most discouraging issue faced by makers today is the manner by which to convey their components or materials rapidly requiring little to no effort and great quality.

With rapid increase in demand of production, manufacturing industries need to increase their potentials in production & effectiveness to compete against their competitors. At the same time, the production process has to be ready with the ability to have abated costs with higher proficiency. Hence the route to simplify the problem regarding the production is of paramount importance.

### 1.1 Problem Statement

The problem was that the industry was not able to fulfill the customer requirements. The company's actual production was very less as compared to customer requirement. The company was producing 19575 components per month while the requirement was of 27000 components per month. So there was the gap of 7425 components per month. To fill up this gap the company had to run the production on Sundays & holidays, yet the requirement of customers was not meeting.

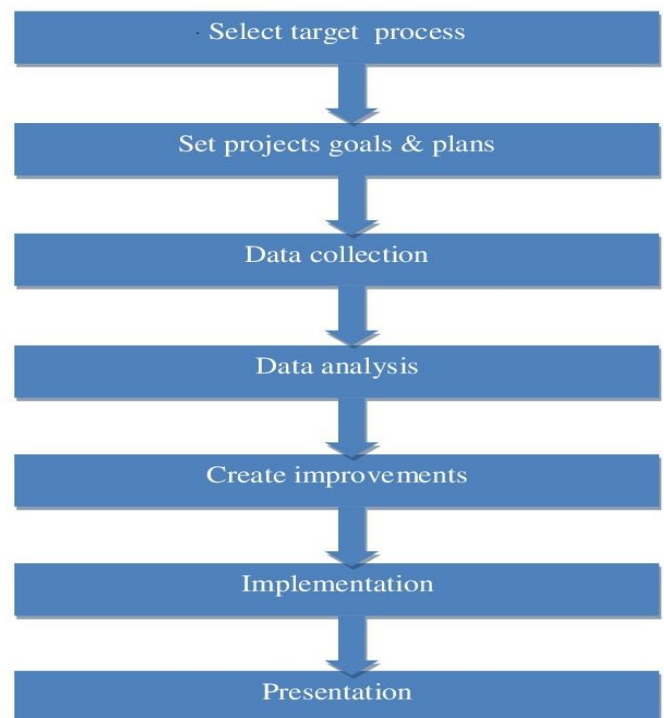
## 1.2 Objective

The given objectives are to be predicted while doing this project work are given below,

- To increase production rate.
- To maximize the use of all of the company's resources such as land, equipments etc.
- To meet the customer requirement.
- To increase profit of company.

## 1.2 Methodology and Process flow

Methodology is the Systematic, Theoretical analysis of the methods applied to a field of study or the theoretical analysis of the body of methods and principles associated with a branch of study. The below flow chart shows the sequential operation/steps that will be performed during the project process.



## 2. LITERATURE REVIEW

Sandeep Malik, et al, (2015) described that time element in manufacturing stretches from the moment the raw material is separated from the earth to the moment when the final

product is delivered to the ultimate customer. Cycle Time Reduction ((CTR)) is the application of the principles and practices of total quality management to key business processes with the added element of speed. It is about refocusing attention from cost to time and creating the alignment that enables organizations to run circles around their slower competitors. It is a process improvement workshop focused on risk reduction, organizational learning and work process improvement with a quick return on the investment. It is a process improvement methodology.

**Prathamesh P. Kulkarni, et al, (2014)** described that methodology for the efficient improvement in productivity with the help of various Work Study Methods associated with Lean Manufacturing Principles & Tools. Lean manufacturing tools are one of the most influential & most effective methodologies for eliminating scrap (MUDA),controlling quality, and improving overall performance of any machine, system or process in any industry with the complete assurance of large annual profit margins. This prescriptive paper proposes genuine solutions & concepts for implementing Work Study Methods and deploying associated lean manufacturing tools in any enterprise or industry, covering the technical, engineering, and manufacturing aspects as well as the business etiquette affairs. Lean Manufacturing together with Work Study Methods, being the most sophisticated & vast area of studies has a huge scope for implementation & deployment of their very own concepts.

**Mihir R. Prajapati, et al, (2015)** described that In this economical world, any company has to fulfill its customer needs to survive in the market. Cycle time reduction plays a vital role in improving the customer demands. When several workplaces are required to process a job, the machining and moving of the parts between the workplaces can be very time consuming unless it is suitably planned. From the point of view of production planning and control the basic bulldog blocks in the production system are WIP (work in process), Takt time and Balancing of line. In this particular study more focus on lean tools and techniques with their principles. The significance of this study is to identify the best possible tools and tools and techniques with respect to the problems. After this study the decision says that few tools and techniques can be applied and it is more preferable. It also discusses the methodology generally adopted, tools and techniques used and benefits obtained

**Dr. T. Ramesh Babu, et al,** described that In today's increasingly competitive world, it is important to constantly improve, be it a manufacturing or service industry. Quality with quantity is a main characteristic which helps a company stay in the competition. Technology has taken leaps of development lately and this has brought about an increase in the customer demands. The main aim is to study the current capacity, analyze it to find areas of improvement and make an improvement proposal to meet the forecasted increase in demand. This thesis presents the current performance of outputs and capacity of the plant calculated using continuous

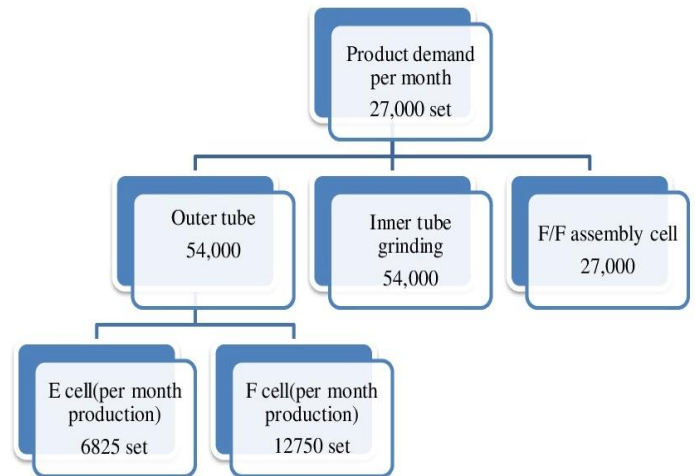
data collected in shop floor. In each workstation the processing time is different and the longest time consumption workstation will be identified as a bottleneck workstation. The identified bottleneck station will be analyzed to reduce the processing time which increases production rate.

### 3. METHODOLOGY ASSESSMENT

The first step in any cycle-time reduction program is to understand the current state. This means completing a detailed process map to understand the flow of materials and paperwork through the organization. During the process of generating this map, there is an opportunity to identify value added vs. non-value-added activities.

#### 3.1 DATA COLLECTION

The purpose of data collection is to provide a basis for analysis, in other words, to turn data into information that is used by, and useful to, decision-makers. However, before data can be collected, a data collection plan needs to be developed. The data is collected to identify the bottleneck station in manufacturing plant and to analyze and eliminate them. The collected data is of direct observation in shop floor using stop watch by continuous assessment of each machine. Data collected is shown in below.



Total sets produced per month in outer tube cell = Total sets produced per month in E – cell + Total sets produced per month in F – cell

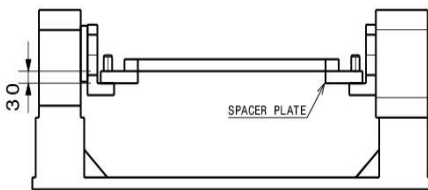
$$\begin{aligned}
 &= 6825 + 12750 \\
 &= 19575 \text{ set/month} \\
 \text{Interval} &= 27000 - 19575 \\
 &= 7425 \text{ set /month}
 \end{aligned}$$

#### 4. Possibilities

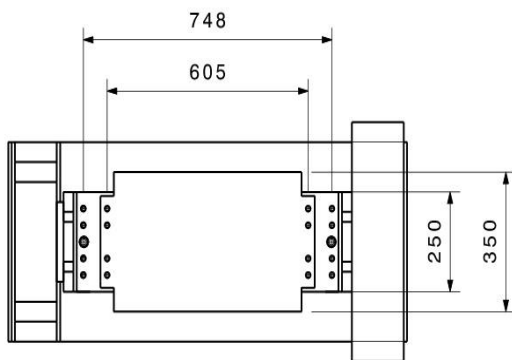
Sr.no.	Possibilities	Outcomes (Total production per month)
1	Working on holidays (Saturdays)	22,707 set/month
2	New Fixture	Requirement was fulfilled but capital cost is more
3	Modification in scrap fixture	7410 set/month

As per the above possibilities we selected modification in scrap fixture on the basis of cost savings.

#### 5. Concept drawing

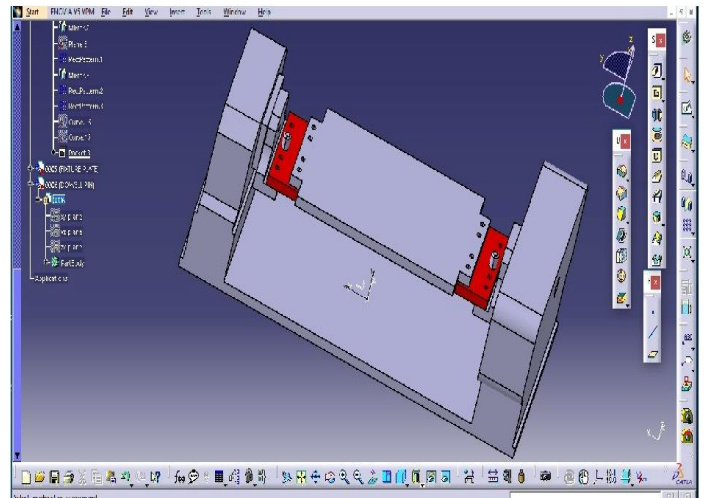


Front view



Top view

#### 5.1 CATIA Model



In above figure red portion shows spacer plate & portion above spacer plate (red region) shows scrap fixture plate.

#### 6. Advantages

- Customer requirement is fulfilled.
- Increased in production rate.
- Competitiveness.
- Higher profit gain.

#### 7. Conclusion

By modification in scrap fixture we had improved the production rate in outer tube machining cell from 21,150 set/month to 26,990 set/ month.

It has given good results, in profit also

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