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METHOD STUDY ON REDUCTION OF OPERATIONAL LEAD TIME

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ABSTRACT

Lead time is the time required between the customer order place at that time and final delivery of the product. Lead time is very important factor in every production industries to reducing lead time of every production process to achieve on time delivery to customer & achieve the customer satisfaction. To reducing the lead time, then the production rate will be increses.Lean manufacturing process use in an actual production line that considers expenditure of available input sources for any aim other than creation of value for the end customer to be wasteful and thus a target for elimination. Lead time is calculated by adding useful time and wasted time. There are various technic are used to reducing the lead time & improve the productivity such technic as Jidoka,Muda-Elimination,5S,Kanbanetc. On studying the present production line of tool manufacturing production the present lead time was calculated and around to be 15.80 days. The lean tools that are applied in this system are First-In-First-Out (FIFO) &Value Stream Mapping and also used wheel's-trolley for Transportation in production line reducing waiting time.by using these technic, organizing the component buffer where the oldest entry or bottom of the stack is processed first which eliminates inventory which is reduces the lead time and Value Stream Mapping (VSM) to map the present and the future state. By using these lean tools has resulted in the reduction of lead time by one day i.e.15.8 days.

Keywords: Lead time, 5S, Kanban, Jidoka, Muda, Value Stream Mapping, First-In-First-Out, Customer Tact Time, 5S, Lean manufacturing.

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I. INTRODUCTION

Today's Huge competitive business world, In these business world there are various new technic are available in market by using these technic to improve the production rate & reducing the waste time. Every Production Industries require small lead times, High Production rate, low costs and high customer service levels to survive. Lead time as the time spent that between the placement of an order and the receipt of the order into inventory, lead time may influence customer service and impact inventory costs. In an attempt to reduce lead time, businesses and organizations found that in reality87% of the existing activities are non-essential and could be eliminated. By eliminating the wasteful activities from the processes and streamlining the information flow significant optimization results can be realized. The focus of this work is to reducing the lead time improve the production rate. In every production Industries there are various process are carried out such as 5Axis Machining, Laser Marking, Blackning, Blastining, Turning & Assembly .Then these Production system work on basis of Input & Output Model. It's one of the basic model of production system .A production system is the set of interconnected input-output elements and is made up of three component parts namely input, process & outputs (Fig-1).A wide variety of inputs are transformed so that they give out a set of inputs .the transforming process can be actual inputs and outputs system for manufacturing may be expensive and difficult.

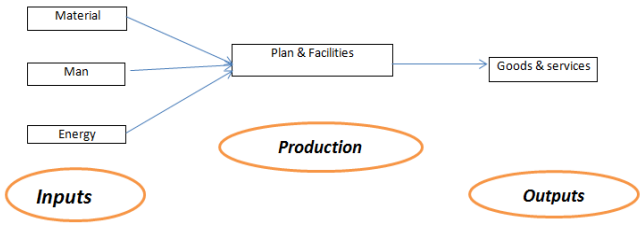


Fig 1.Input &Output Model

We are focusing above principle such as Plan & Facilities, In these Concept process planning is very important factor and arranging the operation sequentially and to provide comfortable facilities in production cycle. Such as providing the wheel trolley for the transportation of material in production line that's affect on production time and reduce wastage of transportation time. In particular reduction process lead time and through put time, this is an important issue of an industrial project now. Reductions in manufacturing throughput time and lead time can generate numerous benefits, including lower work-in-process and finished goods inventory levels, improved quality, lower costs, and less forecasting error. More importantly, reductions in manufacturing throughput time increase flexibility and reduce the time required to respond to customer orders. This can be vital to the survival and profitability of numerous firms, especially those experiencing increased market pressures for shorter delivery lead times of customized product. This paper presents the background, problem statement, method, objectives and limitations of this thesis work in every manufacturing industries.. On the theory and analysis basis, discussion and conclusion are presented.

Time is money, shorter lead time or Minimum production time is always good thing for producer or customer. The production timing effort of each planning step that gives information about the starting and ending dates, which are necessary for an exact scheduling of the whole production process. These starting and Ending dates is Obtained from the Job Card On Production Line, In these Job Card (Operation And Route Sheet) sequential operation process, and work center are included. Based on good planning and comfortable facilities that shorter process lead time is easy to get a way to realize. The present paper is interested in some research work in production plant, analyzing the production data, trying to find out where the problem it is, showing a method by which the given task is carried out, analyzing wastage of time in production system with the help of Job Card data, such as lead time reductions is achieved.

II. LITERATURE SURVEY

1- **Gerard P. Cachon, Marshall Fisher**- Supply Chain Inventory Management and the Value of Shared Information)He study the value of sharing these data in a model with one supplier, *N* identical retailers, and stationary stochastic consumer demand. There are inventory holding costs and back-order penalty costs.

2- **Suzanne de Treville, Roy D. Shapiro, Ari-Pekka Hameri**- From supply chain to demand chain: the role of lead time reduction in improving demand chain performance).- To improve demand chain performance, is it better for parties in a supply chain to focus first on lead time reduction, or instead concentrate on improving the transfer of demand information upstream in the chain? Even though the theory of supply and demand chain management suggests that lead time reduction is an antecedent to the use of market mediation

3- **Bharath R1, Dr. G S Prakash**-(Lead time Reduction Using Lean Manufacturing Principles For Delivery Valve Production)- Lead time is the time spent between the original customer order final delivery of the product. Lead time is calculated by adding value added time and non-value added time. Delivery valve is a non-return valve between the high pressure for the fuel injection system and pump plunger.

4- **Hau L. Lee Kut C. So Christopher S. Tang-(**The Value of Information Sharing in a Two-Level Supply Chain) many companies have embarked on initiatives that enable more demand information Sharing between retailers and their upstream suppliers. While the literature on such Initiatives in the business press is proliferating, it is not clear how one can quantify the benefits Of these initiatives and how one can identify the drivers of the magnitudes of these benefits.

5-**Sophia Sihui Zhang**-(Project Lead Time Reduction - Industrial Module)- Today manufacturers around the world are now trying to Embrace lean production and are attempting to implement lean production system for Speeding up processes, reducing waste, and improving quality. This report based on Lean thinking describes an improvement process in order to reduce project lead time.

III. METHODOLOGY

1-Observing and studying Job Card (Operation and Route Sheet)

2-By using Job Card Find out Individual Production unit Time.

3- By using Job Card Find out Individual Manufacturing Lead Time & Waiting Time.

4- Finding Maximum Waiting Time of Product in production line and there causes.

5 – Using Value Stream Mapping technic.

6-Using the First In First out (FIFO) Technic.

7- Study the WIP technic.

1- Observing and studying Job Card(Operation And Route Sheet)- Job Card sheet is the very important factor in every manufacturing or production company. Total process and summery of every product is given in this sheet, by using this Job Card. In this sheet sequential operation and process are given to understand the every process for each manufacturing shop.

1. **Observing and studying Job Card(Operation And Route Sheet)-** Job Card sheet is the very important factor in every manufacturing or production company. Total process and summery of every product is given in this sheet, by using this Job Card. In this sheet sequential operation and process are given to understand the every process for each manufacturing shop. Format of Job Card as follow.

Product no=1234 **Start date**=30-12-2017
JOB NO=54321
Order quantity= 40
Delivery date=31-01-2018

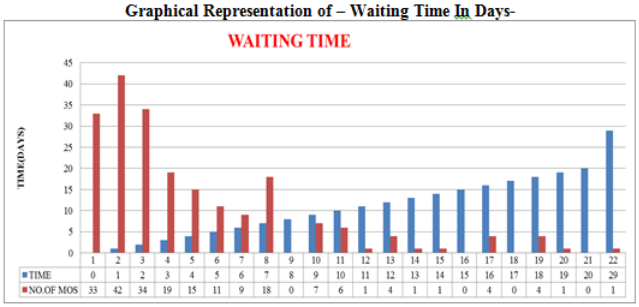
			First Piece Inspection		End control				
Op. No	**Operation description**	**W/C No.**	**DATE**	**REMARK**	**App Qty**	**Scrap**	**Main scrap code**	**Date**	**REMARK**
010	Hard Blank Is	111-A1	4-01-2018	OK	20	------	------	5-01-2018	OK
020	Front Profile Turning	111-A2	5-01-2018	OK	20	------	-------	6-01-2018	OK
030	Milling 5-Axix	111-A3	8-01-2018	OK	20	------	-------	8-012018	OK
040	Hot Blackining	112-A4	9-01-2018	OK	20	-------	-------	9-01-2018	OK
050	Laser Marking	113-A5	10-01-2018	OK	20	------	-------	10-01-2018	OK
060	Assembly & Packing	114-A6	11-01-2018	OK	20	------	-------	11-01-2018	OK
070	Final Inspection	115-A7	11-01-2018	OK	20	------	-------	12-01-2018	OK

ADVANTAGE

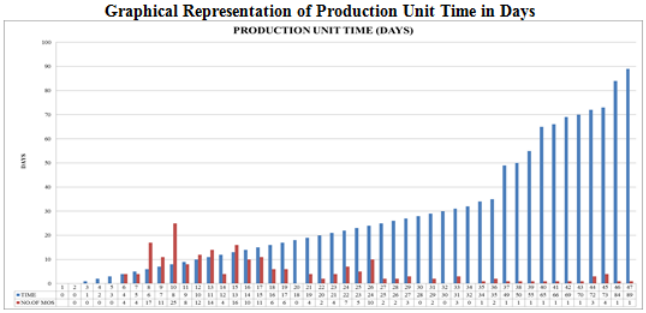
- Company will see reduce inventory cost, more inventory trend faster production, less scrap, less capital investment improve customer relation improved quality and increased profit are achieved.
- Implementing WIP limits can be challenging, but the benefits of approaching our work with focus, clarity, and discipline far outweigh the pains of change. Here are four of the many benefits of using WIP limits to optimize our workflows.
- The persist of lead time reduction can also lead to elimination to other wastage in our production process.
- Improve the delivery of the product on time.

IV. RESULT

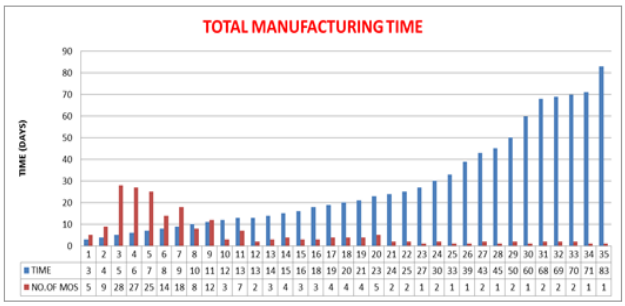
Graphical Representation of – Waiting Time In Days-



Graphical Representation of Production Unit Time in Days



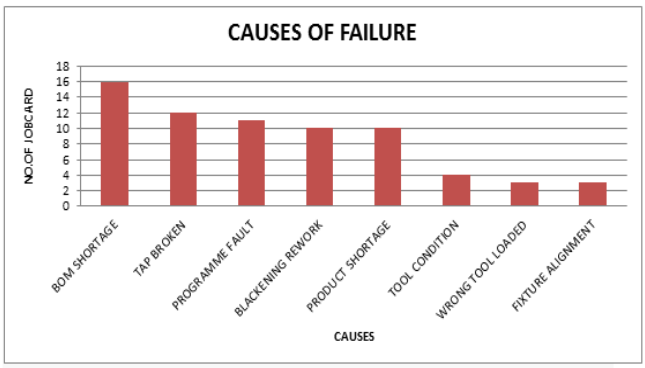
Graphical representation Total Manufacturing Time



Causes OF Maximum Waiting Time on production line-
1-BOM SHORTAGE
2-TAP BROKEN
3-PROGRAMME FAULT
4-BLACKENING REWORK
5-PRODUCT SHORTAGE
6-TOOL CONDITION
7-WRONG TOOL LOADED
8-FIXTURE ALIGNMENT

GRAPHICAL REPRESENTATION OF CAUSES OF MAXIMUM WAITING TIME-

Sr.No.	Causes	No.of Product/Job card
1	BOM SHORTAGE	16
2	TAP BROKEN	12
3	PROGRAMME FAULT	11
4	BLACKENING REWORK	10
5	PRODUCT SHORTAGE	10
6	TOOL CONDITION	4
7	WRONG TOOL LOADED	3
8	FIXTURE ALIGNMENT	3



Value Stream Mapping- The goal of VSM is to determine all types of wastes of time in the value stream and to take step to try and eliminate these. Waste can be a part of a process that takes time and resources but adds no value to the product.

Takt Time – It can be defined as available time to coustomer demand. the time required for producing one unit of daily salable quantity. It helps with the synchronization of assembly, production and sale.

FIFO – It is a system of keeping track of the order in which information or materials are to be processed. The main aim of FIFO is to prevent earlier orders from being delayed in favor of newer orders which would otherwise result in increased lead time and unhappy customers regarding the earlier orders.

WIP-WIP is also called work in process, it is inventory that has begun the manufacturing process and no longer included in raw material inventory but it not yet a complete product. WIP is considered to be an assist because money has end toward complete product.

V. CONCLUSION

TO Reduce Operational Lead Time By Using Various technic VSM, FIFO. And Improve the production rate ,reducing the wastage of time on production line.
Study the various machining process and there required timing, to eliminating problem at time of production .Improve the production rate ,improve quality of product ,to achieve on time delivery to customer.

VI. FUTURE SCOPE

There are many factors consider to the lead time, that is, order handling, planning, procurement, delivery, inspection, manufacturing, handling, picking, packing, and delivery.

This thesis focused on analysis of manufacturing data for reducing lead time and improves the production rate and is addressed within Make and Plan, due to restrictions based on objective factors. Future work can be carried out on design, order handling, delivery or reassembly since those are also important factors affecting production and lead time in the company's operations.

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