

# Optimization of Working Processes by Using Takt Time

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**Abstract**— *Takt Time is an important lean tool used to set the pace of manufacturing process which leads to the customer satisfaction. Takt time is mainly used to standardize the time for the completion of an operation. The case study was carried out in an auto parts industry. The spring pin section of the industry was facing the problem of on time delivery problem of the product which leads to the customer dissatisfaction. Takt time tool were implemented to overcome this problem. Takt time was calculated. One operation's cycle time was above the takt time. To keep the cycle time of operation under the takt time, some improvements were suggested in order to product to be completed within required time. Before state and after state were compared.*

**Keywords**— *Spring pin, Takt time.*

## I. INTRODUCTION

Many manufacturers are applying lean principles to reduce wastes and increase efficiencies. Lean manufacturing is a Japanese approach that focuses on eliminating waste and ensuring quality. The aim of lean manufacturing is to cut unnecessary costs by making the business more efficient and responsive to market needs. The primary idea of this system is to maximizing value while minimizing waste, thereby achieving manufacturing excellence through the creation of more value with fewer resources.

Lean manufacturing may be defined as a set of techniques which are used to reduce and eliminate the wastes. This will make the company more flexible and more responsive by reducing waste.

## II. PROBLEM STATEMENT

The problem is arising while products are more to produce but workers failed to do that or sometimes over production or over processing may happened. Working shift is 8 hrs. and in that workers, get total 1 hour break but still some of those are wasting their time in between WIP (work in process). Result in not achieving their goal. To overcome those waste implement Muda and for time management purpose TT (Takt Time) solution has been implemented.

## III. METHODOLOGY

For solving the problems arising in different departments and during machining, the company followed a system of work by applying manufacturing tools for enhancing productivity of the company.

Table 1  
Operations and Time

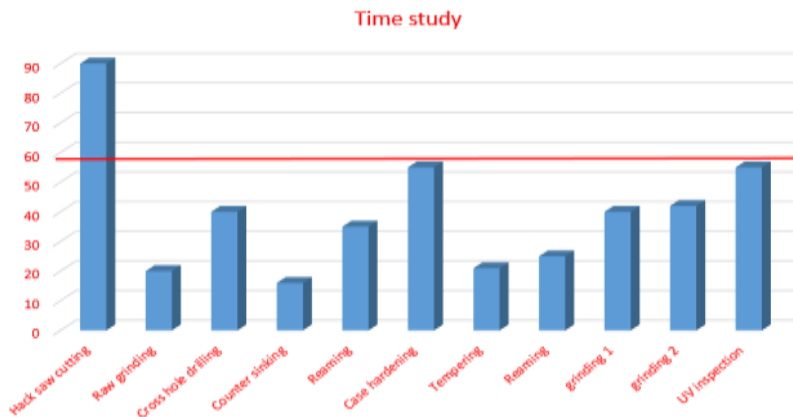
Sr. No.	Operation	Avg. Time Taken(Sec)	Operators required
1	Hacksaw cutting	90	3
2	Raw grinding	20	1
3	Cross hole drilling	40	1
4	Counter sinking	16	1
5	Reaming	35	1
6	Case hardening	55	1
7	Tempering	21	1
8	Reaming	25	1
9	Grinding 1	40	1
10	Grinding 2	42	1
11	UV inspection	55	1
<b>Total</b>		<b>435</b>	<b>13</b>

Above table shows the average time required to perform particular operation. And after that calculated takt time as follows:  
 Demand = 450 pieces.

Available working time = 480 – 60 = 420mins.

Takt Time= 420/450= 0.93min= 56sec.

After calculation for Takt time, graph was plotted and from that we realized which process is going above takt time. There was one operation having cycle time above the takt time. The operation with cycle time above takt time was hack saw cutting. Rests of operations were well covered within the takt time.



**Fig. 1 Graph for Takt time**

Hack saw cutting operation involved 90sec.

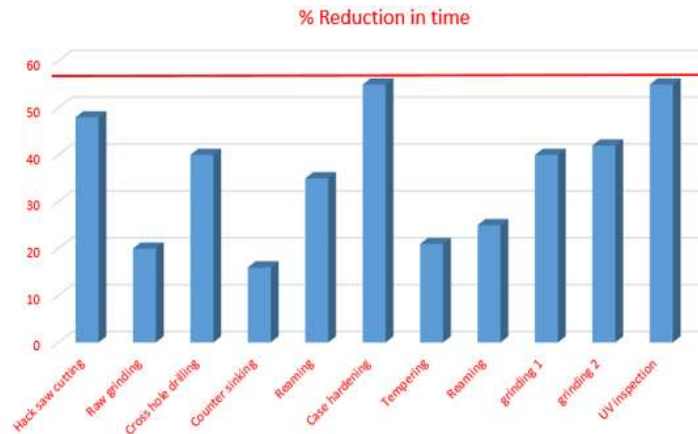
Loading time = 58sec / single rod.

Value added time = 28sec.

Unloading time = 4sec.

#### IV. IMPLEMENTATION AND RESULTS

By incorporating ‘Electric Overhead Travelling Wire Rope Crane’, this non-value added activity could be reduced to a great extent. Only one worker was required for whole operation after the implementation of Crane which led to profit to the company due to elimination of two workers.



**Fig. 2. % reduction in Time**

**Table1**  
**% reduction in Time and Workforce**

SR. NO.	ELEMENTS	BEFORE STATE	AFTER STATE	PERCENTAGE REDUCTION
1	Value adding time	28	28	0%
2	Non-value adding time (loading)	58	16	72.41%
3	Non-value adding time (unloading)	4	4	0%
<b>Total</b>		90	48	<b>46.66%</b>

SR. NO.	PARAMETERS	BEFORE	AFTER	PERCENTAGE REDUCTION
1	Total Processing time	435	392	9.88%
2	Workforce	13	11	15.38%

## V. CONCLUSION

After case study and literature review on Takt time, concluded that before, the loading was done manually by three workers in the hacksaw operation. The primary motive was to reduce loading time. After the implementation of Electric Overhead Travelling Wire Rope Crane, time was reduced to a great extent as well as reduction in workforce too.

1. Processing time for the hacksaw cutting operation was reduced 46.66%.
2. Whole processing time for manufacturing the spring pin was reduced from 435sec to 392sec or 9.88% reduction.
3. Total number of workforce was reduced from 13 to 11

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