

Implementation of Work Simplification And Lean Activities in Diaphragm Valve Of Diameter 125mm

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Abstract:- Today in a competitive world, the primary objective of any manufacturing firm would be to achieve excellence in all aspects of their products to its customers with zero defects and within the target data. To compete in the market, adoption of continuous improvement would help the manufacturing firms to stay at the top. This work concentrates on reducing the cycle time of a manual assembly of valve and improves the productivity of valve. The outcomes showed with introduction of fixture, there was major reduction in cycle time. This study also highlights that proper implementation of Kaizen application helps reduce overburdens on the operator in the workplace.

Keywords:- Cycle time, valve assembly fixture, productivity.

I. INTRODUCTION

Today in a competitive world, the primary objective of any manufacturing firm would be to achieve excellence in all aspects of their products to its customers with zero defects and within the target data. To compete in the market, adoption of continuous improvement would help the manufacturing firms to stay at the top. This work concentrates on reducing the cycle time of a manual assembly of valve and improves the productivity of valve. The outcomes showed with introduction of fixture, there was major reduction in cycle time. This study also highlights that proper implementation of Kaizen application helps reduce overburdens on the operator in the workplace. The work presented here involves implementation of continuous improvement activities in the Diaphragm valve division. The company mainly manufactures two types of diaphragm valves namely S2K series and G2K series. The project involves modeling of fixtures for the valves of above said models to meet the takt time. Fatimah Mahmud, Mohd Ghazali Maarof (2015) in their work he opined that one method to improve business competitiveness is by applying the concept of continuous improvement also known as Kaizen [1]. Pierre E. C. Johansson et al., (2013) in their work he focus on the positive effects of using standardized work also suggests that more focus in future research needs to be carried out on how to implement standardized work in global organizations focusing on local demands and cultural differences and similarities [2]. Dana BOCA (2011) in his work he has stated that the Kaizen management is dedicated

to the improvement of productivity, efficiency, and quality and business in general [3]

Hence in the present work implementation of work simplification and lean activities in diaphragm valve division 125mm. Implementation of Kaizen concepts helped in cycle time reduction. After the introduction of a new fixture the operator can work in safe condition. Unnecessary motion of the worker was eliminated.

Problem Statement

Improvement of productivity and reduction in the cycle time to synchronize with the Takt time for the Diaphragm valve.

Objective of the project

- ◆ To improve productivity of valves of sizes 125mm
- ◆ To model and fabricate the fixture for the valve assembly operation.
- ◆ To meet the takt time by implementing continuous improvement activities

II. EXPERIMENTAL FLOW

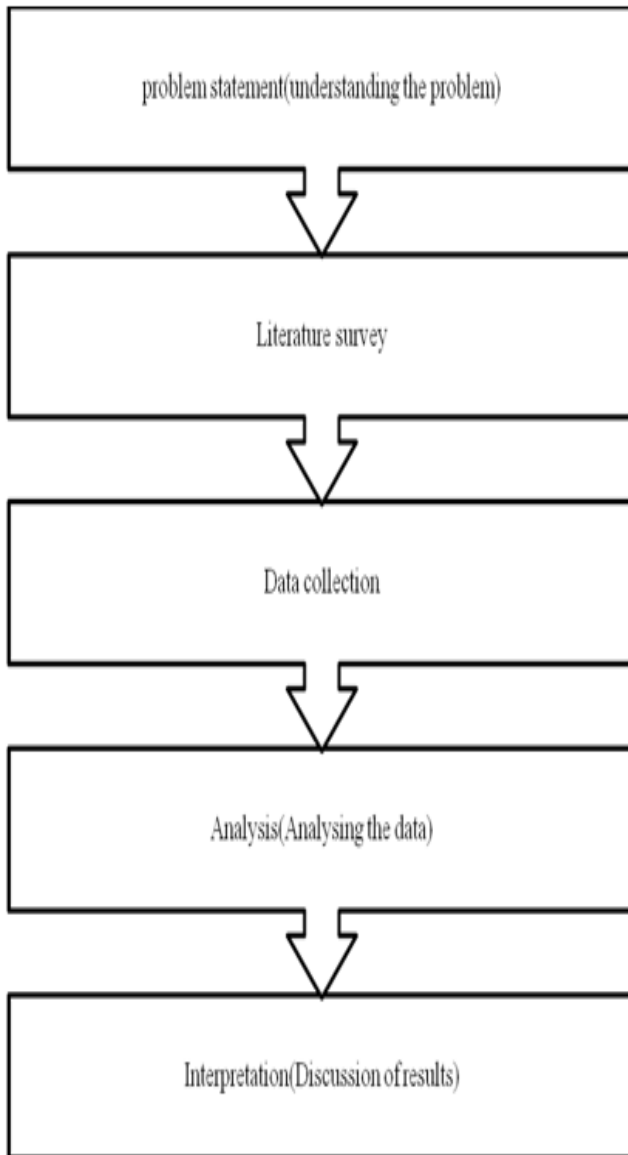


Fig.1. experimental flow

III. TAKT TIME

Takt time is the maximum time per unit allowed to produce a product in order to meet demand.

Takt Time can be determined with the formula:

$$T = Ta/Td$$

Where,

T = Takt time

Ta = Time available to work

Td = Time demand (customer demand)

Fig.2.TAKT time

Takt Time		
Hours/ shift	9	
Minutes/ Shift	540	
Tea Break (In min.)	15	
Machine Clean Up (In min.)	10	
Hand wash time (In min.)	0	
Morning meeting (In min.)	5	
Closing meeting (In min.)	0	
Available time/ shift (In min.)	510	
Planned shifts/ day	1	
Available time/ day (In min.)	510	
Available time/ day (In sec.)	30600	
Demand/ day (In Nos.)	12	
Takt Time (In sec.)	2550	/part

IV. BEFORE AND AFTER



Before Fig(2.1)



After fig(2.2)

From figure (2.1) one can see that the workers have to place the body on the platform for the assembly of valve. There is chance of Body falling down and unsafe for the workers to assemble the valve. Considering this problem

fixture is developed for the assembly of valve for size 125mm as it can be seen in the figure (2.2). There is no chance for tilting of body as there is belt lock provided as shown. Risk free from falling of body from fixture.

V. RESULTS AND DISCUSSION

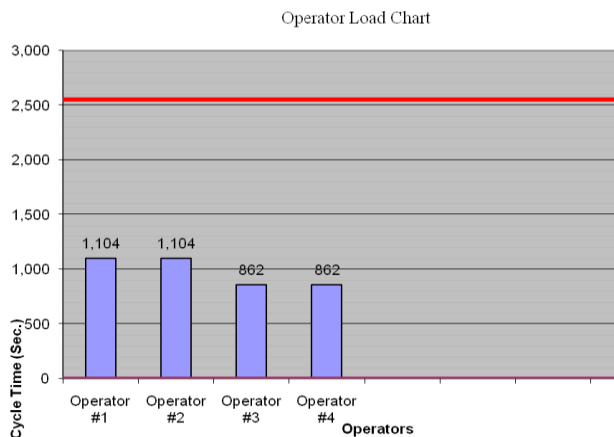


Fig.3. Operator load chart for size 125mm

Figure 3 shows the operator load chart for the assembly of size 125 mm valves. In this operator load chart it can be seen that there are four operators working for the assembly of valve. It can be seen from the load chart that each operator is idle for some time, which can be used for some other work by standardizing the process steps and the number of operators can also be reduced from 4 to 1.

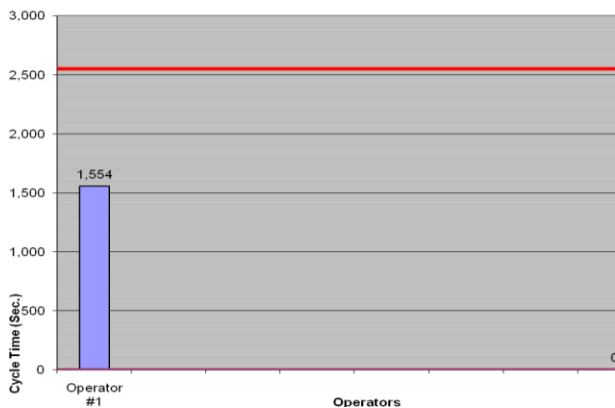


Fig.4. Operator load chart for size 125mm

Figure 4 shows the load chart for the assembly of size 125 mm valves. In this operator load chart it can be seen that there is only one operator working for the assembly of valve, which is also meeting the takt time.

VI. CONCLUSION

From the results & Discussion it can be concluded that;

- Implementation of Kaizen concepts helps in cycle time reduction.
- After the introduction of a new fixture the operator can work in safe condition.
- Unnecessary motion of the worker was eliminated.

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