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Case Study of Counter Shaft Rejection through Lean Manufacturing

Rakesh Kumar Pundad[1] & Dr. Nagendra Sohani[2]
[1]*Assist. Professor, Mechanical Engg, AITR, Indore, M.P., India*
[2]*Associate. Professor, Mechanical Engg., IET, DAVV, Indore, M.P., India*

ABSTRACT : The aim of this paper is to reduce rejection of counter shaft in grinding operation through Lean manufacturing. Lean manufacturing system firstly started in Toyota Motor Manufacturing Company after the "Second World War" when most Japanese organizations including Toyota were confronted with the challenge of managing production facilities with limited resources. This challenge motivated Toyota managers to develop various elements of TPS (Toyota Production System) aimed at reducing waste.During case study of counter shaft I have found intial rejection % from (4.25- 1.84%) and after studying the case & by improving the process rejection % is reduced from 1.84% to 1.62%.
Keywords*:* Lean production, Grinding, Total quality management, case-study, rejection

1. Introduction

Lean manufacturing system firstly started in Toyota Motor Manufacturing Company after the "Second World War" when most Japanese organizations including Toyota were confronted with the challenge of managing production facilities with limited resources. This challenge motivated Toyota managers to develop various elements of TPS (Toyota Production System) aimed at reducing waste. Thus, lean is about producing the same output with lesser resources (men, material, space and machinery).Today, it has helped Toyota achieve the distinction of being the best car manufacturing company in the world. "A systematic approach to identifying and eliminating waste (non-value-added activities) through continuous improvement by flowing the product at the pull of the customer in pursuit of perfection."

1.1 Lean has been defined in many different ways:

In the current era of globalization, industries are adopting new tools and techniques to produce goods to compete and survive in the market. The most daunting issue faced by manufacturers today is how to deliver their products or materials quickly at low cost and good quality. One promising method for addressing this issue is the application of lean management principles and techniques. Lean management simply known as lean is production practice, which regards the use of resources for any work other than the creation of value for the end customer, is waste, and thus a target for elimination. Though there had been numerous claims on the real origin of Lean Manufacturing principles, it was generally accepted that the concept with this back ground, business needs to compete with efficiency and quickly respond to market needs and niches. There is no doubt that the manufacturing industry is confronted with challenges and looking to implement improvements in their key activities or processes to cope with the market fluctuations and increasing customer demands. Applying lean management philosophy is one of the most important concepts that help businesses to complete. In this paper, the literature survey findings such as existing level of lean practices, types of lean tools employed, and perceived level of different encountered by the various manufacturing industries are discussed.

2. Problem Identification and Problem definition:

During the study of complete process of grinding of **Counter Shaft,** shaft get rejected due inspection of following parameters:

1) Diameter of shaft
2) Roundness of shaft
3) Surface finish

Diameter:
Lower limit: 54.998mm
Upper limit: 55.013mm
Roundness value: 0.015 mm
Surface finish: 4 micron

Fig 2.1: Counter Shaft

Fig 2.2: Grinding process of counter shaft

3. Methodology

- Collecting Data analysis
- Cause and effect analysis (Fish bone diagram)
- Observation & Result Analysis

Table 3.1.1: Old data of countershaft in grinding operation

Month	Total component grid/month	No. of component rejected/month	Percentages of rejection
July'2014	3305	113	3.41
Aug'2014	3720	138	3.70
Sep'2014	3410	122	3.87
Oct'2014	3501	149	4.25
Nov'2014	3209	98	3.05
Dec'2014	3927	72	1.84
Jan'2015	3840	89	2.32

Chart 3.1.2: Every month Rejection & total production

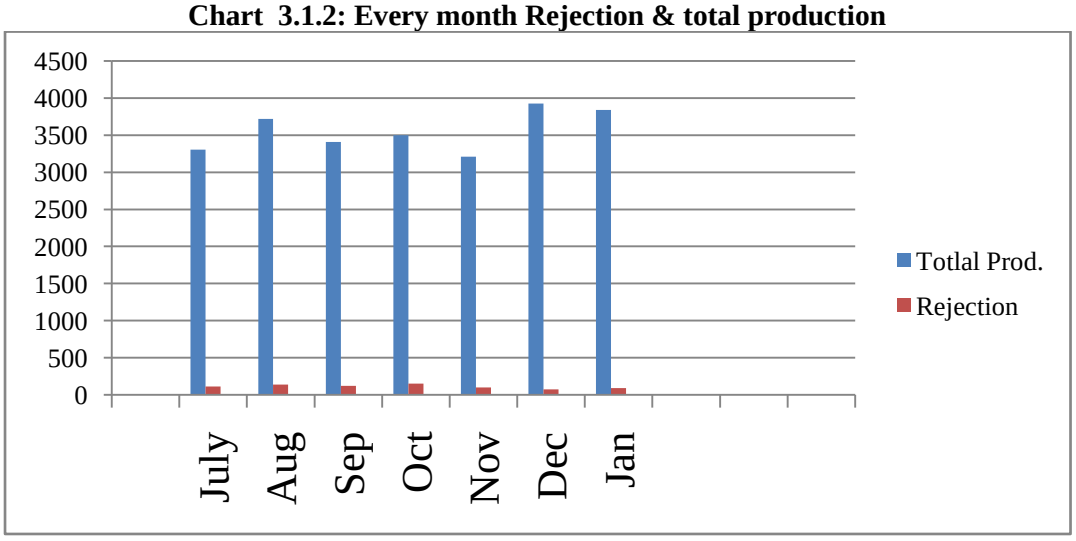


Chart 3.1.3 Total rejection per month

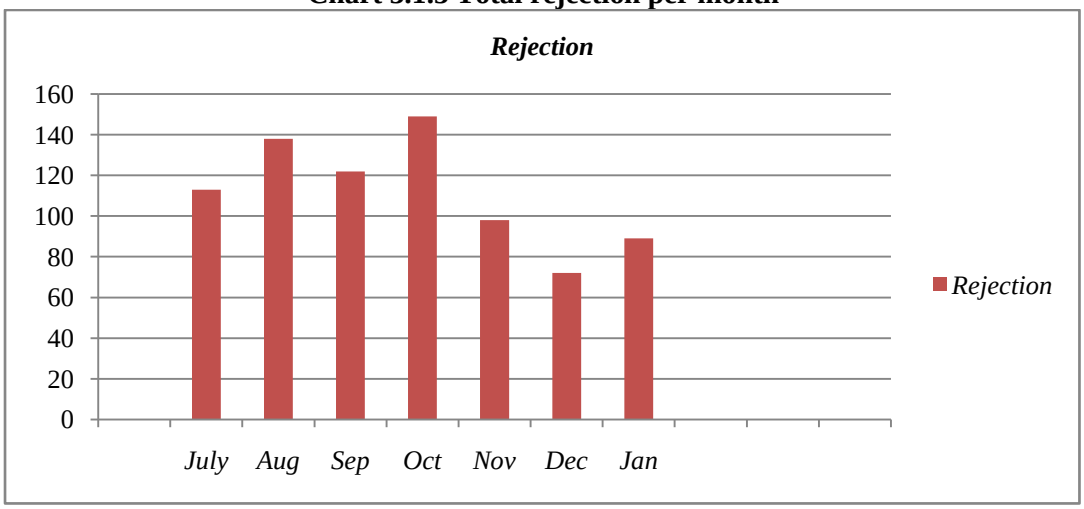
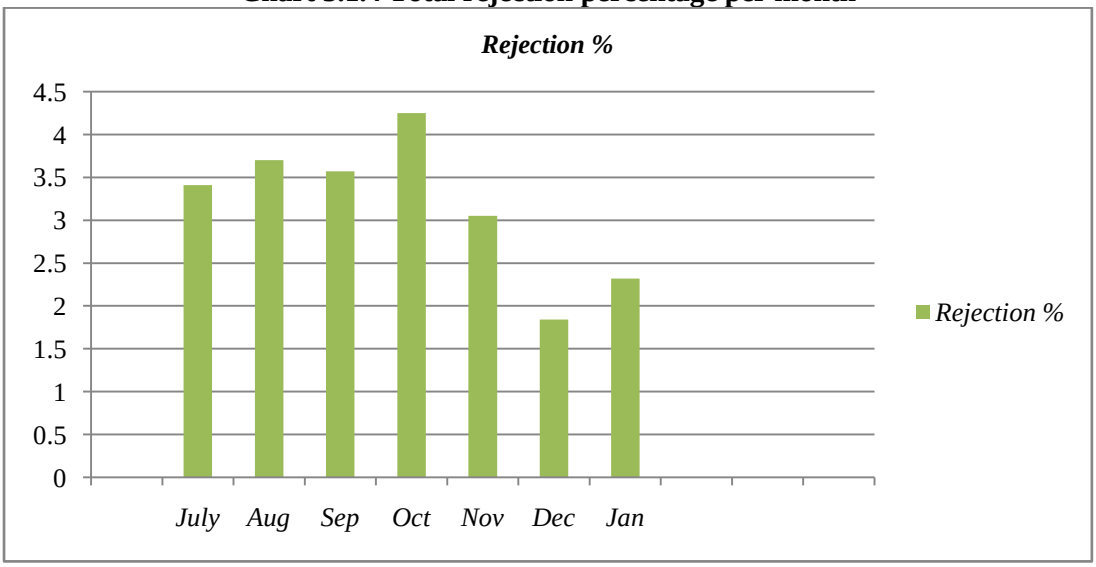
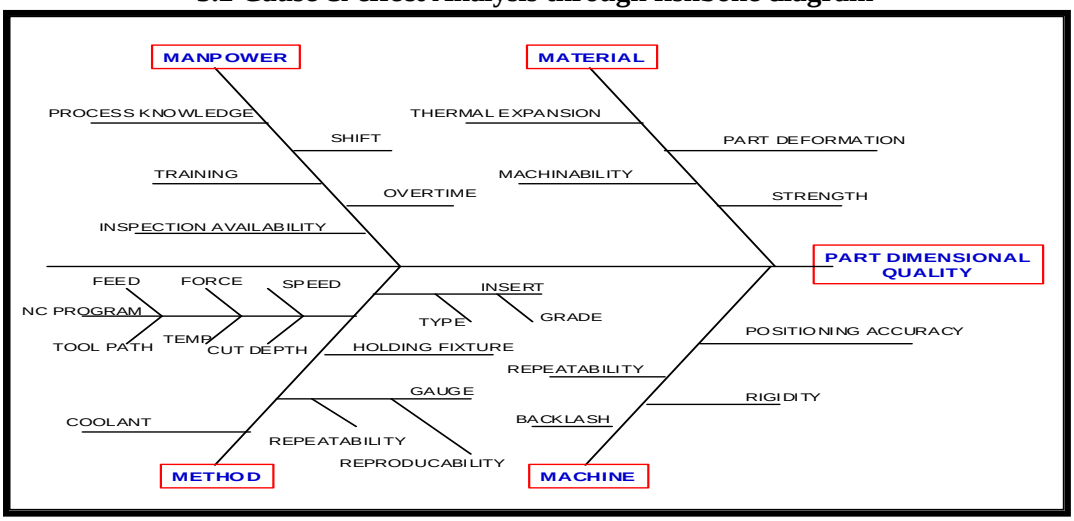


Chart 3.1.4 Total rejection percentage per month



3.2 Cause & effect Analysis through fishbone diagram



3.3 Observation & Result Analysis

TABLE: 3.3.1 Data collection after implementation

Month	**Total component grid/month**	**No. of component rejected/month**	**Percentages of rejection**
Feb'2015	3655	65	1.77
March' 2015	3790	63	1.66
April'2015	3955	66	1.66
May'2015	3640	59	1.62

Chart 3.3.1: Total Production & Rejection per month after applying cause & effect method

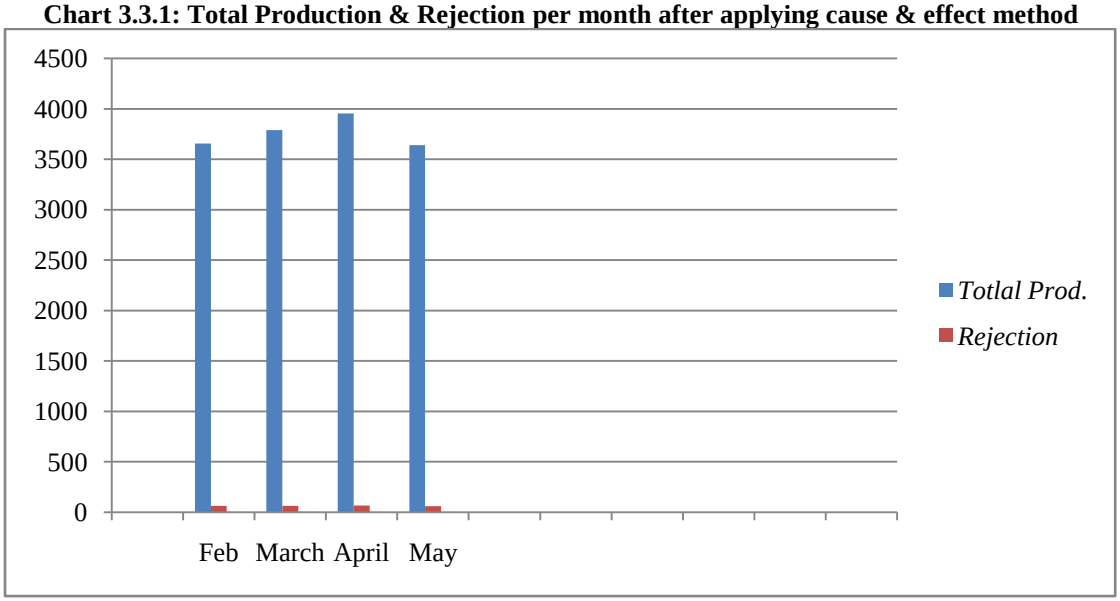
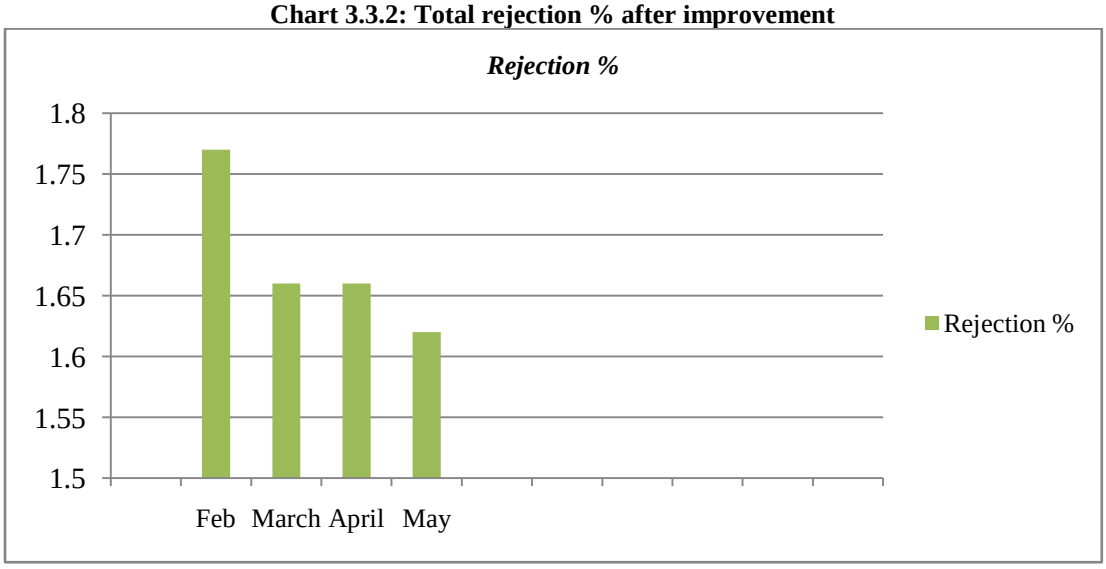


Chart 3.3.2: Total rejection % after improvement



4. Conclusion

In the study of counter shaft I found rejection during the grinding operation due to the following reasons:

- Dressing of Grinding wheel
- Timer Setting
- Lack of proper lapping of job in tailstock centre & ovality more than 0.1 micron.
- Backlash of machine
- Operator Awareness

Due to these reasons the rejection % vary from 4.25 to 1.84 % and after cause & effect analysis I applied dressing of grinding wheel 3 times in shift and I observed that rejection % of counter shaft is reduced from 1.84 to 1.62 %.

5. References

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