

# Quality Assurance Level Up In Transmission Line Problem: Gear Reverse Entry Chamfer Miss

<sup>[1]</sup> Prof. Chandan V, <sup>[2]</sup> M R Akshay, <sup>[3]</sup> Manoj C.  
<sup>[1][2][3]</sup>BE in Mechanical Engineering

**Abstract:**— Our study was to ensure that there will not be any chamfer miss in gear reverse during the continuous flow of operations in the transmission line. Due to chamfer miss there was a hard shifting of gear during gear reverse. Main aim is to develop a poka-yoke in order to prevent chamfer miss.

**Index Terms:**— Chamfer miss, Gear reverse, Transmission line, Hard shifting

## I. INTRODUCTION

### Definition of Chamfer:

A chamfer is a transitional edge between two faces of an object. It can also be known as a bevel but connotes more often cutting and is more often 45° with respect to the two adjoining faces.

In this case chamfer operation is done for smooth mating of reverse gear with the sleeve. If the chamfer is not done, sometimes the mating becomes harder during shifting reverse gear (Hilux Hugo 4\*4), this study was conducted on the basis of customer complaints regarding hard shifting of reverse gear. This problem was not found during the initial stages of vehicle run. As per customer complaint, this problem was found in the vehicle, after the run of 8000-10000 Km. On verifying, it was found that chamfer operation was missing on the gear reverse.

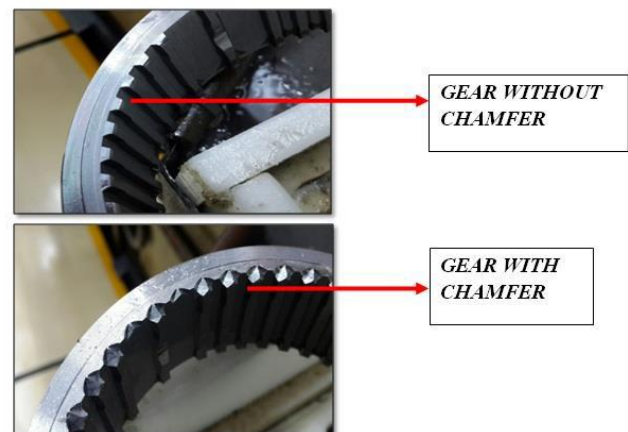
## II. OPERATIONAL DRAWING



## III. PROBLEM

After procuring raw materials from the supplier, the part is soft machined which involves Broaching, External gear cutting, DE-burring, milling and Chamfering. It was found that, shifting of reverse gear is hard due to chamfer miss operation during machining. This was verified in the component found with the customer.

## IV. GEAR REVERSE CHAMFER



## V. SOLUTION

A Poka-yoke is developed in order to check the chamfer operation. Here a pressure seat instrument is developed which ensures the presence of chamfer on gear reverse. The pressure seat instrument is designed in such a way that the air flows through the small pores provided at the surface. a hub is designed to held the gear reverse which is mounted on the pressure seat. Hub provides support and guides to place the reverse gear on pressure

seat.

Gear reverse is made to place in such a way that the chamfered part is being placed on air-flow pores. If chamfer is present then the air flows out, hence no pressure is developed on the air flow line. In case if chamber operation is absent, then the work material covers the pore and hence the air flow is blocked.



## VI. WORKING

A seat is developed in order to place the reverse gear. Also designed in such a way that the shape and size remain same as that of the gear reverse. This seat is used to place the gear reverse after chamfering operation. Seat is fixed with air blowing device from the bottom surface. Air flows through the small holes present between the hub and the gear reverse part which is placed for checking. Also pressure sensing device is fixed.

When the chamfered gear reverse is placed on this pressure seat instrument, due to the space provided by the chamfers, the air flows out there by reducing the air pressure developed. This determined by the pressure sensor and an ALL-SET signal is passed on to operator.

In case the chamfer operation is missed, then air pressure is developed because there is no space for the air to flow as chamfer are missing. Hence this pressure development is identified in the pressure sensors and a NG signal appears.

Therefore the presence of the chamfer is checked and confirmed and also there will not be any chamfer missed part in future stages.

## VII. CONCLUSION

The pressure seat instrument can be used to determine the chamfer miss operation on the Gear reverse effectively. Also another similar hole is used to determine the Jump out miss on the same pressure seat instrument. In this case it act as multipurpose device which is used to determine both chamfer miss along with the jump out miss detection.

## REFERENCES

- [1] Implementation of poka-yoke technique in a gear industry a case study, by Yash Dave<sup>1, a</sup>, Dr. Nagendra Sohani<sup>2, b</sup>
- [2] Application of human error theories for the process improvement of requirements engineering, milene Elizabeth regolin ferreria, carlos Henrique quartucci forster.