

## Simulation of Coupler Shaft of ATV's Engine with Gearbox in ANSYS 12.1 for Effective Transmission of Power

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### ABSTRACT

The power train is designed to transmit the power of the engine to the wheels and tires efficiently and reliable as possible. We did this in a manner that would allow an efficient power-train system which would be easy to operate, and reduce maintenance and its maintenance cost and for that we need to couple the engine and gearbox in such a way that the loss would be as small as possible. So, we are using coupler to join the engine and gearbox.

**Keywords:** - Coupler,

### I. INTRODUCTION

There are various ways to couple or join the engine and the gearbox :-

- 1) Chain
- 2) Belt
- 3) Coupler
- 4) Gears

Chain, Belt and Gears are also used but it is not as much efficient as that of coupler

### II. Principle

This works on the laws of rotation and equation of torsion.

### III. Analysis

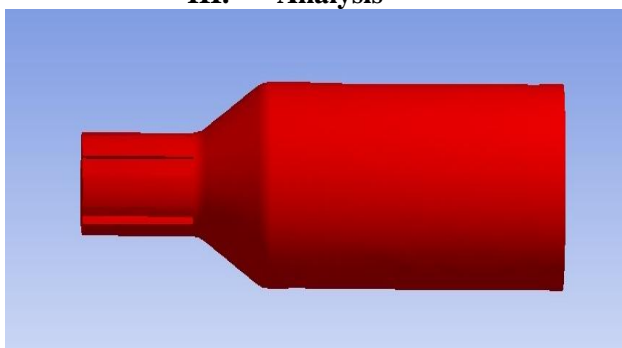


Figure 1. Adapter Shaft

During Analysis of adapter in ansys workbench we fix the splines and the maximum torque (19Nm) is applied at the cylindrical face of the adapter. The von mises stresses and deformation has been analysed.

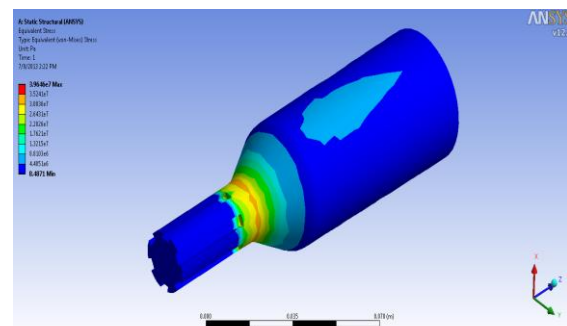


Figure 2. Von Mises Stress(39 MPa)

The Maximum deformation found is

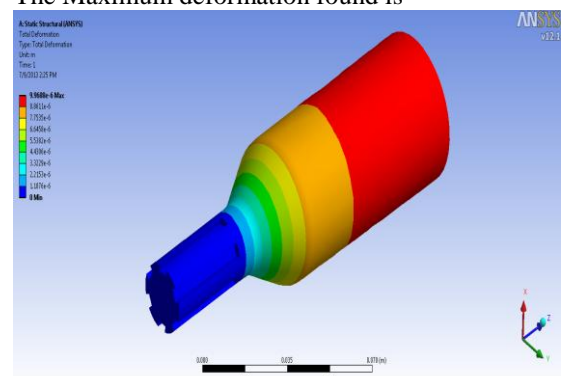


Figure 3. Deformation(0.009 mm)

The Adapter is analysed for infinite number of life cycles i.e for fatigue loading and the fatigue safety factor is found to be 2.23.

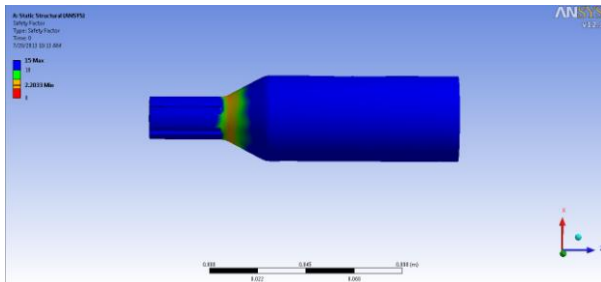


Figure 4. Fatigue Analysis

#### IV. Manufacturing Processes

While manufacturing, different operations were performed over the flange.

1. Cutting
2. Grinding
3. Milling
4. Machining
5. Drilling



Figure 5. FLANGE

And it is installed to cover the adapter shaft in the vehicle between engine and gearbox.



Figure 6. Adapter shaft installed in the vehicle

#### V. Conclusion

It works efficiently without any breakage and gives good performance .

It is having very high life as compare to other sources

It is having low or no maintenance cost.

#### VI. References

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- [3] Machine design by R.S. khurmi