

## Design and Analysis of an Automobile Propeller Shaft

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**Abstract:** A propeller shaft is designed and inspected in this study. The shaft made by the material 5241 is picked. These riggings are used to give degree high rotational speeds and pass at high power levels. The composition of the existing material is changed. The propeller shaft has been coated with nickel chromium. The propeller shaft coated with nickel chromium is designed analysed and compared with the existing propeller shaft. Similarly, a propeller shaft made up of stainless steel is designed analysed and compared with the existing propeller shaft.

**Key words:** Propeller shaft, inspected, material, riggings, composition, India

### INTRODUCTION

The shaft made of different materials is used to transfer motion was used in light weight automobiles (Hambali *et al.*, 2009; Moorthy *et al.*, 2013; Cole and Sherman, 1995). Various materials are used along with the existing material to enhance the properties of the existing propeller shaft (Kim *et al.*, 2001; Alberts and Xia, 1995; Anand and Balasubramanian, 2011; Cooper and Karimi, 2011).

### MATERIALS AND METHODS

The dimensions of the propeller shaft are given in Table 1. The propeller shaft is designed in the SolidWorks Software with the above dimensions in the table and analysis is done in the ANSYS Software.

#### Material properties

**Stainless steel:** Quality having high quality, solidness, sturdiness and flexible properties, auxiliary steel is a standout amongst the most regularly utilized materials in business and mechanical building development.

Consumption when in contact with water can erode, making a conceivably risky structure. Measures must be taken in basic steel development to keep any lifetime erosion. The steel can be painted, giving water resistance. Additionally, the imperviousness to fire material used to envelope steel is usually water safe.

**Nickel chromium:** Quality Nichrome (NiCr, nickel-chrome, chrome-nickel and so on) are composites of nickel, chromium and frequently press (and potentially different components). The most widely recognized use is as resistance wire, however, they are likewise utilized as a part of some dental reclamations (fillings) and in a couple of different applications (Fig. 1 and 2).

Table 1: Dimension of shaft

Parameters	Dimension (mm)
Length of shaft	1584
Outer diameter of shaft	250
Inner diameter of shaft	120
Step turning dia	100

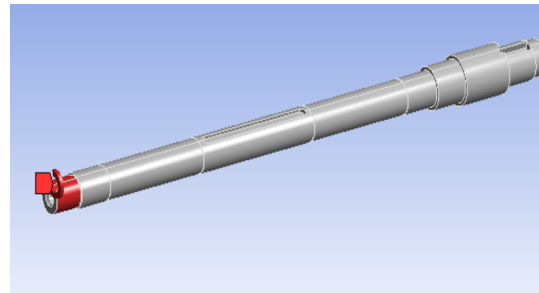


Fig. 1: Designed propeller shaft

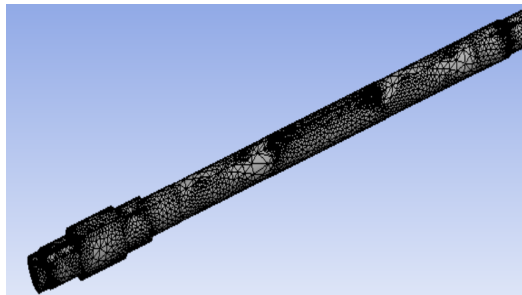


Fig. 2: Meshed propeller shaft

Consumption the presentation of little sums (<7%) of chromium to nickel expand the affectability of the nickel chromium compound to oxidation. This is on account of the dispersion rate of oxygen in the scale is expanded. This pattern switches after expansion levels increment over 7% chromium and increments up to an expansion level of around 30%. Over this level, there is little change.

**3D Model of propeller shaft**

**Meshing:** The existing propeller shaft is coated with nickel chromium. The designed propeller shaft is shown in Fig. 1 and 2.

The propeller shaft made up of nickel chromium is analysed which is shown in Fig. 4. The deformation of propeller shaft made up of different materials is compared and is shown in Table 2. It seen that , the propeller shaft

**RESULTS AND DISCUSSION**

The propeller shaft made up of stainless steel is subjected to structural analysis which is shown in Fig. 3.

Table 2: Comparison of deformation for different materials

Materials	Deformation
Stainless steel	15.25
Nickel chromium	14.25

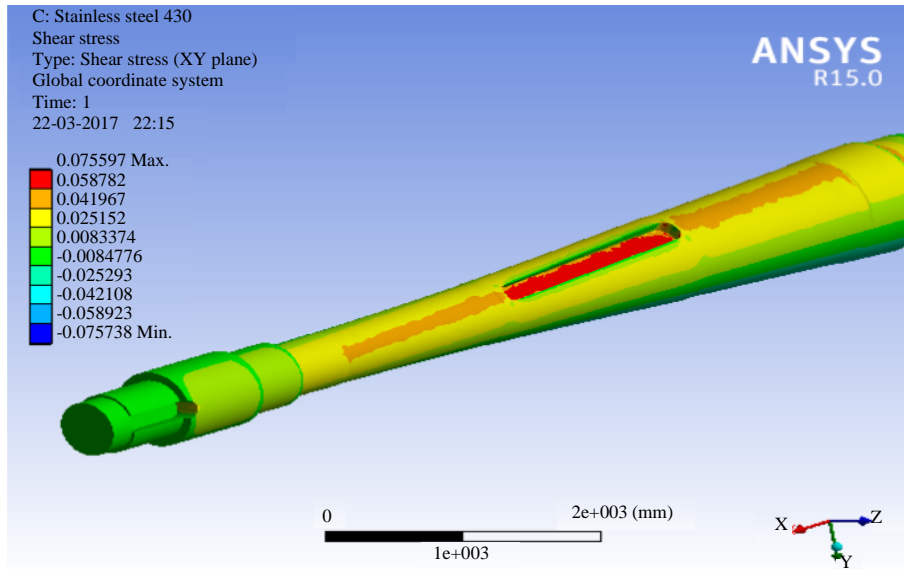


Fig. 3: Analysis of propeller shaft-stainless steel

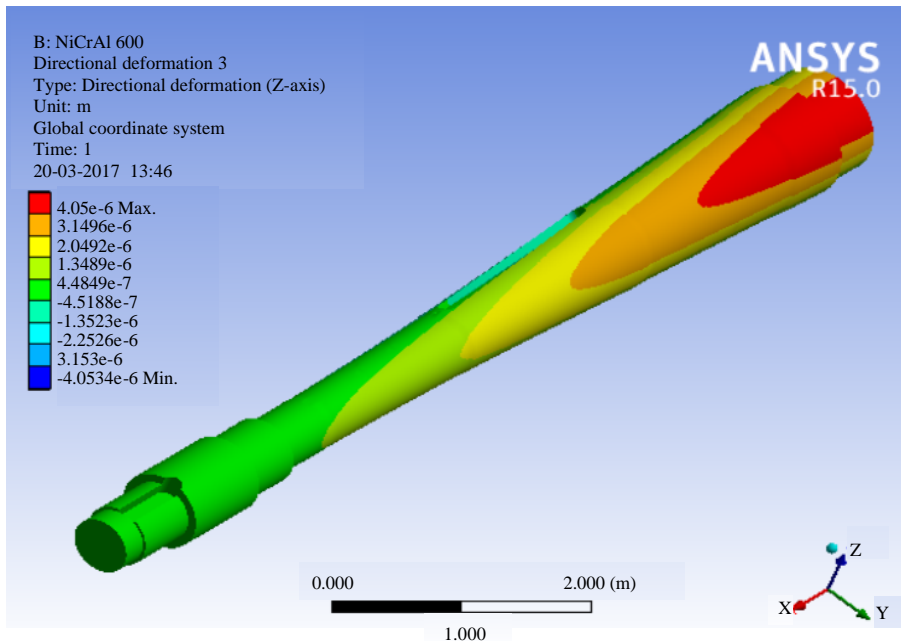


Fig. 4: Analysis of propeller shaft-nickel chromium

made up of stainless steel and nickel chromium showed enhanced properties when compared with conventional propeller shaft.

### **CONCLUSION**

The results showed that the propeller shaft made of nickel chromium showed least deformation. The deformation of the propeller shaft made up of stainless steel was higher when compared with the propeller shaft made up of nickel chromium. It was inferred that the propeller shaft made up of nickel chromium and stainless steel showed enhanced properties when compared with the existing propeller shaft.

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