

## Department of Automobile Engineering

### Research Facility for Experimental Investigation of Torsional Strength of Automotive Drive Shaft.

Developed by : Prof. R. M. Shinde

Month and Year : March 2014

#### 1. Funding Details:

A project funded under TEQIP SEED FUNDING SCHEME of RIT, Sakharale titled, 'Optimization of composite drive shaft for road vehicles' was completed successfully.

#### 2. Objectives:

1. To achieve experimental simulation of torsional strength of automotive drive shaft.
2. To determine angular deformation of automotive drive shaft subjected to torque.

#### 3. Technical details:

The setup consists of torque sensor to measure the torque is based on the specification of low passenger vehicles. The torque sensor selected will measure the torque from 0 to 5000Nm. The details of the torque sensor used for this test rig are as Static reaction type strain gauge based, Excitation-12 Volt DC, Least count- 1 Nm and Flange type fitting.

The angle sensor selected to measure the angle of twist of propeller shaft from  $0^0$  to  $90^0$ . The angle sensor is an incremental rotary encoder provides cyclical outputs (only) when the encoder is rotated.

The hydraulic cylinder is used to apply the hydraulic pressure on the beam attached to the shaft which is to be tested by fixing the one end of the shaft rigidly. The dimensions of the hydraulic cylinder are depending on the range of the torque to be apply on the shaft. Total length: 340 mm Diameter of inner rod: 35 mm Stroke length: 100 mm Bore: 63 mm, Valve hose diameter: 25.25 mm Hinged pin diameter: 15 mm Supporting Flange Length: 35 mm

One end of the shaft is fixed to the static torque transducer through flange and bearing support to calculate output torque and the torque is applied at the other end of the shaft which is also supported by bearing as a shaft is stationary. At the end of the input shaft there is twist angle sensor on an extended shaft to measure twisting of the shaft. As the applied torque on the other end of the shaft, the shaft will go on twisting and after critical point the failure of the shaft will be occurred. If the applied torque and the angle of twist of the shaft is known, then the torsional strength of the shaft will be estimated

#### 4. Work carried out so far:

2.M. Tech. dissertation titled 'Optimization of Composite Driveshaft for Road Vehicles' completed in June 2016.

#### 5. Outcomes (Publications):

1. Rajaram M. Shinde, Dhiraj D. Patil, Suresh M. Sawant 'Design and Development of Test Rig for Experimental Investigation of Low Passenger Vehicle Propeller Shaft'

Proceedings of the 2nd National Conference for Engineering Post Graduate Students, RIT NConPG-16, May 2016.

2. A research article titled 'Design of carbon/epoxy composite drive shaft for low passenger cars' has been published in international symposium on engineering and technology 'ISET 16' held at Trinity College of engineering and research, Pune. 19<sup>th</sup> -20<sup>th</sup> February 2016.

**Photograph of Research Facility developed:**

