

## Design, Fabrication and Experimental Analysis on Torque Measurement

Prof. Mainak Bhaumik<sup>1\*</sup>, Vishal Rajmane<sup>2</sup>, Vishal Jadhav<sup>2</sup>, Suraj Savant<sup>2</sup>, Sunil Nikule<sup>2</sup>

**ABSTRACT:** In the present day, automobile manufacturers demand a certain torque range from hinges provided by supply industry. However, there are no torque measurement system used by the industry to measure this kind of mechanisms and the available systems cannot meet expectations. The purpose of this study is to design a Electronic circuit-based Automatic torque measurement system. This system will be used to measure torque range as well as shaft diameter in according to RPM of the motor and any other dynamic devices. The developed system is an integrated mechatronic system that contains such subsystems as mechanical, electronic and control system. It is expected that the developed torque measurement system will fill an important gap in the relevant industrial sectors and will find widespread application area. This work focuses on the design development and testing of a portable, flexible, precise arrangement for torque measurement. It can be concluded that automatic torque measuring circuit can be used to measure torque in a rotating environment, however, some customization of the component is a required in order to overcome the limitations posed by commercial off-the-shelf solution.

**Keywords:** Automation, Torque Measurement System, Speed Measurement.

### 1. INTRODUCTION:

Shafts that transmit torsional loads, torques, are common in engineering applications.

Common symbols:  $\tau$ , M

SI unit: N\*m

Torque is a rotational force, defined mathematically as the rate of change of angular momentum of an object. It can be thought of as a twist to a specific object. The magnitude of torque depends on three things:

- The amount of force applied to the object.
- The length of the lever arm.
- The angle between the lever arm and the force vector.

An example of torque is a rotational force applied to a shaft causing acceleration, in this case the engine is the force driving a drive shaft. When load is applied to the engine the torque also increases. Not to be misunderstood with the term moment, which is a force applied to an object that does not change its angular momentum.

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Prof. Mainak Bhaumik, Vishal Rajmane, Vishal Jadhav,  
Suraj Savant, Sunil Nikule.

mainak.bhaumik04@gmail.com, vishalrajmane1997@gmail.com

Department of Mechanical Engineering, MGM's College of  
Engineering & Technology, Kamothe, New Mumbai-410209,  
India

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There are two types of torque; static and dynamic. There is one simple difference between them: dynamic torque involves acceleration while static torque does not. For example, when you unscrew the lid from a glass jar, you apply both static and dynamic torque. The torque that is applied initially is of the static variety because the lid is stationary. Once the lid begins to turn, however, the applied torque is dynamic. It is more difficult to measure dynamic torque than it is to measure static torque.



Fig 1. Torque Sensor

### 2. PROBLEM DEFINATION:

Today's World required Speed on each and every field. hence rapidness and quick working is the most important . As follows that we made automatic torque measurement set up instead of traditional torque measurement procedures as well as its calculation. We can get direct torque reading on display.

So we can eliminate all the torque calculations procedure. As a result direct torque is obtained by Automatic torque measuring set up. The main advantage of this set up is

we mounted any size of motor for calculating its torque. Thus this set up is most useful in industry for torque measurement purposes.

### 3. METHODOLOGY:

The Torque measuring setup can be made successfully. we become able to have market survey of raw material and project parts. we can actually implement practical procedure for manufacturing different components with the help of machining process such as cutting, drilling, welding, clamping, mounting etc.

**OPERATING PROCEDURE:** When we start the motor speed is fed to another shaft coupled with pulley. The torque sensor is mounted on along the shaft. The rotating movement is senses by torque sensor. Then this signal is transfer to circuit. Torque circuit displays torque as well as shaft diameter according to motor rpm. 'ON' Thus we get direct torque of motor by using this setup.



Fig. 2. The Torque measuring set up

### 4. RESULTS AND DISCUSSION:

In this project 'design, fabrication & experimental analysis on Torque measurement. which we have practically completed by overcoming various difficulties. we concluded that there are many parameters on which the total project is dependent i.e. Total knowledge of project, its setup, design, its applications, the advantages, its drawback, etc. Though we are having knowledge of this, we should be successful in practical

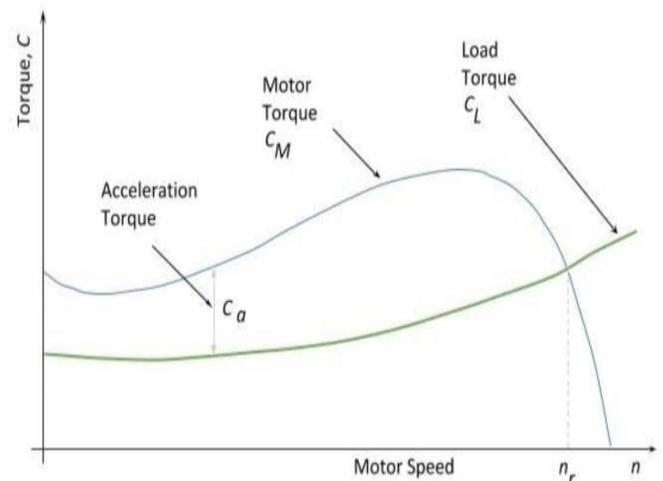


Fig 2. Motor speed Vs Torque

(assembly) work. We want to have the perfect decision about its design, material used for it & control on the cost of it. If we are having this all qualities in us or if we concentrate on all these parameters subjected to project.

### 5. CONCLUSIONS:

The Torque measuring setup has been designed with motor and shaft system using belt and chain drive mechanism. It has been designed to move in any place where torque measurement.

The torque measurement of motor is done with the help of torque sensor. The torque measuring sensor senses shaft twisting movement and displays torque as well as shaft diameter on display by conducting actual experiment these observations are noted.

### 6. ACKNOWLEDGMENT:

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