# ARHAM VEERAYATAN INSTITUTE
## OF ENGINEERING, TECHNOLOGY & RESEARCH
Haripar (Mota Asambia), Bhuj – Mandvi road, Mandvi Tal. Kutch (Gujarat)

**A FEEDBACK REPORT ON VISIT TO SARDAR SAROVAR DAM, SURAT.**

**Department:-** Electrical Engineering

**Date:**-02/12/2016

**Duration:-** 1 Day

**Venue:**- Maruti Motor Rewinding, Koday Pul, Mandvi-Kachchh.

**No. of Students Present:**-19

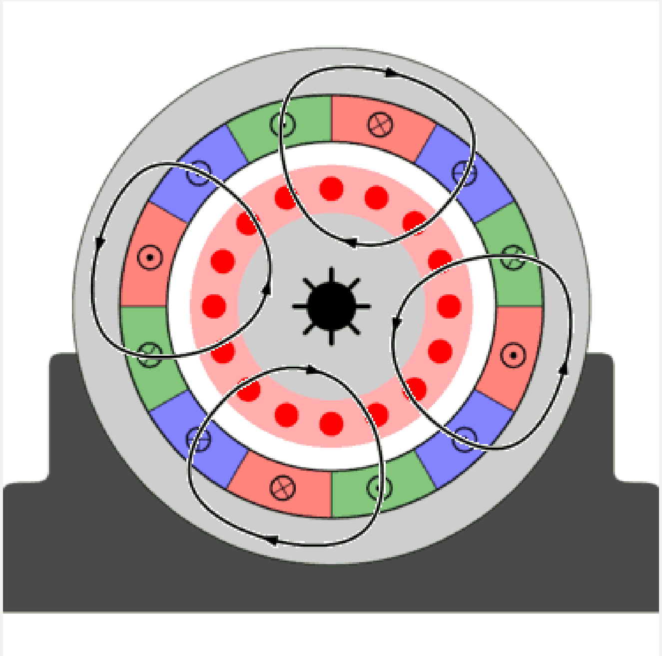
**Faculty Guide:** Mr Rakesh Bhadani

---

## Introduction

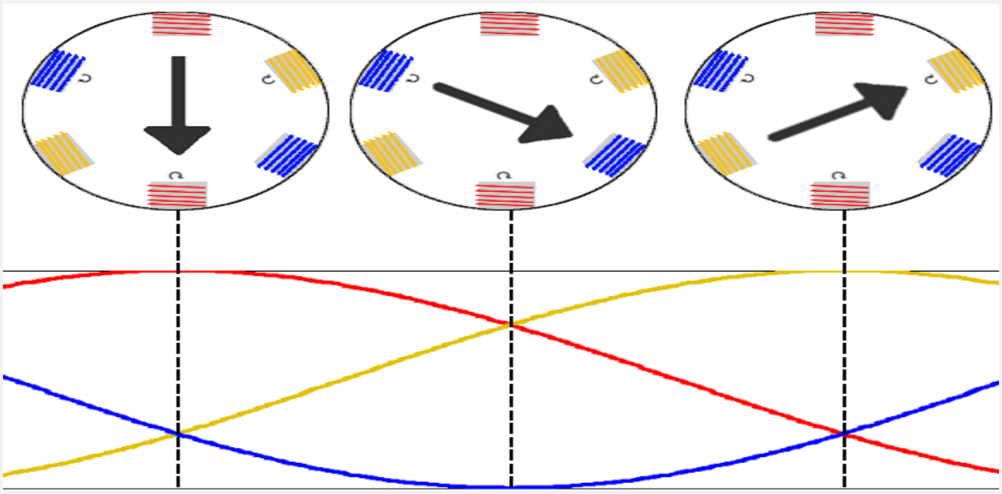
An asynchronous motor type of an induction motor is an AC electric motor in which the electric current in the rotor needed to produce torque is obtained by electromagnetic induction from the magnetic field of the stator winding. An induction motor can therefore be made without electrical connections to the rotor as are found in universal, DC and synchronous motors. An asynchronous motor's rotor can be either wound type or squirrel-cage type.

Three-phase squirrel-cage asynchronous motors are widely used in industrial drives because they are rugged, reliable and economical. Single-phase induction motors are used extensively for smaller loads, such as household appliances like fans. VFDs offer especially important energy savings opportunities for existing and prospective induction motors in variable-torque centrifugal fan, pump and compressor load applications. Squirrel cage induction motors are very widely used in both fixed-speed and variable-frequency drive (VFD) applications.



In induction motors, the AC power supplied to the motor's stator creates a magnetic field that rotates in time with the AC oscillations. Whereas a synchronous motor's rotor turns at the same rate as the stator field, an induction motor's rotor rotates at a slower speed than the stator field. The induction motor stator's magnetic field is therefore changing or rotating relative to the rotor. This induces an opposing current in the induction motor's rotor, in effect the motor's secondary winding, when the latter is short-circuited or closed through an external impedance. The rotating magnetic flux induces currents in the windings of the rotor; in a manner, similar to currents induced in a transformer's secondary winding(s). The currents in the rotor windings in turn create magnetic fields in the rotor that react against the stator field. Due to Lenz's Law, the direction of the magnetic field created will be such as to oppose the change in current through the rotor windings. The cause of induced current in the rotor windings is the rotating stator magnetic field, so to oppose the change in rotor-winding currents the rotor will start to rotate in the direction of the rotating stator magnetic field. The rotor accelerates until the magnitude of induced rotor current and torque balances the applied load. Since rotation at synchronous speed would result in no induced rotor current, an induction motor always operates slower than synchronous speed. The difference, or "slip," between actual and synchronous speed varies from about 0.5 to 5.0% for standard Design B torque curve induction motors. The induction machine's essential character is that it is created solely by induction instead of being separately excited as in synchronous or DC machines or being self-magnetized as in permanent magnet motors.

For rotor currents to be induced, the speed of the physical rotor must be lower than that of the stator's rotating magnetic field ($n_s$); otherwise the magnetic field would not be moving relative to the rotor conductors and no currents would be induced. As the speed of the rotor drops below synchronous speed, the rotation rate of the magnetic field in the rotor increases, inducing more current in the windings and creating more torque. The ratio between the rotation rate of the magnetic field induced in the rotor and the rotation rate of the stator's rotating field is called slip. Under load, the speed drops and the slip increases enough to create sufficient torque to turn the load. For this reason, induction motors are sometimes referred to as asynchronous motors.



## Program Schedule

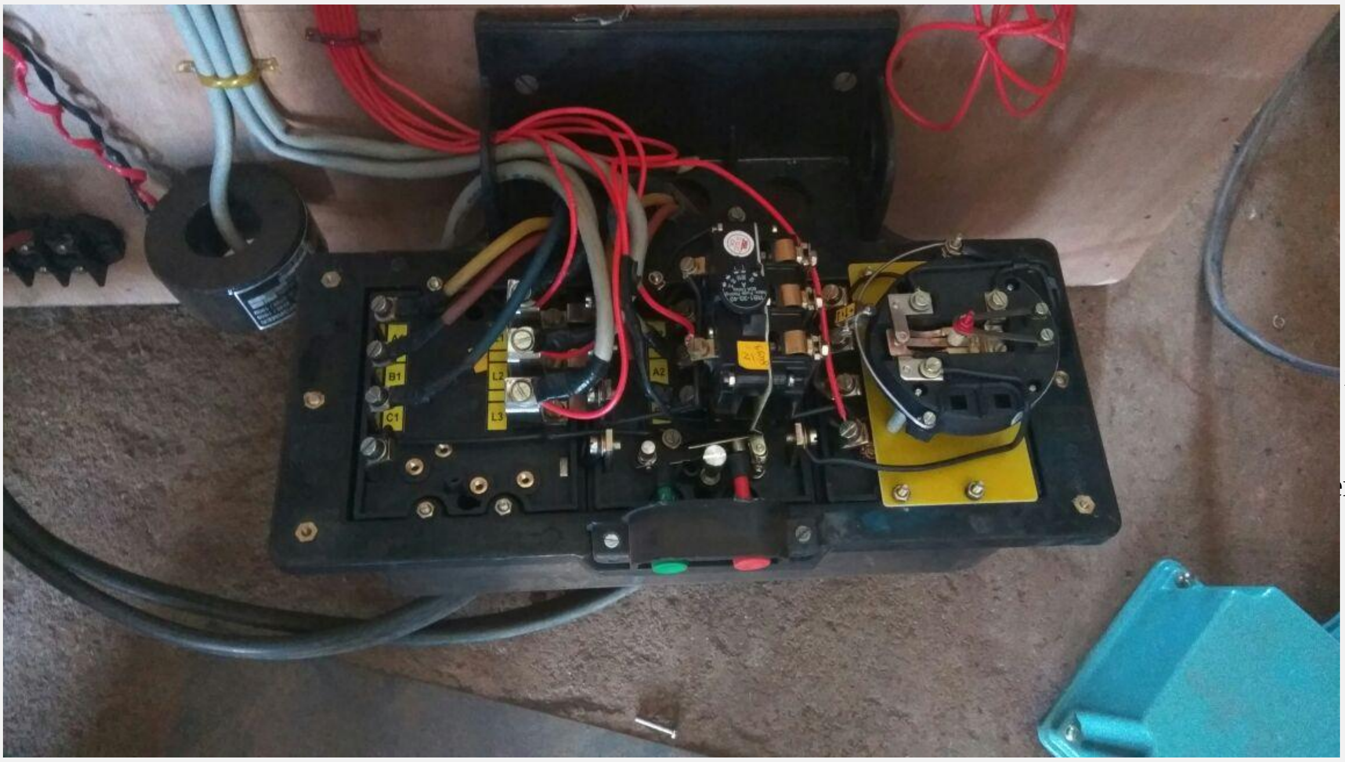
Visit to Maruti Motor Rewinding at Koday Pul, Mandvi on 2nd of December 2016, during 10:00 AM - 12:00 PM. Whole workshop was divided into two parts. One is designing of winding and making motors and second one is submersible pump winding design.

## Training Sections

- ### Winding of Induction Motor

The slots on the periphery of stator core of the three-phase induction motor carries three phase windings. This three-phase winding is supplied by three phase ac supply. The three phases of the winding are connected either in star or delta depending upon which type of starting method is used. The squirrel cage motor is mostly started by star – delta starter and hence the stator of squirrel cage motor is delta connected. The slip ring three phase induction motor are started by inserting resistances so, the stator winding of slip ring induction motor can be connected either in star or delta. The winding wound on the stator of three phase induction motor is also called field winding and when this winding is excited by three phase ac supply it produces a rotating magnetic field.


THE MOST
ENERGY EFFICIENT
PUMPS



its
of
rts

## Benefits & Recommendations

The students found this industrial visit was very useful. This visit improved the students' knowledge of various motor windings that being used as daily work & industries in India. Students were amazed at the speed at which the process occurred and how the automated systems could work according to the requirements. The students were expecting more visits like this one.