Design and Development of Re-Generative Electro Motor

Ajay B. Lathiya, Dhaval R. Dhakecha

(Scholar, Department of Automobile Engineering, Dr. S. & S. Ghandhy College of Engineering & Technology, Surat)

Abstract

The main purpose of our project is to provide electricity without any specific work like mechanical movement. We are trying to introduce basic design with parameters which will one kind of free and renewable energy and nevertheless no pollution and less maintenance as well as service is required. The design of the project is very simple. As the construction being simple and easy. This project can be implemented where ac motors are use and specifically where it run by battery or other power sources.

Keywords– Stator, Rotor, Secondary Stator, VSI, Voltage Regulator

I. INTRODUCTION

1.1 CONCEPT

In this technological era the world is facing energy crisis. Here we present the use of waste energy. In this project we are going to catch waste magnetic energy and convert it into electricity with the help of special arrangement. The energy will generate due to rotating magnetic field which is be able to rotate rotor and cross the conductor. Rotor is surrounded by primary stator furthermore secondary stator also used which is located around primary stator. When primary stator generate magnetic field for rotating rotor, some magnetic field is also used by secondary stator which leads to generate electricity.

Our tentative design is introduce over here by basic drawing as shown in figure with their elements name. Now onwards we are going to start physical model. Our concept generate electricity with help of waste magnetic field, this model impact is created which is the benefit leave for the social health and importantly economic situation.

1.2 COMPONENTS OF THE MODEL

1 Stator (∆ABC)
2 Secondary stator (∆αβƔ)
3 Rotor (squirrel cage) (O)
4 Voltage Source Inverter (VSI)
5 Voltage Regulator

1.3 FULL CYCLE

For easy understanding we have to divide this device in two separate parts one is induction motor and another is alternator.
induced rotor current, an induction motor always operates slightly slower than synchronous speed. The difference, or "slip," between actual and synchronous speed varies from about 0.5% to 5.0% for standard Design torque curve induction motors. The induction motor’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 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".

In relevant to alternator,

A conductor moving relative to a magnetic field develops an electromotive force (EMF) in it (Faraday's Law). This EMF reverses its polarity when it moves under magnetic poles of opposite polarity. Typically, a rotating magnet, called the stator(ΔABC) turns within a stationary set of conductors wound in coils on an iron core, called the secondary stator(ΔαβƔ). The field cuts across the conductors, generating an induced EMF (electromotive force), as the ac supply causes the magnetic field to turn.

The rotating magnetic field induces an AC voltage in the secondary stator windings. Which found at point α, β & Ɣ. Since the currents in the secondary stator windings vary in step with the speed and strength of the rotating magnetic field produce by stator.

We have to regulate induced current as per our requirement.

**EQUATION**

Synchronous speed,

An AC motor’s synchronous speed $s$, is the rotation rate of the stator’s magnetic field,

$$Ns = \frac{2f}{P},$$

Where $f$ is the frequency of the power supply, $P$ is the number of magnetic poles, and $Ns$ is the synchronous speed of the machine. For $f$ in hertz and $Ns$ in RPM, the formula becomes:

$$Ns = \frac{2f \left(\frac{60 \text{ seconds}}{\text{minute}}\right)}{P} = \frac{120f}{P} \left(\frac{\text{seconds}}{\text{minute}}\right)$$

For example, for a four-pole, three-phase motor, $P = 4$ and $Ns = \frac{120f}{P} = 1500$ RPM (for $f = 50$Hz) and 1800 RPM (for $f = 60$Hz) Synchronous speed.

**II. FIGURE**

**Figure.** Re-Generative Electro Motor Model

**III. CONCLUSION**

By advantage this project uses waste magnetic energy which is waste. It provide us AC current. No requirement of any external sources and no mechanical energy to run it.as there are no extra moving parts, hence there are no possibilities of accidents during application.

So that it can be used in Electrical vehicle(car,bus,train, truck etc.) where limited energy. We can also obtain more electricity by doing some modification in the model.

However it has no limitation but sometimes it require cooling system to run in great efficiency.

**REFERENCES**

**BOOK:**
Automobile engineering by R.B. Gupta

**WEBSITE:**
www.wikipedia.com