

Generation of electricity using motor in a running train (A review)

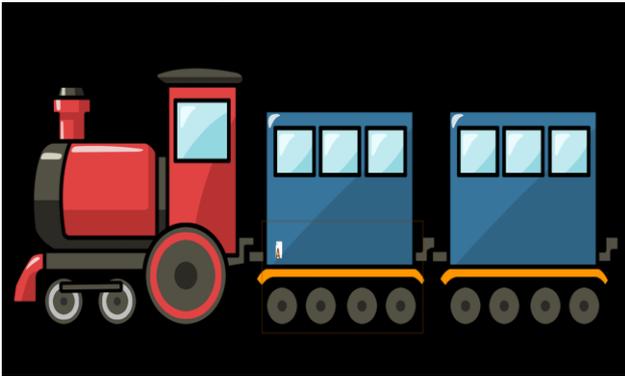
Yogesh .C. Pathak, Aditya Bokde, Palash Tahatwad, Pankaj Zore, Pratik Badwaik, Aniket Naitam

INTRODUCTION

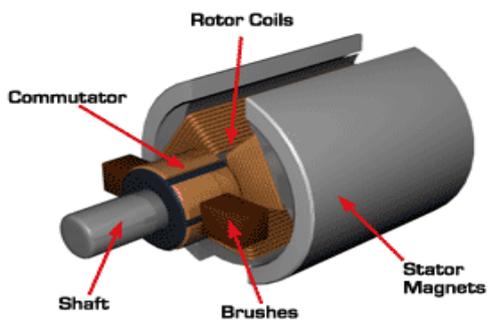
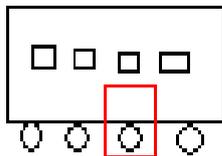
Using the principle of conversion of mechanical energy into electrical energy with the help of motor generation of electricity is generated in the running train.

Concept:

Using the rotating motion of wheels of train we can generate electricity by placing a motor in between the wheels as follow;



Above figure represent the train running on the route and the mechanism used in the blocked named as "a" is as follow:



by placing the motor of suitable rpm it will generate electricity which will further can be used as general purpose in train itself for example :charging , light ,fan ,etc.

Function of motor:

Armature

A d.c. motor consists of a rectangular coil made of

insulated copper wire wound on a soft iron core. This coil wound on the soft iron core forms the armature. The coil is mounted on an axle and is placed between the cylindrical concave poles of a magnet.

Commutator

A commutator is used to reverse the direction of flow of current. Commutator is a copper ring split into two parts c_1 and c_2 . the split rings are insulated from each other and mounted on the axle of the motor. The two ends of the coil are soldered to these rings. They rotate along with the coil. Commutator rings are connected to a battery. The wires from the battery are not connected to the rings but to the brushes which are in contact with the rings.

Brushes

Two small strips of carbon, known as brushes press slightly against the two split rings, and the split rings rotate between the brushes.

The carbon brushes are connected to a d.c. source.

Principle and working:

We've all been there - one moment you're watching your favorite program on TV and the next you're in the dark because the power's gone out. at such a time, you may wish you had a candle or a flashlight so that you could see in your dark house. but what would be really useful is a generator because this converts mechanical energy into electrical energy. If the generator were powerful enough, you could use it to restore electricity to your house, at least for a little while.

Now that you know how handy a generator is, you may be tempted to rush to the store and buy one. So, you get in your car and drive there, pick one up and bring it home. Once you get your power restored, you realize that in the darkness you were clumsy and knocked your dinner plate onto the floor. so, you get the vacuum out and start cleaning it up. at this point you have done an amazing thing - you have essentially reversed what the generator did! Inside the vacuum is an electrical motor, which converts electrical energy into mechanical energy.

While the generator and the vacuum (or any other device powered by a motor) may serve different functions, they are actually two sides of the same coin. In fact, they are the same device! In an electrical motor, the input is electricity and the output is mechanical power. Contrary to this, a generator takes mechanical power and outputs electricity. In both cases, electricity is flowing - just in a

different direction!

Electromagnetism

Both motors and generators run because of something called electromagnetic induction. Discovered by Michael Faraday, this is when a voltage is induced by a changing magnetic field. With electromagnetic induction, an electric current can be produced in a coil of wire by moving a magnet in or out of that coil, or by moving the coil through the magnetic field. Either way, voltage is created through motion.

The amount of voltage induced depends on the number of loops in the coil of wire, as well as the speed at which the magnet is moved through the coil. A greater number of coils means a greater amount of voltage is induced. Similarly, the faster the magnet is moved through the coil, the more voltage you get.

What does this have to do with motors and generators? Well, a generator produces electricity by rotating a coil in a stationary magnetic field, and in a motor, a current is passed through a coil, which forces it to spin. In both cases, Faraday's law of electromagnetic induction is employed, allowing you to produce electricity in your house and then use it to vacuum your floor, wash your dishes in the dishwasher, and keep food fresh in your refrigerator and so much more.

Remember before how we said that a motor and a generator are the same device, but producing opposite results? What we mean here is that the flow of electricity is reversed, not that the machine itself operates in reverse. So, you can't just take a generator and turn it into a motor by 'reversing' the components of the machine. Likewise, with an electric motor you can't just flip a switch that makes the components operate in reverse to produce electricity. Instead, what you have to change is the direction the electricity flows: inward for a motor and outward for a generator.

Alternating and direct current

Ever heard of ac/dc? We're not talking about the Australian rock band - this is a physics lesson after all! When we're referring to ac and dc for motors and generators we're talking about alternating current and direct current. Like the name implies, alternating current alternates direction as it flows through a circuit. In contrast, direct current does not change direction as it flows through a circuit.

Motors and generators are generally either ac or dc. The type of current utilized in the device depends on whether you are more concerned with efficiency or cost. For example, ac motors and generators are more efficient, but also cost more. Most of the electronics you use, like your cell phone and tablet, rely on ac power because of its efficiency. Most hybrid and electric cars also use alternating current.

Advantages:

1. Conservation of electricity.
2. Production of electricity without any other external source.
3. *Less expensive.*

YOGESH .C. PATHAK(1), ADITYA BOKDE (2),
PALASH TAHATWAD (3) PANKAJ ZORE(4) PRATIK
BADWAIK (5) , ANIKET NAITAM(6)

(1)(Guide) ASST PROF. COMPUTER TECHNOLOGY
DEPARTMENT, PRIYADARSHINI COLLEGE OF
ENGINEERING, NAGPUR.

(2, 3, 4, 5,6)Students, Computer Technology Department,
PRIYADARSHINI COLLEGE OF ENGINEERING,
NAGPUR