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# POWER GENERATION USING PERMANENT MAGNET MOTO

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## ABSTRACT

*This paper demonstrates a prototype model for the power generation using permanent magnet motor. The renewable resources have many disadvantages such as dependent in nature, unreliable, occupies large space, maintenance cost is high. To rectify these disadvantages of renewable resources, this paper is implemented. Permanent magnets are used as the source; a generator is added for power generation.*

***Keywords: DC generator, permanent magnets.***

## I. INTRODUCTION

The demand on various sources of energy especially renewable energy source has significantly increased in the 21$^{st}$ century. Renewable resources such as solar, wind, geo thermal, bio gas etc. are eco friendly & non pollutant and rectify disadvantages of non renewable energy sources. But renewable resources have many drawbacks such as dependent in nature, unreliable, occupies large space, maintenance cost are high. To rectify these limitations of renewable resources permanent magnet motor is used. In this paper, there is no need of input supply to the motor. The motor is made up of permanent magnets. The magnet motor is made up of stator and rotor. The magnet motor is coupled with DC generator for DC supply. It is known as free power generation.

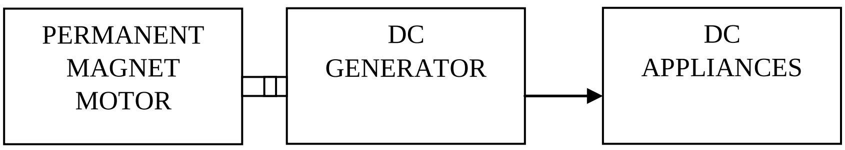


**Fig 1 Block diagram**

## II. PRINCIPLE OF OPERATION

The permanent magnet motor is based on repulsive forces between magnets. It is coupled with DC generator.

## III. DESIGN AND CONSTRUCTION

The construction of magnet motor is same as DC motor. It consists of stator and rotor.A magnet is a material or object that produces a magnetic field. Otherwise it is defined as a piece of iron or other material which has its component atoms so ordered that material exhibits properties of magnetism, such as attracting other iron-containing objects (or) aligned itself in an external magnetic field.

## IV. TYPES OF PERMANENT MAGNETS

4.1 Neodymium iron boron (NdFeB)
4.2 Samarium cobalt (SmCo)
4.3 Aluminum Nickel Cobalt
4.4 Ceramic magnets.

### 4.1 NEODYMIUM IRON BORON (NdFeB)

It has high coercive force. They have an extremely high energy product range up to 50 MGOe. Because of the high product energy level, they can be usually being manufactured to be small and compact in size. They are very strong magnets and are difficult to demagnetize. It can withstand temperature in 200$^{o}$C. High BHmax roughly 10 times higher than a ceramic magnet. MGOe range: 33 to 52

### 4.2 SAMARIUM COBALT (SmCo)

Like NdFeB, SmCo also very strong and difficult to demagnetize. They are also highly oxidation resistant and temperature resistant, withstanding temperature up to 300$^{o}$C.The cost of SmCo is higher than NdFeB.

MGOe range: 16 to 33

### 4.3 ALNICO

It is made up of three ingredients: Aluminum, Nickel and Cobalt. Although they feature good temperature resistance, they can easily be demagnetized and are sometimes replaced by ceramic and rare earth magnets in certain applications. MGOe range: 5 to 9

### 4.4 CERAMIC MAGNETS

Comprised of sintered iron oxide and barium or strontium carbonate ceramic magnets are typically inexpensive and easily produced either through sintering or pressing. However because these magnets tend to be brittle, they are one of the most commonly used type of magnet and are strong and not easy to demagnetize. MGOe range: 1.05 to 3.8

## V. MGOE (MEGAGAUSS OERSTED)

The oersted is the unit of auxiliary magnetic field H in CGS SYSTEM. The unit in SI system is A/m. it determines the magnetic field strength. The oersted is defined as dyne per unit pole. The oersted is 1000/4$\pi$ A/m.

The dyne is a unit of force specified in centimeter- gram-second system of units (CGS),predecessor of the modern SI .The dyne is defined as the force required to accelerate a mass of one gram at a rate of one centimeter per second squared.

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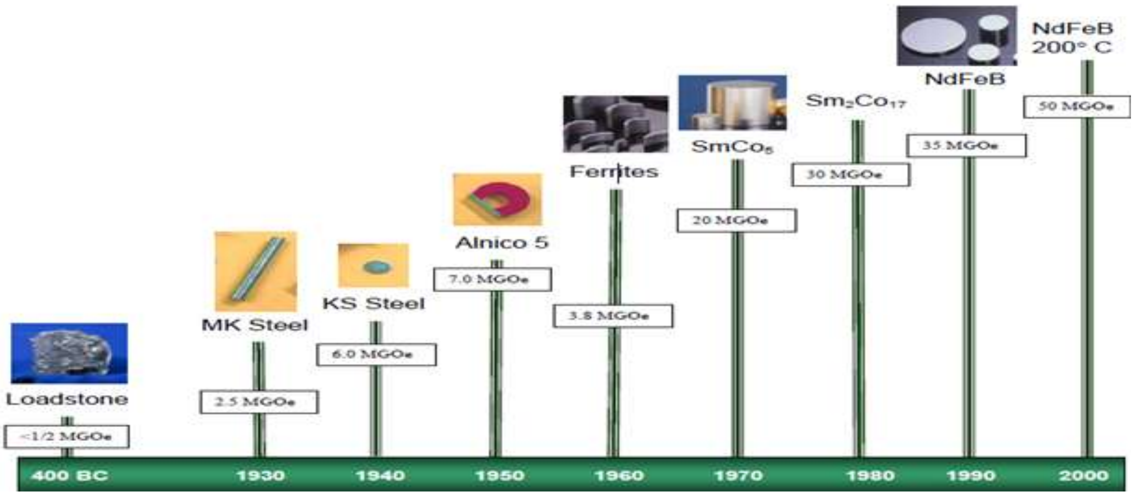


**Fig.2 Evolution of permanent magnets**

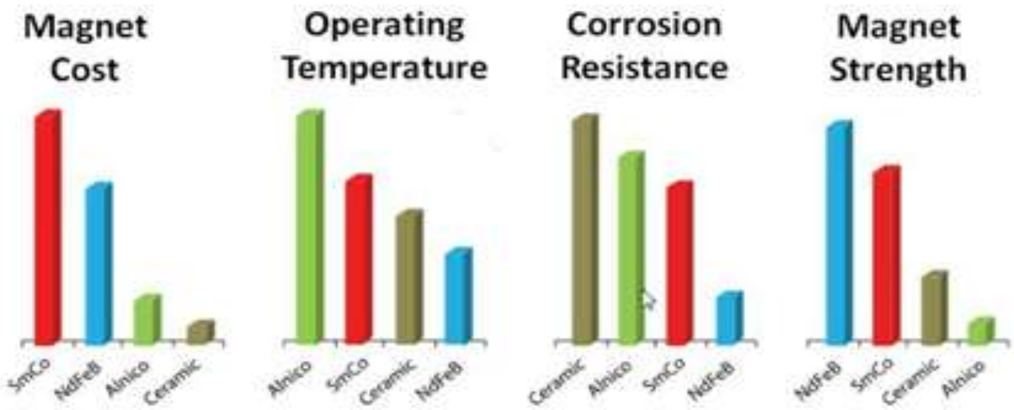


**Fig. 3 Comparison of permanent magnets**

## VI. CURIE TEMPERATURE

| PERMANENT MAGNETS | TEMPERATURE IN KELVIN |
|---|---|
| NEODYMIUM IRON BORON | 583 to 673 k |
| ALUMINUM NICKEL COBALT | 973 to 1133 k |
| SAMARIUM COBALT | 993 to 1073 k |
| CERAMIC | 723 k |

Based on these characteristics, NdFeB or SmCo can be preferred.

## VII. WORKING OPERATION

It consists of

7.1 Stator

7.2 Rotor

The stator consists of permanent magnets. The structure of stator is made up of the open-close type. The yoke is made up of wood or plastics. The permanent magnets are aligned in inner part of wood. The woods are attached with aluminum plates.

The rotor consists of cylindrical type and permanent magnets are aligned with cylindrical rod in cross manner.

When the stator opens, it does not conduct. The rotor in rest position. When the rotor makes to rotate by applying mechanical force, the rotor rotates. The stator is closed after applying mechanical force to rotor for continuous rotation.

## VIII. GENERATED VOLTAGE IN DC MACHINE

It is represented by the equation,

$$V_g = \left(\frac{Z}{a}\right) \times p \times \phi \times \left(\frac{N}{60}\right)$$

Where,

Z= Number of armature conductors

a= number of parallel paths between the brushes

P= number of poles

N= speed of rotor.

The generation of DC supply depends on the speed of magnet motor.

## IX. ADVANTAGES

The primary advantage of permanent magnet motor is that no potentially harmful emissions are released into the atmosphere. No Pollution is generated with permanent magnet motor. It does not require a massive amount of space and suitable for all climates.

## X. CONCLUSION

In this paper, we proposed a system to distribute the power generated from permanent magnet motor efficiently. By increasing the size of permanent magnets, it is possible to construct a HVDC commercial grid using Marx generator which solves the problems of electricity in future and it can be distributed effectively to rural and urban areas and by using the inverter, it converts DC to AC supply for AC appliances.

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