ISSN: 0974-2115
www.jchps.com Journal of Chemical and Pharmaceutical Sciences

Emission free prime mover

A.Ajithkumar[1*], K.Gopalakrishnan[1], S.Gokul[1], J.Hrishi[1], S.Bharath Raghav[2]
[1]Department of Mechanical Engineering, Jeppiaar Engineering College, Rajiv Gandhi Salai, Chennai,India
[2]Department of Electronics and Communication Engineering, Panimalar Institute of technology,Chennai,India.
***Corresponding author: E-Mail: ajithkumarasalavaraja@gmail.com**

ABSTRACT

One of the major issues in the 21st century is the production of alternative source for fuel(petrol/diesel).Many researches and experiments are going on to find out the lowest calorific value, replacing fuel. In our analysis we are converting magnetic energy into mechanical energy, by the use of neodymium magnets. These magnets are powerful, permanent rare- earth metal and they are made from an alloy of neodymium, iron and boron. These magnets are fixed to the blades of the rotor which is keyed to the wheel shaft of the vehicle. A bigger magnet of the same type is fixed adjacent to the rotor. When it is moved near the rotor, there exists a magnetic repulsion and due to this the rotor starts rotating since the rotor is keyed to the wheel, the shaft rotates and hence the vehicle moves. The speed can be varied by moving the magnet further near to the rotor this follows the basic principle of braking principles of braking system used in bi-cycles.

KEY WORDS: Alternate source, Neodymium magnets, ferromagnetic.

1. INTRODUCTION

Neodymium is a rare-earth material which is the most powerful magnet available commercially. These have replaced other types of magnets in many applications in modern products that require strong permanent magnets, such as motors in cordless tools, hard disk drivers and magnetic fasteners etc. This magnet is fixed to the blades of the rotor and the rotor is keyed to the shaft of the vehicle and when brake is applied, the brake shoes stop the motion of the wheel. Likewise a bigger magnet act as a prime mover and so the rotor rotates due to repulsion.

Neodymium Magnet: Neodymium magnet, the most widely used rare- earth material and permanent magnet. It is an alloy of neodymium, iron and boron to form Nd_2 $Fe_{14}B$ tetragonal crystalline structure. The various magnetic properties of Neodymium magnet are higher remanance (which measures the strength of the magnetic field), much higher coercively (the materials resistance to become demagnetized), lower curie temperature (temperature at which the material loses its magnetism) than other. Neodymium is alloyed with terbium and dysprosium in order to preserve its magnetic properties at high temperature

Fig.1.Neodymium Magnet

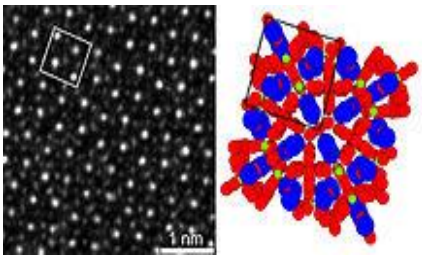

Fig.2.Magnetic Properties

Motion inducer: The working is similar to the braking system, but the principle varies. The motion inducer is a metal piece especially made of aluminum or aluminum alloys (nonmagnetic materials is preferred). The motion inducer consist of big neodymium magnet which when accelerated moves towards the rotor consisting of magnets. This moves along the lateral side

Rotor: The rotor is a circular body made of non-magnetic materials like aluminum or copper. The rotor is keyed to the wheel shaft of the car. When the motion inducer is moved front and back the wheel moves accordingly. The rotor rotates about the axis and is restricted to move in the lateral direction.

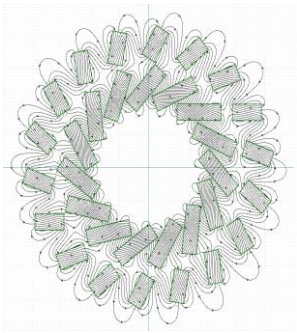

Fig.3. Image of Rotor axis

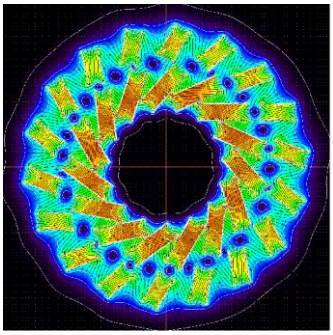

Fig.4. Axis of Rotation of Rotor

Comparitive Study of Neodymium:

Table.1.Comparison Chart for Magnets

Magnet	B_r (T)	H_{ci} (kA/m)	BH_{max} (kJ/m^3)	T_C (°C)	T_C (°F)
$Nd_2Fe_{14}B$ (sintered)	1.0–1.4	750–2000	200–440	310–400	590–752
$Nd_2Fe_{14}B$ (bonded)	0.6–0.7	600–1200	60–100	310–400	590–752
$SmCo_5$ (sintered)	0.8–1.1	600–2000	120–200	720	1328
Sm(Co, Fe, Cu, Zr)$_7$ (sintered)	0.9–1.15	450–1300	150–240	800	1472
Alnico (sintered)	0.6–1.4	275	10–88	700–860	1292–1580
Sr-ferrite (sintered)	0.2–0.78	100–300	10–40	450	842

Table.2.Comparison of physical properties of sintered neodymium and Sm-Co magnets

Property	Neodymium	Sm-Co
Remanence (T)	1–1.3	0.82–1.16
Coercivity (MA/m)	0.875–1.99	0.493–1.59
Relative permeability	1.05	1.05
Temperature coefficient of remanence (%/K)	−0.12	−0.03
Temperature coefficient of coercivity (%/K)	−0.55..–0.65	−0.15..–0.30
Curie temperature (°C)	320	800
Density (g/cm^3)	7.3–7.5	8.2–8.4
CTE, magnetizing direction (1/K)	5.2×10^{-6}	5.2×10^{-6}
CTE, normal to magnetizing direction (1/K)	-0.8×10^{-6}	11×10^{-6}
Flexural strength (N/mm^2)	250	150
Compressive strength (N/mm^2)	1100	800
Tensile strength (N/mm^2)	75	35
Vickers hardness (HV)	550–650	500–650
Electrical resistivity (Ω·cm)	$(110–170)\times10^{-6}$	86×10^{-6}

2. METHODS AND MATERIALS USED IN NEODYMIUM MAGNET

Choke: At inception for the necessity of initial torque we energize the system with the aid of a motor present beneath it. Which thereby acts as a motion transmitted in a circular motion. It consumes very less energy which results in activating the system.

Attributes of Neodymium Magnets

- There are different attributes of neodymium magnets that differentiate them from other magnets.
- Neodymium magnets are very strong permanent magnets. In fact they are the strongest of all rare earth magnets and also the strongest permanent magnets that exist today
- Neodymium magnets have a very high resistance to demagnetization.
- They are good in ambient temperature

Advantages:

- This technique replaces the usage of petrol/ diesel to some extend
- Simple construction
- Low maintenance cost
- Less skilled operator is enough
- Energy produced is constant and can be varied
- Neodymium magnet is more powerful and permanent magnet
- Life time is more
- It act as an alternate to fuel(petrol/diesel)

Disadvantages:

- $Nd_2Fe_{14}B$ is more vulnerable to corrosion.
- This type of corrosion leads to crumbling of a magnet into a powder of small magnetic particles.
- Even a small sized neodymium magnet are strong enough to cause injuries to human beings when body parts is pinched between two magnets.
- When the temperature reaches above 80oC the magnetic power reduces.
- The stronger magnetic fields of neodymium affects mechanical and electrical device.

Design and model:

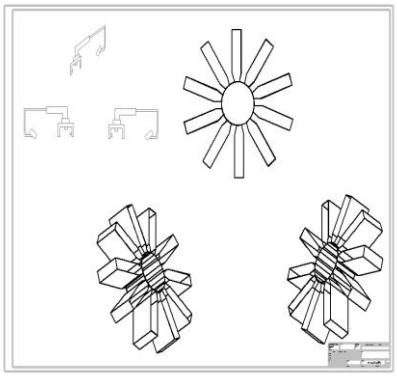

Fig.5.Design Model of Magnet

3. CONCLUSION AND RESULT

With the efficient usage of the natural magnetic energy in a different way to obtain an emission free energy source. Hence with this new alternate eco-friendly motion generation system can be utilized in such a way to preserve and conserve the ecosystem as it existed.

REFERENCS

Catherine Westbrook, Carolyn Kaut, Carolyn Kaut-Roth, MRI (Magnetic Resonance Imaging) in practice, Wiley-Blackwell, 1998, 217.

Griffiths, chapter 12 Jackson, John David, Classical electrodynamics (3rd ed.). New York: Wiley.ISBN 0-471-30932-X, 1998-1999.

Meyers HP, Introductory solid state physics, CRC Press, ISBN 9781420075021, 1997, 362.

Milton, Kimball A, Theoretical and experimental status of magnetic monopoles, Reports on Progress in Physics, 69(6), 2006, 1637–1711.

Schmidl, Petra G, Two Early Arabic Sources on the Magnetic Compass, Journal of Arabic and Islamic Studies, 1, 1996–1997, 81–132.