



## ENERGY GENERATION USING FLYWHEEL AND MAGNETS

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**Abstract:**Electricity has evolved as an essential source over the years. This progressive world today, has become so much dependent on electricity, such that it is impossible to live without it. In this case, generation of more and more electricity is much important to meet the needs.

Usually, electricity is produced using nonrenewable sources such as petrol, diesel, coal, etc., which unfortunately creates lot of pollution to our environment. But what is the alternative? Electricity is present everywhere in limitless quantities and can drive the world's equipment without the need of non-renewable sources. Yes. Generation of electricity using flywheel is one among them.

The aim of our project is to generate electric energy using flywheel. The main reason to develop this idea of producing electric energy using a flywheel and magnet is that it is clean and does not cause pollution.

The gravity wheel or flywheel is coupled with magnets and the gear-train in order to produce energy. Flywheel are usually manufactured by casting process with single materials with high strength. Along with flywheel, magnets are used in such a way that it delivers mechanical force for the flywheel to overcome the frictions on the flywheel. This helps the flywheel to rotate longer which in turn increases the time of generation of electric energy. The friction can be further reduced using smooth bearings.

The outcome of this project is that the power is generated and can be stored using flywheel, magnets and generator.

**Index Terms - Flywheel,Generator,Pedal,Magnet.**

### I. INTRODUCTION

One of the most important gifts that science has given to humanity is electricity. Furthermore, it has become so integrated into modern life that it is difficult to imagine life without it. There are many uses for electricity in daily life. Electrical energy must be created in order for an object to be able to use it to consume the power needed for its operation. Electricity can be generated in a variety of methods, such as by burning coal, petroleum, or diesel, or by harnessing steam, for example.

These procedures are inconvenient in a variety of ways. The environment is endangered by the burning of non-renewable resources because toxic gases are produced. Hazardous materials are also employed in the production of the batteries that generate electricity. Batteries and high-pressure steam are expensive and difficult to maintain.

Consider offering an alternative to the methods indicated above.

Would it be practical to produce power by converting stored kinetic energy into electrical energy?

Yes. A flywheel attached to a generator stores the mechanical force that is applied as kinetic energy. This way of creating electricity is known as flywheel power generation. The generator, which generates power, rotates with the flywheel.

### II. LITERATURE SURVEY

The significance of flywheel design criteria in terms of energy storage performance. In [1], the disk-rim style flywheel was suggested for light weight. The flywheel's mass is kept to a minimum, subject to constraints such as sufficient moment of inertia and permissible stresses. Each disc is covered with revolving discs of uniform thickness and density, and the rim is not affected by the junction's suitability. Suitable centrifugal stress frontier conditions are used.

In [2], two-horsepower mains motor drives a gear-train consisting of a succession of belt and pulley drives that create over twice the rpm at the shaft of an alternator. The interesting thing about this system is that it can get more electrical output power from the alternator's output than appears to be drawn from the input motor. The gear-train is linked with the gravity wheel or flywheel to produce extra excess energy or free energy. In [3], the findings of the proposed computer-aided analysis and

optimization technique reveal that proper flywheel shape design can improve Specific Energy performance while also reducing operational loads on the shaft and bearings. In [4], rather than modifying the dimensions, we changed the materials and used materials that could store the same amount of energy while having a lower mass. Flywheels are made using a single-material casting process that has a high strength but also a high weight. For the flywheel, we use composite materials to provide great strength while reducing weight. In [5], with the design, construction, and design of a proof-of-concept prototype, the SJSU-RBS, a revolutionary regenerative braking system, was developed. It consists of a fast-spinning alternator unit, a progressive braking system, and an epicyclical gear train.

### III. DESIGN AND IMPLEMENTATION

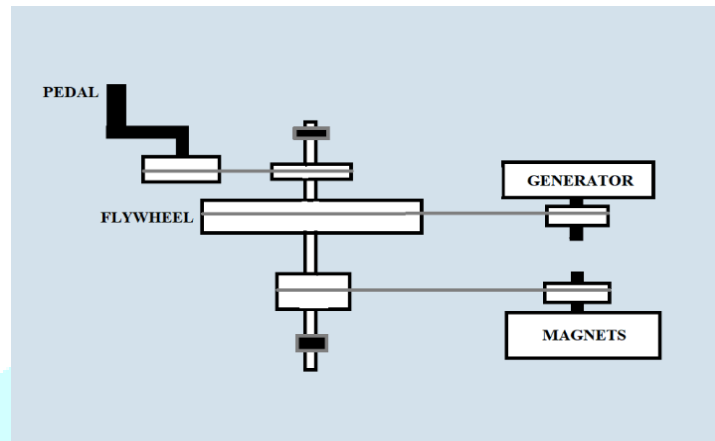


Fig: BLOCK DIAGRAM OF THE PROJECT

#### Detailed Overview of Block diagram

1. **Generator:** The alternator is driven by the power wheel via the belt drive. The generator is design by using a ceiling fan stator which consists of 16 set of windings. It is made to generate to electricity by replacing the metal rotor with a wooden rotor which comprises of neodymium magnets.
2. **Flywheel:** The flywheel is used to convert low RPM on the input side to greater RPM on the output side. The flywheel is equipped with a counterweight to help the generator rotate at a faster rate and for a longer period of time. Placing the flywheel on the hub, which is attached to the little sprocket, rotates it. The chain connects the bigger sprocket to the little sprocket of the flywheel.
3. **Perpetual motor:** Perpetual motor is comprised of a V-gate of strong neodymium magnets attached to a drum. The north pole is pointing upward in one lane, while the south pole is facing upward in the other. The drum is secured to the foundation using metallic rods. The driving magnets are positioned precisely above the drum, with poles pointing in the opposite direction as the drum magnets. Another movable rod (up and down) holding driving magnets is placed above the drum with the help of a support. Attaching two blades to the drum shaft, which spin with the drum and increase the driving magnets on a regular basis, allows the drum to move constantly, is considered a cam system.
4. **Neodymium metal:** Neodymium metal is first recovered from purified Rare Earth oxides in an electrolytic furnace. Rare Earth elements are plentiful; the element Neodymium, for example, is more common than gold. The "Rare Earth" elements, lanthanides (also known as lanthanides), get their name from the unusual oxide minerals used to extract them.

#### Working:

- Initially the mechanical force is applied externally by rotating the pedal by human force.
- The mechanical force powered by pedal rotates the flywheel, V gate magnetic machine and generator.
- This mechanical energy is stored in the form of kinetic energy in the flywheel.
- When the external mechanical force is stopped the energy stored in the flywheel is utilised which keeps it rotating for sometime.
- The flywheel is connected to V type magnetic machine.
- This magnetic arrangement picks up the momentum after some rotation which in turn provides rotational force to the flywheel.
- The generator which is also connected to flywheel rotates along with the flywheel.
- The generator converts mechanical energy into electrical energy.

### IV. RESULTS AND CONCLUSION

The electrical energy in this project is produced by a generator that is physically powered by human exerted external mechanical force that is stored in a flywheel and also by a V-type magnetic machine. The flywheel keeps spinning for a while after the mechanical force from the outside source is gone. As a result, the model functions as a battery.

The flywheel's mechanical energy is lost as a result of friction. Utilizing the magnetic levitation approach, which calls for the employment of stronger magnets, can lessen this.

Additionally, the flywheel will get greater rotational force from the V-type magnetic machine if the magnets utilized in it have a stronger magnetic field.

## V. SCOPE FOR FUTURE WORK

In recent years, the demand for electricity has been steadily increasing. It is difficult to imagine a life without electricity today. Our lives have become so reliant on electricity, from the basic necessity of using lights and fans to the use of electric vehicles. In this scenario, increasing the generation and storage of electricity is critical. However, the sources of electricity are limited. Nonrenewable energy sources are running out, and these methods of producing electricity are hazardous to the environment. Renewable energy sources such as hydro and wind require a high installation cost, a large area, and so on. In this case, producing electricity with a flywheel can be an excellent source with few resources and simple maintenance.

This method of producing electricity can be improved by employing various methods and techniques that increase the production time of electricity. This method can also be used to store energy, making it a viable alternative to batteries. In the current situation, batteries are manufactured using expensive, nonrenewable, and hazardous materials.

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