Fabrication of Free Energy Generation Using Flywheel

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Abstract- *Flywheels have been under consideration to be used for energy storage purposes, with rapid growth in the economy, the demand for electricity is also increasing. With the rising demand for reliable, cost-effective, and environmentally friendly energy storage, the Flywheel Energy Storage System (FESS) is quickly coming into its own. Energy is usually produced by non-renewable sources such as petrol, kerosene and nuclear which unfortunately create pollution; this is the main reason the idea of producing energy using a Flywheel.*

One energy storage technology now arousing great interest is the flywheel energy storage systems (FESS), since this technology can offer many advantages as an energy storage solution over the alternatives. Flywheels have attributes of a high cycle life, long operational life, high round-trip efficiency, high power density, low environmental impact, and can store megajoule (MJ) levels of energy with no upper limit when configured in banks. This paper presents acritical review of FESS in regards to its main components and applications, an approach not captured in earlier reviews. Additionally, earlier reviews do not include the most recent literature in this fast-moving field.

A description of the flywheel structure and its main components is provided, and different types of electric machines, power electronics converter topologies, and bearing systems for use in flywheel storage systems are discussed. The main applications of FESS are explained and commercially available flywheel prototypes for each application are described. The paper concludes with recommendations for future research

Keywords- Flywheel, storage, non-renewable energy, belt and pulley drive, S Glass Epoxy, energy storage systems (ESS); flywheel energy storage systems (FESS); power electronics converters; power quality improvement

I. INTRODUCTION

This is a mechanical device which uses the flywheel to store energy in the form of inertia. In this system we apply extra energy source to start the main motor like electricity or by applying the mechanical energy. In this system a main motor is used to drive a series of pulley and belt arrangement which forms a gear train arrangement which produce a twice/ thrice speed at the shaft of generator. The construction needs to be robust and secure as ideally, the rate of rotation will be high as possible, and of course, the wheel increases if the flywheel weight is concentrated as far out toward the rim of the flywheel as is possible. Needs to be exactly at right angles to the axle on which it rotates and exactly cantered on the axle. The main motor is low speed and low voltage input motor and the generator is high speed and high voltage output generator. So, when we apply an extra energy to the main motor it starts running, which causes to rotate the flywheel. Free Energy generally means a method of drawing power without fuel to be burnt from the local environment. There are many different ways for doing this. These ways span many years and countries. The amount of power which can be obtained can be very high and the few kW needed to power a household are most definitely within the reach.

As the basic law of Physics says energy can neither be created nor be destroyed it can only be converted from one form to another. During huge amount of energy is lost to atmosphere as heat. It will be good if we could store this energy somehow which is otherwise getting wasted out and reuse it next time we started to accelerate. Flywheel concept with wheel refers to a system in which the kinetic energy of the vehicle is stored temporarily, as an accumulative energy, during deceleration, and is reused as kinetic energy during acceleration or running. Flywheel concept with wheel is a small, yet very important, step toward our eventual independence from fossil fuels. These kinds of brakes allow batteries to be used for longer periods of time without the need to be plugged into an external charger.

These types of brakes also extend the driving range of fully electric vehicles. Flywheel concept with wheel is a way to extend range of the electric vehicles. In many hybrid vehicles cases, this system is also applied hybrid vehicles to improve fuel economy. **A normal car is only about 20%** Flywheel concept with wheel could reclaim as much as half of that wasted energy, which equates into more motion produced by the fuel we are paying for instead of using that fuel to create heat that is being dissipated uselessly into the environment.

Energy storage systems (ESS) can be used to balance electrical energy supply and demand. The process involves

converting and storing electrical energy from an available source into another form of energy, which can be converted back into electrical energy when needed. The forms of energy storage conversion can be chemical, mechanical, thermal, or magnetic [1, 2]. ESS enable electricity to be produced when it is needed and stored when the generation exceeds the demand. Storage is beneficial when there is a low demand, low generation cost, or when the available energy sources are intermittent. At the same time, stored energy can be consumed at times of high demand, high generation cost, or when no alternative generation is available [1–4]. Energy demand continues to increase, as demanded by the households and industries with high growth rates in BRIC and developing countries. This has led to increases in energy prices and traditional energy generation methods are less able to adapt, exacerbating the issues due to market deregulation, power quality problems, and pressures to limit carbon dioxide emissions [2,3]. Renewable energy sources (RES) and potential distributed generation (DG) are considered as supplements or replacements for traditional generation methods [3]; however, there are major challenges associated with energy supply coming from renewables, due to their intermittent nature.

1.2 ALTERNATIVE METHODS

- ***Battery-Charging Pulsed Systems***
- ***Moving Pulsed Systems***
- ***Energy-Tapping Pulsed Systems***
- ***Aerial Systems and Electrostatic Generators***
- ***Motionless Pulsed Systems***
- ***Fuel-less Motors***
- ***Magnet Power***

1.3 DESIGN OBJECTIVE OF PROJECT

As the basic law of Physics says energy can neither be created nor be destroyed it can only be converted from one form to another. During huge amount of energy is lost to atmosphere as heat. It will be good if we could store this energy somehow which is otherwise getting wasted out and reuse it next time we started to accelerate. Flywheel concept with wheel refers to a system in which the kinetic energy of the vehicle is stored temporarily, as an accumulative energy, during deceleration, and is reused as kinetic energy during acceleration or running. Flywheel concept with wheel is a small, yet very important, step toward our eventual independence from fossil fuels. These kinds of brakes allow batteries to be used for longer periods of time without the need to be plugged into an external charger.

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The main objective of system is the utilization of gravity using the flywheel:

1) The primary step for this is to increase ratio of input speed to output speed.
2) The secondary step is to use the energy generated by the generator to the load bank.
3) Obtaining the maximum output and calculating the maximum efficiency of the working model.

Description of Flywheel Energy Storage System

The flywheel as a means of energy has existed for thousands of years as one of the earliest mechanical energy storage systems. For example, the potter's wheel was used as a rotatory object using the flywheel effect to maintain its energy under its own inertia, operated by people and animals. These spinning wheels from the middle ages do not differ from those used in the 19th or even 20th centuries. In the 18th century, the two major developments were metals replacing wood in machine constructions and the use of flywheels in steam engines. Developments in cast iron and the production of iron resulted in the production of flywheels in one complete piece, with greater moment of inertia for the same space. The word 'flywheel' appeared at the beginning of the industrial revolution (namely in 1784). At the time, flywheels were used on steam engine boats and trains and as energy accumulators in factories. In the middle of 19th century, as a result of the developments in cast iron and cast steel, very large flywheels with curved spokes were built. The first three-wheeled vehicle was built by Benz in 1885 and can be named as an example. Over time, several shapes and designs have been implemented, but major developments came in the early 20th century, when rotor shapes and rotational stresses were thoroughly analysed, and flywheels were considered as potential energy storage systems. An early example of a flywheel system used in transport was the Gyrobus, powered by a 1500 kg flywheel, produced in Switzerland during the 1950. In the 1960s and 1970s, FESS were proposed for electric vehicles, stationary power back up, and space mission, In the following years, fibre composite rotors were built and

tested. In the 1980s, relatively low-speed magnetic bearings started to appear, Despite major developments during their early stages, the utilization of flywheels has not been significant and has declined with the development of the electric grid. However, due to the recent improvements in materials, magnetic bearings, power electronics, and the introduction of high speed electric machines, FESS have been established as a solid option for energy storage applications, A flywheel stores energy that is based on the rotating mass principle. It is a mechanical storage device which emulates the storage of electrical energy by converting it to mechanical energy performing the interchange of electrical energy to mechanical energy, and vice versa, The flywheel and MG are coaxially connected, indicating that controlling the MG enables control of the flywheel.

1.5 GENERAL CONSIDERATIONS

In this System Design We mainly concentrate on the Following Parameters which can be seen. The system consists of design of various parts like Pulley, Flywheel, Belt drive, Shaft, Bearings etc.

1.5.1 Design of Shaft and Bearings:

There are 2 shafts in the Layout of the system. Thus Design of Shaft is to be calculated in order to find the proper Shaft diameter
r which would withstand the load easily and to ensure the maximum energy is transfer with minimum loss. Bearing selection is also some important criteria in order to ensure smooth and long lasting functioning of the system.

1.5.2 Design of Belt Drive:

At the first stage we selected pulley as per standard specification. We know that a belt drive is useful for the power transmission using pulley. Each pulley has different diameters and speed. The belt, wire (rope) drives are used for the power transmission. In the project, we are going to use total six pulleys, so we need three different belt drives.

1.5.3 Design of Flywheel:

This Project is all about generation of free energy with using the gravitational energy. Thus we are using flywheel of mass 28kg that can utilize the gravitational energy and give us more output.

1.6 METHOLODOGY

The aim of this project is to recover energy of flywheel by using principle of energy recovery system from flywheel and generating sufficient energy to run the project set up & also little additional energy to run external power supply. The project is inspired from CHAS CAMPBELL's Generator. An A.C motor is firstly run with the help of A.C supply. The speed changes with help of pulleys with various diameters. After some time, the initial AC input supply is replaced by the output supply of generator.

The main components of the project are described below and are as follows

1. Flywheel
2. Generator
3. Motor
4. Shaft
5. Bearing
6. Pulley
7. Belt drive

3.2.1 LINE DIAGRAM OF FLYWHEEL

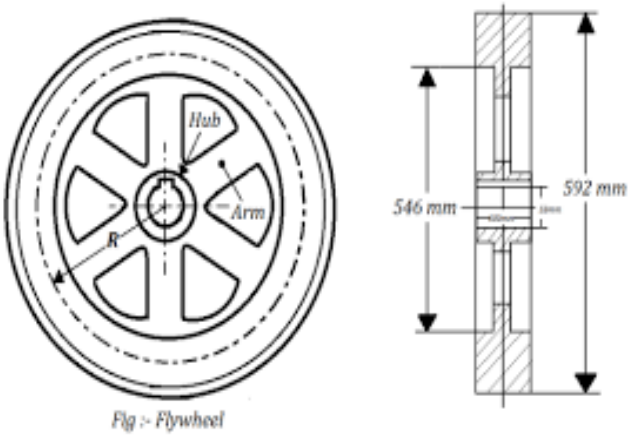


FIG 3.2.1 Line diagram of Flywheel

II. IDENTIFY, RESEARCH AND COLLECT IDEA

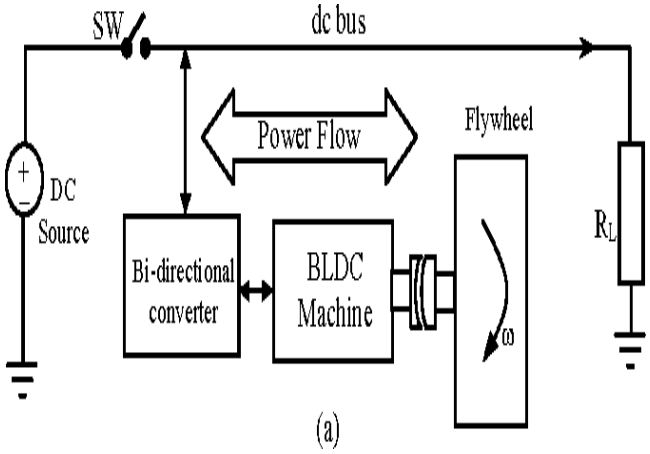
This study aim to use thin firm shaped flywheel in FESS. Then, aluminum was chose as raw material for the flywheel rotor. Another scope of this study is using a three phase a synchronous induction machine as motor-generator set of FESS. If higher specifications system is used such as 8HP motor and 150kg flywheel could produce 50% more free energy at the output alternator. Such high end system could extend the life of exhaustible nonrenewable resources for more than 50% of its current life.

Conclusion Based on the above work of free energy generator using flywheel the following conclusion can be

drawn. It is clear that, cast iron flywheels are having greater Stress and deformation. **S Glass Epoxy** can be used in flywheels to store energy with less mass. Environmental concerns in conjunction with the call for greater operational safety may incite demand for new decentralized electricity production systems, coupled to the network and integrating small scale storage devices. Flywheels would then provide an excellent solution and allow the market to expand. We got 18% extra electrical outputs. This is our free energy. The AC generator and flywheel produce 450 W of electricity from 0.5 HP motor.

Flywheel concept with wheel refers to a system in which the kinetic energy of the vehicle is stored temporarily, as an accumulative energy, during deceleration, and is reused as kinetic energy during acceleration or running. Flywheel concept with wheel is a small, yet very important, step toward our eventual independence from fossil fuels.

BLOCK DIAGRAM



CHARACTERISTICS

The main characteristics of flywheels are a high cycle life (hundreds of thousands), long calendar life (morethan20years), fast response, high round trip efficiency, high charge and discharge rates, high power density, high energy density and low environmental impacts. The state of charge can be easily measured from the rotational speed and is not affected by life or temperature. On the downside, flywheel self-discharge at a much higher rate than other storage mediums and flywheel rotors can be hazardous, if not designed safely.

Flywheels have a long life time and very low operational and maintenance requirements. The cycle life is also high, compared to many other energy storage systems, as fly wheels do not require long charge-discharge cycles. It can be charged and discharged rapidly, based on the application and functionality, and is not affected by the depth of discharge (DoD). The life time is estimated to be more than 20 years and a charge-d is charge cycle life in excess of hundreds of thousands, with no deterioration in its performance.

APPLICATIONS

Flywheel applications range from large scale at the electrical grid level, to small scale at the customer level.

A high power and capacity is reached by arranging flywheels in banks, rather than by using large machines. The best and most suitable applications of flywheels fall in the areas of high power for a short duration (e.g., 100 s of kW/10 s of seconds) [6], when frequent charge-discharge cycles are involved.

The most common applications are power quality such as frequency and voltage regulation, pulsed power applications for the military, attitude control in space craft, UPS, load leveling, hybrid and electric vehicles, and energy storage applications.

III. FINDINGS OF THE PROJECT

1) Flywheels are one of the most promising technologies for replacing conventional lead acid batteries as energy storage systems for a variety of applications, including automobiles, economical rural electrification systems, and stand-alone, remote power units commonly used in the telecommunications industry.
2) A recent advance in the mechanical properties of composites has rekindled interest in using the inertia of a spinning wheel to store energy.
3) The state of charge can easily be measured, since it is given by the rotational velocity.
4) The first rotation of flywheel rotors is suitable for direct generation of high voltage.
5) It has obtained (100%) extra electrical output which is free energy from our project.
6) The AC generator have produce (3.7) kW of electricity by using flywheel from (1.5) HP motor. The other main advantages of conventional free energy using flywheel is that it can generate without extra equipment.
7) It can be used in various applications like electric fuel cars and increase the efficiency of traditional electrical equipment.

IV. CONCLUSIONS

This paper has presented a critical review of flywheel with reference to its main components and applications. The structure and components of the flywheel are introduced and the main types for electric machines, power electronics, and bearing systems for flywheel storage systems are described in detail.

The main applications of FESS in power quality improvement, uninterruptible power supply, transportation, renewable energy systems, and energy storage are explained, and some commercially available flywheel storage prototypes, along with their operation under each application, are also mentioned.

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V. FUTURE SCOPE

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