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A REVIEW ON INCREASING THE EFFICIENCY OF THE FLYWHEEL USING PERPETUAL WHEEL

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Abstract- *The efforts required in achieving the desired output can be effectively and economically decreased by the implementation of better designs. The benefit of the modification is reduction in revolving time of the flywheel that is to produce more time to for more revolutions to increase its efficiency. This modification takes the strain off the flywheel and allows its to remove more freely as a bonus as there is more moment of inertia that allows flywheel to release more power. Flywheel design can ensure high efficiency, high energy, power density and a long life. On the other hand, traditional flywheels are more expensive and requires more space than batteries and fuel cells. The aim of the project is to improve the efficiency of the flywheel by elongating the inertia run time. A system which is convenient to operate and easy to understand. A unit with rotating modified flywheel for storing energy and thus suppressing the discrepancy between electricity supply and demand. To recover the frictional losses, between flywheel motor & alternator. Firstly, we remove the belt drive arrangement & transfer the energy through Oldham's Coupling. Also, we apply perpetual motion to the flywheel to overcome the gravitational force & run for the long time. Which will improve the running time of the flywheel and increase the efficiency of the flywheel.*

Keywords: Perpetual, Frictional Losses, Gravitational Force, Inertia.

1. INTRODUCTION

The project is basically based on modification of flywheel, it aims to increase the efficiency of flywheel by increasing its rotation time per minute. With the increase in its rotation per minute we can obtain greater output that the traditional flywheel. The modification is carried out to overcome various problem occurred in traditional flywheel i.e. One disadvantage is the potential safety risks that arise if a flywheel is loaded up with more energy than its components can handle. Such a scenario could result in an almost explosion-like event, which requires security walls thus increasing the weight of the unit. With this modification we can ensure high efficiency, high energy, power density and a long life of the flywheel in a compacted design. Flywheels are traditionally used in vehicles to maintain the smooth run of the engine. With this project our aim is to apply this concept to increase the power generation. Since there is huge demand for electrical energy in industrialization as well as modernization, but the energy resources are gradually decreasing at high extent. Within coming years the energy resources will be demised & there might be shortage of conventional fuel (coal, wood, water etc.) for power generation. The other renewable sources such as solar, wind, biomass etc. are available with certain drawbacks as they are dependent on atmospheric condition. So here we are trying to improve the performance of the system which are presently used in our daily use domestically or commercially, in additionally we are pursuing to make the design less complex and compact to allocate the maximum usage in the operations. To provide an to electricity mechanically, we can create a cycle of motor, flywheel & alternator & extract energy from it. For that, we need to make some design changes into the flywheel to elongate the run time & it's efficiency

2. OBJECTIVE

The main objective of this Modification is Increasing the Efficiency of Flywheel, to Extract the free energy using the high rated Alternator, to Reduce the friction losses in the system, to maintain the Rpm.

3. LITERATURE RESEARCH

Generation of Power Using perpetual Motion-The demand for energy is increasing day by day with rapid increase in modernization along with industrialization. But energy resources are slowly depleting at higher levels. Energy

resources will be within a few years Is reduced and hence there will be a shortage of fuel (coal, wood, water, etc.) to produce electricity. Other renewable Sources like solar, wind, biomass etc. are available with some drawbacks as they depend on atmospheric Conditions. Peripartum based power generation means using the free energy available in nature for power generation. Free energy is also used to reduce the cost of energy consumption. Free energy generator is a decent, powerful and Good-looking topology that can benefit humans. One of the motto of this paper is to present the method Electricity generation which is independent of any atmospheric conditions unlike wind, solar, biomass etc. and does not do so Unlike thermal or diesel generators are dependent on any fuel or raw material. Here we tried to get the first speed Using gravitational energy and then achieving permanent motion and output using magnetic energy. Gravity energy, however weak, is uniform and constant and has magnetic energy that depends on the magnetic Shakti provides a good source of energy for harnessing.

Fredrik Armelin- Department of Real Estate and Construction Management, KTH Royal Institute of Technology, SE-100 44, Stockholm, Sweden; American Perpetual Motion with Random Start. We consider the valuation of American permanent options with the property they are It is possible to exercise only after a random time event, which is a stopping time In relation to a filtration. A situation where this feature exists is when making an irreversible investment, e.g. Construction on vacant land waiting for permit be allowed to do so. In this case the random time is the time at which the permit is Given. This and the value of one version of the abandonment option are given as two applications of this modeling framework.

Jiří Šonský, Václav Tesař- Institute of Thermo mechanics Acad. Sci. Czech Rep, Dept. of Thermodynamics, Dolejskova 5/182 00 Praha, Czech Republic; Design of a stabilised flywheel unit for efficient energy storage**.** The authors developed a unit with rotating flywheel for storing energy and thereby suppressing the discrepancy between power supply and demand. The goal of development was to reduce the energy extracted from it. Flywheel for stabilization of all five free degrees of freedom. Concept here stated proof of the laboratory model combines levitation Maxwell (electromagnetic) and Lorentz (current in magnetic fields) Lifting forces. While yet existing storage units spend a lot of power on stabilization, the authors' The proof-of-concept design was only sufficient for hundreds of stabilizations - not quite moving With increased flywheel size. Once the stabilization and control problems are mastered & rectified, the principle which author has used may bring significant number of advantages relative to other storage methods. The principle allows flywheel or system for exceptionally rapid charging, limited only by the power of rotational machinery. Storage units are unaffected by temperature. Level of charging is simply and reliably measurable. Here author concludes that extremely rapid may be the discharging, capable of generating extremely high output power levels. This research helps our project in applying principle of the Maxwell (electromagnetic) and Lorentz (current in magnetic field) for the maximize the output of the system model and generating more electricity, which in our case is the miniature model compare to author's

Perry Tsao, Member, IEEE, Matthew Senesky, Student Member, IEEE, and Seth R. Sanders, Member, IEEE; **An Integrated Flywheel Energy Storage System.** Design, manufacture and testing of an integrated Flywheel energy storage system with a domestic inductor it offers motor / generator and high-frequency drive paper. The work is presented as an integrated design of the flywheel Systems, motors, drives, and controllers. Motor Design Features low rotor loss, a spotless stator, stronger and build from low cost material and a rotor that also performs energy work Storage rotor for flywheel system. A high frequency six-phase the drive scheme is used in place of pulse width modulation because of high electrical frequencies. A motion sensor controller works without state estimation are also described. A prototype of the flywheel system has been demonstrated at the power level the average system efficiency of 9.4 kW is more than 83% 30 000-60 000-r / min speed range. Index Terms - flywheel energy storage, high frequency motor Drive, homopolar inductor alternator, homopolar inductor motor, Integrated flywheel, senseless motor control, six-phase drive.

H. J. BORNE~A~ N ~ T. RITTER, C. URBAN, 0. ZAITSEV,~ K. WEBER and H. RIETSCHEL For schungszentrum Karlsruhe GmbH, Institute fur Nukleare Festkorperphysik, PG. Box 3640. 76021 Karlsruhe, Germany; LOW FRICTION IN A FLYWHEEL SYSTEM. A flywheel system with superconducting magnetic bearing was fabricated and tested. Impact A continuous flow LN2 cryostat consists of six melts textured YBCO pellets mounted inside. A disk The measuring Q 190 x 30 mm was safely rotated at speeds up to 15,000 rpm. The disk was powered by a high Speed three phase synchronous homopolar motor / generator. The maximum energy capacity was 3.8 Wh. The maximum power was 1.5 kW. The dynamic behavior of the prototype was tested. Feature and Axial and lateral stiffness, rated with respect to damp, decaying torres and critical motion. Discount Experiments were conducted in a vacuum chamber to check the energy efficiency of the system. To

pull Tors were found to depend on the width of the trench in the bearing. Pressure on background 4 x 10m4 torr and an interval width of 6 mm to measure the coefficient of friction (drag-to-lift ratio) 9 x iOe6 at low speeds. Experiments demonstrate the applicability of superconducting magneticBearings in highly efficient, kinetic energy storage systems.

Jiuyu Dua , Ye Liua , Xinying Moa, , Yalun Lia , Jianqiu Lia , Xiaogang Wua,b , Minggao Ouyanga a State Key Laboratory of Automotive Safety and Energy, Tsinghua University, Beijing 100084, China b College of Electrical and Electronics Engineering, Harbin University of Science and Technology, Harbin 150080, China; Impact of high-power charging on the durability and safety of lithium batteries used in long-range battery electric vehicles. Battery electric vehicles with a range of over 500 km are expected to become increasingly competitive Future. The energy density of currently available lithium batteries should be significantly increased such vehicles support operation, and high-power charging is required to reduce charging time. However, high-power charging may negatively affect the durability and safety of lithium batteries. Increased heat output, fading capacity, and lithium plating, which can induce exposure to battery thermal run away. Currently, there are no established boundary conditions for high-power charging or methods Evaluation of its risks, especially in the case of high capacity lithium batteries. A test procedure is proposed for this study Lithium battery capacity fading and thermal tolerance response characteristics are investigated Subject to high power charge. In addition, the migration characteristics of the battery temperature range Thermal runways are investigated using the proposed procedure. Test results demonstrate high strength Charging affects the durability and thermal safety of high capacity lithium batteries. In particular, the capacity extinction rate can reach 30% only after 100 charge cycles, depending on the type of battery. In addition, thermal tolerance can decrease by up to 40% by considering changes in self-heating Temperature as an indicator. Based on the results of the study, it can be concluded that thermal management the system must be carefully designed to meet high-power charging requirements. Otherwise, high Power charge can only be done for batteries with long electric range w Sara Saidia,*, Abdelouahed Djeblib a,b Department of Physics, Faculty of Science Tetouan, University Abdelmalek Essaadi, Tetouan 93030, Morocco; Analysis of the effects of materials on the resistance of the flywheel. Wind generators are those generators whose primary source of energy is wind. It is well known that there is a lot of fluctuation in this source. And because of unexpected characteristics it is impossible to estimate its value for a given moment. This causes many problems for energy. System managers in stabilizing power generation, especially not for sites connected to the power grid. The flywheel energy storage system (FESS) is one of the developed technologies for the storage of wind energy. Flywheel there are accumulator electromagnetic storage systems associated with wind generators, which enable the storage of energy in kinetic inside a flywheel, especially when the wind speed increases. In addition, the accumulator allows restoration Electric energy to the grid while reducing wind speed. In this work, we chose a material with the lowest density and highest braking strength. We also chose a hollow cylinder as a suitable geometric shape to increase the energy efficiency of FES and its efficiency. To build our structure, first we used MATLAB software to achieve the expected results. Then we compared between three flywheels of inertia technologies: inertia flywheels in high-strength carbon fiber (R) in Kevlar, and high deformation glass (R) to investigate their deformation capacity. Finally, we retained the least deformable and most efficient material for use with our storage machine.ith limited range for electric cars.

Jr-Yi Shen, Brian C. Fabien* Department of Mechanical Engineering, University of Washington, Box 352600, Seattle, WA 98195, USA Received 3 March 2000; received in revised form 30 October 2001; accepted 9 January 2002; **. Optimal control of a flywheel energy storage system.** This paper describes the design and implementation of digital controllers for a flywheel Energy storage device that incorporates a radial flux hybrid permanent magnetic bearing. Although the uncontrolled device is unevenly stable, active control is required for: (i) Ensure that a finite radial air gap remains at all times, and (ii) attracts oscillations Flywheel which reduces the efficiency of the motor generator. Paper design presents Determined Discrete-Time Linear Quadratic Regulator (LQR) and Linear Quadratic Gaussian (LQG) controller for this rotor dynamic system. Real time use Conducted to check the performance of the controllers. The result indicates that LQR Controller with approximate system velocity is easier to implement than LQG controller. The paper has shown the design and dynamic model of flywheel energy storage system(FES) device which uses the radial flux permanent magnetic bearing which causes flywheel to rotate. FES devices are being consider for use in space based application, in these cases the effect of the friction force due to gravity is significantly reduced.

Yongjie Hana,*, Zhengyi Ren, Yongxiang Tong *aEngineering training center ,Harbin Engineering University, Harbin Heilongjiang 150001,China;* General Design Method of Flywheel Rotor for Energy

Storage System. Flywheel rotor design is the key of researching and developing flywheel energy storage system. The geometric parameters of flywheel rotor was affected by much restricted condition. This paper discussed the general design methodology of flywheel rotor base on analyzing these influence, and given a practical method of determining the geometric parameters. The foundation was laid for optimal design and analysis of flywheel rotor in the future. In the development of the flywheel rotor, current researches have focused on optimum design and stress analysis. This analysis can be applicable in our research to design the preferable dimension and specification to optimize maximum output. The flywheel consist of the many components and energy conversion system. In this paper the general design method of flywheel rotor is derived by analysing inertia and forces and can be used to determine geometrical parameter for physical model of the rotational modified flywheel. In this paper the principle is used is also the proven method.

4. METHODOLOGY

A Flywheel is a mechanical device specifically designed to efficiently store rotational energy. It is a comparison of Conventional Flywheel to the Modified Flywheel. The concept of flywheel energy storage system is to store the electrical energy in the form of kinetic energy by rotating a mass which is connected mechanically into motor/generator combination. Flywheels resist changes in rotational speed by their moment of inertia.

A) Kinetic Energy

The amount of stored energy in the flywheel is related to the mass shape and material, moment of inertia and velocity, as illustrated in equation (1) [3].

E =1/2 Iω2 (1)

Where E is the amount of stored kinetic energy,

I is the moment of inertia and

ω is the velocity.

The moment of inertia I depends upon the shape of the spinning mass, for the solid cylinder the moment of inertia is given by the equation (2) [3].

I = 1 /2 m r 2 (2)

Where I is the moment of inertia,

m is the mass of the solid cylinder,

r is the radius.

For thick wall cylinder-flywheel, the moment of inertia is given by the following equation (3) [3].

I = 1 /2 m (r2 2 + r1 2) (3)

Where r2 is the outer radius and r1 is the inner radius as depicted in figure 1.

The mass of a hollow cylinder with height h and density ρ is given by the equation (4) [3].

m = ρπh (r2 2 − r1 2) (4)

From equations (1), (3) and (4), the kinetic energy of a hollow cylinder flywheel is given by equation (5) [3].

E = 1 4 ρπhω2 (r2 4 − r1 4) (5)

To ensure that the flywheel speed is not too low or too high the speed should be limited between ωmin and ωmax, this also ensures that the flywheel provides an acceptable voltage level with low fluctuation, so in this case the kinetic energy is expressed by equation (6).

B) Moment of Inertia

Flywheels are used extensively on many drive systems especially where a variable speed drive has not been used (e.g., two speed and single speed lift installations). They help reduce the shock of initial staring, and the value of initial acceleration. They also reduce the variations between full load and no load. In this section we discuss the method of calculating their inertia.

A diagrammatic representation of typical flywheel is shown in Figure 5. If we take a thin slice of an annular ring, at a distance x from the centre of the flywheel and of thickness dx, the moment of inertia for it is:

[2π (X x dx) x ρW] x x^2 = 2 π ρ W x^3 dx

To obtain the total moment of inertia, we need to integrate for x between R1 and R2, giving us the important result:

$$\int_{R1}^{R2} 2\pi\rho\, W x^3 dx = 2\pi W\left[\frac{x^4}{4}\right]_{R1}^{R2} = \frac{\pi\rho W}{2}\left(R2^4 - R1^4\right)$$

A special case is for a cylinder, where R1 is zero.

∴ If A flywheel if manufactured with

R2= 200mm= 0.2m and

R1= 150mm= 0.15m,

W= 30mm,

Calculate its inertia

$$I_F = \frac{\pi \times 2720 \times 0.03}{2}(0.2^4 - 0.15^4) = 0.14\, kg \cdot m^2 \blacksquare$$

5. EXPECTED RESULTS

1. Increase in Flywheel Effeciency.

2. Frictional Losses reduced in the Flywheel.

3. Free Energy conserved from the Flywheel.

REFERENCES

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