Design and Fabrication of Road Power Generator

Mr. Kamlesh Shivankar[1], Mr.Akshay Wankhede[2], Mr.Dikshant Nitnaware[3], Mr. Palash Gajbhiye[4], Mr.Kunal Somkuwar[5], Mr.Ankit Bhagat[6]

[1,2,3,4,5,6]G.H. Raisoni Academy of Engineering &Technology, Students of 8th Semester Mechanical Engineering, Department, GHRAET, Nagpur

***Abstract*- Man in his lifetime uses energy in one form or the other. in fact whatever happens in nature, results, out of the conversion of energy in one form or the other? The blowing of the wind, the formation of the clouds and the flow of water are a few examples that stand testimony to this fact. The extensive usage of energy has resulted in an energy crisis, and there is a need to develop methods of optimal utilization, which will not only ease the crisis but also preserve the environment. In this paper the electricity is generated through the flip plate mechanism. For obtaining the electricity through the flip plate mechanism a prototype model is developed and studied. Findings from this research work are discussed in this paper.**

This research work used a permanent magnet D.C. generator thereby generating 12 Volt D.C. This D.C. voltage is stored to the lead 12-volt battery. Electricity stored in battery is used to activate the light, fan etc. By increasing the capacity of the battery power rating is increased.

I.INTRODUCTION

Electricity is one of the most widely used forms of energy. Today also there is great scarcity of electricity. In this study an innovative concept of Generating Electricity from moving vehicles is presented i.e. Road Power Generator by Using Flip Plate Mechanism. Producing electricity from a Road power generator is a new concept that is undergoing research. The number of vehicles on road is increasing rapidly and if we convert some of the kinetic energy of these vehicle into the rotational motion of generator then we can produce considerable amount of electricity, this is the main concept.

Today our whole life style is dependent on electricity. With the increasing population the use of electric power is also increasing. But we know that the resources to generate electricity are limited, and this has lead to the energy crisis. During this scenario we need to generate electricity from the things used in day-to-day life. In this project the speed breakers present on roads are used to generate electricity. As we know that vehicles on road are increasing day by day which will help us to generate electricity as these vehicles pass through the speed breakers? This electricity generated can be used for different purpose such as lighting of signals and streetlights on road etc.

II.WORKING PRINCIPAL

Road Power Generation (RPG) is a system design to capture waste and kinetic energy from all vehicles. This device converts the kinetic energy of the vehicles into electric energy. This is done by moving plate installed on the road, this plate captured very small movement from the road surfaces and it transferred to a key way flywheel system. From hundreds of wheel lies a single flywheel having used to driving machinery. The RPG included the method of driving one flywheel to another, once it reached predetermining velocity. The RPG flywheel system has been developed to achieve large amount of moment of inertia in relatively small space. The captured energy is converted into electricity which is fed into power grid.

III.WORK DISCRIPTION

The energy scenario in the world is calling for efforts towards more efficient use of electrical energy as well as improved quality of its delivery. Due to limited budgets, the alternative is having different levels of supply quality. This issue involves the usage of equipments applying the concept of energy storage devices like batteries or flywheels. The demand for these equipments is increasing and thus their usage is increasing more and more. The type of energy storage system that is most widely researched and used especially in the last period is the Flywheel

Energy Storage System (FESS). Due to the advancements in machines and power electronics, the flywheel is becoming more popular. Many feasible projects employing the FESS have been implemented all over the world.

A. Bearing

Bearings are used as a mechanical component to transfer the power and to move a certain part, and this is done by utilizing the small frictional force of the bearings, which makes them rotate easily move in one direction easily, all the while withstanding the force and might load acting against them. Bearings can be classified into two major groups. namely, sliding bearings and rolling bearings, depending on their friction type.

B. Shaft

A rotating element used to transmit power or motion. It provides axis of rotation for rotating elements and controls their motion. By shaft one means a rod which has to handle tensional (rotational) loads. For any shaft, the stresses are proportional to the radius. This means that the central part is having very less stress but it is adding weight. It is advantageous to remove the central material and get a hollow shaft.

Previous projects have pointed out the importance of machine elements such as fasteners, springs, gears, valves, pipe fittings, etc., in engineering design. SHAFTS, too, are a basic, important and very common machine element. We have already come across some examples of shafts in earlier projects, e.g. gears must be mounted on some sort of shaft.

C. Flywheel and its operation

A flywheel is an inertial energy-storage device. it absorbs mechanical energy, and serves as a reservoir, storing energy during the period when the supply of energy is more than the requirement and releases it during the period when the requirement of energy is more than the supply.

The main function of a fly wheel is to smoothen out variations in the speed of a shaft caused by torque fluctuations. If the source of the driving torque or load torque is fluctuating in nature, then a flywheel is usually called for. Many machines have load patterns that cause the torque time function to vary over the cycle. Internal combustion engines with one or two cylinders are a typical example. Piston compressors, punch presses, rock crushers etc. Are the other systems that have fly wheel. Flywheel absorbs mechanical energy by increasing its angular velocity and delivers the stored energy by decreasing its velocity.

D. Alternator

This alternator is uniquely designed and engineered to provide the finest performance and durability for your vessel. Unlike most automotive type, alternators found standard on the majority of pleasure craft and marketed as lower priced marine alternatives, our marine alternators are built specifically to provide exceptional output at lower engine r.p.m typical of marine diesel engines, so you can enjoy shorter charge cycles, greater economy, longer battery life and less noise and fumes.

When used in conjunction with Balmar microprocessor-controlled Max Charge and ARS-4 multi-stage regulators, your new Balmar alternator can provide even greater efficiency when charging deep-cycle flooded, standard flooded, gel, AGM, Optima and other marine battery technologies. When preset for your battery type, the smart regulator will guide your alternator through a charging program that's tailored to provide your batteries with the best care possible. In addition, Balmar multistage regulators provide the ability to temperature sense at your alternator.

Should an over-temperature condition occur with an alternator temperature sensor (MC-TS-A) installed, the regulator will reduce field output to 50 percent to allow the alternator to cool under lesser load, and the Dash Lamp circuit on the regulator will activate to provide power for a visual or audible alert, enabling the user to respond to the source of the over-temperature condition. Together, the Balmar high-output alternator and multi-stage regulator.

E. Gear

There are a wide range of parameters that influence the selection of gears. Strength of the gear tooth is one of the most important factors. This is also known as the bending strength of the tooth as allowed by the stress at the tooth root under load from the mating gear. Surface durability is another, which can be described as the allowable tangential force transmitted safely at the pitch circle. Proper lubrication of the gears will also enhance the life of the working gears and extend service life. Selecting

the proper lubricant and ensuring adequate re-lubrication is also an important consideration. Surface speed of the mating gears is another factor to consider. Unlike enclosed gears that are typically flooded in a lubricant, open gears are more subject to contamination and less lubricant. Other factors that influence selection include operating temperature, moisture, gear alignment, duty cycle and application shock loads. As speeds increase, whether on mating circular gears for rotational motion or for gear racks and pinion gears that create linear motion, higher speeds may require ground gears for more precise and quiet movement. Minimizing the backlash, which is the space between the non contact side of mating gear teeth, may require gears sets with a precision fit.

What is the purpose of gears?
1) To improve the speed and agility of the wheels.
2) To increase or decrease the speed and/or power.

Types of Gears:
1) Bevel Gear
2) Spur Gear
3) Worm Gear
4) Helical Gear

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IV.SCOPE OF PROJECT

RPG could be prom (path) for the vehicle manufacturers and the government to actively persuade production of electric cars and motor bikes. This mechanism is installed on popular or traffic areas when we required more electricity are generated.

V.ADVANTAGES

1. The RPG units have minimum visual impact on their surrounding environment.
2. Road power generator emits no noise, the unit has relatively low set up and trailing costs.
3. Highly efficient in more volume of vehicle places.
4. Depending upon the power generator and number of them, power output is very high.
5. It has simple construction.
6. Less area is required.
7. Easy maintenance.
8. No consumption of any fuel. Power will be generated throughout the year.

VI.CONCLUSION

Road power generator is a new type of unconventional sources of energy this uses wasted energy of moving vehicle, in coming days it will prove a great born to the world since it will save a lot of electricity of power plants that also can be as a power source for street lights, signals and other electric appliances related to the same

REFERENCES

[1] R.S.Khurmi & Gupta “Theory of Mechanics”.
[2] Automobile engineering vol 1. By Dr. Kirpal singh
[3] Refer some concept from diploma ideas as well as books.
[4] Sarkar “Mechanics of Machines.” Tata mcgraw Hill, 2004.
[5] R.S.Khurmi&Gupta “Theory of Mechanics”.
[6] Abdullah, M.A, Shaharuzaman, M.A .Jenal.
[7] Refer some concept from diploma ideas as well as books.