GENERATION OF ELECTRICITY USING SPEED BREAKER BY APPLICATION OF RACK AND PINION
A Review

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***Abstract*:** Energy is the primary need of survival of all organisms in the universe. Everything what happens in the surrounding is the expression of flow of energy in one of the forms but in this fast moving world population is increasing day by day and conventional energy sources are lessening . The extensive uses of the energy resulted in the energy crisis in the few years. Therefore to overcome this problem we need to implement the techniques of optimal utilization of conventional sources for conservation of energy. This project includes how to utilize the energy which is wasted when the vehicle passes over the speed breaker. There are four mechanisms to generate electricity through speed breakers via, Rack and Pinion mechanism, Crank shaft mechanism

Keywords: Rack and pinion, Power Hump, Speed breaker, generator, Battery.

INTRODUCTION

In the present scenario power becomes the major need for human life. Energy is an important input in all the sectors of any countries economy. Energy crisis is due to two reasons, firstly the population of the world has been increased rapidly and secondly standard of living of human beings has increased. India is the country, which majorly suffers with lack of sufficient power generation. The availability of regular conventional fossil fuels will be the main sources for power generation, but there is a fear that they will get exhausted eventually by the next few decades.

Therefore, we have to investigate other types of renewable sources, which produce electricity without using any commercial fossil fuels, which is not producing any harmful products. There are already is existing such systems using renewable energy such as solar wind), OTEC (ocean thermal energy conversions) etc…for power generation. The latest technology which is used to generate the power by such renewable energy" POWER HUMP".

A large amount of energy is wasted at the speed breaker through friction, every time a vehicle passes over it. So electricity can be generated using the vehicle weight (potential energy) as input. So this is a small step to try to improve this situation. In this method in general potential energy is converted into electrical energy.

Speed breaker POWER GENERATOR Converters basically new concept of non-conventional energy generation. It is electro-mechanical energy generating machine. This machine converts reciprocating motion

in to rotary motion. The rotational power is stored in flywheel & flywheel rotates dynamo, which generates electricity. We put our machine underneath the Sped breaker installing different units. All the units are connected to the common shaft using gears. The head of rack is brought up to level beneath the speed breaker surface. When vehicle moves on the speed breaker, the rack it will be pushed down. The rack is attached with free wheel type pinion that rotates in one direction only. The rack & pinion arrangement convert reciprocating motion in to rotary motion.

This rotary motion is further magnified using reciprocating motion in to rotary motion gear drive. The output of pulley is attached with flywheel which stores kinetic energy and transfer to dynamo which generate electricity with zero cost. A "generator" and "motor" is essentially the same thing: what you call it depends on whether electricity is going into the unit or coming out of it. A generator produces electricity. In a generator, something causes the shaft and armature to spin. This generated power is used for various application required by different user.

2.1 LITERATURE SURVEY:

Abhishek et al.[1]They use setup mainly consist of an arrangement which is having a shaft with a U shape projection carrying a bearing .They found that using U shape arrangement and bearing the motion of mechanism become smooth .G. Ramkrishnaprabu, G. Ethiraj et al. [2] In this paper a retchet - wheel type mechanism which in turn rotate a geared shaft loaded with recoil spring .Because of the spur gear it transmit high power efficiency so that the more electricity will produce. Pravin K Ghuleet al.[3] Mainly focused on principle of potential energy into electrical energy using rack and pinion mechanism, flywheel and spring. Output power

developed for 1hr is 441.45 watts and electrical energy is use to street lamp.

M .sailaja et al.[4]They design rack and pinion mechanism and analysed in ansys how much load can give voltage.e.g-3kg load give 9.9 volt. They found that the model has less no. of parts and cost of assembly very less with all the components being available regularly and no model specific part are to be manufacture. P. Marimuth et al.[5] In this paper design of rack and pinion is discussed and its type (1) conventional (2) Direct design.In this , attempt were made to find reasonably accurate estimation of proper design.Canhiwo et al.[6]In this paper surface equation of shaper was established by using the equation of rack cutter tooth surface. The effects between modification and drive contact track were analyzed. The results provide a method for getting rotated contact push. Mahmoud Khaled et al.[7]In this different types of SBPC, system are presented. And an experimental analysis is performed on the rack and pinion and their results are compared. In this they found different energy produced at different   workloads. In this a prototype is constructed.

Jean mator et al[8].In this paper a float rack and pinion system is used to generate energy at sea shore.In this a prototype device is used that exploits the surface wave force to produce a hewing motion that is transformed into a rotating motion through rack and pinion system. Sundropareira-dos santorEt al.[9]In this process honing process is used to improve the mechanism of rack system.There is improved in quality of engagement process after honing. Christophorchrman et al.[10].This paper shows the prospect of condition monitoring of rack and pinion drive system. In this paper three potential principle of condition monitoring of rack and pinion drive are proposed.f-h ramirez-leyva et al[11].this paper address the design, simulation and experimental   validation of a permanent-magnet synchronous motor speed control. This paper addressed to design simulation and eperimental validation of passivity

based PMSM control stability of system was analyzed. simmon simulation were carried out to validate the controller design.

wen-jun-xu et al.[12]in this paper a lineraized mathematical model of permanent magnet synchronous motor is proposed with the help of vector control method and the defination of new variables the LQR control methodology is investigated and a optimal speed controller is design for PMSM system. In this paper the mathematical model of PMSM dynamic system was setup considering the non-linearityand cross coupling of the system. Boonyangplangklang et al.[13]in this the operating principle of transformation PSMS to function as generator in energy regenerative mode. In this the characteristics of motor is observed with feeding both positive and negative load. the study of PMSM is performed by simulation to study the the behavior of motor in a generator mode called regenerative mode this study proposed the regenerative energy to be used as energy regenerative unit(ERU). olgav. shepovalova et al.[14]in this result result of research have been analyzed dedicated to investigation of dependence of mechanic characteristic n=f(t) of accumulator type dc motors with three types of exicition on pv array characteristics and parameters in natural conditions of solar radiation for comparable capacity of pv array and dc electric motor in autonomous photoelectric system. It is advisable to apply parallel excitation dc motors when working gears with low breakaway torque value. Dc motors with independent and series excitation shall be applied in working gears having high values of torque resistance if they are supposed to feed directly from pv array. sedakul et al[15]in this paper low power line start PMSM IS ANALYSED and simulated by finite elements method using ANSYS RMXPRT .the torque and efficiency curved is acquired and compared with each other. It is seen that breaking torque is proportional to the magnet size directly total torque is the sum of cage and breaking torque.

G. Ramkrishna. Prabhu et al[16] In this paper a ratchet wheel type mechanism is used which in turn rotate a general shaft blade with recoils springs. There is improved in quality of engagement and also there is increase in efficiency. KesayoshiHadano et al[17]In this paper we determine the model for evaluating the output electric power and the result of numerical calculation. From this study it was revealed that the continuous generation device would be more efficient in practical than the intermittent one in terms of stability as to wave power generation.

Qingping Wuet al.[18] In this paper it mainly introduce working principle of brush less PMDC motor and digital signal controller. In this experiment ds PIC-design for brushless dc motors with theoretical possibility and a good ratio of performance is obtained. Alexander meyar [19]In this paper the concept of the traceability of a single magnet and enables to compensate variation of magnetic properties by selective magnet assembly. The presented paper gives an overview of the challenging aspects of the magnet assembly process and sketch of a solution for magnet tolerance.

Arkadeep Narayan Choudhary et al[20].This paper presents a methodology for designing prismatic springs of non circular coil shapes and non prismatic springs of circular coil shape using analytic and numerical methods. Thus the analysis shown in the work are expected to be flexible and should lend themselves for future applications involving selection of an optimal spring for a given design scenario. Armound A.T.Met al.[21]A method is proposed to design planar ZFL springs with specified stiffness within certain range. The feasible values of stiffness are bounded by design area, minimum feature size and yield strength of material. Armound A.T.M et al.[21]A method is proposed to design planar ZFL springs with specified stiffness within certain range. The feasible values of stiffness are bounded by design area, minimum feature size and yield strength of material .

Armound A.T.M et al.[22] A method is proposed to design planar ZFL springs with specified stiffness within certain range. The feasible values of stiffness are bounded by design area, minimum feature size and yield strength of material.

Conclusion:

It can be implemented at metropolitan cities.
So that more electric power is produced.
Arrangement of whole setup is easier.
The store electricity could satisfy the daily requirement of electric power. This is one path of exploring the possibility of energy.

Future Scope:

Such speed breaker can be designed for heavy vehicles, thus increasing input torque and ultimately output of generator.
More suitable and compact mechanisms to enhance efficiency.

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