POWER GENERATION USING SPEED BREAKER

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Abstract – *In this project we are generating electrical power as non-conventional method by simply running on the vehicle in the speed brake. Non-conventional energy system is very essential at this time to our nation. Non-conventional energy using speed brake needs no fuel input power to generate the output of the electrical power. This project using simple drive mechanism such as rock and pinion assemble and chain drive mechanism. For this project the conversion of the force energy in to electrical energy. The control mechanism carries the rack & pinion, D.C generator, battery and inverter control. We have discussed the various applications and further extension also. The Indian highways are having several numbers of speed brake. So this project is implemented to all speed brake, the power generation is very high. The initial cost of this arrangement is high.*

***Key Words*:** Generator, Inverter, Rack and pinion, Battery, Chain Sprocket.

1. INTRODUCTION

Man has needed and used energy at an increasing rate for his sustenance and well being ever since he came on the earth a few million years ago. Primitive man required energy primarily in the form of food. Subsequently he discovered fire and his energy needs increased as he started to make use of wood and other bio mass to supply the energy needs for cooking as well as for keeping himself warm. With the passage of time, man started to cultivate land for agriculture. With further demand for energy, man began to use the wind for sailing ships and for driving windmills, and the force of falling water to turn water for sailing ships and for driving windmills, and the force of falling water to turn water wheels. Till this time, it would not be wrong to say that the sun was supplying all the energy needs of man either directly or indirectly and that man was using only renewable sources of energy.

2. EXISTING SYSTEM

Currently there is some complex systems are available to generate power from speed breaker. In this mechanism the roller is fitted in between the speed breaker so that when a vehicle passes over speed breaker it rotates the roller. So that the shaft of the DC generator rotates, it produces electricity.

2.1 DRAWBACKS IN EXISTING SYSTEMS

In the existing system the power generation is less. Maintenance cost is high. Wear and tear is high. It May not work properly in rainy season. We have to check mechanism from time to time. In this mechanism there is no continuity in power production and very low efficiency.

3. PROPOSED SYSTEM

My project includes how to utilize the energy which is wasted when the vehicles passes over a speed breaker. Lots of energy is generated when vehicle passes over it. We can tap the energy generated and produce power by using the speed breaker as power generating unit.
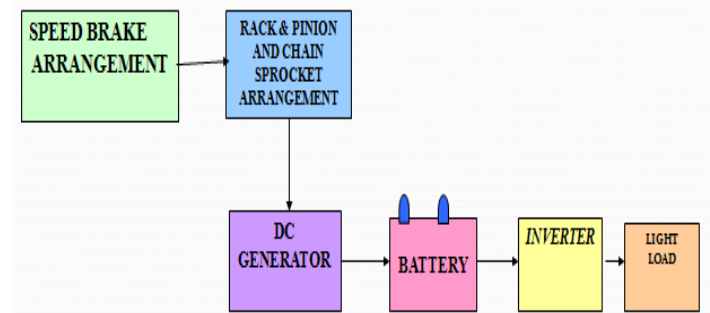
3.1 BLOCK DIGRAM

FIG 1: Block diagram of proposed system
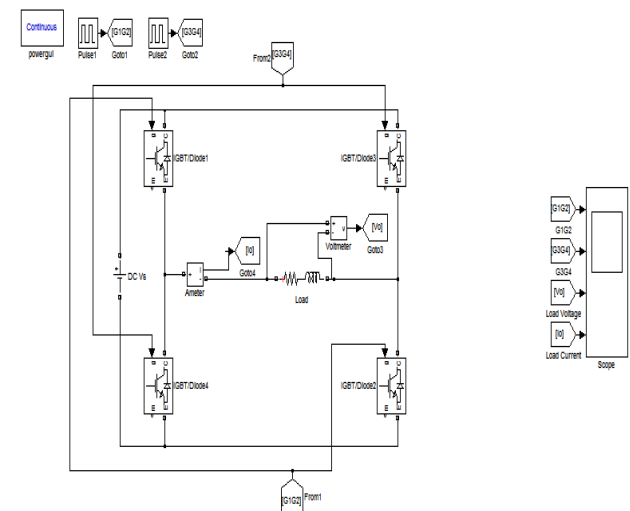
3.2 CIRCUIT DIAGRAM

FIG :2 Circuit diagram of proposed system.

3.4 ADVANTAGES

Pollution free generation. Simple construction, mature technology and easy maintenance. No manual work necessary during generation. Energy available all year round. No fuel transportation problem. No consumption of any fossil fuel which is non-renewable source of energy.

4 POWER CALCULATION

Let us consider,

The mass of a body	=	60 Kg (Approximately)
Height of speed brake	=	10 cm

∴Work done = Force x Distance

Here,

Force	=	Weight of the Body
	=	60 Kg x 9.81
	=	588.6 N
Distance traveled by the body	=	Height of the speed brake
	=	10 cm = 0.10 m

∴Output power = Work done/Sec

= (588.6 x 0.10)/60

= 0.98 Watts (For One pushing force)

However, this much power produced, it cannot be tapped fully. From the
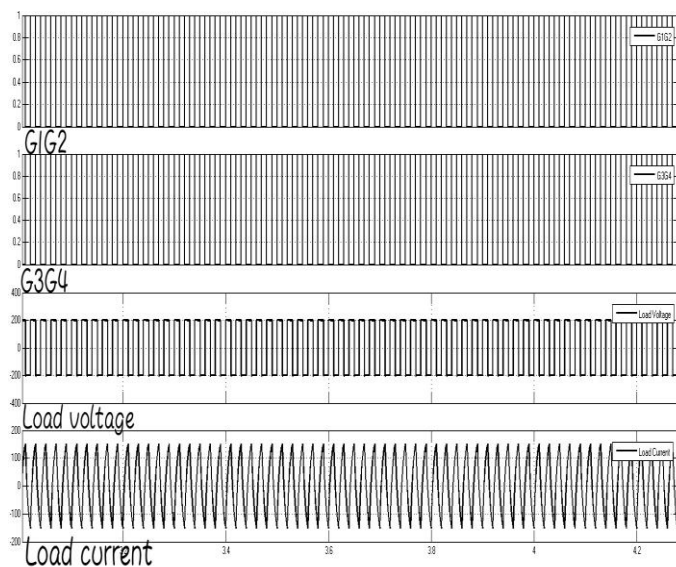
5. SIMUATION

5.1 SIMULATION RESULTS

FIG: 3 Output waveform

6. HARDWARE:

6.1 Chain Sprocket:-

FIG: 4 Chain sprocket

This is a cycle chain sprocket. The chain sprocket is coupled with another generator shaft. The chain converts rotational power to pulling power, or pulling power to rotational power, by engaging with the sprocket. The sprocket looks like a gear but differs in three important ways:

- Sprockets have many engaging teeth; gears usually have only one or two.
- The teeth of a gear touch and slip against each other; there is basically no slippage in a sprocket.
- The shape of the teeth is different in gears and sprockets.

6.2 Bearing

FIG: 5 Bearing

A ball bearing is a type of rolling-element bearing that uses balls to maintain the separation between the bearing races. The purpose of a ball bearing is to reduce rotational friction and support radial and axial loads. It achieves this by using at least three races to contain the balls and transmit the loads through the balls. In most applications, one race is

stationary and the other is attached to the rotating assembly (e.g., a hub or shaft). As one of the bearing races rotates it causes the balls to rotate as well. Because the balls are rolling they have a much lower coefficient of friction than if two flat surfaces were sliding against each other. Ball bearings tend to have lower load capacity for their size than other kinds of rolling-element bearings due to the smaller contact area between the balls and races. However, they can tolerate some misalignment of the inner and outer races.

6.3 Rack and pinion gear

FIG:6 Rack and pinion gear

The block is the impartment part of the unit as it houses the rack and pinion. This rack and pinion attachment gives the rotary motion to the chain sprocket. This block converts linear motion into rotary motion. Rack and pinion gear system is used to transmit rotary motion into linear motion. The rack is a portion of a gear having an infinite pitch diameter and the line of action is tangent to the pinion.
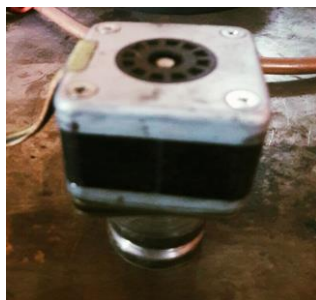
Pinion:

This is a gear wheel which is provided to get mesh with rack to convert the linear motion into rotary motion. They are made up of Cast iron.

Rack:

Rack teeth are cut horizontally about the required length. This is made up of Cast iron.

7. DC Generator:

FIG: 11DC Generator.

Basic Operation of a DC Generator A single conductor, shaped in the form of a loop, is positioned between the magnetic poles. As long as the loop is stationary, the magnetic field has no effect (no relative motion). If we rotate the loop, the loop cuts through the magnetic field, and an EMF (voltage) is induced into the loop. When we have relative motion between a magnetic field and a conductor in that magnetic field, and the direction of rotation is such that the conductor cuts the lines of flux, an EMF is induced into the conductor. The magnitude of the induced EMF depends on the field strength and the rate at which the flux lines are cut. The stronger the field or the more flux lines cut for a given period of time, the larger the induced EMF.

8. CONCLUSION

The coming days, demand for electricity will be very high as it is increasing every day, speed breaker power generator will prove a great boom to the world in theFuture. The Aim of this research is to introduce another innovative method of green power generation in order to contribute toward developing the world by enriching it with utilization of available resources in more useful manner. Any country, especially Nigeria and other developing nations, can only develop when there is steady and available power supply for its citizens and Electric Power Generation by Speed Breaker Generators International organization of Scientific Research not by getting breakdown in middle course of time or unreliable power sources. Now time has come for using these types of Innovative ideas and it should be brought into practice.

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