

Design & Development of Pedal Powered Generation System

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Abstract— Access to power has been a major relation in the remote areas even after few decades of independence. It needs attention of researchers to find an economically viable alternative for produce energy with the help of available resources to improve the quality of life in such remote areas. This paper proposes a pedal powered generator with energy storage that can be utilized to light a bulb and a small fan even during non-pedaling period. The same can be extended to charge other devices such as mobile phones, laptop, iPods etc. Also Today's we are facing the problem of load shedding more & more, even in some villages it does about 15-20 hours daily during summer. Humans are able to generate 100 watts of power while bicycling however this power is wasting without a knowledge but if we can make use of this we can able to power any electronic gadgets.

Index Terms— Generator, Pedaling, Energy

I. INTRODUCTION

In today's world electricity is the basic need. People are mostly depends upon the non-renewable energy sources but they are not long lasting. Also in some areas electricity can't reach, also not affordable to generate with conventional processes using fueled generator. So to fulfill that requirement there is need to use the alternate ways which are eco-friendly. It saves fuel as well as cannot produce harmful bi-products which harm our environment. Pedal power generation is one the better alternate source to produce electricity. Also it is working on human workout/exercise and not depend upon any natural requirement eg. Sunlight for the solar power or sufficient wind speed for the wind power generator. That's why it is more useful than other alternative energy sources.

The conventional model of the pedal power generation system is uses the generators which are use in wind power generation system or alternators of small cars. They provides electricity for that moment which is not more useful. So, we get to work on the model that provide more amount of electricity for long time which is very useful in

house. At least it will fulfill the requirement of electricity of a house.

I. PROBLEM STATEMENT

- In many areas electricity cannot reach but there is need of electricity. Also to generate electricity in that areas with our conventional methods using fueled generator are not possible because they are costly. In the pedal power generation system, there are not special pedal operated electricity generation purpose generators which work on less rpm and give efficient output.

Objectives :

- To design the model that produce high amount of electricity in less time.
- To reduce the required rpm input for the alternator.
- To produce sufficient electricity to charging the battery which provide electricity for long time.
- Reduce working time in pedaling for the pedaling power generation.

II. WORKING

Working Principle of Alternator : Rotating a coil within a magnetic field induces a voltage at the coil terminals, which allows powering a load connected to terminals. If the coil rotates at constant speed within a uniform magnetic field, an AC voltage with zero mean value is induced at its terminals. The periodical change of the voltage polarity is due to the change of the position of the coil relatively to the magnetic poles. The amplitude of the voltage depends on the magnetic field strength and the rotation speed. This is the principle of operation of alternator.

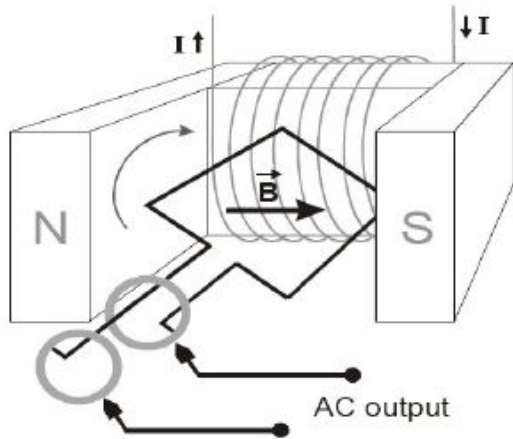


Fig. Principle of operation of single phase alternator

The alternator generates AC power so often called as alternators operate on the same fundamental principles of electromagnetic induction as D.C. generators. The voltage may be generated by rotating a coil in the magnetic field or by rotating a magnetic field within a stationary coil. The value of the voltage generated relates to,

- The number of turns in the coil.
- Strength of the field.
- The speed at which the coil or magnetic field rotates.

IV. PRODUCTIVE PARAMETERS

The first step in the process was to determine the output capabilities of the alternator since we were unable to find data sheets for specific motor. To do this, we use our DC-generator with a DC motor from the electrical setup.

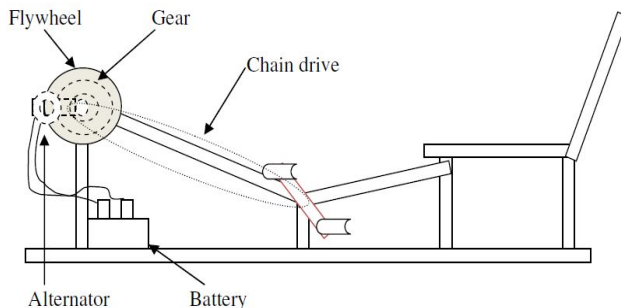


Fig. Construction of model

Alternator specification :

Model : Lucas TVS
 Use in car: MARUTI 800
 Voltage: 12V

Current: 35A



Fig. 6.1 Picture of alternator

Multipliers Battery Selection :

Ah rating of the battery = (Required backup time) x (current)

Where,

current = wattage load / battery voltage

Input parameters of the battery:

Input voltage : 12V

Required backup time : 15-20 hours

Required output power : 50 watt

So,

$$\text{Current} = 50 / 12 = 4.18 \text{ Amp}$$

Then,

$$\text{Ah rating of battery} = (15 \text{ hrs}) \times (4.18) = 62.7 \text{ Ah}$$

Of which rating battery is not available, so we use battery of 80Ah, which gives sufficient output.

Advantages:

1. Portable model
2. Produce electricity in emergency purpose (power failure)
3. Useful for household purpose
4. Use for exercise
5. Provide power to electric equipments like laptops, mobile phones etc.
6. Eco-friendly

Limitations :

1. Pedalling the Pedal Exerciser is Noisy
2. Exercising with the Pedaller Makes You Sweat
3. No one wants to sit on a bike seat all day.

V. CONCLUSION

Based on the results obtained , we conclude that,

- 1) The system provide the electricity of 50 watt for about 15-20 hours with the pedaling operated generating system.
- 2) The 80 Ah battery is suitable for providing 50 W for 20 hours
- 3) The time to charge that battery is 3-4 hours using alternator.

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