

Study of Human Operated System to Generate Electricity

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Abstract— Power Generation using human effort is a force for the future. With increasing demand for fuel and a new source of energy, development of human powered generators become a necessity. The most famous human powered generator is dynamo. On similar lines various human powered generators like backpack generators, biomechanical energy harvester and shoe generator are being developed. These harvesters are under development and are considered one of the best inventions of recent times. One such way is to develop alternate source of energy which will help us to save energy. Geothermal energy, biogas, solar energy, wind energy are various forms of energy which are used alternatively today. One such source of energy is Human Power. Human power is an endless source of energy which has been wasted. The energy is stored in a mechanical form and retransmitted to the wheel in order to help the acceleration. Electric vehicles and hybrid have a similar system called Regenerative Brake which restores the energy in the batteries. The device recovers the kinetic energy that is present in the waste heat created by the car's braking process. It stores that energy and converts it into power that can be called upon to boost acceleration. There are principally two types of system - battery (electrical) and flywheel (mechanical). Electrical systems use a motor-generator incorporated in the car's transmission which converts mechanical energy into electrical energy and vice versa.

Key words: Generate Electricity, Study of Human Operated System

I. INTRODUCTION

In a world with growing demand for energy, it has become a necessity for alternate source of energy. As a result various inventions have been made to overcome the issue. Increasing efficiency of electrical and mechanical products has been one of the ways to reduce energy consumption. These techniques are useful for reducing energy consumption. One such way is to develop alternate source of energy which will help us to save energy. Geothermal energy, biogas, solar energy, wind energy are various forms of energy which are used alternatively today. One such source of energy is Human Power. Human power is an endless source of energy which has been wasted. Humans eat food and spend it on his work without proper conversion of energy. This paper brings to light various benefits of human power also the harvesters used to utilize this power. Various harvesters which use human power to generate electricity or power include cycle Dynamo. Biomechanical Harvesters, shoe Generator, Backpack generator. These devices utilize human energy to produce mechanical work.

II. LITERATURE SURVEY

Onwards of 1876, it is attached to tools like lathes, saws, grinders, shapers, tool sharpeners and to boring, drilling and cutting machines [2]. The air-craft is also flown for sufficient distance on human powered systems [3]. In 20th century, the human powered systems are widely used in Pedal-powered transmitter, Windup radio, Military radio [1] DAVID SOVERWINES's village-scale human power plants [4]. Center of bicycle technology runned by Maya pedal a Guatemalan NGO based in San Andrés Itzapa, successfully tested for a range of heights.

A. First Model for electricity

The first prototype was developed using a car alternator. A used 40 Amp car alternator was used. The speed needed to get an output of 6 amps was over 90 rpm (at pedals). It was felt after use for about a month that this speed was pretty high and could not be maintained. A reclining chair was used for sitting. Therefore other design changes were considered. Limitations were found to be the design of generator and lighting system.

B. Second Model for electricity

The second prototype was developed using a reclining chair but a low rpm DC motor that was originally developed for an electric bicycle. A 15-ampere diode was connected so that the battery would not drive the motor when the pedaling stopped. Pedalling speed required to achieve 6 amps output was brought down to 70 rpm. The frame was made of mild steel angles and square channels. A 40 Amp-hour battery was used to store the electricity. Two 11-watt compact fluorescent lamps were used for lighting. This model was installed in the Narmada valley and used for a year and feedback obtained. The photo on the right shows the second prototype.

C. Third Model for electricity

A Third model was made to include all the feedback received for the second prototype. The seat was changed to a standard bicycle seat and basic frame of a bicycle was used to manufacture the machine. An LED bar indicator and an ampere metre were added for state of battery and rate of charging indicator respectively. The ratios were changed so that pedalling speed was brought down to 40-60 rpm. Various experiments were done with varying sizes of flywheels and finally a flywheel was attached on the generator to balance the irregular of pedalling force.

III. METHODOLOGY

- Step 1: Collection of the Raw material.
- Step 2: Assemble the parts.
- Step 3: Power given to cycle rim by Paddling [5].

- Step 4: Rim is connected to the alternator by rotating shaft.
- Step 5: These output is used for alternator to generate electricity.

IV. MATERIAL COMPONENTS

- Paddle.
- Bicycle Rim.
- Alternator: 12 volt Gear Motor Obtaining 6 To 15 Volt Supply. An alternator is an Electrical Generator that converts Mechanical energy to electrical energy in the form of Alternating current.
- Pulley.
- Shaft.
- Fan.
- Water Heater.
- Storage Batteries.
- Bulb Connections.
- Mobile Charging Setup.

V. THE BASIC PRINCIPLE

- By giving rotating Motion To the shaft through the pedal. We implementing the Faraday's Law due to which electricity generation takes place.
- These altering source of energy can be stored or simultaneously can be used.

VI. APPLICATIONS

- Used to Save Environment from Pollution
- Electricity generated can be stored in the battery and may be used for different applications-mobile charger, Lamps, etc.
- Most of the electric based work can be done on this even if power is cut off

VII. ADVANTAGES

- Helpful for rural areas.
- Electricity generation is help full to us for many purposes.
- Bulb, fan and some other appliances are used over the batteries.
- It is easy to maintain and make.
- Power generation is simple by pedaling on this arrangement.
- Time and effort required is medium.

VIII. CONCLUSION

The whole study over the topic that the wheel deal bicycle powered electricity generation is a very advantageous especially for rural areas. The problem of energy crises is very big in India and by use of this project. We generate electricity and the stored energy can be used for small and medium level application.

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