

Advanced Foot Step Power Generation System Using RFID For Charging

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Abstract- *The main objective of this project is to develop much cleaner cost effective way of power generation method. In present condition the shortage of electricity is the big problem for industrial growth as well as rural developing, shortage of electricity has its effect on human being we need to develop the strong electricity generating technique. By utilizing the wasting energy for our better future. In this project we are generating the electric power by running the foot step on the piezoelectric plate. The advanced foot step power generation can be effective method to generate electricity. Walking is the most common activity in human life. Piezoelectric material is the main component for generating power. The control mechanism carries piezoelectric plates the is generated by using the weight of the persons.*

When the person walks on the road he loses some form of energy of impact due to the transfer through foot falls on the ground during every steps. This energy can be converted into usable form. the generated power will be stored and then we can use it for the domestic purpose. This type of system can be installed at school homes and colleges the power. The mechanical energy is applied on the crystal into electrical energy. When there are some vibrations, stress, strain, force exert on foot on that platform. It can be used for charging devices Ex. Mobile.

Keywords- power utilization, power generation, piezoelectric material, energy conversion.

I. INTRODUCTION

Now, day by day the population of country is increasing and the requirement of the power is also increasing. In this topic we are generating electrical power using non-conventional method by simply walking on the foot step. Walking is the most common activity in the human life. when a person walks he losses energy to the load. Energy nothing but the ability to do the work. In the day to day life the most commonly used energy source is electricity it is needed that the wasted energy must have to utilize. Walking is the most common activity that is done by the human being while walking energy is wasted in the form of vibration. This wasted

energy can be converted into electric energy using the principle called “piezoelectric effect”. The main function of the piezoelectric effect in which mechanical vibration pressure strain or force is applied on the piezoelectric material is converted into electrical form. Larger movement of people will generate more energy. Now a day’s modern technology needs a huge amount of electrical power.

Electricity production is the second largest source of pollution in the whole world. In this project we have generated power by using non -conventional method. When the people walk on this platform their body weight compress the setup which rotates dynamo or Sanyo coil and currents produces is stored in dry battery non- conventional method for generating the electricity. The embedded piezoelectric materials are providing the magic of converting pressure exerted by the moving people into electrical current.

1.1 PIEZOELECTRIC SENSOR

Piezoelectric sensors devices are used to measure pressure and acceleration with the help of piezoelectric effect. Strain or force converting into an electrical signal are used for quality assurance process control. In 1950’s that are used for quality assurance effect is started to be used for industrial sensing applications. Such as in medical, aerospace Nuclear instrumentation. Pressure sensors in the touch pads of mobile phones in the automotive industry are used to monitor the combustion when developing internal combustion engines. Piezoelectric sensors are so rugged with an extremely natural high frequency and an excellent linearity over a wide amplitude range.

The commonly measure physical quantities by a piezoelectric sensor are acceleration and pressure. Both pressure and acceleration sensors are work on the same principle of piezo-electricity but the main difference between them is the way force is applied to their sensing element. In the pressure sensor, a thin membrane is placed on a massive base to the piezoelectric element.

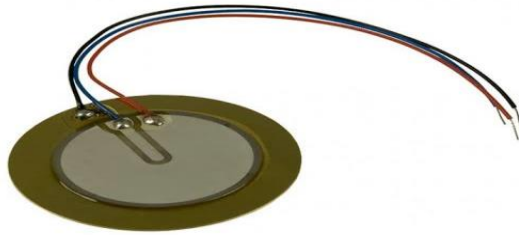


Figure1: piezoelectric sensors

1.2 LEAD ACID BATTERY

Battery is an array of electrical cells for electricity storage. The storage battery or secondary battery is type of a battery where electrical energy can be stored as chemical energy and this chemical energy can be converted into electrical energy as and when required. This conversion of electrical energy into chemical energy by applying external electric source is known as charging of battery. Whereas conversion of energy chemical energy into electrical energy for supplying h external load is known as discharging of secondary battery. During charging of battery current is passed through it which cause some chemical changes inside the battery. This chemical changes absorb energy during their formation battery may be used once and discarded or recharged for years are in stand by power applications.



Figure2: Lead Acid Battery

II. WORKING

In this advanced foot step power generation project, we are generating power with the help of human’s footsteps. The power is stored in a battery that can be used to charge a mobile phone using a RFID card. This system is powered by AT mega 328 microcontroller, it consists of RFID sensors, USB cable and LCD. When we power on the system, the system enters into the registration mode. We can register three users. When the user is entered in the system then the system asks to swipe the card and connect the charger.

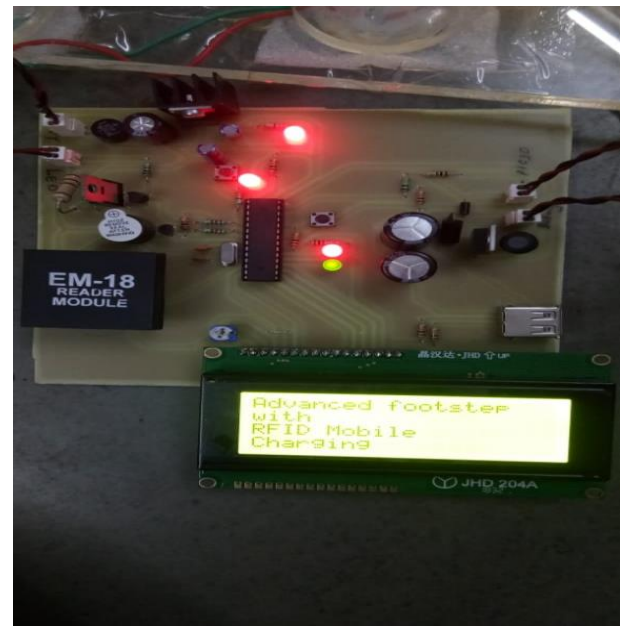


Figure3: Hardware implementation

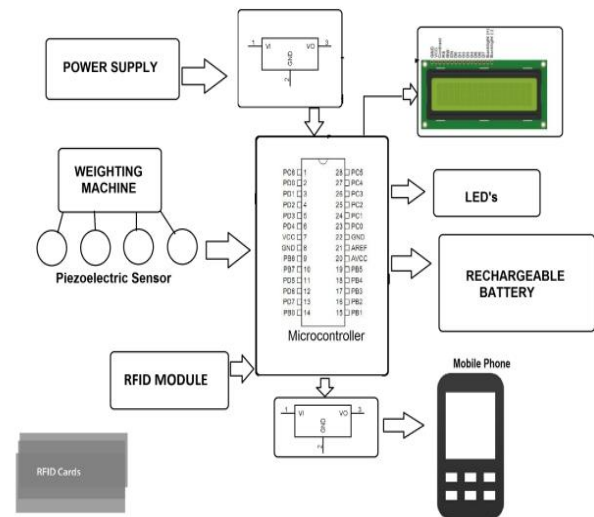


Figure4: Block diagram of advanced foot step power generation

Initially all the user gives 5 minutes of charging time as default. When we swipe the cards and if the user is authorized, the system turns on for charging and will charge the mobile phone. If the user is unauthorized then the system will display unauthorized user, just in case if the user wants to stop the charging in midway the user need to swipe the card again. Whenever the card is swiped again, the remaining time balance is displayed. Following that, the charging stops. In order to recharge a card, we need to press recharge button which on the system and then system will ask to swipe the card. By swapping card, user can get extra 5 minutes.

III. APPLICATIONS

1. Foot step generated power can be used for agricultural, home applications, street-lighting.
2. Foot step power generation can be used in emergency power failure situations.
3. Metros, Rural Applications etc.

IV. ADVANTAGES

1. Power generation is simply walking on step.
2. No need fuel input.
3. This is a Non-conventional system.
4. Eco friendly
5. Ultra-low noise

V. DISADVANTAGES

1. Implementation is difficult
2. Only applicable for the particular place

VI. FUTURE SCOPE

The utilization of wasted energy is very much relevant and important for highly populated countries in the world in the future.

1. Flooring Tiles-

Japan has already started experimenting with the use of the piezoelectric effect impact on generating energy. They implement a piezoelectric effect on the bus stairs. Thus every time passenger steps on the tiles; they trigger the small vibration that can be stored as energy in the battery.

The flooring tiles are designed by the rubber which can absorb the vibration. This vibration generates when people are running or walking on it. Under these tiles, the piezoelectric material is placed. They can generate electricity when the movement is felt by the material. Simultaneously this generated energy is stored into the battery. The generated electricity can be used for the lighting of a lamp or street light. Energy is generated by the step of one human being is too less but if the number of steps increases ultimately energy production also increases simultaneously.

2. Dance floors-

Europe is one of the countries which implemented and started experimenting with the use of a piezoelectric crystal for energy generation in night clubs. The floor is then

compressed by the dancer's feet and piezoelectric materials make contact and generate electricity which can be used as the generator in the club. The generated electricity is nothing but 220 watts. It depends on the impact of the dancer's feet. If constant compression of the piezoelectric crystal causes a huge amount of energy.

VII. RESULT

In 1 square ft. we used an 8piezo sensor. As piezo sensors power generating varies with different steps, we get

Minimum voltage = 1V per step

Maximum voltage = 10.5V per step

We took an average of 50Kg weight pressure from a single person.

Considering the steps of a 50Kg weighted single person, the average calculation is:

It takes 800 steps to increase the 1V charge in the battery.

So, to increase 12V in battery total steps needed

= (8*800)

= 6400 steps

As we will implement our project in a populated area where footstep as source will available, we took an average of 2 steps in 1 second. For 6400 steps time needed

= 6400/ (60*2)

=53minutes. (Approximately)

VIII. CONCLUSIONS

From this reviews it's very easy to understand the basic comparison and design criteria that used for methods to generate the power using the foot step in the method only easy to implement and maintain the energy generated will be store and then we can use it for domestic purpose. the control mechanism carrier piezoelectric sensor. this mechanical energy applied in the glass in the electrical energy. This can be used for many applications in the city areas where want more power this can be used in street lighting without use of long power lines. It can be used as charging ports. lighting of pavement side building.

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