POWER GENERATION FROM UNTAPPED SOURCES IN DAY TO DAY LIFE

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ABSTRACT: This paper concern about the tapping of untapped or unnotified mechanical energy into electrical energy using piezoelectric crystals. Some of the untapped mechanical energy are force exerted by human being during movements, rotational movements of automobile parts in vehicles, pressure force applied while typing, etc. This untapped mechanical energy are tapped by piezoelectric crystals for generating electrical energy. The piezoelectric crystals like PVDF. Piezoelectric crystals are one of many small scale energy sources. Whenever piezoelectric crystals are mechanically deformed or subject to vibration they generate a small voltage, commonly known as piezoelectricity.

Keywords: untapped, mechanical, piezoelectric, PVDF, electrical energy.

I INTRODUCTION

This paper deals about the method of generating power from the untapped mechanical energy. The power generated from the conventional resources are emptied at a much faster rate than they are replenished. So it is necessary to adopt another power source preferably non-conventional energy source to reduce pollution and power demand. Recent developments have been made in harnessing the untapped mechanical energy for generating electrical energy. Piezo-electric crystals have the capability of harvesting energy from mechanical vibrations in a dynamic environment. Untapped power exists in various forms such as walking, frictional parts of automobile, vibration in pavements while walking, vibrations in roads and bridges etc. These energies are converted into electrical energy by piezoelectric crystals. The power generated by this crystals are used for charging/feeding the low power consumption systems like mp3 players, mobile phones, automobile batteries, GPS receivers or sensors of remote sensing systems or transmitters which are conventionally powered by batteries.

Polvinylidene fluoride (PVDF) piezoelectric polymer crystals are used commonly due to its flexibility and strength. The advantage of piezoelectric power supply is ecological, embedded and it does not require any maintenance. Piezoelectric polymers are commercially available and are relatively inexpensive.

II SOURCES OF ENERGY

2.1 WALKING
Walking is a huge mode of transportation. People walk for so many reasons: to buy groceries, for shopping, local transport, to go to nearby places, for fitness and so on. Walking is one of the exercises, which involve quite a lot of our muscular energy. Many people walk as a hobby, and in our post-industrial age it is often enjoyed as one of the best forms of exercise. An average walking speed is about 6 to 7 km/h (3 to 4 mph).

2.1.1. WALKING STATISTICS
The Ramblers formerly known as the Ramblers' Association, is the largest walkers' rights organisation in Great Britain, which aims to look after the interests of walkers (or ramblers). It is a charity registered in England and Wales, with around 135,000 members. There are 485 Ramblers' groups in about 50 areas, and around 350 other affiliated bodies, such as societies especially interested in the heritage of the countryside, the Footpath Society, and local councils.

The statistical data about the walking community of Great Britain is issued by its Department of
Transport. There are many people who make walk trips to visit their nearby houses or places. The chart showing the walk trips made by the men and women of Great Britain.

Fig. 2 Data indicating the walk trips of people of England

2.2 ROADS
The following chart will show the tendency of people towards walking as years roll on. It could be found out that the tendency of the people towards the walking decreased. People use cars to reach even nearby places almost 58% people use cars to reach the distances within mile. Hence the usage of roadways also gets increased.

Fig. 3 Comparisons of travel by walking and through roadways

2.3 SIMILAR ISSUES
There are similar concepts harnessing energy from untapped mechanical energy. Some of them resembles and related to our idea

PIEZOELECTRIC ROAD:
We can develop a way to recoup the pristine energy from cars operating on public roadways. Using piezoelectric crystals installed under the asphalt, highway vibrations are converted into a staggering amount of electricity. It is possible to cultivate electrical energy from the untapped mechanical energy up to 500 kilowatts from a busy four-lane road per kilometer. It is enough to power about 100 homes.

Fig. 4 Piezoelectric road

PIEZOELECTRIC SHOES: Our concept of piezoelectric shoes involves 0in the placing of piezoelectric sheets inside our shoes so that the stress which is being given on to the shoes while walking, running and jogging could be effectively utilized using the piezoelectric effect. Any people to go anywhere could wear a shoe and there are lot of Footsteps made every day by the people. So this is an idea of harnessing the power from each of the footstep.

Fig. 5 Piezoelectric shoes

PIEZOELECTRIC TIRES: As the vehicle moves, new area of the tire continually deforms and relaxes in a cyclic pattern whose frequency is dependent upon the vehicle velocity. The deformation of the Treadwall and the reduction in the effective Section Height. Due to the deformation of the Sidewall presents an opportunity for energy harvesting through the use of piezoelectric bender elements that would deform and relax with the tire.

Fig. 6 Tire deformation
PIEZOELECTRIC POWER STATION

It is possible to power up the whole area (small region) by collecting the power generated by the piezoelectric roads, piezoelectric railroads and piezoelectric pavements and storing it in a unique station which is known as piezoelectric power station. From the piezoelectric power stations the power is converted and transmitted to various parts of the city/village/area. We can also set up a charging station for charging electrical vehicles.

OTHER PIEZOELECTRIC DEVICES

By using piezoelectric crystals it is possible to generate power from presitine mechanical energy of various sources. The following devices are designed to generate and power electrical energy. Some of them are piezoelectric keyboards, piezoelectric railroads, piezoelectric backpacks, piezoelectric mobile phones etc.

III CONCLUSION

It is possible to harvest large amount of power using the piezoelectric crystals by employing the above mentioned energy harvesting methods wherever the mechanical energy is untapped. This kind of presitine mechanical energy converters may reduce the power demand of other conventional energy sources and produce a green energy to our environment.

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