INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

To Investigate the Generation of the Electricity through the Gravitational Force and Use of Artificial Light

Vivek Mishra[1], Dr. Alka Bani Agrawal[2]

[1]*Research scholar,* [2]*Professor, Department of Mechanical Engineering, Bhopal, University Institute of technology(U.I.T.), RGPV Bhopal, India*

Abstract: In current scenario, due to effects of pollution and global warming there is a need of generating power from renewable sources. The main purpose for generating power using gravity is that it is available all over the Earth, abundant and consistent too. In this project we designed a methodology wherein we combine two different (gravitational force and photovoltaic effect) methods of energy generation, firstly gravitational potential energy is transformed into rotational kinetic energy in terms of its magnitude by using perpetual motion mechanism and hence can be successfully converted into usable electrical energy. And another mechanism in my analysis is to harvested energy from artificial source of light (LED bulb) by use of solar cell or panel so for this arrangement we harvested some energy from ongoing energy(i.e. energy which is used in lighting the room in night time). Perpetual motion describes "motion that resume definitely without any external source of energy but it is impossible in practice because of friction.. So for this concern we used in reciprocating actuator in our project to provide intermittent energy to the system to overcome friction losses, and for stable operation.
Keywords: Gravitational potential energy, rotational kinetic energy photovoltaic effect, artificial light, Perpetual Motion, Actuator, Solar cell or panel

I. INTRODUCTION

As we seen in last few decades power requirement has reached to high extent, for various purposes due to ever increasing population, development and modernization. And also for any developing country power play vital role. Power can be extracting or harvested through multiple methods using Renewable energy source or Non-Renewable energy source. But all this method used to generate electricity, have their own limitations and energy can be grasped only in a specific quantity and only for some extent. Therefore there is crucial need for having new method which would generate power for overcoming these limitations. Gravity is one such the source which can serve our requirement

Gravitational force is a force that attracts any object with mass. The primary objective is to is to use gravity potential energy by help of actuator applied force which can continuously convert gravity potential energy into rotational kinetic energy. This motion is converted into circular motion and is then converted into electricity using a d.c . Generator. Thus we are mainly concerned with study of power generation using a technique which produces power from gravity force the gravity power generation apparatus not only has the advantages, such as:, higher conversion ratio, more simplified in structure and more environment-friendly only just needs a little of starting energy to perform a long-time energy conversion. Especially, the gravity is more stable, so the gravity mechanism is much stable than the wind power generation methods and can be placed at an any arbitrary position without being compromise the efficiency of system by the outside environment.

Then After the generation of electric power, that power is stored in battery and it is utilized to operate household appliances like bulb, tube light, fan, T.V etc.

In night time there is compulsory to lighting the room or space by illuminating the bulb or tube light, now our secondary method is taken off the energy through the artificial light, direct recovery of energy is minimum but can be improve by some proper arrangement like use of mirror or lenses with solar cell or panel. solar cell is mount on light source (LED bulb, tube light) in such a way that it makes angle of 90 degree with both mirror and solar panel, and 45 degree with source of light, firstly the light rays incident on mirror in such a way that it should reflect on solar panel now the solar cell or panel is activate and produce electricity, further energy is minimum so we use boost converter to increase magnitude of voltage, That electricity is stored in batter. so in this arrangement we harvested energy From ongoing energy.

So our concept is that to utilized artificial source of light(i.e. LED bulb/tube light) to further generate the electricity or recovered some energy through the visible light i.e led bulb) by the help solar panel or cell .by this type of arrangement we generate stable and reliable power.

So that gravitational force is primary source to generate electricity and artificial (visible

Light: i.e.led bulb/tube light) light is secondary source to further recharge the battery

A. Research Significance

Significance of this project is to finding the alternative source of electricity generation, gravity is a alternative source of energy for which we can generate power, this energy is economically cheap and harmless energy, and to provide uninterrupted power.

This system is to provide electrification on that area's where electrification is not done due to geographically or climatically challenging area's

II. LITERATURE SURVEY

CHUNCHAN WANG et al [1] [Kaohsiung City] which produces vitality utilizing gravity transformation unit that produces positive forces by embracing outward-spreading single directional swing arms and decreases the negative forces by helping out collapsing activity of single directional swing arms

[2]John. J. Hurford, "Gravity motor", United States Patent number: 6237342,he worked on gravity motor The feeling of vision is one of man's most significant senses. So as to utilize this sense, we need light that part of the electromagnetic spectrum that gives rise to a visual sensation. This light must be provided in adequate amount and has to be properly distributed if a situation of maximum visual comfort and performance is to be created. Not with standing that, light has significant non-enhanced effects on humans. Since the discovery of a third type of photoreceptor in the human eye is most important (BERSON D.M. 2003), et al [3] researchers have been able to understand more and more how light influences our body's functioning, our health and wellbeing. Particularly the impact of light on the circadian system, then again, artificial lighting is accountable for a large part of an office building's electricity needs. So as to lessen this power utilization, significant efforts have been made during the last decades and will still have to be made later on. Different systems are additionally evolved to use this gravitational power for creating required force. MAXIMO GOMEZ-NACER et al [3] have structured an arrangement of generating electricity by methods for utilization of the power of gravity, by consolidating pendulums whose weight and speed give vitality to power generation. Another such system is created by. According to RS AMBADE et al [4] Conserving vitality has become the greatest issue in present situation. Because of the turn of events and modernization the power request is expanding at serious degree. To satisfy this interest universally which is with no destructive impact on condition is conceivable by utilizing gravity power method to generate electricity. Sir ISSAC NEWTON had found the wonder of gravity close to 400 years prior. London investigates MARTIN RIDDIFORD and JIM REEVES who have gone through four years for creating gravity light as a disconnected undertaking. They are utilizing attempted and tried assembling who has the correct information to make gravity light. Gravity light is a progressive new way to deal with putting away vitality and making enlightenment. It takes just three seconds to lift the weight which powers gravity light, making 30 minutes light on its drop.

III. WORKING EXPLANTION

In this project firstly we take wheel of 1m diameter ,wheel having double grooves on circumference, one having attached with 9 weights of 2 kg each is attached with spacing of 40 degree each and another having belt is wrapped on it. weight is attached on wheel in such a way that 8 weights is cancelled out each other by balancing equilibrium only 9th weight is effective weight which can cause to rotate the wheel. Attaching weights on wheel in such a way that every time top most weight is treated as 9th weight which can cause to rotate the wheel. Now after obtaining gravitational potential energy by rotating weights, this energy is now converting into rotational

kinetic energy by connecting of smaller size wheel of dai.10cm.smaller wheel is attached on d.c generator so that shaft of d.c. generator is rotate can convert rotational kinetic energy into electric energy

Now after converting electric energy, that energy is stored in battery to use. As we now that gravitational potential energy is kind of force and force is always associate with friction and that friction is stop our wheel after certain rotation so that for continuous operation we need that device which can be provide intermittent energy to overcome the friction losses so we use rod style linear actuator which can provide sudden energy of our wheel for every certain period of rotation rpm of wheel is scene by proximity sensor and accordingly M.C.U supply the current and automatically cut off after giving energy to 9th weight which are mount on larger wheel.

Circuit of actuator is design in that way that whenever speed of larger wheel is decrease then sensor gives the signal to the actuator, then actuator gives power stroke to the 9th weight power stroke is given to 9th weight by actuator then it automatically cutoff and same cycle will continue ;so for this arrangement we can overcome with friction losses and our cycle is rotate continuously. And perform stable operation After the electric energy generation; which are stored in battery is used for household appliances. In night time it is compulsory to use tube light or bulb to illuminate the room so that we use our secondary method of energy extraction that is; extract energy through artificial light (LED bulbs/led tube light)by use of solar panel or cell. Direct extraction of energy is not efficient ;so we use proper arrangement to enhance the artificial light power by using mirror. the mirror and panel are attached on 90 degree each other and in between source of light is placed. or in other words we should understand the arrangement like V-shape on which both will attached and in between source of light is placed. Mirror is always in top side and panel is in bottom side, the arrangement is such a way that all rays of LED light is totally reflected to mirror than incident on panel With high intensity so that silicon is activated on panel and perform p-v effect. That harvested energy is back through the battery.

As we know that extraction of energy is minimum so that to prevent the transmission losses we used boost converter to enhance the voltage and it will help to charge the battery, For the above arrangement we will be able to increase battery backup time because some amount is energy is recovered during consumption.
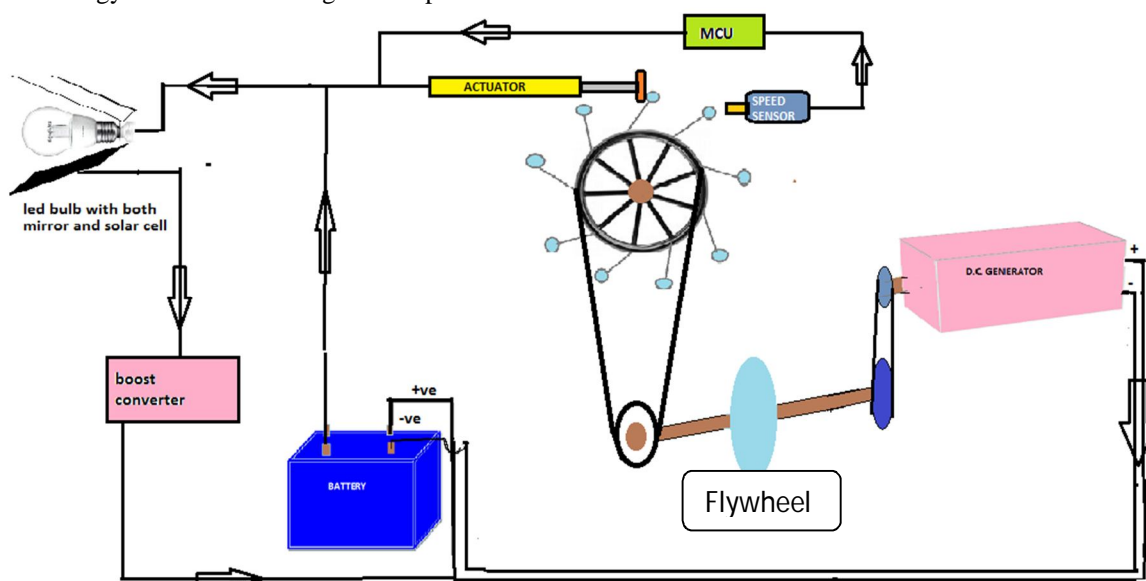

Fig.3.1 Complete working model

IV. RESULT AND CALCULATION

Firstly we decide the load of a particular house.

Suppose, we have

led bulb light of 9 w

led tube light of 28 w

television of 100 w

fan of 70 w

cooler of 200 w

Miscellaneous equipment in a house like(mobile charger, computer, etc) of 200 w

So the total load of a house is **723 watt** every time in peak hours and for this purpose we decide our system to run in such a way that they are capable to produce that much of power continuously.

by that cause we take a d.c generator of **1.5 k.w.** so that they are capable to produce that much of power. because some of the power is lose in transmission, that means generator are not design as for 100 efficiency they have some their own limitations. Generally we assume that generator gives us 85 percentage of transmission efficiency. and also battery have there own capacity to recharge, that means they losses power during charging. and we use actuator for transmission of force to wheel so they also consume power so we take **1.5 k.w.** generator so that, at least they will gives us 723+ power every time.

I took d.c generator whose rated rpm is 1500 rpm and generate 1.5 k.w. power so we achieve   that much of rpm by our system

Power	1.5 k.w.
Voltage	220 Volt
Speed Range	1500 Rpm
Current	8 Amp

Now in this experiment I use two methods of power generation first one is primary method i.e (gravitational force)and secondary was recovery of used energy by solar cell.

In this project I uses , steel wheel which have high strength and durability

Diameter of wheel D_1=1000mm

No. of spokes in a wheel = 9

Length of spoke = 500mm

Weight of each spoke =0.5 kg

Weight of rim of wheel = 2.8 kg

Diameter of pulley d_2=100mm

Distance between two pulley and wheel C =1000mm

No. of weight is attached = 9

Weight of ball attached on wheel = 2 kg

Reciprocating actuator which produce power = 700(approx.)

Diameter of Flywheel d_3= 500mm

Weight of flywheel = 30 kg

Diameter of pulley d_4 = 250mm

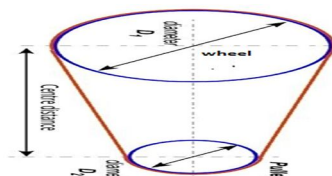Diameter of pulley d_5=100mm

Actuat stroke length = 30

Fig.4.1

Now first of all we calculate belt length

A.   *Formula For Belt Length*

$$Lp = 2C + 1.57(D+d) + \frac{(D-d)^2}{4C}$$

Where c is the center distance between pulley and wheel

So that belt length is taken out as 3.93 m

During the fall of load which is attached to the larger wheel when loads falls

As per the our project, initially actuator strikes the ball which are attached on wheel then, wheel will start rotate

Work done by actuator,

Work done = force *displacement

Work done = 700*.3

Work done=210 N-m

Now this work done and potential energy will converted into rotational kinetic energy and

W.D+MGH $=1/2*I*w^2$ .... (eq. 1)

MGH = 2*9.81*1.6

MGH= 31.392 N.m

Now,

$210+31.392=1/2*I*w^2$

Where I is moment of inertia of wheel and ball

And w=angular velocity of wheel

I of wheel is given as

$I = 9*I (spoke) +I (rim)+I(ball)$

I (spoke)=$.334*m*r^2$

I(spoke)= $.334*.5*.5^2$

I(spoke) = 0.04175 kg-m²

I (rim) =$m*R^2$

I (rim) =$2.8*.5^2$

I (rim) = 0.7 kg-m²

I(ball) =$2/3*m*r^2$

I(ball)=$2/3*2*.03^2$

I(ball)= 0.0012 kg-m²

$I = 9*I(spoke) +I(rim)+I(ball)$

$I = 9*0.04175+0.7+0.0012$

$I= 1.0769 \ kg-m^2$

Now ,put the value in equation 1

$W.D+MGH =1/2*I*w^2$

$210+31.392=1/2*I*w^2$

$210+31.392=1/2*1.4762*w^2$

$w^2 = 448.288 rad/s$

$w=21.17 \ rad/s$

$w=(2\pi*N1/60)$

$N_1=202.18\approx 203$ RPM

Now as per the ratio of diameter and no. of rotation

Speed reduction ratio,

$(D1/D2)=(N2/N1)$

$1000/300=(N2/220)$

$N_2=676.66 \approx 677$ RPM

Since N_2,N_3,N_4 are of same RPM because all are mounted on same shaft

$(D_5/D_4)=(N_4/N_5)$

$100/250=734/N5$

$N_5=1691.66$ RPM

On that rpm our generator shaft will rotate and generate power of 1500w or 1.5 kw and it is sufficient power to charge a inverter battery.

B. Calculation For Flywheel

Flywheel is device which can hold the energy and provide whenever its requirement, it also maintain the constant speed.

We take a flywheel energy as a rotational kinetic energy

$E = ½*I*w^2$

Where v is velocity

V= 2*π*n/60

w=70.89 rad/sec.

$I=MR^2$

$I=30*.25^2$

I=1.875

E=1.875*70.89*70.89,

E=9424 J

So that flywheel stored 5535.36 joule of energy

DIAMETER(mm)	ROTATION PER MIN.(rpm)	TORQUE
$D_1 =1000$	203	381.39
$D_2=300$	677	114.36
$D_3=500$	677	114.36
$D_4=250$	677	114.36
$D_5=100$	1691	45.78

Tab.4 (dia, rpm, torque)

C. Now for Calculation of Torque

Torque=force * perpendicular distance

In that case force is equal to force given by the actuator and ball (gravity)

So that total force =700 + (m*g)

F = 700 + (2*9.81)

Force =719.62

Torque= 719.62*(0.5+0.03)

Torque= 381.39 N-m

By the help of 1st torque we can calculate other torque,

T2/T1=N1/N2=D2/D1

T2/381.39=203/677

T2=114.36 N-m

Similarly,

T3/T2=N2/N3

T3=114.36

T5/T4=N4/N5

T5=45.7845

D. Parallely Connected (Secondary Process)

Harvesting energy of artificial light through solar panel to generate electricity

Using 18v polycrystalline solar panel–

Now recovery of energy calculation is done on led bulb of 40w

E. First Method of Calculation

Energy emitted by led bulb in lumens = 2984

Solar panel area in cm = 22.4cm*18cm

Luminous efficiency of LED bulb in lumens per watt =(2984/40)=75 lm/w

By standard formula for calculating artificial light power output

P(watt) = Ev (lx)*A (m^2) / η (lm/w)

Here ,

Ev (lx) = energy emitted in lumens

A (m^2) = area of solar panel in which light strike the panel

η (lm/w) = standard luminous efficiency

POWER (p) = 2984*0.224*0.18 / 75

P (output) = 1.6041 watt

By using reflecting mirror and placed at suitable position at 45° angle so that it converge it and focus maximum light to solar panel .

Energy emitted by the led lamp = 3500 lux

P = 3500*0.224*0.18/87

P(output) = 1.8816 watt

F. Second method– by using Multimeter to check out Current and Voltage

I took 18v polycrystalline solar panel whose maximum capacity is 4w form sun light but I perform the experiment in led bulb so following output is taken out

The distance between the bulb and the solar panel is about = 5cm

Energy emitted by the led bulb = 2984 lumens

Placing mirror at suitable position= 45° to spread more light with reflection

When the light fall after reflection on the solar panel

The output current and voltage can be measure with multimeter –

    Output current (Amp) = 0.155 A

    Output voltage (V) = 18v

We know that ,

    P (output) = V*I

    p = 2.79watt

so we perform the experiment with different volt of solar panel with 40 watt led light and 24 watt led light whose result are given in tabulate form.

Table For Artificial Light Output

Different volts of solar panel	Artificial light bulb	Multimeter reading		Power output
		(V)	(I)	(watts)
12 volt	40 watt (led Bulb)	12	0.100	1.2
18 volt	40 watt (led Bulb)	18	0.155	2.79
24 volt	40 watt (led Bulb)	24	.46	11.04
36 volt	40 watt (led bulb)	36	.53	18
36 volt	24 watt (led bulb)	36	.21	7.56

V.   CONCULSION

As per the combine analysis of effect of gravitational force and photovoltaic effect by the use of artificial light to generate the electricity is much effective, in our project we work firstly gravitational force on which gravity Potential energy into rotational kinetic energy and then to electric energy, so in my analysis I conclude that by use of gravitational potential energy, our system can able to produce 1500watts of power which is sufficient to run the single basic household appliances efficiently ,also during night time, there is compulsory to illuminate the room or space so that our secondary method is used to be run i.e P.V -effect by use of artificial light(LED bulb/tube light) so that during night time we also harvested or extract some energy from ongoing energy, as per my experiment, 40 watts of led light with 18v solar cell can produce 2.79 watt. Of energy and this energy is stored in same battery by the help of boost converter so in this way we can make the system energy efficient and get continuous and stable energy output.

As we seen that whole world trends move to a non conventional source of energy. But currently looked as the sources which will meet the future energy requirement such as solar , wind , tidal etc yet these sources have their own unique geographical as well as other limitation and not available throughout But gravity is available across our entire planet thus , we can use something like electricity from gravity on a large scale to generate electricity any time at any place.

So gravity is one such option to generate power without any effect of earth's atmosphere, also it does not required too much area for installation, and operating cost is very less and   this mechanism is very useful for those area where electrification is not done due climate or geographically challenging area's, and also we find(by National Energy Policy (NEP) issued by the government's policy NITI Aayog) that Some people may also not interested accessing electricity by choice because of the monthly bills, so this mechanism is useful for those kind of persons who does not able to pay the monthly bills.

REFRENCES

[1]   Chun-chao Wang, Yuh-suiang Wang "Gravity Power Generation Mechanism" United States patent number: 20090115195 A1 App No.11/935,228 May, 2009.

[2]   "Gravity Light Description of the Concept and its Realization" archived athttp://archive.aec.at/ last accessed on 15th May, 2016.

[3]   John. J. Hurford, "Gravity motor", United States Patent number: 6237342

[4]   Rakesh s. Ambade, Roushan Prabhakar, Rupesh s. Tayade, "Review on Gravity Power Generation", International Innovative Research in Science, Vol. 3, Issue 4, April 2014.PP1,2,3

INTERNATIONAL JOURNAL
FOR RESEARCH

IN APPLIED SCIENCE & ENGINEERING TECHNOLOGY

Call : 08813907089 (24*7 Support on Whatsapp)