

ENERGY GENERATION BY USING GRAVITY WEIGHT BALANCE MECHANISM : A NEW APPROACH

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ABSTRACT

Recent days man has been in pursuit of energy to meet his ever increasing demand. Nowadays the society has woken up to the great perils of pollution and global warming caused by fuel based energy sources. The problem of generating power is recent quest, so everyone should think gravity be the option in non conventional energy sources. Because gravity is available all over in abundant quantity. Since gravity is present all over from beginning of universe. Sir Issac Newton discover phenomenon of gravity near 400 year ago. All over it is abundant. It is consistent i.e. 24 X 7. Comparing to chemical, thermal and other energy source gravity is weak, is scalable. This weakness is primarily due to the uniformity, or steady state, of our interactions with gravity. As gravity is weak it cannot be efficiently be converted into electrical energy or in other form .In this paper we have designed a methodology wherein gravitational energy is further amplified in terms of its magnitude by using mass unbalancing mass. It can be successfully be transformed into usable electrical energy. When compared to other sources of energy like hydal, thermal, tidal, wind, nuclear etc. it's present all over 24*7 consistently. Concept of gravity power generation is simple.It is when a body goes downward from higher altitude to lower one its potential energy get converted into kinetic energy through linear motion. Dynamo generates electricity converting this linear motion into circular motion.

Keywords: *Dynamo, Electrical Energy ,Gravitational Energy, PMDC Generator ,Unbalance Mass*

I. INTRODUCTION

In recent times due to effects of pollution and global warming there is a need for generating power from renewable sources. The reason for generating power using gravity is that it is available all over the Earth, abundant and can be utilized at any place on the Earth. Energy demand is increasing day by day with rapid growth in industrial as well as house hold utilization. But the energy resources are gradually decreasing at a higher rate, with this scenario the energy resources would come to an end within a few years and hence there will be scarcity of fuel (coal, wood, water, etc.) for power generation. The other sources like solar, wind, biomass, etc., are available only for a particular duration of time during the day and the night. Therefore it is the time to look for other resources, or to find a new method to generate power in order to fulfill our Energy demands and requirements.

Power generation is done through various methods, some of which uses Renewable energy sources and some use Non Renewable Energy Resources. But all this methods can be used to produce the Electrical energy only for some extent. The energy generated from Renewable sources is also not continuous throughout the day for 24 hrs. Therefore a source through which energy can be harvested continuously for 24hrs is to be found. Gravity is the force that is present on the earth at every instant of time; hence with suitable mechanism it can be used as a source to generate Electrical energy. An arrangement is made in such a way that the Kinetic Energy of a body due to the gravitational force is converted into electrical energy.

This mechanism is based on the simple principle i.e., when an object is placed on a higher level ground then due to the gravitational force it experiences a pull towards the lower level and gain kinetic energy. This kinetic energy can be utilized in a precise manner in which it can be transformed into electrical energy.

There are many ways to convert gravitational energy into electrical energy. Gravia Lamp is one of the mechanisms.

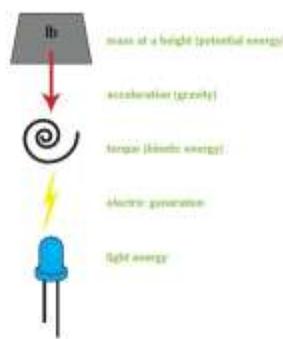


Fig.1: Procedure For Power Generation.

When a body is at certain height from the ground, it possesses potential energy. Due to gravitational pull the body falls down. In this process, potential energy is converted to kinetic energy in the form of torque. This converted into electrical energy using generator. The electrical energy is supplied to the LEDs, where electrical energy is converted into light energy. Gravia lamp and Gravity Generator follow the same mechanism.

II. LITERATURE REVIEW

David Hatcher Childress[May,1990] has apparently devised mechanism whereby static gravitational pull can be harnessed to generate useful energy. The claim is that the energy required to turn the small motor is much less than the energy gained from the imbalanced larger wheel turning a generator.

Martin Riddiford and Jim Reeves, [1998]London based designers who have spent 4 years developing Gravity Light as an off-line project. They are using a tried and tested manufacturer who has the right expertise to make Gravity Light. They had some links to partner organizations in Africa and need to do the same for India. Gravity Light is a revolutionary new approach to storing energy and creating illumination. It takes only 3 seconds to lift the weight which powers Gravity Light, creating 30 minutes of light on its descent.

Russian inventor, Mikhail Dmitry on January[2001] has been working on various iterations over the years. In those activities a small motor at about the 2-o'clock location spins a deflector mechanism clockwise. The deflectors push

dangling weights to the right. Being on a counter-clockwise ratchet, this causes those evenly-spaced weights to stay outward long enough to cause the larger wheel to be imbalanced and thus turn clockwise.

III. EXPERIMENTAL METHODOLOGY

The primary objective of the present mechanism is to provide gravity power generation mechanism which can be continuous and stable operation to continuously convert the gravity potential energy into the kinetic energy and then to convert the kinetic energy into the electrical energy, so as to perform a long time, effective and stable energy output.

This mechanism utilized the gravity energy conversion unit to convert the gravity potential energy into the kinetic energy. The gravity energy conversion unit produce positive torques by adapting outward –spreading single directional swing arm (crank) and reduce the negative torques by co-operating with folding action of the single direction swing arms, so as to perform a long time, effective and continuous energy conversion of converting gravity potential energy into the kinetic energy. Next, the kinetic energy will be transmitted to a power generating unit to perform another energy conversion of converting the kinetic energy into the electrical energy. And finally, a power supply system used to transmit the electrical energy out.

By such arrangements, the gravity power generation mechanism not only has the advantages, such as more simplified in structure, higher conversion ratio, and more environments –friendly but only need a little of starting energy to perform a long-time power conversion. More particularly, the gravity is more stable, so the present mechanism is more stable than the wind power generation and solar power generation systems and can place at arbitrary position without being affected by the outside environment.

The secondary advantage of this mechanism is that it can generate independently electricity and also able to generate electricity in connection with wind power and solar power system. Because of that initial energy to the mechanism is provided by motor run on wind or solar energy and provide a little start to the mechanism, then this mechanism can self output the energy for a long time.

The single direction pivot slip only allow the respective single direction swing arms to be pivotally folded to 70° in opposite direction to the transmitting member, and the respective single direction arms can freely rotate within a horizontal and vertical angle with respective the transmitting member.

The transmitting member and the wheel members of gravity energy conversion unit can be design as: it provides a co-operation of stand and couple of pulley, and a co-ordination between belt and pulleys so that it handles weight as well as no slip of belt on pulley occur. The single direction swing arm contain a crank, crank pin, and load at the top of the crank. It connected on the belt and having equal distance. The outer end of crank (swing arm) is fixed and inner end fixed with crank pin which allow 70° moments as side restriction having in the clip. Due to design of single direction swing arms the gravity member at the outer end of the swing rod will produce a larger positive torque. And continuous rotation of mechanism occurs.



Fig. 2: Experimental methodology



Fig. 3: Experimental methodology

The gravity energy conversion unit can be parallel connected to multiple gravity energy conversion units to produce a much larger positive torque for driving a power generating unit with much more capacity. The power generating unit can be parallel connected to at least one mechanical structure to increase the positive torque which the power generation requires. This rotational energy (torque) can be directly converted electrical energy PMDC generator of voltage: 6.8 -7.4 volt current: 0.2-0.5 amp gears: sintered type gear ratio: 1:6, Speed: 200-400 rpm.

IV.RESULT & DISCUSSIONS

When working with number of angular pipes on the ring

The number of angular pipe containing water attached on the ring are having mechanism which allow the water to move downward in the pipe from left to right when ring move in a clockwise direction. This moment of water provide its kinetic energy to act in that direction which increased the force act in that direction as compare to other direction and because of that the ring is move in higher force direction . During working initially starting torque are given to the ring which makes the ring to rotate. Then this rotation is continuous by unbalance force which is come by movable water as explain above.

Observations

This is taken after giving one rotation to the ring.

4.1 When there are four pipes on the ring



Fig.4. Four pipes on the ring

SR.NO	NUMBER OF ROTATION
1	15
2	14
3	13
4	14
5	15

Average 14

Table 1:- Observation when there is four pipes on ring.

$$1. \text{Ngen}_4 = 6 * N = 6 * 14 = 84$$

$$\text{Torque} = r * wt = 0.28 * 480 = 134.40 \text{ N-m}$$

$$\text{Given, } r = 28 \text{ cm } \text{ Wt} = 480 \text{ gm,}$$

$$V_4 = \pi DN_4 / 60$$

$$= 10.26 \text{ m/s}$$

$$\text{Given, } D = 14 \text{ mm, } N = 14 \text{ RPM,}$$

$$P_4 = \frac{2\pi N_4 T}{60} = 197.040 \text{ Watt}$$

$$\text{K.E} = \frac{1}{2} Mv^2$$

$$= 247842.04 \text{ N/m}$$

$$\text{Pact} = (P_4 - \text{Pin}) = (197.040 - 0.628)$$

$$= 196.412 \text{ watt}$$

4.2 When there are three pipes on the ring



Fig.5 Three pipes on the ring

SR.NO	NUMBER OF ROTATION
1	16
2	15
3	13
4	14
5	16

Average 15

Table 2:- observation when there are three pipes on the ring.

$$2. N_{gen5} = 6 * N = 6 * 15 = 90$$

$$\text{Torque} = r * wt = 0.28 * 480 = 134.40 \text{ N-m}$$

$$\text{Given, } r = 28 \text{ cm } \text{ Wt} = 480 \text{ gm,}$$

$$V_5 = \pi DN_5 / 60$$

$$= 10.99 \text{ m/s}$$

$$\text{Given, } D = 14 \text{ mm, } N = 15 \text{ RPM,}$$

$$P_5 = \frac{2\pi N_5 T}{60} = 211.115 \text{ Watt}$$

$$K.E = \frac{1}{2} Mv^2$$

$$= 284364.6674 \text{ N/m}$$

$$P_{act} = (P_5 - P_{in}) = (211.115 - 0.628)$$

$$= 210.48 \text{ watt}$$

4.3 When there are two pipes on the ring



Fig.6. Two pipes on the ring

SR. NO	NUMBER OF ROTATION
1	15
2	17
3	15
4	17
5	16

Average 16

Table 3:- observation when there are two pipes on the ring

$$N_{gen\ 3} = 6 * N = 6 * 16 = 96$$

$$\text{Torque} = r * wt = 0.28 * 480 = 134.40 \text{ N-m}$$

Given, r = 28 cm Wt = 480 gm,

$$V_6 = \frac{\pi DN_6}{60}$$

$$= 11.70 \text{ m/s}$$

Given, D= 14mm, N= 16 RPM,

$$P_6 = \frac{2\pi N_6 T}{60} = 225.189 \text{ Watt}$$

$$\text{K.E} = \frac{1}{2} Mv^2$$

$$= 323948.724 \text{ N/m}$$

$$\text{Pact} = (P_6 - P_{in}) = (225.189 - 0.628)$$

$$= 224.56 \text{ watt}$$

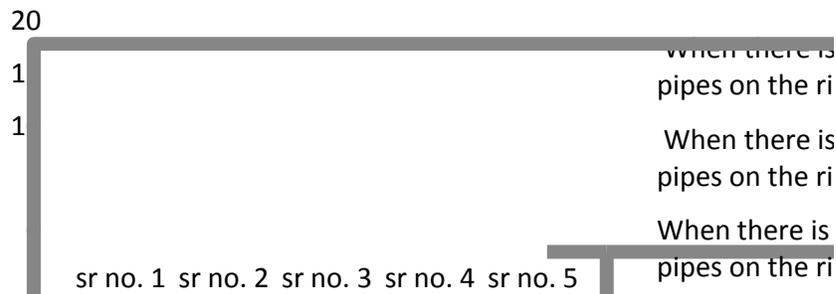


Fig.7:- The graph between number of rotation and sequential number of reading when there are four, three & two pipes attached on the ring.

Taking an average speed of all

Now, power output $P = \frac{2\pi NT}{60} = 225.188 \text{ watt}$

Torque T= weight * perpendicular distance. **T= 96 N-m**

Number of rotation N = 16 rpm.

Hence, output power $P = \frac{2 \square NT}{60} = 225.188$ watt

And input power = $P_{in} = \frac{2 \square NT}{60} = 0.628$

Initially number of rotation is $N_{in} = 6$

Now, power output $P = \frac{2 \square NT}{60} = 224.56$ watt.

V. CONCLUSION

The project work completed and it executes the expected result keeping in mind the eco-friendly behaviour of working. This project work and uses gravitational energy that is wasted any way. Thus future approach of this project seems to be encouraging and bright.

When compared to other sources of energy like hydro, thermal, tidal, wind, nuclear etc. Gravity is more abundant and available everywhere on the earth. Moreover it is eco-friendly. The output of the equipment depends on specifications of the generator, disk, electric circuit, battery. So, by increasing the specifications of the components we can improve the power output.

The project completed is of one module of whole electricity generator by using gravity. If we install number of such module in a series at various places will generate sufficient energy to be consumed locally. Thus the project will serve at its extreme level to the globe. The future of the project work seems to be great and promising.

The power of gravity here is renewable. This technique is such that we harness the energy derived from the motion of a device in both upward and downward direction. No consumption of fuel. Just pure renewable source of power - gravity. Other positive aspects of gravity power include;

Moreover it is eco-friendly. The output of the equipment depends on specifications of the generator, clamping arrangement, unbalancing weight, and pulley. So, by increasing the specifications of the components and solving a problem of continuous rotation we can improve the power output.

REFERENCES

- [1] George.O. Schur, "Gravity actuated thermal motor", United States Patent number: 4121420.
- [2] John. J. Hurford, "Gravity motor", United States Patent number: 6237342.
- [3] Peter Smith, Ralph Charles Smith, "Mechaincs", John Wiley & son's ltd., Second edition.
- [4] Vidhan Srivastava, Sumit Chaudhary, Shailesh M. Pandey, Kulvinder Rana " Gravity Power Generation" IJMRS's International Journal of Engineering Sciences, Vol. 01, Issue 03, September 2012, ISSN: 2277-9698
- [5] Patrick J. Kelly "Gravity-Powered Systems" A Practical Guide to Free-Energy Devices
- [6] Chun-chao WANG "Gravity Power Generation Mechanism" United States patent number: 0115195
- [7] David Hatcher Childress Anti-gravity and the Unified field Adventures Unlimited press May,1990 Pages: 6,38,106,204,545
- [8] Victor Rene AnguloValpreda, Mayra Palomares Coral US 8344537 B2 App Number12/668,757 January, 2013.

- [9] Agrawal, S. K., Gardner, G., and Pledge, S., "Design and Fabrication of a Gravity Balanced Planar Mechanism Using Auxiliary Parallelograms", Journal of Mechanical Design, Transactions of the ASME, Vol. 123, Number4, 2012, 525-528.
- [10] Rahman, T., Raman than, R., Seliktar, R. and Harwin,W., "A Simple Technique to Passively Gravity-Balance Articulated Mechanisms", Journal of Mechanical Design, Vol. 117, 2010, 655-658.
- [11] Wongratanaphisan, T. and Chew, M., "Gravity Compensation of Spatial Two-DOF Serial Manipulators", Journal of Robotic Systems, Vol. 19, Number7, 2009, 329-347.