

An Experimental Study on Power Amplification and Energy Conservation

Rupesh Kumar Choudhary

Surat – 395 009, Gujarat (India)

Abstract

The common misunderstanding about power is we can't amplify it i.e. 1 kw of power can't be amplify it into 2 kw of power without violating energy conservation law. But in present experiment it is proved using gravitational energy conversion method that power can amplify without violating energy conservation law. In present experiment mechanical power is converted into electrical and it was found that output electrical power is greater than input mechanical power but output energy is less than input.

Keywords: - energy, power, work, efficiency.

1. Introduction

Energy and power is two different things. Here's the simplest way to do so: Energy is ability to do work; power is the rate at which work gets done or energy is used. The more power we have, the quicker the work gets done. We don't care what energy is. We want what energy does. And what energy provides is power. We use energy to make power whether power is mechanical or electrical. For producing power we use conventional source of energy like coal, oil or gases. Other than that we have non-conventional sources of energy sun and wind which are endless sources of energy.

Today more than 90% of electrical power produces from conventional sources of energy like coal and gases. These sources are responsible for green house effect and global warming. Non-conventional sources are not so use in power industries due to low power density and require more land compare to conventional sources of energy. If we are able to produce more power in less area and if we are able to store non

conventional source of energy then this sources can replace the conventional sources of energy.

The problem of non-conventional source of energy can solve if we can amplify power but a common misunderstanding about power is we can't get more power from less. That because this experiment is performed to know is it possible or not to amplify low power into high power and is it violets energy conservation law?

2. Experiment

2.1. Apparatuses

The experimental apparatuses shown in Figure 1 which is gravitational method of power conversion. A weight 20 gram is used which acts as energy source when it is present in height. This weight is attached with thin rope with pulley. Here 5 mm OD pulley was used. DC motor used as generator which generates electrical power when weight falls from height. DC motor used to take electrical power to convert into motion. Multimeter is used to measure voltage generated and current taken by motor. Shock absorber is used to absorb impact force while falling weight which avoids damage of rope.

2.2. Experimental procedure

First weight is lifted upto 30 cm and time required to lift weight measured using stopwatch. Weight lifted in 9 different rates and time measured for each rate. Now work done is calculated. This work done is same for all rates at which weight is lifted. Same way power calculated for all rate. In second step weight falls from 30 cm, now time taken to travel 30 cm is measured. By using multimeter current and voltage were measured and electrical power was calculated. By multiplying electrical power and time to fall electrical energy

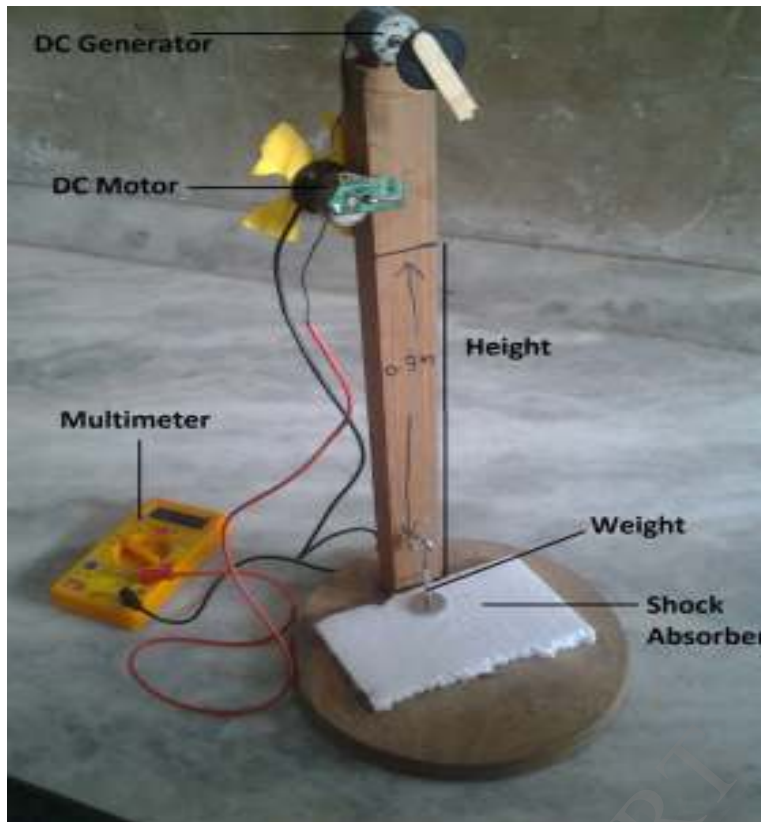


Figure 1 Experiment Setup

was calculated. Efficiency of mechanical power to electrical power and mechanical energy to electrical energy conversion was calculated.

2.3 Calculations

If weight having mass *m* is lifted to height *h* then work done to lift weight is equal to change in

potential energy so work done or input is,

$$E_1 = mgh \tag{1}$$

Let mechanical work is done to lift weight in *t*₁, seconds then mechanical power is,

$$P_1 = \frac{E_1}{t_1} \tag{2}$$

Now weight falls from height *h* then generator produces average terminal voltage *V* and DC motor takes average *I* ampere current then DC electrical power is,

$$P_2 = VI \tag{3}$$

If weight falls in time *t*₂ second that means DC motor runs for *t*₂ second so energy taken by motor is

$$E_2 = P_2 \times t_2 \tag{4}$$

Let efficiency of power conversion,

$$\eta_p = \frac{P_2}{P_1} \times 100\% \tag{5}$$

Same way efficiency of energy conversion,

$$\eta_E = \frac{E_2}{E_1} \times 100\% \tag{6}$$

Now if any system is amplifying power then equation (5) will more than 100% and if it is not violating energy conservation law then equation (6) will less than 100%.

Input Calculation						Output Calculation					η_p %	η_E %
m (Kg)	g (m/sec ²)	h (mètre)	PE or E ₁ (Joule)	t ₁ (sec)	P ₁ (watt)	V (volt)	I (amp)	t ₂ (sec)	P ₂ (watt)	E ₂ (Joule)		
0.02	9.81	0.3	0.05886	4.72	0.01247	0.82	0.02	0.5	0.0164	0.0082	132	14
				5.33	0.011043						149	
				5.37	0.010961						150	
				5.71	0.010308						159	
				5.81	0.010131						161	
				5.92	0.009943						165	
				11.25	0.005232						313	
				18.89	0.003116						526	
				28.5	0.002065						794	

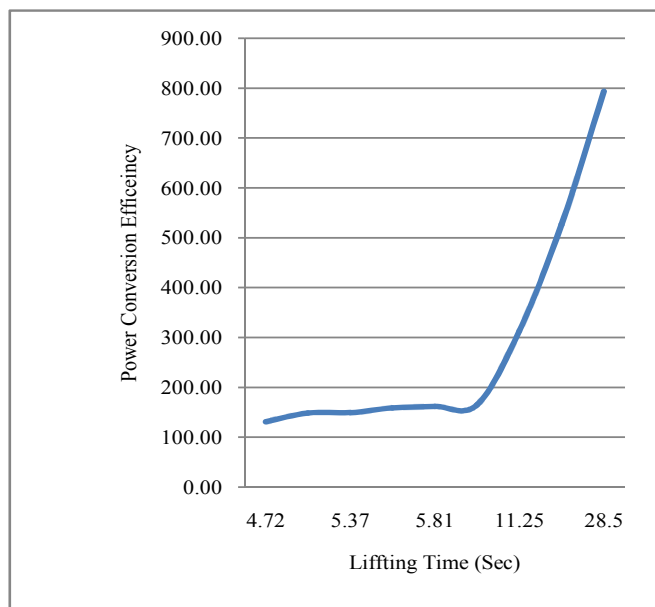


Figure 2 Effect of lifting time on power conversion efficiency

3. Results and Discussion

As shown in Fig. 2 power conversion efficiency is increases with increase in lifting time of weight. But question is why power conversion efficiency is increase even more then 100%? It can understand in this way power is time dependent variable as shown in equation (2) that cause if we increase time of doing work then input power is reduces which happening while lifting weight. But rate of falling weight is constant that means output power is constant that cause efficiency of power conversion is increasing when we increasing lifting time and it is coming more than 100%.

Now as we know here potential energy is converting into electrical energy and as per energy conservation law efficiency of energy conversion should not be more than 100% and as per second law of thermodynamics energy losses is always happen that cause due to electrical and mechanical losses here potential energy to electrical energy conversion efficiency is coming 14%.

4. Conclusion

It was found that power conversion efficiency can be more than 100% but energy conversion efficiency is less than 100% that means power can amplify and it does not violets energy conservation law. This method will helpful in that way if we having a solar cell which is giving 1 watt of power then by using gravitational method of power

amplification we can amplify it into 2 watt in same area even more then that as per requirement and design. In that way we can increase power density.

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