Gravity Generator

The use of gravity as in a weight dropping a distance to generate energy is not practical. The weight has to be returned to its original position. This needs extra mechanics and power. One would be better off making a hand crank or peddle powered generator. The idea comes up enough times that it is worth mentioning what is involved.

Typical Discussion
Read from bottom up

The motor in most portable battery operated drills is a permanent magnet motor and works well as a DC generator. I am not sure the gears in these drills are as efficient as the one you made but if you have one of these drills, just tape or wire the trigger switch in the on position. Take out the battery pack and use jumper leads from the drill to your test load. Crank by hand to test to verify it is a PM motor.

I am thinking the shorter the time of drop the greater the variation in starting current and ending current and the harder to determine the average. Thus this would be the possible explanation for over unit (1) efficiency in your second measurements. In general though it sound like you have set up a very efficient gear system. Do you have a digital camera that you can take a picture of it? Or Can you describe the gears and what you used them from?

My thinking is centrifugal governors waste energy. Let the variation in speed pump into a battery it will even out the results in the long run and capture the energy that a governor would waste.

A simple and possibly more accurate way to measure efficiency is what you indicated with:
1) 2lb/40lb => 5% losses due to mechanical friction.
2) 6lb/40lb => 15% losses due to mechanical friction.
40 or 50 lb being your maximum useable weight.

I am not sure I understand the significance between 1 and 2. However, less than 15% losses is quite impressive for as high a gear ratio as you indicate. The motor used as a generator will have it's own electrical losses which would need to be added to the mechanical losses.

> By the way, you you give the units of your formula as watts, should it not be Joules, i. e. power over a length of time?

Your question gave me a double take and I needed to go and look it up. I have included the definitions I found below. My comments are: Watt is backward from energy and includes per unit of time in it already. This is not natural to remember even for me. To get amount of energy used we use watt-hr or multiply by time.

As a more practical example, if one visualize a 100 watt light bulb. It radiates heat or consumes power from the electrical company at the rate of 100 watts or 100 Joule/sec. This is energy radiated over each unit time and is constant until the bulb is turned off. Power companies need to charge for amount of energy delivered not the rate of flow; this would be Joules or watt-seconds. But this is too small a unit so they use Kilowatt-Hr. I hope this helps straighten out these concepts of rate of flow and total energy over a given time.

http://whatis.techtarget.com/definition/0,,sid9_gci294147,00.html

The watt (abbreviated W) is the International System of Units' (**SI**) standard unit of **power** (**energy** per unit time), the equivalent of one **joule** per second.

http://searchsmb.techtarget.com/sDefinition/0,,sid44_gci213565,00.html

The joule (pronounced DJOOL) is the standard unit of energy in electronics and general scientific applications. One joule is defined as the amount of energy exerted when a force of one newton is applied over a displacement of one meter. One joule is the equivalent of one watt of power radiated or dissipated for one second.

In some applications, the British thermal unit (Btu) is used to express energy. One Btu is equivalent to approximately 1055 joules.

 ----- Original Message -----
 From: gill
 To: MikeL
 Sent: Sunday, October 30, 2005 4:01 AM
 Subject: graeme gravity weight generator

 Mike, thanks for your interest.

 Here are a couple of actual results measured this morning:

 1. weight 40lbs, load resistor 47ohms, current 290ma, volts=6, run time 2mins, drop=4ft. If I am using your formula correctly, this gives 0.98. Almost unity. is this a useful benchmark?

 2. Weight 47lbs, load R=47, current 360 (?) volts =7, run time 86sec, drop=3.5ft, giving 1.41.

 Have moved things indoors against inclement winter weather, unable to produce/reproduce 50lbs at 10ft., but will these do?

 By the way, you you give the units of your formula as watts, should it not be Joules, i. e. power over a length of time?

A couple more figures in the interest of calculating efficiency:

  1. Min. Wt. for sustained unloaded generator rotation = about 2lbs.
  2. Min weight for s/c motor coils and steady motion = 6lbs. This gives 12rpm geni speed, at unmeasurably low o/p.
  3. At 40lbs, I get 350 ma and 30mv, again s/c geni coils. (coil resistance about 3.8ohms).

  Surprised to find 350 ma this morning, up from the usual 290 max., although I did adjust and oil some bearings. At a total system ratio of 234.375:1, small changes can make a big difference. another 2:1 and I have a clock mechanism, which is the very first thing I made with my gears (another story). I have in fact doubled up the ratio and used a smaller motor, which produced power and run time perhaps more suited to LEDs and rechargeable cells.

  Have also tried a stepper motor, but the very high starting torque needed to overcome cogging means that if that torque is maintained once the stepper is up to speed, it will "run away". I think either a profiled winding drum (high torque for a few turns only to accelerate it) or a centrifugal speed governor may be required.

----- Original Message -----
From: "MikeL
To: "gill
Sent: Saturday, October 29, 2005 4:09 PM

> Any interest? Yes most defiantly. I am going to share this with some others
> on a list to indicate what can be accomplished.
>
> From the data you have given one can calculate efficiency:
> Assume 1 horsepower (hp) = 550 ft-lb/sec = 746 Watts
> or 1 ft-lb/sec = .00182 hp = 1.36 Watts
>
> Input power then is:
> distance(ft) * weight(lb)/time(sec) *.737 = X Watts in theory
> 10ft * 50 lb/(.5hr * 3600 sec/hr) *.737 = .204 watts (maximum for 100%
> efficiency)
>
> Output power is:
> Amps * voltage = watts
> 240 amp * 2 volts = .480 watts
>
> I would be interesting to know how long it took for the 50 lb to fall the 10
> ft to produce the .480 watts. Using the above formulas you can calculate

> your efficiency and losses in gear friction etc. Efficiency is the ratio of
> output power to input power. it will be less than one. I would be very
> interested to know what your results show.
>
> A practical way to use the power and to stabilize voltage is to charge a
> small battery. This would keep you from burning out light bulbs. For
> example assume the charging at .24 amp lasts for say Y minutes. This amount
> of charging rate pumped into a 3 or 4 rechargeable cells in series (or a
> battery) could run a .020 amp LED (with a proper series resistor) for
> Y*(.24/.020) = 12 * Y amount of time. Thus it should run a LED for about 12
> times the length of time for the fall of the 50 lbs. Is this useful? Yes.
>
>
> ----- Original Message -----
> From: gill
> Sent: Saturday, October 29, 2005 7:06 AM
> Subject: gravity weight generator
>
>
> Good day to you, Mike.
>
> Just stumbled accross a few words you contributed to the Troubled Times
> site about using the energy stored in a suspendrd weight.
>
> I have just built such a system. Hand cranked, using a system of pulleys
> and gears. I made the gears and bearings from scratch, also the drum wind-up
> ratchet and pulley system. Because the suspended weight is now up to fifty
> pounds, (a water filled plastic barrel) and towards ten feet off the
> ground, safety concerns made me change to pulleys commercially made for
> sailing craft. (cost about £25).
>
> The "string" is 50lb. B.S. fishing line over a 6 string pulley system (6:1
> reduction), and the gearing system giving a further reduction 40:1 and
> upwards, variable by gear substitution.
>
> The only things that have broken so far are:
>
> 1. The drum ratchet, which I remade and beefed up,
> 2. A carelessly tied knot,
> 3. A gear, when a carelessly secured bearing allowed the gear to slip out
> of engagement under load.
>
> The DC motor I use as a generator originally drove the print head carriage
> of a dot matrix printer.
>
> The motor generates a steady 240Ma from near s/c and about 2volts, up to

> 40v. This makes my load resistors smoke, and the weight run down quite fast!
> I have burned out a few low voltage bulbs, which is why I stick to load
> resistors.
>
> Run time for thirty cranks of the winding handle can be 1/2 hour upwards
> at low voltages.
>
> Any interest?
>
>