

# Human Power

**Human power** is work or energy that is produced from the human body. It can also refer to the power (rate of work per time) of a human. Power comes primarily from muscles, but body heat is also used to do work like warming shelters, food, or other humans.



World records of power performance by humans are of interest to work planners and work-process engineers. The average level of human power that can be maintained over a certain duration of time, say over the extent of one minute or one hour is interesting to engineers designing work operations in industry. Human power is sometimes used to generate electricity that is stored.

## Available power

Normal human metabolism produces heat at a basal metabolic rate of around 80 watts.



A trained cyclist can produce about 400 watts of mechanical power for an hour or more, but adults of good average fitness average between 50 and 150 watts for an hour of vigorous exercise. A healthy well-fed laborer over the course of an 8-hour work shift can sustain an average output of about 75 watts. The yield of electric power is decreased by the inefficiency of the

human-powered generator, since all real generators will incur some losses during the energy conversion process.

While some exercise equipment has been fitted with generators, the amount of energy collected is of low value compared to the cost of the conversion equipment

### **Human-powered transport**

Several forms of transport utilize human power. They include the bicycle, wheelchair, walking, skateboard, wheelbarrow, rowing, skis, and rickshaw. Some forms may utilize more than one person. The historical galley was propelled by freemen or citizens in ancient times, and by slaves captured by pirates in more recent times. The Gossamer Condor was the first human-powered aircraft capable of controlled and sustained flight, making its first flight in 1977. In 2007, Jason Lewis of Expedition 360 became the first person to circumnavigate the globe using only human power: walking, biking, and rollerblading across the landmasses; and swimming, kayaking, rowing, and using a 26-foot-long pedal-powered boat to cross the oceans.

### **Human-powered equipment**

Some equipment uses human power. It may directly use mechanical power from muscles, or a generator may convert energy generated by the body into electrical power.

*Human-powered equipment* consists of electrical appliances which can be powered by electricity generated by human muscle power as an alternative to conventional sources of electricity such as primary batteries and the power grid.

Such devices contain electrical generators or an induction system to recharge their batteries. Separate crank-operated generators are now available to recharge



battery-powered portable electronic devices such as cell phones. Others, such as mechanically powered flashlights, have the generator integrated within the device itself.

An alternative to rechargeable batteries for electricity storage is supercapacitors, now being used in some devices such as the mechanically powered flashlight. Devices that store the energy mechanically, rather than electrically, include Clockwork radios with a mainspring which is wound up by a crank and turns a generator to power the radio.

An early example of regular use of human-powered electrical equipment is in early telephone systems; current to ring the remote bell was provided by a subscriber cranking a handle on the telephone, which turned a small magneto generator.



Human-powered devices are useful as emergency equipment, when natural disaster, war, or civil disturbance make regular power supplies unavailable. They have also been seen as economical for use in poor countries, where batteries may

be expensive and mains power unreliable or unavailable. They are also an environmentally preferable alternative to the use of disposable batteries, which are a wasteful source of energy and may introduce heavy metals into the environment. Communications is a common application for the relatively small amount of electric power that can be generated by a human turning a generator.

## **Pedal-powered transmitter**

The *Pedal Radio* (or *Pedal Wireless*) was a radio transmitter-receiver powered by a pedal-driven generator. It was developed by Alfred Traeger in 1929 as a way of providing radio communications to remote homesteads in the Australian outback. There were no mains or generator power available at the time and batteries to provide the power required would have been too expensive. It is considered an important Australian invention.

As the pedal radio you can put your Cold War Generator on steroids.

## **THE EXTRA PEDAL SPIN**

Now that your Cold War Generator is up and running and feeding the hungry electricity hogs in your home, you may want to start earning some extra money from the electric companies, right? You now have the solution! Next, we will present you one simple, yet innovative way to provide that wealthy extra spin to the Cold War Generator.

One of the most efficient devices in nature is the human body.

Anyone can pedal a bike and charge a battery and light a bulb. But your possibilities are not limited to just that, for it is possible to connect the bicycle to the generator and get even more RPMs for the generator which will result in a higher output.

Here is the solution: generate extra spin to the generator and feed even more energy back into the system. Next we will present the means by which you can generate up to 500 RMPs for the Cold War Generator which means around 70 KW per day.

Moreover, in times of great distress, or even on a daily basis (for training), when the power goes off, you may need even more power for your generator. You never know when times get hard.

This method will also be useful if one of the (or more) magnets) are missing because the spin of the generator will be greatly reduced.

Pedaling to produce electricity might be a great work-out, but in many cases, it may not be a choice - you may need to do it for your family.

So here are the step by step instructions to build a pedal power generator that will provide the extra spin for the Cold War Generator.

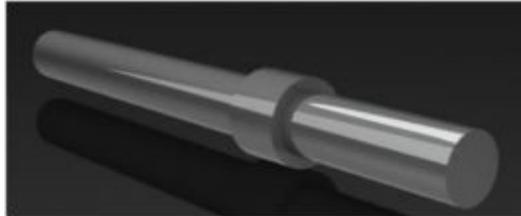
At the end of the instructions, we will present a second appliance for this device.

The components you need:

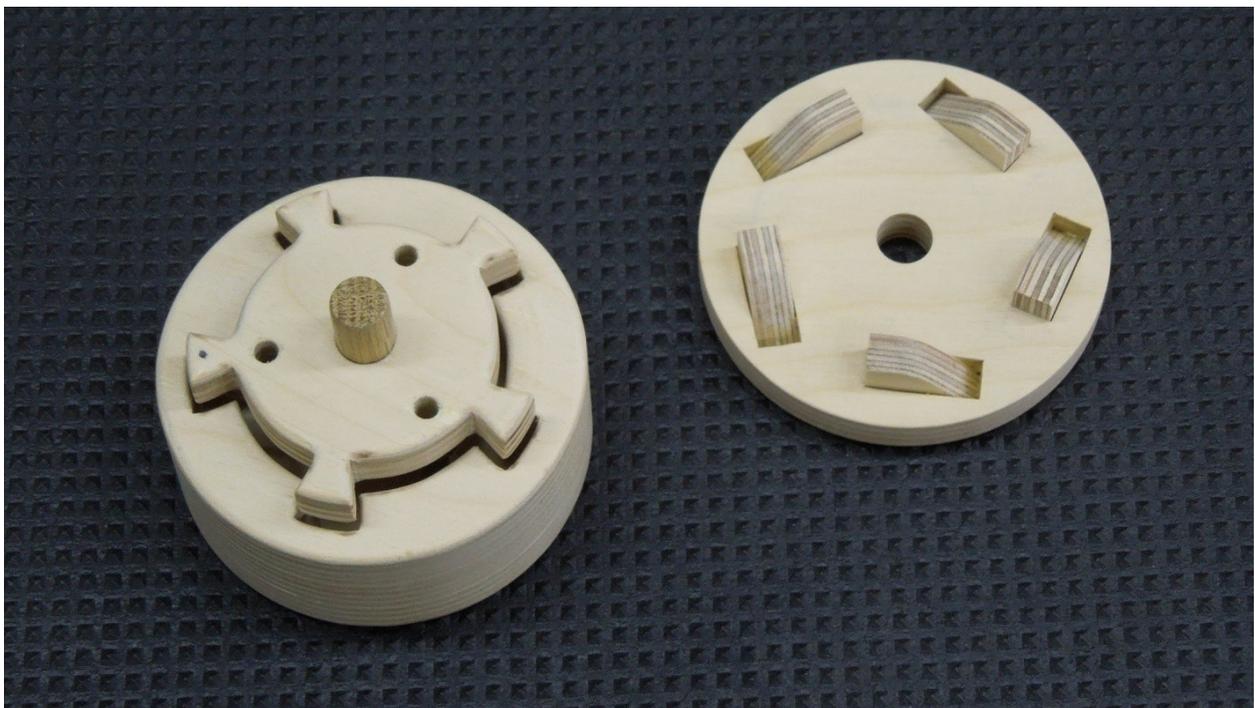
1. Bicycle training stand - you can order it at a small price on the Internet.



2. 1 aluminum bar - the same diameter as the aluminum thread



3. One-Way Ratcheting Dog Clutch



4. Belt - the same width as the wheel of the bicycle - stripped or non-stripped.



5. One old chain-bicycle

Building the device:

1. Turn your bike upside down and remove the rear tire. The ascent bike stand comes with a spare quick release axle. It has hardened ends in the optimal shape to fit with the stand. If your quick release axle has plastic ends, don't use them! Use the axle that comes with the bike stand.



2. Remove the tube and tire from your rear wheel so it looks like this.



3. Put the wheel back on the bike frame.



4. Make sure the wheel is equidistant from the frame. This is a very common mistake. Notice in the picture below how the gaps between each side of the wheel and frame are the same size. You need to do the same comparison check.

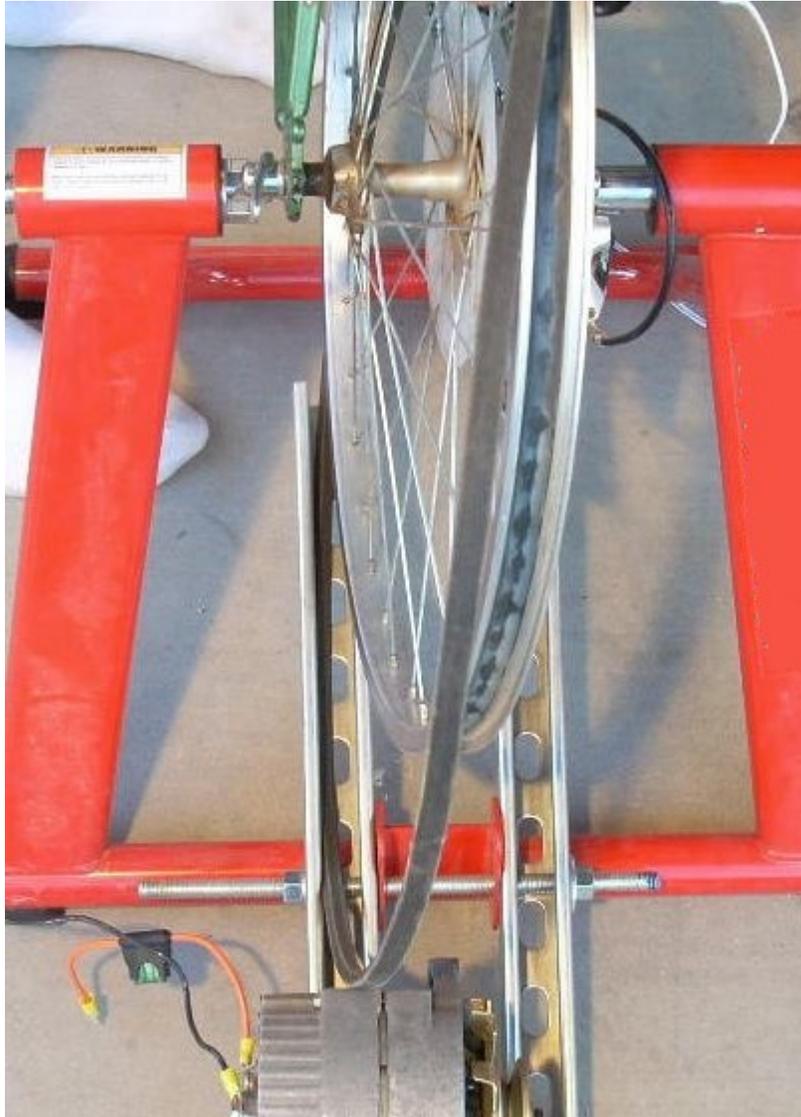


Mount the bicycle on the stand:

5. Unscrew the tension knob all the way out



6. Insert the axle end first that does not have the handle on it as shown below.



7. Connect the loose rubber band to the mini rotor on the base of the stand.



8. Connect the aluminum shred to the other end of the mini rotor:



9. Place the rubber band over the mini rotor.

10. Connect the One-Way locking system to the other end of the driveshaft.

11. Connect the driveshaft with the Ratcheting Dog Clutch to the driveshaft of the Cold War Generator.

The One-Way Ratcheting Dog Clutch will provide the extra spin for the generator as the driveshaft of the generator will maintain the minimum constant of 300 RPM.

Now all you need to do is pedal and give the generator the extra spin.  
Earn money by working out!