

Energy Production by Conservation of Angular Momentum

(Energy Production in the Scale of Type-1 Civilization from the Rotation of a Planet)

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Abstract: SK ENGINE is a very first engine that can produce a very high renewable unlimited amount of energy in the scale of type 1 civilization using the conservation of Angular momentum of a celestial body. In our special case, earth is used to produce renewable, unlimited and high amount of energy. This will be a great leap of human kind to achieve a technology like this. The first ever Type 1 civilization tech in the whole earth. This project is done by the help of a tower called 'SK TOWER'.

Keywords: Conservation, Angular momentum, Celestial body, SK engine, SK Tower, Type 1 Civilization Tech.

1. Introduction

This invention has the capability to produce a high amount of energy by the law of conservation of angular momentum. We are using the angular momentum of a celestial body to produce energy. In our special case, earth is used to produce renewable, unlimited and high amount of energy. This will be a great leap of human kind to achieve a technology like this. This project is done by the help of a tower called 'SK TOWER'. SK Tower consists of a tower, a flipping rotor and a giant wheel at the top end of the SK Tower. "SK Tower uses angular momentum of earth to produce an angular momentum on the wheel in using the Law of Conservation of Angular Momentum". earth is spinning at almost 463 m/s tangential velocity. So why can't we take advantage of earth's rotation to produce energy. For that we need a principle that can alter its own system, which can change its own system. That principle is the Law of Conservation of Angular Momentum. We are taking the advantage of the rotation of the earth and we are going to make that in our head. Best of luck

2. Theory and Principles

A. Angular Momentum

Angular Momentum is a vector quantity that represent the product of a body's rotational inertia and rotational velocity about a particular axis. Angular momentum can be considered as a rotational analog of linear Linear Momentum. Thus, where Linear Momentum, 'P' is proportional to mass, 'm' and linear speed, 'v'.

$$P = mv$$

But Angular Momentum L is proportional to momentum of inertia, 'I' and angular speed, 'ω' in radius per second.

$$L = I\omega$$

Unlike mass, which depends only on amount of matter, moment of inertia is also dependent on the position of the axis of rotation and the shape of the matter. Unlike linear velocity, which does not depend upon the choice of origin, orbital velocity is always measured with respect to a fixed origin. So, Angular Momentum 'L' should relative to that center.

$$I = r^2m \quad \text{where } r \text{ is the radius of the object}$$

and

$$\omega = V/r \quad \text{where } V \text{ is the tangential velocity of the object}$$

$$L = I\omega = Mr^2 \times V/r = mVr$$

$$L = mVr$$

A rotational analog of Newton's Third Law of Motion might be written. "In a closed system, no torque can be exerted on any matter without the exertion on some other matter of an equal and opposite torque.

Hence, angular momentum can be exchanged between objects in a closed system, but total angular momentum before and after exchange remains constant, means conserved.

This is called the Law of Conservation of Angular Momentum.

Law of conservation of Angular Momentum explains any of the individual Angular Momenta can change as long as their sum remains constant. It means if there is no external torque, the Angular Momentum of the system is conserved.

Example of Angular Momentum being conserved:

A person is holding a spinning bicycle wheel on a rotating chair. The person then flip or turn over the bicycle wheel,

causing the chair to rotate in the opposite direction of the rotation of wheel.

Explanation:

Initially, the wheel has an Angular Momentum in the upward direction, When the person turns over the wheel, the Angular Momentum of the wheel reverses direction.

Because, the person-wheel-chair is an isolated or closed system. And in a closed system, the total Angular Momentum must be conserved and the person in chair begin to rotate in an opposite direction of the wheel.

Sooraj Krishna's Example of Angular Momentum (mine):

I am holding a fidget spinner in between my index finger and my thumb. Reminding you that the fidget spinner is not rotated. Now I start to rotate myself. And by rotating myself I flip the fidget spinner, causing a rotation in the fidget spinner. This also happens when we substitute bicycle wheel instead of fidget spinner.

Explanation:

Initially, when I started to rotated myself, an Angular Momentum in upward direction is produced, mean I rotated in anti-clockwise direction. When I turn over or flips the fidget spinner at 180° angle, from the view of fidget spinner, I turned over and have negative Angular Momentum. So to conserve the Angular Momentum of the system, the fidget spinner will rotate in opposite direction of me spinning. Because I and the fidget spinner is a closed or Isolated system.

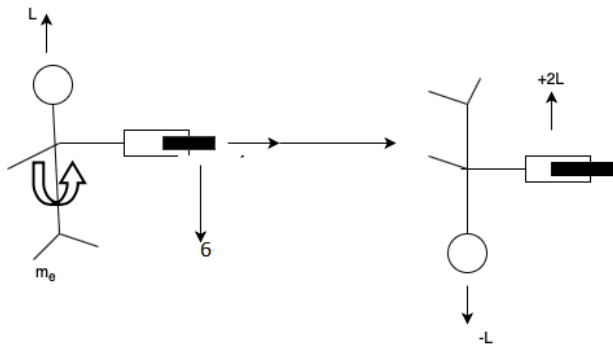


Fig. 1. SK's example

The Angular Momentum should be same before and after flipping in a closed system.

$$L = -L + 2L$$

After flipping the spinner, it gains twice the Angular Momentum of me spinning. But the Angular velocity will be low due to gravity.

B. Principle

By using the Sooraj Krishna's example of Angular Momentum being conserved, we are building an actual Energy production or Energy harvesting device. Take my example, the example of Sooraj Krishna's conservation of Angular Momentum. Imagine instead of me, there is earth and instead of a fidget spinner there is the SK tower. SK tower is a giant tower which consisted of large tower, flipping rotor and large

inertia wheel. This tower can do turn over by the help of flipping rotor at the tower portion.

Normally nothing happens. But when we flip the inertia wheel, the wheel starts to rotate with twice of the Angular Momentum of earth's. This will be so high but, the Angular velocity will be not big due to gravity.

By this principle can plot the image of 'SK Tower'

SK tower:

SK Tower is a large tower with a freely spinning wheel which rotates on its own axis at the top end. This wheel is connected to a generator. When the wheel rotates, electric energy will be generated. This wheel will be rotated by the principle of 'Conservation of Angular Momentum'.

C. Working Principle

We know the earth is rotating at a constant tangential velocity of 463m/s. So why can't we take that velocity to produce unlimited energy. There comes the angular momentum.

We are going to place the SK tower on the equator of the earth as shown in the annexed Fig. 1.

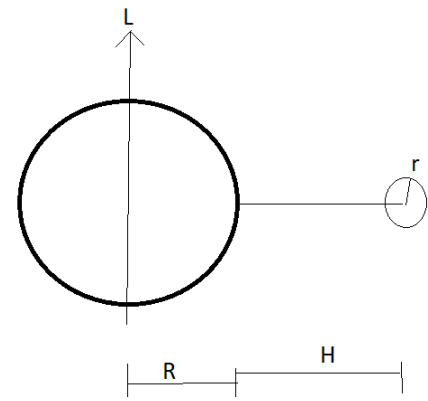


Fig. 2. Working

where \vec{L} is the angular momentum of earth.

R is the height of axis of SK wheel from Earth's surface

r is the radius of the wheel

D. Conservation of Angular Momentum

If no external torque is applied on a rotating system, the angular momentum is conserved.

$$\vec{L} = \vec{I} * \vec{\omega}$$

There will be a moment of Inertia that will act on SK wheel and compels it to rotate on opposite side of earth rotation. But we are taking advantage of it. It's the same direction of rotation of angular velocity of wheel.

So here when we flip the SK wheel the earth is going to apply an equal force on the wheel too. This can be explained by Newtons' Third Law: For every action, there will be an equal and opposite reaction acting.

So we start at +L of the earth.

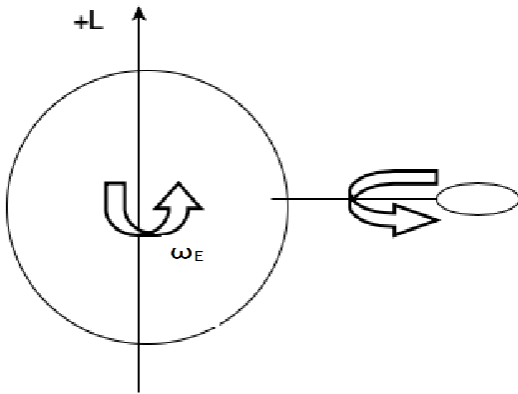


Fig. 3. Angular momentum of earth

Now, we are flipping the wheel to the opposite direction.

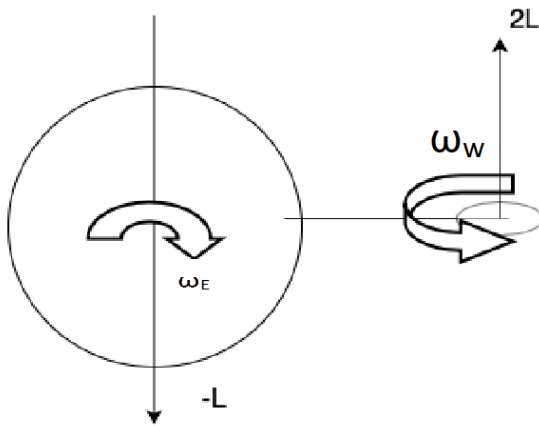


Fig. 4. Flipped angular momentum of earth

So, from the perspective of wheel, the earth is rotated.

ω_E is the angular velocity of earth

Where ω_w is the angular velocity of the wheel.

So, after flipping, the system tries to stay on the angular momentum of +L. So, the equation becomes:

$$+L = \underbrace{-L}_{\text{Earth's New Angular Momentum}} + \underbrace{2L}_{\text{wheel's Angular Momentum}}$$

$$L \uparrow = 2L \uparrow + \downarrow -L$$

So, the equation of angular momentum of the wheel after full rotation becomes,

$$\vec{2L} = I_w * \vec{\omega_w}$$

where I_w is the inertia of wheel

ω_w is the angular velocity of wheel

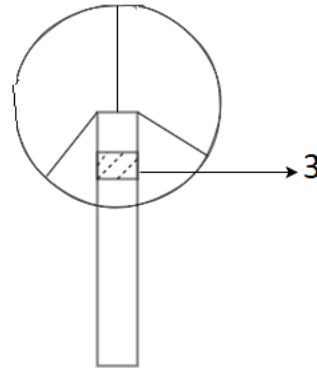
$$\frac{2L}{I_w} = \omega_w \cos Q$$

$$\omega_w = \frac{2L}{I_w \cos Q}$$

Where Q is the flipping angle

The angular velocity of the wheel will be very high when we flip the wheel completely. This may cause the demolition of SK Tower. So we just need to flip the wheel at a very small amount.

The flipping rotor can be given to the tower at close of the wheel.



3 is Flipping Rotor

Fig. 5. SK tower

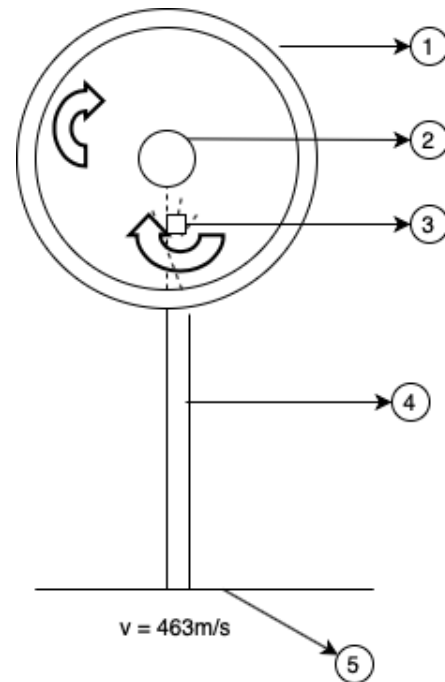


Fig. 6.

- 1 is SK WHEEL
- 2 is GENERATOR
- 3 is the FLIPPING ROTOR
- 4 is the TOWER
- 5 is the HOME PLANET
- v is the rotating velocity of earth

E. Effect of Gravity on SK Tower (Wheel)

Initially, the wheel will not rotate. But when we apply torque on the flipping rotor, the wheel will start to rotate at '+2L' Angular Momentum. But we will get a low angular velocity on the wheel because of gravity. As time moves the angular velocity tend to approach zero or slowly diminishes to zero because of the continuous acceleration due to gravity.

But when the wheel starts to rotate on Angular Momentum is produced on the wheel and gravitational force acting on the wheel. Consider the tower,

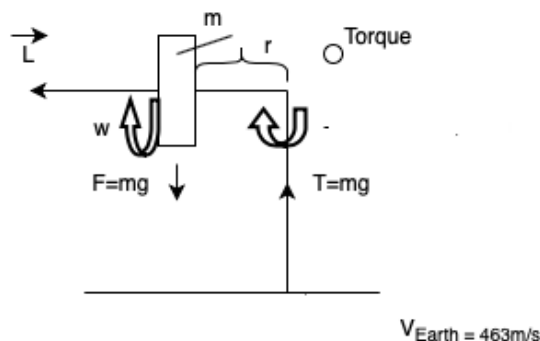


Fig. 7. Effect of gravity on SK engine

Where

m is the mass of the wheel

' r ' is the distance between the wheel to the tower

T is the tension, $T=mg$

F_G is the gravitational force, $F_G = mg$

So there will be a torque τ (Tau) in inward direction (according to the figure). So, the Angular Momentum will chase the torque ' τ ' (Tau) and compels the flipping rotor to rotate in the applied torque direction.

By rotating the flipping rotor, we are making a rotation on the wheel and with the help of gravitational force, a torque is produced on wheel and the produced torque will help to rotate the flipping rotor. This cycles go round and round making a renewable energy in the "SK ENGINE".

So the gravity was a negative factor which slows down the angular velocity of the SK wheel. But actually we can turn that negative factor to be the required positive factor in order to get more energy required.

The SK ENGINE have a vertical rotation (rotation of the wheel) and a horizontal rotation (flipping rotation of flipping rotor) produced by only one resource, the rotation of Earth.

F. Effect of the Earth's Magnetic Field

By implementing generator to produce electricity from the rotation of wheel, the magnetic field of earth provide more magnetic flux if the we make the magnets of generator stationary and align with the polarity of earth's magnetic field. This will increase the output energy of the SK Engine.

G. Disturbance Torques

1. Gravity of other celestial body

Discussed in the previous page

2. Earth's Magnetic field

We can take advantage of Earth's magnetic field to produce more energy. More magnetic field, more flux is cut by armature.

3. Solar radiation pressure

It is too low that we can neglect it.

4. Aerodynamics Torques

Like winds, atmospheric drags etc. can be cancelled by making the wheel swiftly.

Comets, Asteroids, Debris, etc.

5. Internal torque of Generator

6. Frictional Force

7. Coriolis Force

It's a pseudo force and is produced by the inertia of the wheel. We can take advantage of this force too. Because it's the same direction as the angular velocity will produce in the wheel.

H. Advantages

1. Large amount of energy can be produced without polluting the nature.
2. Renewable energy.
3. Achieve type 1 civilization.
4. Technological advancement in almost every sector.
5. Substitution for almost every type of non-renewable energies such as petroleum, gas, nuclear energy, etc.
6. The basic living expenses drops.

I. Disadvantages

1. Needs very large quantity of materials.
2. Too costly but once we made it, it will be worth it.
3. There is a chance of affecting the rotation of planet. Rotation of earth becomes slow. The day duration will be longer. The variation is almost negligible.
4. Drop in world economy because of the non-usage of the petroleum products.

J. Application

1. Energy production

It can produce a very large amount of energy in a short period without polluting the environment.

We could wirelessly transfer the produced electrical energy. There will be no battery needed. There will be no fuel needed. It can reduce pollution also. We can feed the electrical appliances with live electricity. There will be no need of batteries in electric car, mobiles, in houses, etc.

It doesn't matter if the efficiency of transmission is low, we will get plenty of energy, if my calculation is correct.

Wide range of applications like, Battery less vehicles such as cars, bikes, planes, trains, ships, etc. if we are able to deliver electricity by air transmission.

This will paves the way to produce flying cars, flying bike, flying trains, hovering boards etc. Because we need not to use batteries.

The usage of Air transmitted electricity need to be monitored and controlled by sellers. We can provide the internet also.

No pollution will occur to our earth. We will substitute any pollution making engines. There will be no need of fuels, gas, burning wood, etc.

2. *Weapon*

SK TOWER can be treated as a weapon against foreign entities. What if we can give an acceleration to the wheel and detach it from the tower. The wheel will go towards the space.

So imagine a celestial body coming towards the earth.

SK tower can be treated as a weapon against those entities.

The path of wheel is curved due to gravity.

What if an asteroid or comet hits us like when dinosaur died. We had advanced this much technology yet we don't have a defense system against foreign entities. We can't run from it, we can't hide from it, we are actually helpless. It will become the end of our civilization. We should be able to deliver the wheel by making it detachable and flying off.

K. *Comments*

1. This is not a free energy device. There are no free energy devices. We can't produce energy from nothing!! There should be a source. In this case the source is the rotation of the earth. We are converting the angular momentum of earth to produce rotation on wheel. Which will give unlimited and high amount of energy until the earth stops spinning which will not happen near foreseeable future.
2. Let the engineers do the calculation professionally because I can't.
3. Please develop the designs, works on equations regarding every area.
4. Energy production details
 - Generation
 - Conversion

- **Transmission**

Suggestion of air transmission, I know it's more hypothetical but can be worked. I can't with myself.

We can change the magnetic field by rotating magnets in transmission side.

L. *Application of Air Transmission*

1. Battery-less vehicles (cars, bikes, planes, trains, ships, etc.).
2. This paves the way to produce flying cars, bikes, hovering boards, etc. We don't have these because the main problem with these things are the weight of the batteries that's why we can't build these things. With the available of live electricity, we don't need the batteries.
3. The usage of air transmission electricity need to be monitored and controlled by us.
4. With unlimited energy the human kind can achieve anything. We can increase the perimeter of our potential.
5. It's also very dangerous with wrong hands. So security is the prior thing.

3. **Conclusion**

This paper presented an overview on energy production by conservation of angular momentum (energy production in the scale of type-1 civilization from the rotation of a planet)

References

- [1] Newton's conservation laws
- [2] Conservation of Angular momentum examples, youtube.com