Swing Set Irrigation System

Ambe Verma, Ankita Pandey, Jagriti Shanker, Nitu Pandey, Swati Singh Sarkar, Ajay Yadav

ABSTRACT: India is a vast country based on agriculture and irrigation is the most important factor for agriculture. In India there are many sources provide for irrigation. Every day new technologies are emerged in the world which brings a revolutionary change in the nature of this world. day by day the energy resources used by the large population of this world are coming on the last stage This project give the idea that how the other different form of energy can be used and implemented efficiently to overcome from this problem The aim of this project is to achieve the objective of energy lasting problem which is likely to be faced over in coming decades. Energy lasting is a big problem in India. This is faced by every people, who live in the country. Swing energy is the form of energy. In this paper we have represented the methodology of swing energy using for rural area of application. This paper is all about Swing Set Water Pump in which the water pump will execute with the help of a swing set of canopy type. As we need a motor to operate the water pump but in this project we use the swing in the place of motor and we use oscillatory motion of swing in the place of rotating motion of a motor. Everybody has needed the energy at an increasing rate, ever since he came on the Earth. Because of this lot of energy has been exhausted and wasted. All the member are dedicated the amount of their important time to participate in multiple meetings, read and research for making the content to the report. We would especially like to thanks for the efficient condition of the entire Advisory member and their experiences. This study was initial and performed within the BUDDHA INSTITUTE OF TECHNOLOGY, GIDA, Gorakhpur the final report represents the labour and interest of the entire member working for this project. Finally, we would like to thanks to all the member of our college workshop who helped us in manufacturing of this project model.

INTRODUCTION

Energy in the form of swing play a very important role in the life of a normal human .it has practically revolutionized the world. In Swing Set Irrigation System we convert the oscillatory motion of swing in to the reciprocating motion of piston in reciprocating type pump. In this project we use only the half revolution of crank in the place of full revolution. This half revolution is used to reciprocate the piston in reciprocating pump. This project is about a swing, which is used by the children that powered water pump for irrigation and many uses. The swinging activity of swing makes the horizontal member turn through some angles continues to oscillatory motion and this motion is transmitted to the link which transfers this angular motion into reciprocating motion as well as amplifies the same. This link is connected to the piston used in pipe which converts the mechanical energy into hydro energy. The water then pumped can be used for local use. It is free of cost and also ecological friendly. These ways of powered water pump, if implemented at various parks, playhouse, school, etc. It is very effective and useful tool for educate the children to learn how to conserve energy. It can also be used for local purpose.

Why this???

The aim of this project to achieve what we directly wants to do i.e., A “Swing sets water pump” is a mechanism used to power or supply water with the help of swing set in garden. In this system when a person start swing on its play set with the help of Grasshopper Law a link is connected to water source from when they suck the water through a inlet valve and flow out through a exit valve. A swing is a famous and an interesting tool that children like to play with. A swing consist mainly of a long rod ended with a seat on which the child can stand or sit while swinging. Normally friction is a major dissipative force that affects the motion of a swing causing it to decay gradually. So a child playing with a swing has to learn some pumping mechanism in order to keep the swing running. Not only can a child keep the swing running but he can also make the oscillation grow up. Surprising enough, those pumping schemes can even start a swing from the rest position as experienced by children on the playground. Pumping means that the child keeps storing energy into the swing by performing some movement at certain position. This energy by means of conservation of momentum is converted into kinetic energy. The mechanism of pumping may take several forms depending on the state of the child (standing on the swing or sitting.) A child can pump from a standing position by periodically standing and squatting on the swing which result in periodic displacement of the center of mass up and down. This is modeled by a changing the length of the rod of the swing with time. Another method is by leaning forward and backward periodically while sitting on the swing. Both schemes will be analyzed in this paper.

PRINCIPLE OF WORKING

Swing system work like a pendulum. As the pendulum rises, its kinetic energy changes to potential energy as it falls its potential energy changes back to kinetic energy .same as the pendulum the swing set also consist two types of energy.

1. Kinetic energy
2. Potential energy

When the swing started from the centre position it is initially not moving so no kinetic energy and at the highest point it has maximum potential energy.

$$PE=mgh$$

Once it has swung to its lowest point gravity has accelerated it to its maximum speed and therefore have maximum kinetic energy.

Given by-

$$KE=\frac{1}{2}(mv^2)$$

Where-

m=mass, g=gravitational constant, h=height, v=velocity. So at the bottom it has zero potential energy and all the potential energy it had in the first place is now kinetic energy

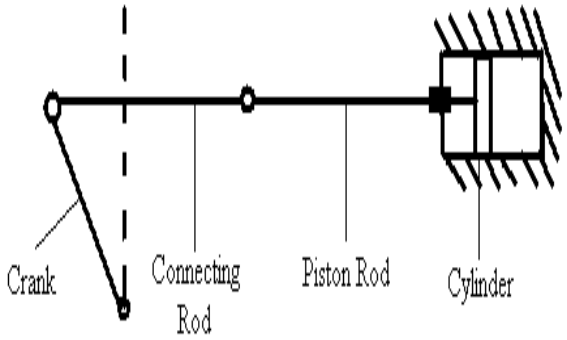
Therefore-

$$\mathbf{PE=KE}$$

$$\mathbf{mgh=\frac{1}{2}(mv^2)}$$

$$v^2 = 2gh$$
$$v=\sqrt{2gh}$$

This Project is completely based on “SIMPLE PENDULUM”. We have created a simple machine which is an eco-friendly and economical way of irrigation. In this project the mechanism which we used is “FOURTH INVERSION OF SINGLE SLIDER CRANK MECHANISM” In which we fixed the fourth link of single slider crank that is we fixed the cylinder.



METHODOLOGY

To find the displacement, velocity and acceleration we use the following equation given below:

For displacement,

$$X = (l+r) - r\cdot\cos\theta - \left[\sqrt{l^2 - (r\sin\theta)^2}\right]$$

For velocity,

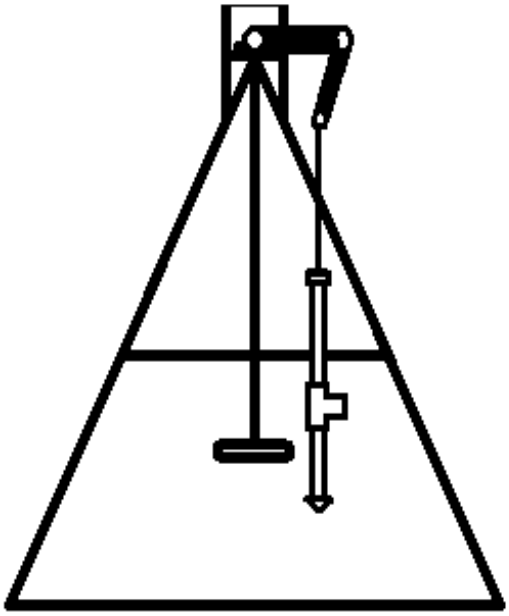
$$V = r\cdot\sin(\theta).w + \frac{r^2}{\sqrt{l^2 - r^2(\sin\theta)^2}}\sin(\theta).\cos(\theta).w$$

For acceleration,

$$a = \left[r.\cos(\theta).w^2 + \frac{r^4}{(l^2 - r^2\sin\theta^2)^{\frac{3}{2}}}\sin\theta^2.\cos\theta^2.w^2 + \frac{r^2}{\sqrt{l^2 - r^2\sin\theta^2}}\cos\theta^2.w^2 - \frac{r^2}{\sqrt{l^2 - r^2\sin\theta^2}}.\sin\theta^2 w^2\right]$$

As we know that a crank has rotary motion but in this project we will only use the half revolution of crank. When we swing, the upper link of swing set oscillate which we use to rotate the crank which will further oscillate the second link called connecting rod which gives the reciprocation motion to the third link called piston and then the pumping process begins. When we swung the swing from a centre position, the piston rod will start to reciprocate then the piston move from bottom dead centre to top dead centre, it create a vacuum in the cylinder which will suck the water from water source. After the suction process the piston move from top to bottom and the water delivered to outside.

CONSTRUCTION AND WORKING



This project is related to powered water pump for irrigation system, by playing swing set in the park, play house, school, nursery, etc.

ADVANTAGE

The following are the advantages of this project:

1. Free from pollution,
2. Simple mechanism,
3. easy installation
4. easy to maintain,
5. no fuels consumption,
6. no man power required,

DISADVANTAGE

1. Required periodically inspection
2. Implementation is difficult

CONCLUSION

In the coming days the demand for energy resources will be increasing everyday's the aim of this research is to develop the world by enriching. By utilizing its resources more. Now time has come for using this type of innovative ideas and it should be brought into practice. This operating system is design to process a mechanism which is capable of powered water for irrigation for agriculture. A "Swing Set Irrigation system" is a mechanism used to generate power for lifting water from one place to another place with the help of reciprocating pump. This Project is completely based on "SIMPLE PENDULUM". There are many sources to convert the mechanical energy into various other forms. In this system no man power and electrical energy is used. This project gives the overview for the challenges and opportunity for energy lasting in coming decades due to this project we are going to make the best use of existing technology to ensure reliability and efficiency under changing condition. By such arrangement, this mechanism has more simplified structure, more environments friendly and provides stable energy output. It is full independent system. It outlines the need for cost effective technology in rural region. This article was beneficial to our research because of deals with directly, what we want to achieve.

REFFERENCE

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