VOLUME-7, ISSUE-6, JUNE-2018 • PRINT ISSN No 2277 - 8160

Original Research Paper

Engineering

DESIGN AND FABRICATION OF INNOVATIVE WATER LIFTING SYSTEM

Raj S. Khatri	B.E. Mechanical Engineer, 13, Shubham Colony, Balaji Nagar, Amravati-444606, Maharashtra, India,
Yash S. Panat*	B.E. Mechanical Engineer, 58, Vaibhav Colony, Dastur Nagar, Amravati-444606, Maharashtra, India *Corresponding Author
Aniket P. Garge	B.E. Mechanical Engineer, 3/8, Vidharbha Housing Society, Shastri Nagar, Amravati-444602, Maharashtra, India

ABSTRACT This research is about a swing, which is used by children for playing that produces electricity and water pumping while being used. In its simple construction, the swinging action of swing makes the horizontal beam members turns through some angle continuous it's to and fro motion and now this motion is transferred to a link which transfer this angular motion into linear one as well as amplifies the same. This amplified motion is then transmitted to a free wheel that uses flexible links. As well as it is used for pumping of water from the lower tank to upper tank.

KEYWORDS : design, water lifting, swing, fabrication

INTRODUCTION

Energy need of today's modern world is growing day by days because of consumption of some of larger extent or amount of growing population. Due to lack of proper planning and delay in its implementation is leading to a factor called "load shedding". Many concepts are being carried to generate electricity and pumping on local basis and utilize the same for said to locality.

This swing electricity and water pumping generator not only generates electricity and water pumping but also can be a very useful tool for educate children to learn to conserve energy. Along with this project uses that energy that is given a way in playing. Swing electricity and water pumping generation system produces electricity and water pumping and can be used for local purpose. This electricity and water pumping thus produces free of cost and ecologically friendlier this way of generation electricity and water pumping. If implemented at various sparks, play houses, schools etc. can be certainly lower down the load on main grid thus helps in saving electricity and water pumping. This system can be very useful tool for educating children to learn renewable source of energy along with this project uses that energy that is given a way in playing. This work is related to generation of electricity and water pumping.

COMPONENTS OF WATER LIFTING SYSTEM

Given below is the list of various components required for water lifting system:

- Reciprocating Water Pump
- Pedestal Bearings
- Shaft
- C Type Clamp
- PVC Pipes
- Non-Return Valve for Water Suction

Figure 1: Components of water lifting system. Left to Right (Reciprocating Water Pump, Pedestal Bearing with C Type Clamp, Shaft, PVC Pipe and Non Return Valve for Water Suction)

CONSTRUCTION AND WORKING

In its simple construction 37 inch height supports structure is carried out most 31 X 29 inch area of CI pipe. To this structure a rigid swing is attached that is 30.5 inch long from top. This rigid swing is attached and fixed to horizontal beam that can rotate. So whenever this swing is used that is it swings, the horizontal beam is made to rotate clockwise and anticlockwise. Our project consists of mainly two parts one is water pumping and other one is electricity generation. The first part of our project is water pumping. Whenever it swings the piston reciprocating pump travels from TDC to BDC which is connected at the right side of the swing mechanism. When swing moves in backward direction the piston is move towards downward and the water is sucked with the help of Non Return Valve that is NRV. The main function of Non Return Valve (NRV) is to make the flow of water in only one direction. In this system the function of Non Return Valve is to only suck the water. Now when the swing moves in forward direction the piston of reciprocating pump move toward upward direction and discharge of water takes place. In simple words we can say that in background stroke the water is struck by Non Return Valve (NRV) and in forward stroke the water is delivered to upper tank. As per our calculation we concluded that we will get 1 litres water in 43 seconds, at a head of 15 feet when the swing moves 17 times in forward as well as in backward direction, and we need approximately 2-3 hours to get the effective result. This is how this project is made and works, the actual project works includes a scale down working model that is built to approximately size of three feet high and having base 2 X 1.5 feet.

Figure 2: Water Lifting System Final Assembly

TEST RESULTS

Test 1: When the first test was conducted, there is a leakage from the pump due to which the water is not supplied to the desired height. This was possibly because of a comparatively smaller diameter of a piston ring such that the gap increases and the leakage is there due to which the water is pumped to 11 feet only

Test 2: Before the second test, we implemented the necessary corrections which we pointed out in the first test. Also, adequate measures were provided to moving parts in order to reduce the

leakage. After the second test, leakage problem disappeared. But the suction is not desirable due to the NRV which is in the storage tank.

Test 3: Before the third test, the Plastic NRV is replaced by the Brass NRV which is very effective in suction at any angle. After the modifications, the problem is solved and the suction is now desirable.

CONCLUSIONS

The water pumping procedure using swing water pumping is pollution free process and considering manufacturing cost of this project, it can be looked upon as a probable solution for partial fulfilment of energy demand not only regarding Indian context but for whole world as well. In conclusion therefore, the project successfully explored the practicality of supplying the water to a desired height.

RECOMMENDATIONS

- Further research and exploration of this technology will realize its full potential. Therefore, we recommend that students needs to be encouraged to take this project for research.
- This swing system can be integrated with dynamo which can be used for power generation.
- It can be used where shortage of power is a major issue.
- Implementing a pendulum pump setup which uses gravitational force leads to large amount of energy generation.

References

1. http://en.wikipedia.org/
2. http://www.ijstr.org/
3. http://www.slideshare.net/