

# Design and Fabrication of Pendulum Based Water Pump

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**Abstract :** This paper examines the importance of a pendulum pump which can be used as a supplementary device for pumping water and can perhaps replace hand pumps. The traditional hand water pump could possibly take more efforts to operate, the man who operates traditional hand water pump must apply his force in coinstantaneous on the lever of the pump, due to which people using this pump get tired immediately. The primary feature of a pump with a pendulum is that the work is simplified when compared with a traditional hand water pump. This feature enables the pendulum pump to be used in an efficient manner for irrigation of smaller lots, water-wells and can also be used in extinguishing fire even by old people and children. A pendulum-based water pumping system could possibly increase the efficiency of the system by reducing the required effort, cost of production, production time and manpower as in the case of a conventional hand pump. The research done to this day is concentrated on the working and effectiveness of the mechanism only. Considering all the advantages of the mechanism it was chosen to use it for lifting water with the assistance of reciprocating pump such an extent that the contribution to the system is given by people which is nearly not exactly the exertion connected by people to lift water utilizing hand pumps straightforwardly.

IndexTerms - Oscillating Pendulum, Energy conservation, Reciprocating Pump, Lever, spring, Pendulum bracket, Bearing.

## I. INTRODUCTION

The regularly expanding interest for energy has prompted the development of different propelled resources which creates a specific piece of the required energy. One key shopper of a lot of energy is our family itself. A lot of electrical energy is squandered in pumping water, water system purposes and so on. It is in this setting the significance of pendulum pump emerges, utilizing which a lot of energy can be saved and the moderated energy can be utilized for different purposes.

The main significance of a pendulum pump is that the inception energy for beginning the way toward pumping, swinging of the pendulum, is extensively less when contrasted with the work required with work hand pumps. Regular hand pumps require adequately expansive exertion and a normal individual can utilize the pump consistently just for a brief timeframe, however, the pendulum pump requires the main least of the exertion since it is just required to waver the pendulum and can keep up these motions for a few hours, with no weakness. The benefit of this creation contrasted with present hand pump arrangements are less power to begin the pump, less water utilization, and the two arms can be utilized to get the water.

Essentially, in towns and furthermore in some town side territories, we could ready to see the cylinder pumps which have been introduced to suck the water starting from the earliest stage, this wellspring of water from the beginning known as groundwater. In a pump, the responding movement is to be given by the general population who get to it. What's more, by utilizing that responding movement, the suction is made and thus water turns out starting from the earliest stage. Henceforth no other strategy can without much of a stretch supplant it, because of its less upkeep, and simple availability. Thus it has been at a crest for quite a long while. In any case, we don't have the plan to supplant those pumps. In any case, we have the plan to lessen the human exertion which is being given in these sorts of pumps. The new and in fact unique thought - hand water pump with a pendulum - gives lightening of work, since it is sufficient to move the pendulum sometimes with a little finger to pump the water, rather than huge swings.

To get the water coming up short on the pump, the pendulum should be out of parity. From that point forward, considering gravitational potential, the cylinder begins swaying and the ceaseless stream of water is leaving the yield pipe. The pendulum ought to be sporadically pushed, to keep up the adequacy for example the flood of water. The pump functions admirably with all sizes of the pendulum, however

for the most part with the adequacy of 90°. The upside of this innovation contrasted with present hand pump arrangements are less power to begin the pump, less water utilization, the two arms can be utilized to bring the water. The innovation is material to different gadgets that utilization switch components, for example, a hand press and so forth.

## II. LITERATURE REVIEW

The following research papers were studied during the project:

[1] **AmbeVerma** et al. in the research paper “**Swing Set Irrigation System**” (May 2015) discussed that in the coming days the demand for energy resources will be increasing every day’s the aim of this research is so done to develop and enrich the world by utilizing its resources in an efficient manner. Now it is time to use such innovative ideas which are effective and it should be brought into practice. This operating system is designed to process a mechanism which is capable of powered water for irrigation for agriculture.

[2] **BojanPetkovic** in the research paper “**MODELLING AND SIMULATION OF A DOUBLE PENDULUM WITH PAD**” investigated the results of the simulation of a double pendulum with a horizontal pad are presented. Pendulums are arranged in such a way that they are in a static equilibrium. The smaller pendulum takes the vertical position, while the bigger pendulum is in a horizontal position and rests on the pad provided. Motion during one half oscillations is studied and analyzed. The impact of the bigger pendulum on the pad is considered to be ideally in-elastic. The characteristic positions and angular velocities of both pendulums, as well as their energies at each instant of time are presented. The obtained results proves to be in acceptance with the motion of the real physical system. Double pendulum with pad refers to the two-stage mechanical oscillator that is invented, Patented and constructed by Serbian inventor Veljko Milkovic.

[3] **Milkovic** et al. in the research paper “**THE SECRET OF FREE ENERGY OF THE PENDULUM**” (Sep 2003) said some information about the pendulum pump which is as follows Hand water pump with a pendulum is an acknowledgement of another, unique, and even fantastic, by extremely basic answer for pumping water. Work is lightened on the grounds that simpler, durable and easy utilization of the hand water pump has been empowered. Info energy for beginning the way toward pumping, in the type of incidental pushing of the pendulum, is considerably less than with run of the mill hand pumps.

[4] **Matos** et al. in the research paper “**PENDULUM PUMP**” (Jan 2010). He said about the pendulum pump is as follows The Milkovic’s pendulum –lever system does work only in one direction, when the working of lever side goes up. To return it to the underlying point he needs to utilize a spring or a weight in the switch to drive it down. This is the strategy used to beat the switch. At the point when the pendulum is in its lower position is when most extreme work is accomplished. Some energy is utilized in the spring or to lift the weight. In his proposition, the pendulum works a similar way of the load, and the sufficiency is autonomous of work is done or load connected.

[5] **Nikhade G.R.** et al. in the research paper “**TWO-STAGE OSCILLATOR MECHANISM FOR OPERATING A RECIPROCATING PUMP**” (August, 2013) presented the conceptual mechanism to run the reciprocating pump by the two-stage oscillator. It gives the energy required to lift the water from a tank put around 2.5 meters underneath the ground level. The essential use of the component will be for watering the greenery enclosure which will be worked by methods for opening and shutting of the passageway door. Paper comprises of the essential idea, plan of the pump and two-arrange oscillator component and creation of the model.

## III. METHODOLOGY

### Formulation and Presentation of Problem

The regularly expanding interest for vitality has prompted the development of different propelled assets which delivers a specific piece of the required vitality. One key buyer of a lot of vitality is our family itself. A lot of electrical vitality is squandered in siphoning water, water system purposes and so on. It is in this setting the significance of pendulum siphon emerges, utilizing which a lot of vitality can be monitored and the preserved vitality can be utilized for different purposes. Utilizing the base of human quality in contrast with present exemplary hand water siphons empowers productive application in water system of littler parts, for water-wells and smothering flames even by elderly individuals and kids. Hand water siphon with a pendulum is an acknowledgment of another, unique, and even mind boggling, by straightforward answer for siphoning water. Work is eased because simpler, durable and easy utilization of the hand water

siphon has been empowered. Information vitality for beginning the way toward siphoning, as infrequent pushing of the pendulum, is significantly less than with run of the mill hand siphons. To get the water coming up short on the siphon, the pendulum should be out of equalization. From that point onward, considering gravitational potential, the cylinder begins swaying and the persistent stream of water is leaving the yield pipe. The pendulum ought to be infrequently pushed, to keep up the sufficiency. The siphon functions admirably with all sizes of the pendulum, however primarily with the sufficiency of  $90^\circ$ . The fig.1 shows the research methodology, which shows the various steps of the said research.

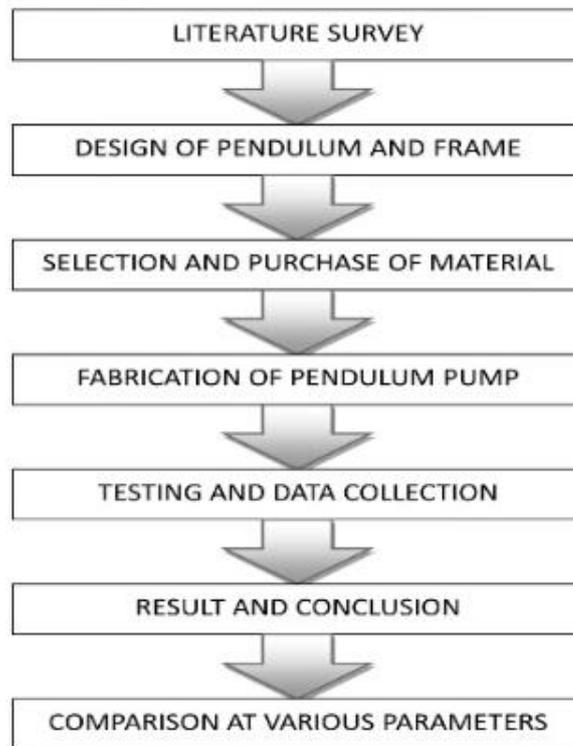


Figure 1: Methodology diagram

#### IV. REQUIREMENTS AND SPECIFICATIONS:

##### a) Pump specification:

- i) Bore diameter (D) = 8.2cm
- ii) Stroke length (L) = 17 cm
- iii) Plunger length (l) = 25 cm
- iv) Total cylinder length = 21 cm
- v) Weight of plunger with bucket = 500 g

##### b) Spring specification:

- i) Helical Extension type spring
- ii) Number of coils = 75
- iii) Solid length = 31cm
- iv) Diameter of coil = 1cm

##### c) Ball Bearing:

- i) Inner diameter = 15mm
- ii) Outer diameter = 45mm

##### d) Pendulum:

- i) Material: welded cast iron plates

ii) Weight = 7.2kg

iii) Arm length = 53 cm

Table 1:

Sl.no	Components	Material	Specification
1	Single acting pump	Mild steel	Borediameter=8.2cm, Stroke=17cm
2	Helical spring	Mild steel	Number of coils=75, Solid length=31cm
3	Ball bearing	Mild steel	Innerdia=15mm,Outer dia=45mm
4	Piston	Mild steel	Weight=350g
5	Pendulum	Mild steel	Weight=7.2kg

Experimental Dimension

V. 2D DESIGN OF THE MODEL

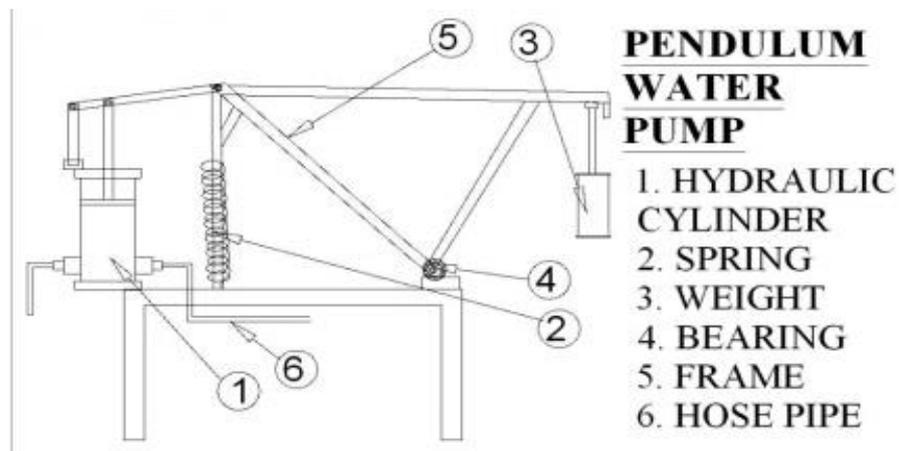


Figure 2: Pendulum water tank (2D)

### ACTUAL MODEL



Figure 3: The proposed model

### VI. APPLICATIONS

1. Drainage: Used to control the level of water in a protected area.
2. Sewage: Used in the collection and treatment of sewage.
3. Irrigation: Used to make dry lands agriculturally productive.
4. Chemical Industry: Used to transport fluids to and from various sites in the chemical plant.
5. Petroleum Industry: Used in every phase of processing of petroleum, its transportation, and separation of the impurities.
6. Medical Field: Used to pump fluids in and out of the body.
7. Steel Mills: Cooling water in steel mills can be transported using a pendulum pump.

### VII. CONCLUSION

The free energy of the machine dependent on swaying pendulum-switch framework is characterized in this investigation, as a contrast between the subsequent energy of the machine and the energy contribution from the earth in a similar time interim. Presence of the free energy characterized along these lines isn't as per the energy protection law, however, it has been confirmed tentatively and it very well may be clarified. Machines dependent on the task of the two-arrange oscillators can have proficiency coefficients fundamentally higher than one. This determination is checked by a progression of analyses done as such far with two-organize oscillator frameworks of various measurements and diverse client frameworks.

The principle favourable position of the hand water pump is to Avoiding human strain. It additionally causes us in a simple method for pumping water. The cost required to execute this is nearly low. The hand water pump is progressively proficient when contrasted with a typical hand water pump as the water stream is high here. Hand water pump with a pendulum can be generally utilized in rustic zones. As the establishment cost of the hand water pump with a pendulum is low and it is valuable for needy individuals. It tends to be introduced in all the open spots. It very well may be worked by youngsters or elderly individuals as the power required by the pump is low.

From the tests, the release of the water by utilizing the hand water pump with a pendulum is 1200 liters/hr.

## VIII. REFERENCES

- [1] "A scientific paper of Dr. BratislavTošić:," Oscillation of the lever caused by the swinging of the pendulum(Novi Sad, Serbia, 2000).
- [2] VeljkoMilkovic – website<http://www.veljkomilkovic.com>
- [3] "ANGULAR MOMENTUM OVER UNITY"Jovanmarjanovic, 2011 edition, VOL 4
- [4] A book on "KEYS OF GRAVITY MACHINES" by jovanmarjanovic, 2008 edition.
- [5] A scientific paper of NejbosaSimin on „FREE ENERGY OF OSCILLATING PENDULUM LEVER SYSTEM“ (Novi sad Serbia, sept 11 2007)
- [6] " The secret of free energy of the pendulum v. Milkovic,2010 edition (vrelo, novi sad, serbia, 2001).
- [7] A scientific paper of Prof.B.Berrett, Energy Abundance Now presented in university of Ohio 2007.