Electric Power Generation from Waste Water and Purify It & Pour it to Trees

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Abstract— Now a days the use of electricity is increased so in the industry flow of their water wastage is increased. This water can be utilized by producing electricity and filter it to pour it into the tree. So the water can be fully utilized. In this process the water can be collected in the wastage collector tank and screening process done to remove the materials like potato skins and leaf etc. can be removed. Now the water can be transferred into turbine with help of slope. When turbine is rotated the generation of electricity is done. When the water can be used it can be moved in filtration process .That water can be used to pour the trees and we can use that electricity in the same industry.

Key words: Pelton Wheel, AutoCAD

I. Introduction

Hydroelectricity is the term referring to electricity generated by hydropower; the production of electrical power through the use of the gravitational force of falling or flowing water. It is the most widely used form of renewable energy, accounting for 16 percent of global electricity generation – 3,427 terawatt-hours of electricity production in 2010, and is expected to increase about 3.1% each year for the next 25 years.

Hydropower is produced in 150 countries, with the Asia-Pacific region generating 32 percent of global hydropower in 2010.China is the largest hydroelectricity producer, with 721 terawatt-hours of production in 2010, representing around 17 percent of domestic electricity use.

The cost of hydroelectricity is relatively low, making it a competitive source of renewable electricity. The average cost of electricity from a hydro station larger than 10 megawatts is 3 to 5 U.S. cents per kilowatt-hour. It is also a flexible source of electricity since the amount produced by the station can be changed up or down very quickly to adapt to changing energy demands. However, damming interrupts the flow of rivers and can harm local ecosystems, and building large dams and reservoirs often involves displacing people and wildlife. Once a hydroelectric complex is constructed, the project produces no direct waste, and has a considerably lower output level of the greenhouse gas carbon dioxide (CO_2) than fossil fuel powered energy plants.

II. Literature survey

A. O. B. Nganga et al, "An Experimental Prototype For Low Head Small Hydro Power Generation using Hydram"

In this article they research that most feasible hydroelectric power (HEP) plants sites have been exploited and the current focus is on harnessing energy from small HEP plants which have low head and flow velocity representation them unsuitable for HEP generation. Previous research work focused on improving the turbine shape and efficiency; designing better water intake, improving the generator and development of turbines suitable for low heads. The main aim of this research was to optimize the power generated by low head small hydro plants through the use of hydraulic ram pump (hydra) to boost the water pressure before it impinges on the turbine. In the current work, a small HEP prototype system was designed fabricated and test runs conducted. Based on the results obtained, it can be concluded that hydraulic ram pump was able to operate at heads as low as 0.68m. This was done by redesigning of the waste valve and optimizing the waste valve return spring so as to archive high pumping efficiencies even at very low heads. The voltage generated by the prototype system when using the hydraulic ram pump was approximately 5 times greater than when the prototype was operated without the use of the hydraulic ram pump.

HEP- hydroelectric power plant.

B. Loice Gudukeya Et Al, "Efficiency Improvement of Pelton Wheel and cross-Flow Turbines in Micro-Hydro Power Plants"

In this research study investigated hydro power plant efficiency with view to improve on the power output while keeping the overall project cost per kilowatt produced within acceptable range. It reviews the commonly used Pelton and Cross-flow turbines which are employed in the region for such small plants. Turbine parameters such as surface texture, material used and fabrication processes are deal with the view to increase the efficiency by 20 to 25 percent for the micro hydro-power plants. This research has revealed that turbines of better efficiencies can be manufactured, made available for micro-hydropower system and the projects remain financially workable. This was achieved through the comparison of current fabrication methods used locally to methods used by different suppliers of turbines. Even though the better efficiency turbines are more expensive than the ones being used currently the overall benefit is clear. More electricity is generated hence the cost per unit kW actually decreases making the projects even more workable. The financial workability of a project was determined by the project cost per kilowatt produced. Use of better efficiency turbines will make it possible to harness more electrical power from the same resources.

C. Bilal Abdullah Nasir et al, "Design of High Efficiency Pelton Turbine for Micro- Hydropower Plant" (2013)

In this research paper the Pelton turbine was performed in high head and low water flow, in establishment of micro-hydroelectric power plant, due to its simple construction and ease of manufacturing. To obtain a Pelton hydraulic turbine with maximum efficiency during various operating conditions, the turbine parameters must be included in the design procedure. In this paper all design parameters were calculated at maximum efficiency. Based on the results obtained, it can be concluded that the Pelton turbine is suitable for installing small hydro-electric power plants in case of high head and low water flow rate. A complete design of such turbines has been presented in this paper based on theoretical analysis and some empirical relations. The maximum turbine efficiency was found to be 97% constant for different values of head and water flow rate. The complete design parameters such as turbine power, turbine torque, turbine speed, runner dimensions and nozzle dimensions are determined at maximum turbine efficiency.

D. F. Behrouzi et al, "Review of Various Designs and Development in Hydropower Turbines" (2014)

In this article researcher mainly focused on design and development of different kind of turbines to capture hydropower to generate electricity as clean and reliable energy. This paper is a review of the status of research on water current turbines carried out to generate electricity from hydrokinetic energy especially in places where there is no electricity, but there is access to flowing water. As a result obtained hydropower is certain the first choice for renewable energy that can manage the kinetic energy of water by implementation of turbines. Improvement of turbines is compulsory increase their performance. Today, many researchers attempt to offer new concept, new design or new device to increase performance coefficient.

E. Shambhu Ratan Awasthi et al, "Enhancement in Power Generation in Hydroelectric Power Plants with Water Conservation" (2014)

In this article they research that the hydroelectric power plants need huge quantity of water for their operation. Normally these plants are operated as per the generation schedule provided by the Load Dispatch Centre. The method presented in this paper is based on the fact that discharge of water is minimum when a turbine operates at maximum efficiency, thus conserving water and thereby improving power generation as compared to normal or usual practice. A case study for Indira Sagar Hydroelectric power plant is presented and estimated for other hydroelectric power plants in cascade on river Narmada in India. As a result obtained an algorithm has been developed for minimization of plant discharge. The enhanced average generation of 2.07% and 1.71% respectively are achieved for constant load and constant head in 8x125 MW Indira Sagar hydroelectric plant. Total enhancement in generation is found to be 58.2 MWin constant load variant whereas 48 MW in the case of a constant head. The enhanced generation capacity for other cascaded power plants on river Narmada is found to vary from 1.5 to 24.8 MW.

F. R. K. Tyagi et al, "Hydraulic Turbines and Effect of Different Parameters on output Power" (2012)

In this article they research that the energy demand of industry grows rapidly, fabrication of hydraulic energy system becomes a critical point of concern. Many research activities about hydraulic have been carried out by experimental methods and by theory and simulation. Hydro energy parameters have been used to study the relation between the hydro energy parameters and subsequent relative output energy. In this work different parameters have been used to generate water, which contains potential energy. The water injected on blades of hydraulic turbines. The water energy effecting parameters (height, quantity of water etc. has been examined by taking combination of parameters. The outcome obtained by theoretical calculations is identical to the experimental results. As the result obtained that the study of hydraulic turbine and its characteristics showed that how it can be properly designed and used to get the maximum output, even with the variable speeds

G. Archana Tamrakaret al, "Hydro Power Opportunity in the Sewage Waste Water" (2015)

In this article the alternative energy source of municipal waste water for micro hydro power generation, are detail discussed in the present investigation. Reuse of municipal waste water can be a stable, inflation proof, economical, reliable and renewable energy source of electricity. Both the historical and the present day civilization of many kind are closely interwoven with energy and there is no reason to doubt but that in the future our existence will be more dependent upon the energy.This paper also deals with simulation of both hydraulic turbine and alternator and their clearly shows the steady state output for various gate position. The feasibility of small hydro power for domestic needs is justified by giving a proposal of the implementation of small hydro power in Sewage water; Hydro power is a proven and generally predictable source of renewable energy and is one of the few that is not intermittent.

H. Lokesh Varshneyet al, "Self Excited Induction Generator and Municipal Waste Water Based Micro Hydro Power Generation System" (2012)

In this article they describes an alternative energy source: municipal waste water for micro hydro power generation. Reuse of municipal waste water can be a stable, inflation proof, economical, reliable and renewable energy source of electricity. The hydro potential of the waste water flowing through sewage system of the university has been determined for annual flow duration and daily flow duration curves by ordering the recorded water from maximum to minimum flows. Output power has been estimated for available different head and flow rate of the waste water. MWW (Muncipal Waste Water**)** flow rate and head have been measured considering summer / winter and day / night cycles and typical power output has been estimated at different flow rate and head at sewage plant. In the point of the view of the prevention of the holy Ganga River from water pollutions.

III. CONSTRUCTION WORK

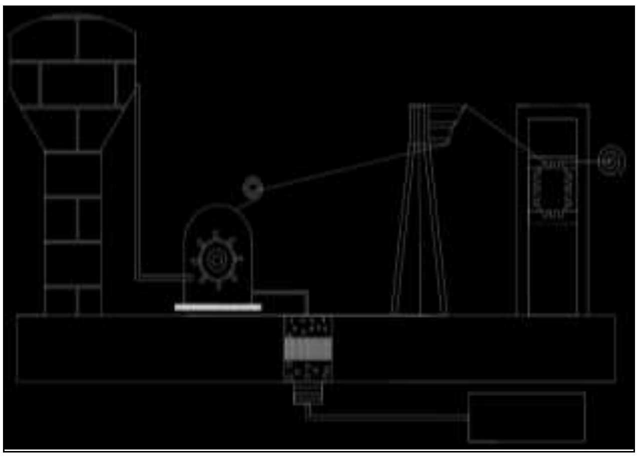

Fig. 1: AutoCAD Line Diagram

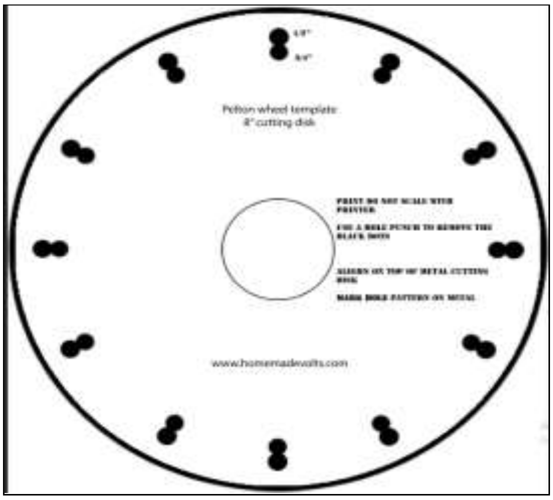

Fig. 2: Standard Design of Pelton Wheel 8 Inch with 30 Degree to Each Other

Fig. 3: Final Pelton Wheel

Fig. 4: Motor Mechanism

Fig. 5: Model

IV. Velocity Calculation at Outlet

Calculation about to find the velocity of water at nozzle outlet.

Here given date

Q=10 sec

D=15mm at outlet of nozzle.

Q =mass flow rate m^3/sec

A = area of nozzle mm

C =velocity m/s

$$Q = C*A$$

$$C = \frac{Q}{A}$$

$$Q = \frac{1\ liter}{10\ sec} = \frac{0.001}{10 sec} = 0.0001\ m3/sec.$$

$$A = \frac{3.14*d*d}{4} = 0.0001767\ \text{mm}.$$

$$C = \frac{Q}{A}$$

$$= \frac{0.0001}{0.0001767}$$

C = 0.56588 m^3/sec.

The velocity of water at outlet is 0.56588 m^3/sec.

V. Conclusion

1) Here conclude the velocity of water at outlet is 0.56588 m^3/sec and get the and get produce energy is 3 watt bulb.
2) if we want to produce more by this experiment set put multi gear shaft can produce more energy.
3) To change the height of the waste water head means increase the height also we can increase the speed of the turbine.

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