

Design and Analysis of Hydraulic Operated Solar Parabolic Dish water Purification System

Ashish P Pawar
Mechanical Engineering
LOGMIEER
Nashik, India.

Pavan A Chavan
Mechanical Engineering
LOGMIEER
Nashik, India.

Yatin K Ghule
Mechanical Engineering
LOGMIEER
Nashik, India.

Kirti G Mahajan
Mechanical Engineering
LOGMIEER
Nashik, India.

Abstract:- Water could be a basic necessity of man in conjunction with food and air. Water resources typically out there area Unit Rivers, lakes and underground water reservoirs. regarding seventy one of the earth is roofed in water, however of all of that 96.5% of the planet's water is found in oceans, 1.7% in groundwater, 1.7% in glaciers and also the ice caps and 0.001% within the air as vapor and clouds, Only 2.5% of the Earth's water is fresh and 98.8% of that water is in ice and groundwater. Less than 1% of all fresh is in rivers, lakes and also the atmosphere. And despite the superb quantity of technological progress and advancement that this world we have a tendency to board has undergone, roughly one billion folks, or 14.7% of the earth's population, still don't have access to wash, safe drinkable water. This report specifically appearance into the options, efficiency, no power consumption of parabolic reflector & water purification system. The parabolic reflector collects additional alternative energy than the flat plate reflector. It heats the water in receiver so it's heated any through pipe water is condense so it's sublimate. This technique is extremely economical as we have a tendency to area unit pursuit sun's position be that the sunrays area unit sheer incident thereon. as a result of perpendicular incident of sunrays we have a tendency to have gotten most temperature so system becomes additional economical. We have a tendency to area unit exploitation hydraulic mechanism so once during a day we have a tendency to do manual cranking of dish at that time throughout the given time it'll go on its own. As sun changes its direction it'll follow permitting U.S.A. to induce most temperature. we have a tendency to area unit exploitation aluminum foil for heating. For additional temperature we are able to conjointly use silver foil but price is often enhanced.

Keywords:- Solar water purifier, Hydraulic operated tracker.

I. INTRODUCTION

Solar energy is associate exhaustible supply of energy probably capable of meeting a big portion of all nations Future energy desires with a minimum of adverse environmental consequences. the present industrial growth and environmental impacts shows that solar power for star thermal plant is that the most promising of unconventional energy supply. The

solar power choice has been known in concert of the promising various supply for future. style and analysis of hydraulic operated star parabolic dish water purification system may be a project within which natural energy accustomed purify water with none non-renewable energy is consumed which supplies US price effective methodology to purify the water, particularly in remote areas. Distillation is one among several processes out there for water purification, and daylight is one among many types of energy which will be accustomed power that method. To dispel a standard belief, it's not necessary to boil water to distill it. Merely elevating its temperature, in need of boiling, can adequately increase the evaporation rate. In fact, though vigorous boiling hastens the distillation method it can also force unwanted residue into the liquid, defeating purification. The essential construct of star water heating is intuitive and simple. A dark surface is positioned to soak up daylight and convert it to heat. Water or another heat transfer fluid passes on that hot surface to select up the heat-either for direct use or for transfer through a device to the tip use. Parabolic dish star water-heating systems carry star water-heating technology a step any by concentrating the daylight before it strikes the absorbent. The parabolic dish reflector technology is incredibly helpful because it is employed for roughly all solar power applications. By the comparative study materials to be used for reflector, silver foil includes a terribly high overall potency and having excellent response to star intensity as a reflective material. Silver foil is additionally price effective compared to different materials. Mistreatment system for trailing can increase the output of star panels and removes the constraint on the placement of the trailing system. Mechanical trailing system consumes no energy for operation and contributory towards increasing productivity of star panels. This can be a shot to utilize the attractive force energy as a drive for star trailing systems and conjointly in providing an acceptable trailing system for the overseas.

II. PROBLEM STATEMENT

As in Asian nation seventy two youth lives in villages and main drawback there's shortage of fresh water at cheap value. Several water purifying devices in the main out of reach of rural individuals as value is main drawback. So we tend to functioning on our distinctive project, within which we tend to victimization renewable supply of energy to purify water.

Issues occurring whereas victimization alternative water purifiers are:-

- Water apparatus is expensive and not cheap to poor peoples
- Water purifiers desires electricity, and in rural region there's shortage of electricity
- Maintenance is required often in electrically operated water purifiers.
- In geographical region, there's not effective thanks to purify water therefore thanks to this many of us in are susceptible to waterborne diseases.

III. OBJECTIVES

- The objective of our project is to produce value effective and economical device which is able to generate clean water therefore it may realize its applications in rural areas.
- Purify the water at bound degree of purity.
- The device ought to be extremely economical.
- Utilization of most sun rays by trailing of dish towards sun orientation.
- The gift electrical trailing system consumes most of the energy created by star panels that is a demerit for the scheme. We have a tendency to decide to altogether negate the wastage of electricity generated by the panels. In different words we have a tendency to hope to extend the output of the star parabolic dish.
- The output from the parabolic dish can magnified with the magnified size of dish.
- The model should be transportable and straightforward in construction.

IV. CONSTRUCTION AND WORKING

When the daylight rays square measure incident on the reflective surface they're mirrored and sent to the surface of the absorbent to heat the water. The parabolic dish created with extremely reflective panels of metallic element sheet and silver foil. The reflector withdraws tiny shapes and stuck parabolic which may be turned handily. Hydraulic trailing is provided for trailing of the reflector to induce the utmost potency of the star setup.

• *Tracking*

As the trailing weight acts on the piston through rod, it pushes the oil out of the cylinder and additionally the oil flows towards reservoir. While, as a result of the restricted cross sectional area at flow management valve the piston moves with rate the speed the rate up to calculated trailing speed. Throughout this action the check valve remains closed, thus oil is allowed to flow alone through flow management valve. At the rod end of the cylinder, the oil is sucked into cylinder as a result of the vacuum pressure created by the applied weight.

• *Return*

As the trailing time finishes, the panel seat should be turned by applying the torsion, manually, to bring into initial position. The vacuum pressure is made at piston finish chamber and oil from reservoir rushes towards cylinder. As presently because the system pressure exceeds the cracking pressure of check valve, check valve opens and permitting full flow of oil from it, reducing the time needed for positioning operation. The flow management valve conjointly permits the oil to ensue it, increasing rate of flow and reduced panel positioning time. At rod finish of cylinder the piston forces the oil. The force per unit area will increase and oil flows out of the cylinder. Oil come backs to reservoir through a filter placed within the return line.

A. Figures and Tables

^a Sr.No.	^b Parameters	^c Before	^d After
^e	^f pH	^g 7-8	^h 7-8
ⁱ	^j Turbidity	^k 0-0.2N TU	^l 0-0.2N TU
^m	ⁿ Dissolved oxygen	^o 5-6 mg/L	^p 4-5 mg/L
^q	^r Biological oxygen demand	^s 18-19 mg/L	^t 16 mg/L
^u	^v Chemical oxygen demand	^w 5-5.2 mg/L	^x 4.8 mg/L
^y	^z Suspended solids	^{aa} Not visible	^{bb} Not visible
^{cc}	^{dd} Chloride	^{ee} 57-58 mg/L	^{ff} mg/L

Table of parameters

V. ACKNOWLEDGMENT

We take this immense pleasure in thanking Prof. R.R.Chakule, Head of the Department of Mechanical Engineering.

We wish to express our deep sense of gratitude to my Project Guide, Prof. Kamesh Patil, for his able guidance and useful suggestions, which helped us in completing this project work in time.

Needless to mention that, Dr. T.H. Sutar, Principal, Who has been a source of inspiration and for his timely guidance in the conduct of project work. We would also like to thank the entire Faculty Members of Mechanical Engineering for all their valuable assistance in the Project Work.

Finally, yet importantly, we would like to express my heartfelt thanks to my beloved Parents for their blessings, my Friends / Classmates for their help and wishes for the successful completion of this project.

VI. CONCLUSION

It is observed that the designed mechanical tracking system is a system, which consumes no energy for operation and contributing towards increasing the productivity of the solar panels. This is the first attempt made towards utilizing the gravitational energy as a driving force for solar tracking systems and also in providing a suitable tracking system for the remote places. In view of increasing demand for the electrical power, this tracking system can contribute a little (around 87.6 kW-hr per year) in the fulfillment this demand.

It is observed that the designed water purifier with tracking system is a system which consumes little energy for operation and contributing towards the more use of solar parabolic dish for the purification by heating the water in a aluminum flask and make water drinkable .

REFERENCES

- [1]. Deepak Devasagayam, Mayuresh Kathe, Mayur Patil, Nimish Kavishwar, "Solar Water Purifier", International Journal of Innovative Research in Advanced Engineering (IJIRAE), Vol. 1, Issue 9, October 2014.
- [2]. Rutukesh Bhosale, Gauri Ambekar, Sumesh Bhagat, Alim Shaikh, " Water Distillation System using Parabolic Dish Solar Collector", International Research Journal of Engineering and Technology (IRJET), Vol. 4, Issue 5, May 2017.
- [3]. Jinesh S. Machale, Prachi D. Thakur, Piyush S. Lalwani, Gayatri M. Apte, "Solar Water Purification with the help of CSP Technology", Scientific Reviews and Chemical Communications, 3(2), 2013, 128-132.
- [4]. Mr. S. D. Kulal, Prof. S. R. Patil, "Performance Analysis of Parabolic Solar Dish Collector for Various Reflecting Materials", International Research Journal of Engineering and Technology (IRJET), Vol. 3, Issue 11, November 2016.
- [5]. Hossein Mousazadeh, Alireza Keyhani, Arzhang Javadi, Hossein Mobli, Karen Abrinia, Ahmad Sharifi, " A Review of Principle and Sun-Tracking Methods for Maximizing Solar Systems Output", ELSVIER, Renewable and Sustainable Energy Reviews..
- [6]. Prof. Kusekar S. K., Ajinkya Patil, Sachin B. Patil, Prasad B. Rajmane, Akshay B. Bhosale, "Tracking of Solar Panel By Hydraulic System", International Journal of Informative and Futuristic Research, Vol. 2, Issue 8, April 2015..
- [7]. Ayush Khare, Sachin Saxena, C. H. Tyagi, Sanjeev Kumar, " Parabolic Solar Collector", International Journal of Mechanical Engineering and Robotics Research, Vol. 3, Issue 4, October 2014.

- [1] www.metalwebnews.com
- [2] www.hk-phy.org/articles/solar/panels_e.html.
- [3] www.gluckman.com/parabolicdish
- [4] www.o-keating.com/hsr/solardish.html.