International Journal of Advance Research in Science and Engineering
Volume No.07, Special Issue No.01, April 2018
www.ijarse.com
IJARSE
ISSN: 2319-8354

Designing & fabrication of Combined Solar Cooker&Water distillation system

Happy kumar Srivastava[1],Haresh kumar[2], Mahendra Sahani[3] , Sachchida Nand[4]

[1,2,3,] Undergraduate students of Mechanical Engineering Dept.of Buddha Institute of Technology,CL1,sec-7 GIDA Gorakhpur,U.P.(India).

[4]Assistant professor professor of Mechanical Engineering Dept.of Buddha Institude of Technology,CL 1,sec-7 GIDA,Gorakhpur,U.P(INDIA)

ABSTRACT

Solar energy is available everywhere for free of cost.sun's energy can be directly converted on to electrical energy.we can use it to make electricity to heat building and to cook.the field of cooking consumer many fossil fuels such as gas and wood.Design solar water distillation has two parts.Upper part is made by aluminum foil for absorbing heat inside it proper insulator is attached behind this arrangement. The copper tube is attached to the parabolic disc one side inlet and another side outlet then the water coming in inlet tube and water till to tube then the outlet tube is closed then fresnel lens are used that the sun ray's in focal point this tube is heated. The central point of outlet to connect a plastic pipe and vapour collect to the container.

***Keywords ambient temperature* ,Parabolic reflector, *solar energy*.**

I.INTRODUCTION

Solar cooker is a device that cooks food using only Sun energy in the form of solar radiation the Solar cooking save a significant amount of conventional fuels the Solar cooking is a simplest safest clean environmental friendly and most environment way to cook food without consuming fuel or heating of the kitchen solar energy is the cheapest in exhaustible and can be used for domestic and Agriculture requirements including cooking drying the hydrogen dehydration heating cooling and solar power generation cooking temperature begin at about 65 °C all the temperature of 120°C to 200°C are prepare The project aims of producing distilled water using solar energy the process involved the evaporation of water using solar energy from the sun the evaporation water gets condensed to the plastic pipe and drop left to the container the rate of evaporation depends on the intensity of the solar radiation incident on the Solar still. The aim of project is to produce around 3 to 5 liters distilled water does shaving on conventional source of energy and also reducing the cost price of distilled water

II.LITERATURE REVIEW

We preferred many research paper,reference books related to this topic and review papers.By observing that a lots of information and ideas regarding our concept.Some of these papers are described below.

1.First time this technique used by Arab alchemistts in 1551 in 1872.The 1st moderrn solar still was Built in chile which consists of 64 basins and supplied up to 20000 litres of water per day.

2..In 2012 ozvomba J.V etal this Discover a roof type solar water distillation which was tested this system contains for measure components rectangular wooden basin observing surface a glass roof and up condensed channel. The system has capability to produce 2.3m^3 water in 6 days which is not sufficient to fulfill the requirement of human need..

3. Tiwari and Madhuri (1987) studied the effect of initial water temperature on the distillation output and they found that yield increases when the initial water temperature of the brine was greater than 45°C

4. Tripathi and Tiwari (2004) indicates that the change in the length of a solar still for given height and width of the Solar still does not affect the daily output but the change in the height of the north wall for a given height of the Solar still affect the daily output.

5. Tiwari and Tiwari (2006) found that the evaporative heat transfers depends significantly on water depth and the natural distillation is significant in the case of higher water depths..

6. .Jamal and khashan (1998) studied the effect of extracted heat load on solar pond performance in their experiment set up the thikness of LCZ is 1m and NCZ was 0.91m to 1.18m.

III.OBJECTIVE

The objective of this project that can be improved of the temperature at a focal point and manufacturing whole set up at low cost it is to be combined of the Solar cooking and water distillation .To use the Soline water and distil it to be obtained the Portable water .The sun rays concentrate on the focal point and it makes to the food**..**

Specification

Sr.No	Part	**Dimension(mm)**
1	Fresnel lens	**289.56mm X 203.2mm X 7.62mm**
2	Copper tube	**Dia.-40mm Length: 1000mm**
3	Foil paper	**dia. – 1800mm Depth- 260mm**

		Thickness- 1 mm
4	Stand	**height -500mm**
5	Inner tube	**dia-15mm**
6	Outer tube	**dia-20mm**
7	Parabolic dish	**T=1mm,depth=260mm,l=1000 mm,dia 1800mm**
8	Grid	**300mm**

Components of Solar Cooker Water Distillation

The following parts materials were used to construct the Parabolic Solar**:**

- Frame (Mild Steel)
- Mirror
- Fresnel lens
- Foil paper
- Solid Foam
- Aluminum
- Copper tube

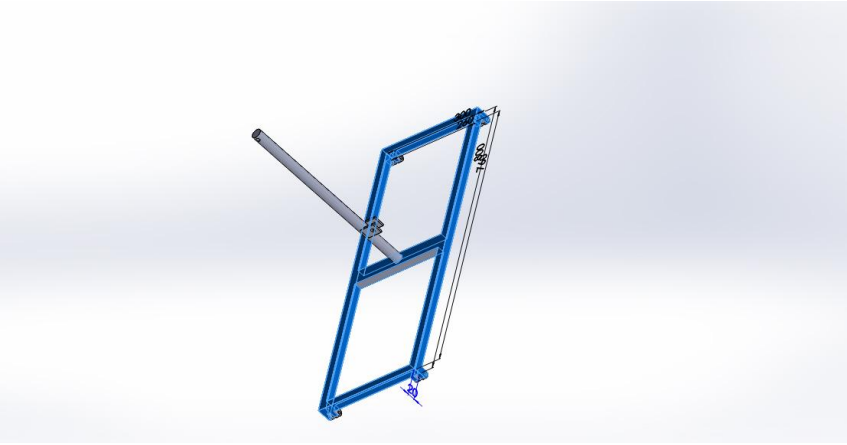

Fig 1.1- design of base frame structure by solid work

This design shows that is to be base frame of the supporting of the dish system. This frame is to be attached to the stand. The stand to be attached on a parabolic solar dish.

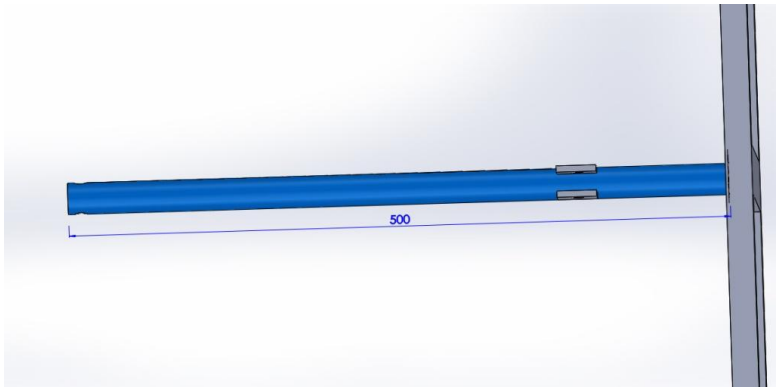

Fig 1.2 -tube by solid work

This figure shows that tube is to be attached to the parabolic dish. There are two tubes are attached in a parabolic solar dish. This tube is made by copper.

Fig 1.3- design of frame of dish by solid work

This figure shows that is the base frame of the parabolic dish. The sun rays are coming and reflected on a concentrate on a focal point. This point is attached on a pots the food is making.

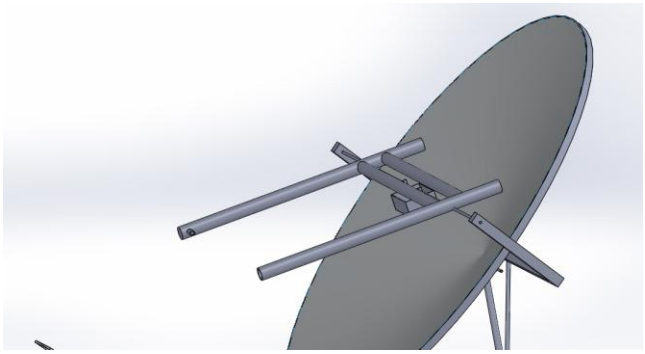

Fig 1.4- design of a parabolic dish by solid work

This figure is so that assemble of the dish.Pots, and tube are attached to the system. There are tube attached in a parabolic solar dish. One tube is inlet and second tube is outlet and other tube is connected to the inlet and outlet.

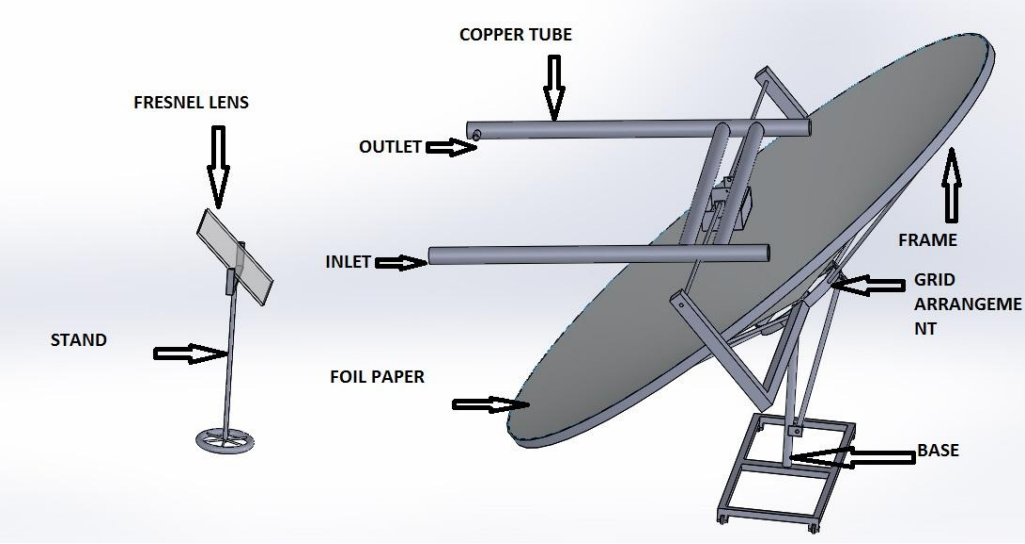

Fig 1.5-design of final model by solid work

All of the part is assemble and final of the design in a solar cooking and water distillation system. The sun rays is coming to a fresnel lense. These lense all the rays in a focal point in a outlet tube. This tube is hot and then the water is vapourised.

IV.DISCUSSION

The parabolic solar cooker and water distillation is very efficient and the efficiency improved.The sun ray's incident on the parabolic disk the rays are concentrate on the a Focal Point the focal point is attached to the pots is to be insulated and make a food. That is very effectively process without consuming fuel. The parabolic dish attached to the copper tube one is inlet and outlet tube the other tube is connected to the inlet and outlet. The outlet tube is closed and this tube is to be attached in a other tube.

The fresnel lens are used to be out late tube is not the water is boiling and the vapour is exit on a plastic pipe and collect in a vapour in the container the water is purified this water is drinkable.

V.CONCLUSION

Solar cooker is ideal for large family as it can provide sufficient temperature for cooking. Many food items can be prepared in 1 to 2 hour at bright sunshine days. At morning hours ambient temperature affect it perform but at sunshine hour due to high surrounding temperature it has high surrounding temperature it has high efficiency. Main advantage is that, Sun tracking magnesium though it is manual but it can increase cooking time quiet bit

more.Parabolic cooker can cook food faster than parabolic type cooker this concentrating cooker hits the visual uniformly so no burning and food vitamin will remain intake.A parabolic solar dish concentrate has been design,built and tested the experimental results so that the favourable table conditions for distillation are the best hour of distillation is between 12 to 12:30. The temperature of 146 °C at focal point and the water temperature is 102.7°C the system will be more effective if the Solar tracking is used.

REFERENCE

[1.] Chemical engineering group desalination division by bhabha Atomic Research Centre Trombay Mumbai Government of India Department of Atomic Energy 400 085, 2010, www.barc.gov.in/publications/tb/desalination.pdf.

[2.] A.N. Khalifa "Evaluation and energy balance of study of a solar still with an internal condenser", JSER3(1) 1-11(1985).

[3.] 2nd international conference on advanced in energy engineering (ICAEE 2011) 1876-6102 2011 published by Elsevier Limited. Doi: 10,1016/J.egypro.2011.12.887(2ro0c1eld)i a0 0104-(020001 2)1701-1708

[4.] Khaled M.S.Eldalil,"New concept for improving solar still performance by using vibratory harmonical effect experimental prediction part 1 mechanical engineering department, tanta University tanta Egypt.

[5.] Ibrahim Ladan Mohammed /International Journal of engineering research and application (IJERA)ISSN:2248-9622 www.ijera.com volume 2, issue 1 January 2012,pp.822-830

[6.] Shukla SK, Sorayan VPS,(2005), thermal modelling of solar still; and experimental validation renewal energy fuel energy Abstr 30(5);6 83 – 699.

[7.] Dunkle RV (1961), solar water distillation. the roof of type steel and multiple effect diffusion Steel, International development in heat transfer, in A,S,M,E, proceeding of international heat transfer, part V,University of Colorado,p 895