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Increasing the Efficiency of Solar Still Water Purifier with the Help of Parabolic Concentrator

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Abstract: As we know under the increasing issues of Global warming and water pollution, Potable water available will be in scarce proportion in near future. Arid regions like Rajasthan is already suffering from this crisis in present. We have tried to use heat of sun to address this problem and devised a parabolic solar concentrator. Previously existing solar stills were not parabolic while we have made the surface parabolic in accordance to concentrate solar rays and increase efficiency of solar concentrators.

Keyword: 1.Solar Still, 2.Parabolic Concentrator, 3.Desalination, 4.Water Purification, 5.Increasing Efficiency

I. INTRODUCTION

A. Solar Still

- 1) *Introduction to Solar Still:* The solar still is the device which is use to purify the water by boiling it with the use of sunrays. And convert the sea water into the domestic water.
- 2) *How Solar Still works?*
 - a) The sunrays fall on the upper glass surface of the solar still.
 - b) And then sunrays get refracted to the other black metal surfaces of the solar still.
 - c) And then that metal surface get heated.
 - d) Due to that the temperature of whole device increases.
 - e) Then water starts boiling and starts evaporating.
 - f) After the water converted into the steam it goes up on the surface of glass.
 - g) Then it gets cooled down and due to the angle of glass it moves downward and gets collected in the bowl.



Fig 1.1 Solar Still

B. Parabolic Concentrator

- 1) *Introduction of Parabolic Concentrator:* The Parabolic concentrator is device which is use to concentrate the light fall on it. If light falls anywhere on this device it reflects it on one single point.
- 2) *How Parabolic Concentrator works?*
 - a) We make a light to fall on the inner surface of a parabolic concentrator.
 - b) Then the parabolic concentrator starts reflecting the light.
 - c) And due to its shape it reflects the light on one single point.



Fig 1.2 Parabolic Concentrator

C. Aim and Objectives

- 1) **Aim:** The main aim of the project is to increase the efficiency of a solar still water purifier in optimal and economic cost.
- 2) **Objective**
 - a) To increase the efficiency of solar still.
 - b) To provide cheap source of water mass purifier.
 - c) Innovation in water purification technology via use of divergent optical

D. Problem Statement

What are the basic needs of human beings to survive? I think **water** is one of them. As you know the 75% of a earth is covered with the sea water. but we can't use that sea water. Today in the era of 21st century we have a scarcity of water which we use in our day to day life. This problem is one of the biggest problems among us.

II. DESIGN OF PARABOLIC CONCENTRATOR

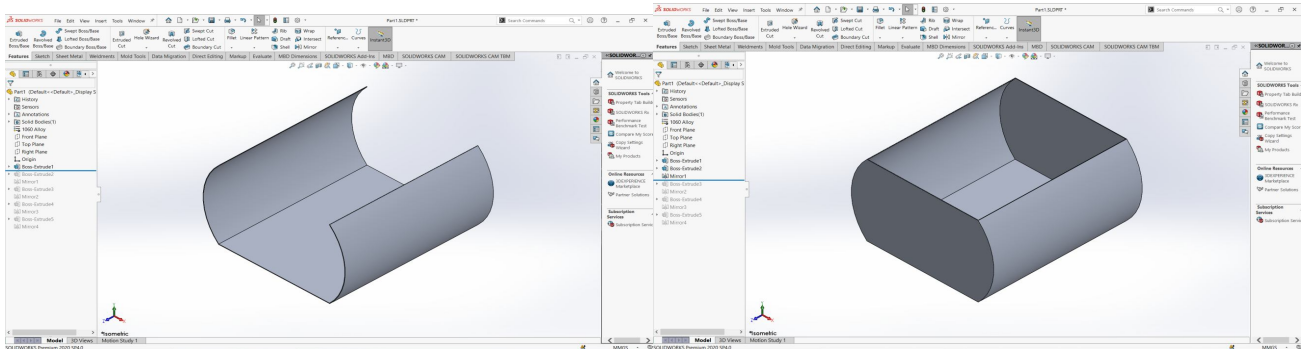
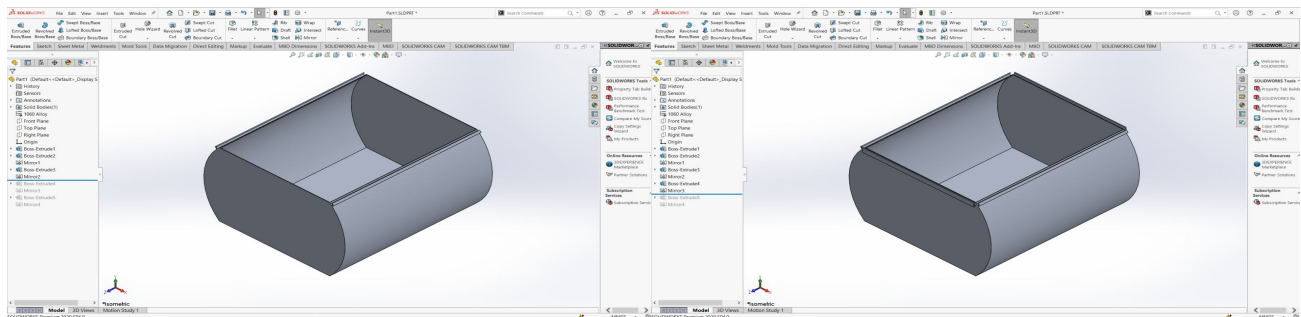


Fig.2.1 Bending of sheet

Fig.2.2 Support from Both the Side



2.3 Support From Two For Glass Fig.

2.4 Support From All Side For Glass

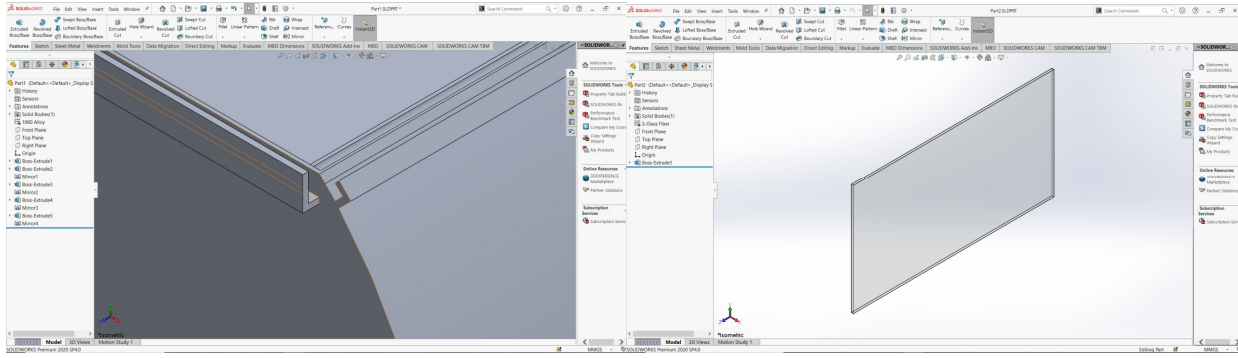


Fig. 2.5 Close-up Of Support Of Glass

Fig. 2.6 Large Glass

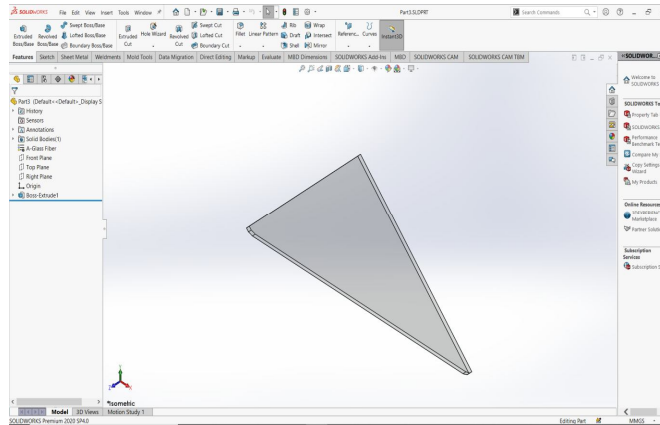
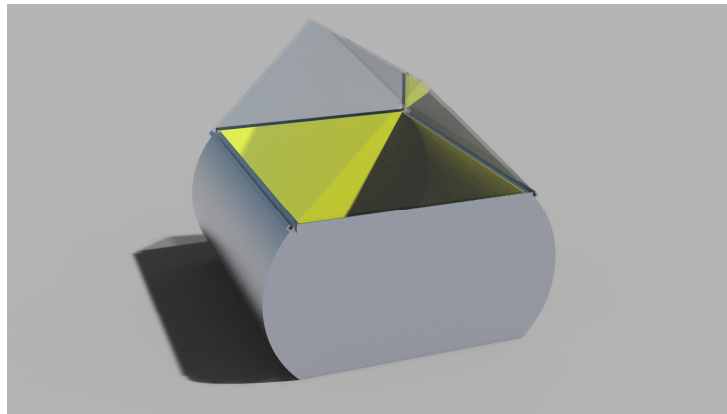


Fig. 2.7 Small Side Glass



III. EXPERIMENTAL WORK

Before

After



Time	Temperature
09:00 Am	28.5
10:00 Am	29.8
11:00 Am	32.4
12:00 Pm	35.3
01:00 Pm	37.6
02:00 Pm	39.9
03:00 Pm	42.9
04:00 Pm	43.2
05:00 Pm	44.1

Table : Readings at Different time

IV. CONCLUSIONS

The from discussion, after reading some research papers and from the table of results we can conclude that we can increase the temperature of parabolic solar still device with the use of parabolic concentrator as compare to normal solar still and with help of this temperature we can also increase the efficiency of parabolic solar still.

REFERENCES

- [1] Dr. Neetu Rani, Archana Agarwal “Solar energy utilization for reverse osmosis of water desalination” international conference on recent development in engineering science-2017, Page no: 420-425
- [2] Mr.Wadekar Abhijit Narayan, Mr. Jadhavdanyeshawar Vittha, Mr. Zagade nitin vishnu, Mr. Pasale Abhay Narayan, Mr. Gawade Prashant Sanjay “Solar Power Operated Water Purifier Plant” International Journal Of Innovations in Engineering Research And Technology-2018, page no:-17-21.
- [3] Indra Mohan, Satyapal Yadav, Hitesh Panchal & Shivani Brahmhatt “A Simple Desalination technology to obtain Portable water” International Journal of Ambient Energy October-2017, Page No:-399-419.
- [4] Amitava Bhattacharya “Solar Stills for Desalination of Water in Rural Households” International Journal of Environment and Sustainability-2013, Page No:21-30.
- [5] Mohammed Shadi s. , Abujazaar, S. Fatihah, A.R. Rakmi, M.Z.shahrom “The effects of design parameters on productivity performance of a solar still for seawater desalination” The Journal of Elsevier-2000, page No:178-193.
- [6] M. Wilson, Shakeelur Rahman, A.R. Ankita, E. Parab, Neetu Jha “Ultra-low cost cotton based solar evaporation device for seawater desalination and waste water purification to produce drinkable water” The Journal of Elsevier-2019, page No:85-96.
- [7] Jinesh S. Machale, Piyush S. Lalwani, Gayatri M. Apte “Solar Water Purification With The Help Of CSP Technology” R.A. Mayers, Ed., encyclopedia of Physical Science & Technology-Academic Press, vol.15-2001, page No:237-256.
- [8] B.E. Smith “An experimental wick – Type solar still system” Design and Construction, volume 267-2011, page No: 233-238.
- [9] Sonido, Mark Darwin T., Balcueva, Blizelda M., Pinpin III, Juanito Carlo A., Mosquera, Rizal M, Portable Solar Powered Flood Water Purifier System, International Journal of Recent Technology and Engineering,2019,141-145.
- [10] Manoj Phalak, Piyush Kurkure, Nikhil Bhangale, Vipul Deshmukh, Mayur Patil, M H.Patil, Solar Powered Reverse Osmosis Water Purifier, International Journal for Research in Engineering Application & Managemen,2017,56-59.



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