PERFORMANCE & ANALYSIS OF PARABOLIC COLLECTOR – SILVER FOIL REFLECTING MATERIAL

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ABSTRACT

Solar energy forms radiant light and heat from the Sun harnessed using a range of ever-evolving technologies like solar heating sources, photo voltaic chambers, solar thermal energy systems, solar architecture and artificial photo synthesis. The important source of renewable energy and its technologies are broadly characterized as either passive solar or active solar its available on the way they capture and distribute solar energy or convert it into solar power. Active solar techniques introduce the use of photovoltaic systems, concentrated solar power and solar water heating to harness the energy. Passive solar techniques include orienting a building to the Sun, selecting materials with suitable thermal mass and light dispersing properties, and designing spaces that naturally circulate air.

Keywords: Solar Energy, Collectors, parabolic etc.

I. INTRODUCTION

1.1 Types of Solar Radiation

- **Direct Radiation: -** Direct radiation is received from sun rays travelling in a straight line from sun to the earth. Direction radiation is also termed as beam radiation or direct beam radiation.
- **Diffuse Radiation: -** Direct radiation has a fixed direction. Diffuse radiation have not any fixed or perticular direction. When sun rays are scattered by particles present in the atmosphere, these scattered sun rays account for the diffuse radiation.
- **Reflected Radiation: -** Reflected radiation is the component of radiation which is reflected from earth surfaces and also from air particles. Radiation reflected from hills, trees, houses, water bodies accounts for reflected radiation.
- **Global Radiation: -** Global radiation is the sum of direct, diffuse and reflected radiation.

1.2 Types of Collector

- Flat plate collectors.
- Evacuated tube collectors.
- Glass-glass evacuated tube.
- Parabolic trough.

- Parabolic dish.

1.3 Components of Parabolic Dish Collector

- Black Body.
- Submersible pump.
- Thermo couple.
- Plastic Pipe.
- Power meter.

1.4 Advantages of Solar:

- It is indefinitely renewable energy source.
- Solar panels also require little maintenance.
- Solar panels are also a silent producer of energy, a necessity if dealing with picky neighbors.

1.5 Disadvantages of solar:

- Solar power is that it obviously cannot be created during the night.
- The power generated is also reduced during times of cloud cover.
- Initial cost is high.

1.6 Objectives if Research Paper:

- To find out effectiveness of reflecting material of parabolic collector.
- To Calculate the Efficiency of Silver foil reflecting materials.

II EXPERIMENTAL PROCEDURE

- Fill the water into the water tank.
- Give the electric supply to the motor and temperature indicator.
- Start the motor switch, and wait until the water come out the delivery pipe.
- When water come out the pipe ,note down the reading i.e.T1,T2,T3,T4,T5,T6,T7.and solar intensity.
- After ten minutes take another reading.
- This procedure until one hours, after one hour drain the water tank and fill the new water. and wait till the water come out the delivery pipe.
- Note down the reading .
- Do the all above procedure for whole day.
- Make the calculations and plot the graph time verses efficiency and time verses solar intensity.
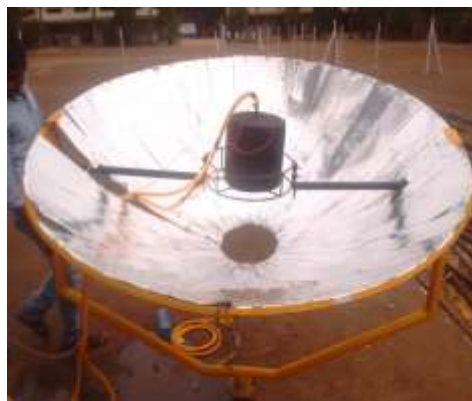
2.1 Experimental setup
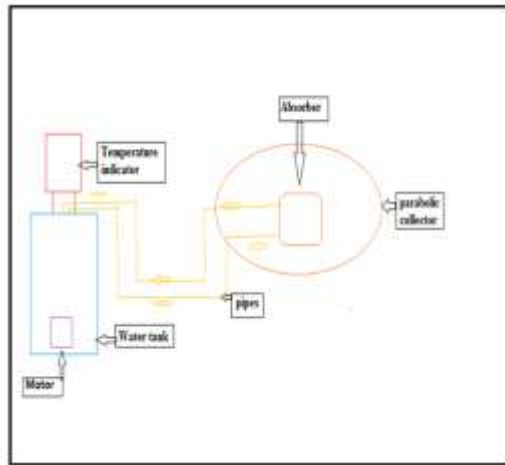
Experimental Set up

Experimental Set up

Experimental setup for Silver Foil

III RESULT TABLES, GRAPHS & DISCUSSION

SR. NO.	Time	Temperature							I (W/m^2)
		T1	T2	T3	T4	T5	T6	T7	
1	10:10	29	27.9	27.3	34.3	33.8	35	26	827
2	10:20	29.9	28.5	27.7	35	34	35.3	26	880
3	10:30	31.4	28.9	28.4	34.9	33.2	34.6	27	768
4	10:40	33.5	29.6	29.3	36.9	34.9	37.0	28	1021
5	10:50	32	29.5	29.7	36.6	34.3	37.5	28	996
6	11:00	33.6	28.9	29.9	34.3	33	36.3	28	809

Sample Calculation:

Output-

Heat Energy Gain by Water $= MC_p \Delta T \times 1000$

$= \quad 0.049 \times 4.187 \times (27.7\text{-}27.3) \times 1000$

$= \quad 82.06$ W

Input-

Average of Solar Intensity $= \quad (827+880)/2$

$= \quad 853.5 \quad$ W/m2

Input power= Average of Solar Intensity×Area of parabolic collector
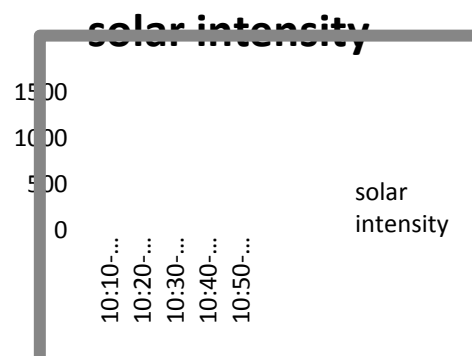
$= 853.5 \times 1.539$

$=1313.80$ W

$$\text{Efficiency} = \frac{\text{Heat Energy Gain by Water}}{\text{Input power}}$$

$$= \frac{82.06}{1313.80}$$

Ƞ $= \quad 6.25\%$.

Sample Graph:-

Solar Intensity Vs Time(10.00-11.00)

IV CONCLUSIONS

Constantly diminishing non renewable energy source.

Cost of electricity per unit will increase in the near future.

The demand for power is always on increase and it cannot come by thermal, wind, hydro power plants because they are not reliable.

Once solar energy is installed then upto 25 years you no need to worry about its maintenance and it constantly produces energy since.

It is a life time investment and the payback is within next some years max. so for the next some years you will produce your own power at low of cost.

So considering some factors there is an increase in awareness among indians both for domestic and industrialist purposes.

I am sure in the future we will produce maximum of energy through solar.

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