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Review of Alternative Equipment for Desalination of Seawater

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Abstract: ***As the world population is growing, the need for fresh water is increasing. So Desalination of seawater is the best options for fulfilling the water demand for drinking purpose Water desalination is a mean for producing fresh water from saline water abundant in seas and oceans. This paper gives a review of alternative equipment for desalination of seawater. In this paper we are trying to solve all the limitations of the alternative equipment for seawater desalination. It will provide potable water from seawater. The cost of potable water would be less as compared to reverse osmosis plant. This equipment mainly focuses on making proper use of solar radiation for desalination purpose.***
Keywords: Desalination, Evaporation method, Economical, More Efficient, Alternative method of desalination, Modification

I. INTRODUCTION

Many countries in the world suffer from a shortage of natural fresh water. Increasing amounts of fresh water will be required in the future as a result of the rise in population rates and enhanced living standards, together with the expansion of industrial and agricultural activities. Available fresh water resources from rivers and groundwater are presently limited and are being increasingly depleted at an alarming rate in many places. Desalination has become one of the world's most important unconventional water resources in recent years, and it is particularly relevant in places where water is scarce. Among the different existing desalination technologies, there are two main process groups; processes based on evaporation and processes based on membranes. This paper mainly focuses on the new equipment which is based on evaporation method of desalination.

II. NEW EQUIPMENT

A. *Review Stage*

1) After studying the various desalination technologies based on evaporation method, we came to know that there are mainly following setbacks/disadvantages of these processes or equipment:-
a) They are not as efficient as that as membrane desalination technologies.
b) They consume more energy as compared to Reverse Osmosis.
c) They have higher maintenance cost or running cost.
2) Also after studying the concept of the alternative equipment for desalination we came to know that there are some limitations of this equipment as well. Those being as follows:
a) The solar radiations are not available during rainy season as well as winter season.
b) Number of solar cell panel required for the small quantity of seawater desalination is also more.
c) The cost of the model increases if the solar cell panels are used since their initial cost is very high.
d) The equipment could not work at night time as well.
e) The solar panels might not provide electricity continuously to the coils or heater provided.

B. *Final Stage*

Based on these problems or setbacks we decided to overcome these problems with a new equipment design which will solve these problems.
This paper provides the design of the equipment which could be used as new equipment for desalination.
The basic design or frame is shown in fig 1. As shown there are 2 zones in the equipment.
1) Working Zone
2) Collecting Zone
In the working zone, the seawater is poured in the container and is kept in sunlight so that there is rise in the temperature of the water. Due to this the heating energy required from the heater reduces. Hence Efficiency and Economy is achieved.

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In collecting zone, the steam striking the top plate will get condensed and get converted to water droplets. These water droplets combine together and get collected in the collecting pipe provided.

a) Advantages

i) The equipment is made up of glass hence initial cost o construction is less as well as maintenance cost is also less.

ii) By placing the equipment directly over the Salt Evaporation Ponds we will also get Raw Salt as a bi-product.

iii) Since no heavy or moving part is used hence the maintenance is very easy and less.

In this way the model which we are working on will solve the problems occurring in the evaporation method for desalination as mentioned above.

C. Experimental Setup

The design of the model is as shown in fig 2.1. The figure shows all the components of the model as mentioned above.

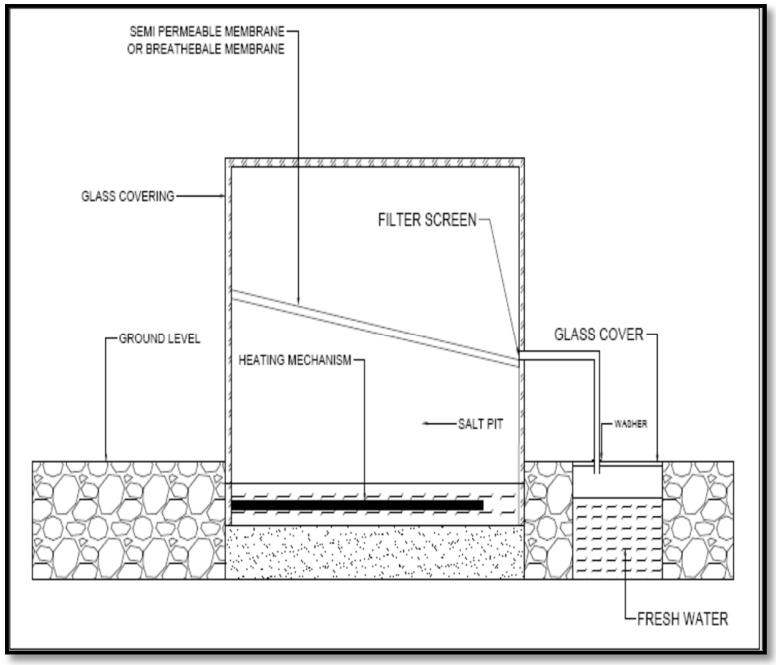


Fig:-Theoretical experimental setup of our equipment

III.RESULTS AND DISCUSSION

Following were the results that came after the use of Desalination equipment;

A. 180ml per half hour
B. 185ml per half hour
C. 182ml per half hour

From these results it can be concluded that the overall average water desalinating capacity of our equipment is around half litre per hour.

Hence we could say that our equipment could produce good (best) quality of water at a good rate. Even with some more research in this model we could increase the overall efficiency of our model.

But unfortunately after three results, the crack was developed at bottom side of the equipment. The material used was glass. The thickness of glass used was 4mm. Hence we think that the cause of crack was:

1) Less thickness of glass.
2) Sudden increase and decrease in the temperature.
3) Due to exceeding the permissible thermal stresses of the glass.

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IV. CONCLUSION

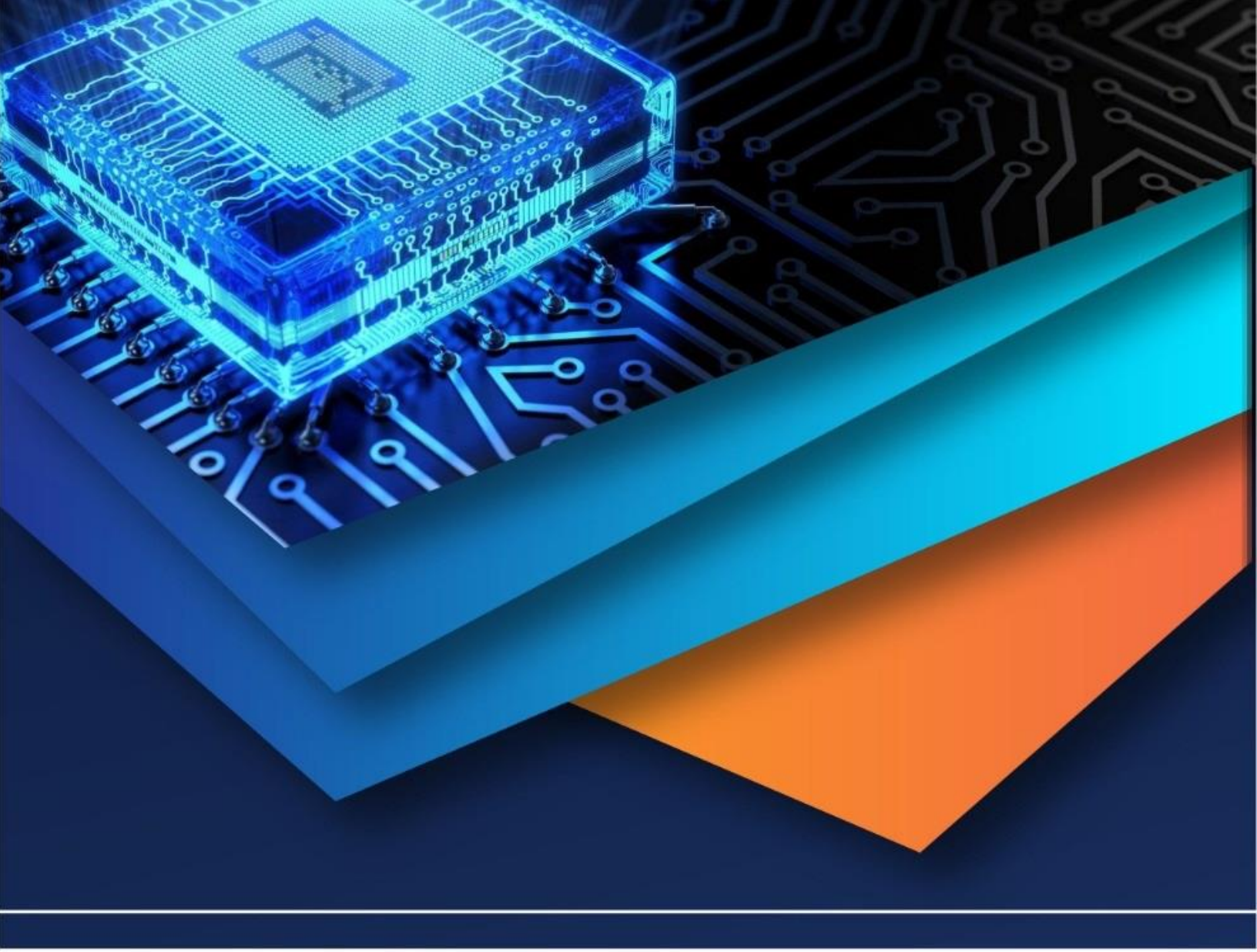
After studying the various aspects of desalination of seawater, its uses, application, necessity, etc various points can be concluded

A. Now we can see Oceans and Sea as a new source of potable water due to knowledge of Desalination of seawater.
B. Out of all the desalination technologies the efficiency of producing potable water on a large scale is highest in Reverse Osmosis (RO) method.
C. The costliest method is Reverse Osmosis since external energy is given to the method.
D. Also the method discussed in the seminar above could be a new method to produce potable water at a very low cost.
E. After studying all the major desalination technologies like RO, MSF, Multi effect Distillation etc it can be concluded that the future fresh water resource will be Oceans and seas if all the present fresh water sources get vanished.

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