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Heating of Tourist Hotel in the City of Palmyra by Using the Technique of Solar Ponds

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Contents:

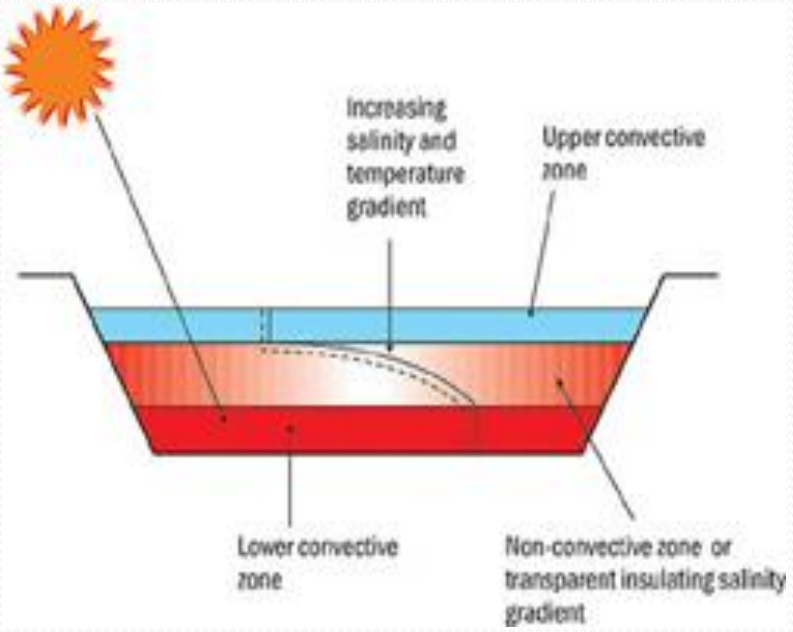
1-Motivation

1- Find cheap and simple way to convert solar energy into heat energy

2- Optimum utilization of solar energy in the region of Palmyra

2-Principle of working of solar ponds

In an ordinary pond, the sun's rays heat the water and the heated water from within the pond rises and reaches the top but loses the heat into the atmosphere. The net result is that the pond water remains at the atmospheric temperature. The solar pond restricts this tendency by dissolving salt in the bottom layer of the pond making it too heavy to rise.



3- Thermal and analysis study for the solar pond

-calculating area of the solar pond

-thermal budget of the solar pond

-calculating the area of the solar pond

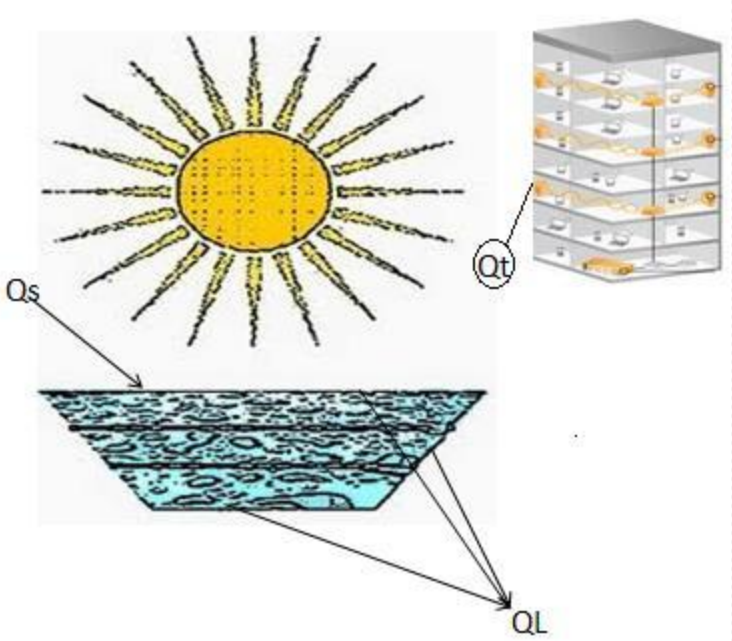
Information required to estimate the size of the pond:

1-The annual average temperature of the pond
2-Average annual temperature for Palmyra
3-Annual solar radiation
4-Annual heat rate
5-Latitudes of the region

-thermal budget of solar pond

Qt=Qs-QL

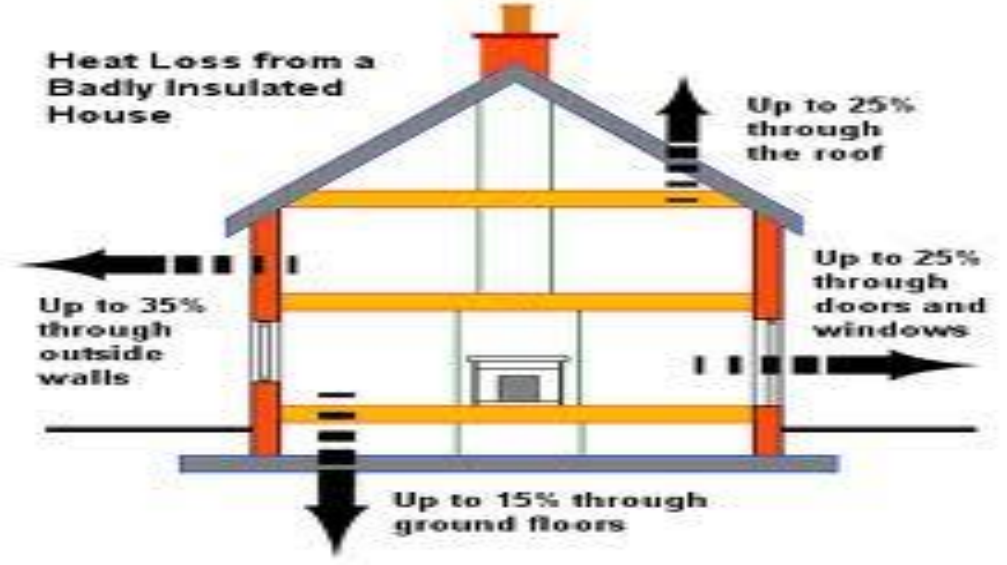
Qt: Heat load required to heat the hotel
Qs: The amount of heat accumulated in the storage area
QL: Total heat loss in the storage area



Qt: Heat load required to heat the hotel

-Calculate the amount of thermal losses from all surfaces and from the floor

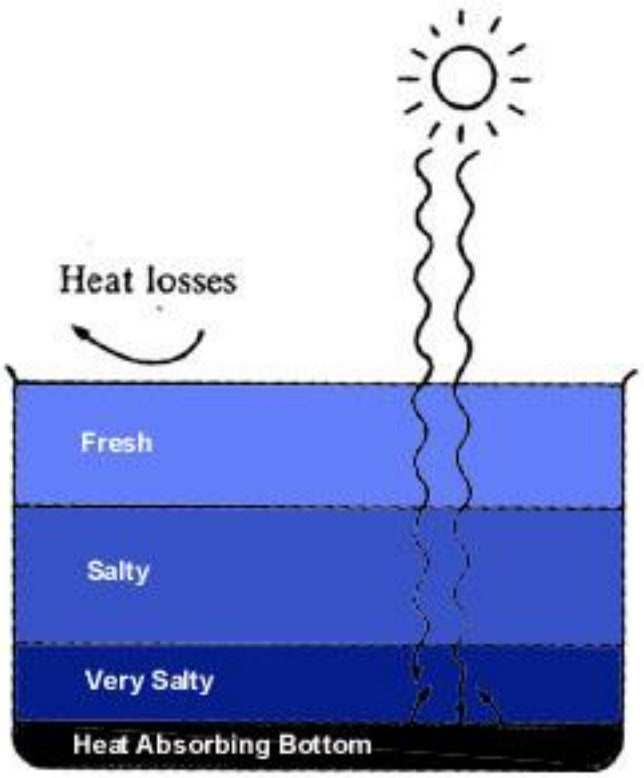
- Calculate the thermal losses due to leakage



Qs: The amount of heat accumulated in the storage area

Qs= Ip.A

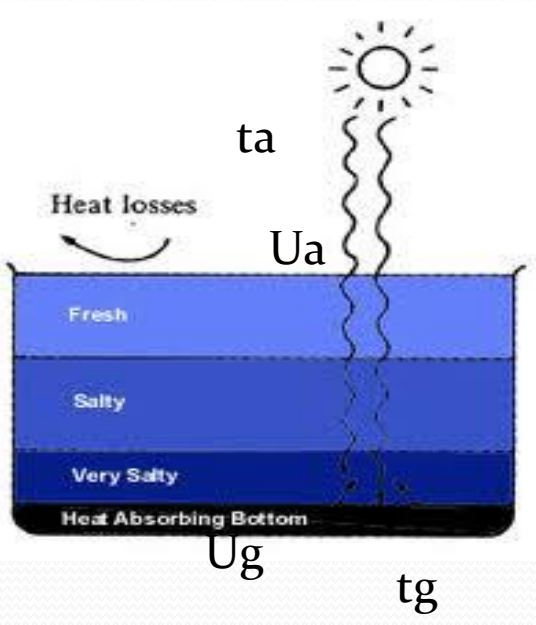
Ip= Solar radiation striking the pool
A= The surface area of the pond



QL: Total heat loss in the storage area

QL=Ua(ts-ta)+Ug(ts-tg)

Ua: Coefficient of heat loss between the surface of the pond and the surrounding
Ug: Coefficient of heat loss between the pond and the ground
ta: Temperature of the surrounding
tg: Temperature of the ground
ts: The temperature of the spot containing the pond



5-Summary

-Technique of solar pond is a simple and cheap way to convert solar energy into heat energy and to store this energy

-The cost of one unit of surfaces of the solar pond is much lower than any system using solar collectors flat

-we do not need to have equipment of store heat because of the possibility of retaining the long-term heat

6-Outlook

-Calculate the ideal amount of salts in the pond

-design the appropriate heat exchanger

Thank you for attention