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# Passive Cooling of Building by Convection Method in Summer

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**Abstract:- Since beginning of mankind human beings are searching for removal of heat from building. Keeping building cool in hot climates has always been a human concern. From long back people ingeniously applied a design feature to their shelters to avoid or reject unwanted heat.**

**A building approach must be in a such a way that it controls heating. External heat gain can be avoided with architectural form i.e. by light color painting, vegetation, high-performance glazing etc. Internal heat gains can be reduced by using more efficient building equipment Such as lights, computers, printers, copiers, electronic equipments etc. The present paper representing how a passive cooling system by convection method can be utilized for natural cooling. By this method $3^0$c to $5^0$c temperature of room can be reduced.**

***Keywords:-*** *Passive Cooling System.*

## I. INTRODUCTION

Due to increase in the population and increase in standard of living of human beings consumption of electricity is increasing day by day. Peoples of all categories are not able to afford the air conditioning system and coolers etc.

In this paper attempt has been made to reduce the building temperature during summer season up to $3^0$C to $5^0$C using a simple passive system. It is less costly and affordable to all categories.

In this system water is circulated in the pipes which are laying on the floor which extract heat from the floor due to difference in temperature.

The hot water is then cooled in the stationary radiator. After cooling once again it is re circulated. By repeating this procedure for several times a cooling effect can be experienced in a room.

## II. EXPERIMENTATION

A top floor of size 10’ x 15’ is chosen for experimental purpose. A pipe of ½’’diameter made up of aluminium material is laid on the floor at equal interval throughout floor. In order to increase the heat transfer rate a aluminum clamps are used which also act as a source of heat transfer. Always heat transfers from higher level to lower level. In the present case the water is at lower temperature and floor is at higher temperature.

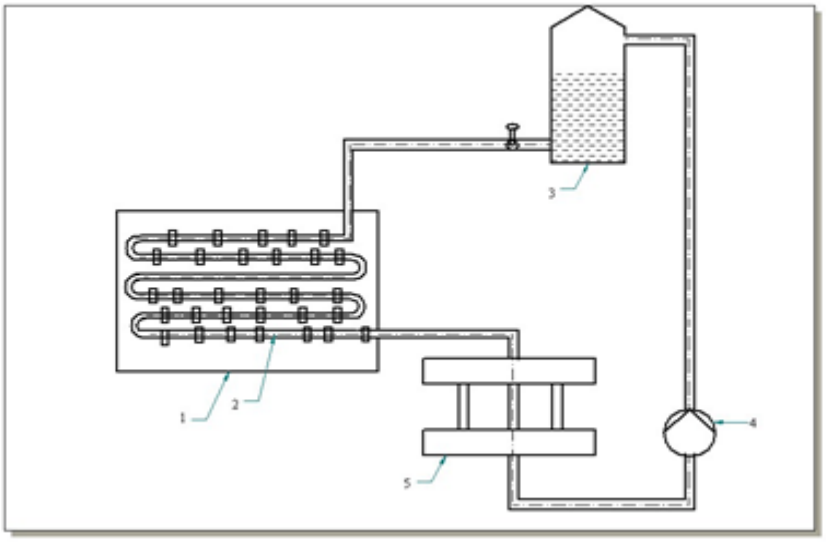


Fig 1:- Experimental Test Rig

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| S. No. | Name of the part |
|---|---|
| 01 | Floor |
| 02 | Aluminium pipes with clamps |
| 03 | Water tank |
| 04 | Pump |
| 05 | Radiator |

Table 1

A water is made to pass through these pipeline with different discharge rate through the over head tank. Water after being circulated in the serpentine pipeline is being cooled in the radiator. A radiator is a device which cools water. It consists of two tank i.e. upper and lower tank. Both the tanks are connected by many numbers of small tubes. The water after entering into the upper tank is made to pass into lower tank. In doing so the water looses the heat to the surrounding. Cooled water collected in the tank is recirculated by a pump to overhead tank.

By repeating this procedure for several times a cooling effect can be in experienced in the room. The same method may be repeated by varying the discharge rate. Further room can be cooled by using a special type of window glasses which permits only light but not heat.

## III. RESULT AND DISCUSSION

After conducting the experimentation following readings are obtained which are tabulated below. Based upon the readings the graph is plotted which indicates the variation of room temperature with change in discharge.

| Sl No. | Discharge Lt/min | Room temperature before cooling in $^{O}$C | Room temperature after cooling in $^{O}$C |
|---|---|---|---|
| 1 | 20Ltr | 34 | 32 |
| 2 | 30Ltr | 34 | 30 |
| 3 | 40Ltr | 34 | 29 |

Table 2

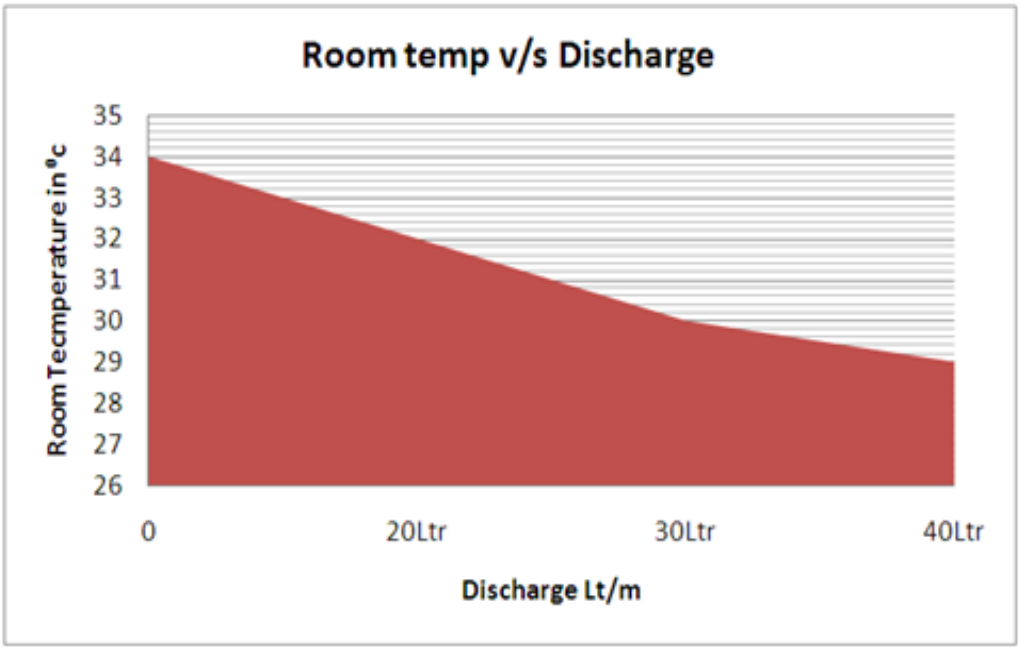


Fig 2

## IV. CONCLUSION

After the experimentation, it is concluded that by increasing the discharge rate through the pipe line, decrease in temperature is experienced. Furthermore cooling effects can be experienced by laying the pipe line very closely and discharging more water. This is the economical and eco friendly method.

## REFERENCES

[1]. 'A Review on performance analysis of passive cooling and ventilation system' Mahendra Kumar Verma **"**Vikas Bansal, "Rajasthan Technical University (RTU), Kota, Rajasthan April-2016.
[2]. 'A Review on performance Analysis of Passive cooling and ventilation system' Mahendrakumar Verma **"**Vikas Bansal, ISSN 2349-4476" April 2016, Vol -4 "Rajasthan Technical University (RTU), Kota, Rajasthan .India.
[3]. 'Review on passive cooling practices in residential building' Ramesh kumar, Vijaykumar, IJIMSE, Vol - 1, March 2014.
[4]. **'**Impact of shape of container on natural convection and melting inside enclosures used for passive cooling of electronics devices' Kamal El Omari Tiarik kousksou, Yves Le Guer, "Applied thermal engineering, vol-31 (14-15) 3022-3035,2011