

A Review of Nonconventional Techniques Used in a Room for Cooling Assessment

Mr.Udit Kumar Devra

Assistant Professor, Faculty of Engineering & Technology, Department of Mechanical Engineering, Rama University, Kanpur, U.P. India, 209217

Abstract- a review is conducted so as to look at the result of cooling techniques, on cathartic heat from area to atmosphere and saving energy. a space of inclined roof is employed because the take a look at platform for analysis of 2 sorts of cooling techniques: “inserting cold tobacco pipe within the wall”, “Spraying the cold water on roof of room”[1] And “Using an fan for moving the air within the room”. it's confirmed that combined result of those 3 cooling techniques incorporates a decrement in surface and close temperature within the space. Through the numerical simulations, it's confirmed that the introduction of those cooling technologies saves energy consumption for cooling up to seventieth. The analysis is completed for maintaining the temperature of area below the atmosphere temperature solely in summer season. Newton's law of cooling and Fourier's law of conductivity is employed for locating out the warmth transfer from the space to encompassing temperature. The heat transfer method relies on forced convection and conductivity modes.

Keywords: Heat transfer, R Roof spray, pipe under the wall, exhaust fan.

I. INTRODUCTION

Energy is vital input for driving the life cycle. each method that takes place within the world is that the expression of flow of energy. The consumption of energy is directly proportional to the progress of the group. With growing population, improvement within the living normal of humanity, industrial enterprise of developing countries, the world demand for energy is increasing endlessly .The increasing gap between the world demand and provide of energy is changing into a serious threat likewise as a challenge for the engineering community to satisfy the wants of the energy hungry society. several forums and energy management teams are shaped to stress the saving of energy in each industrial and domestic sectors, in any doable kind. during this approach exploitation nonconventional method for cooling could save an honest quantity of electricity. In Republic of India energy saving teams square measure rock oil Conservation analysis Association (PCRA) and Bureau of Energy potency. These teams square measure engaged in promoting energy potency and conservation in each walk of life.

II. LITERATURE REVIEW

Evaporative cooling techniques exploitation spraying mist water has been the recent focus of attention as a technique of mitigating the thermal surroundings throughout the summer in Japan.Daisuke Narumi [1],

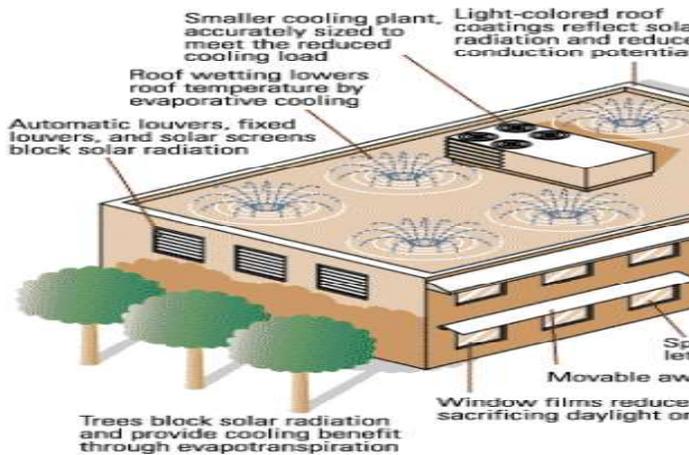
KentaroShigematsu[1] and Yoshiyuki Shimod[1] in 2004 conducted the verification tests on a mist cooling technique that used water droplets micronized beneath high-pressure. Takeda [6] in 2006 conducted the verification tests on a system exploitation picture catalyst technology to chill walls by forming a water film on their surfaces. Japan's Ministry of surroundings (Ministry of the surroundings 2006) additionally conducted the verification tests on a mist cooling technique supposed to boost air-con potency by spraying water droplets to an out of doors unit of room air conditioner. This analysis targeted on these technologies Associate in Nursing conducted verification tests and numerical simulations to analyze reducing urban heat flux and saving energy in an dwelling equipped with the complete array of mist spraying techniques. The analysis associated with water spraying has been done by Daisuke Narumi, KentaroShigematsu and Yoshiyuki Shimoda, Osaka University Suita town, Osaka Pref., Japan [1].

III. TECHNIQUES USED INCOOLING

In the analysis 3 techniques are used, that square measure following. 1- Inserting cold kalia within the wall. 2- Spraying cold water on roof of the space. 3- Exploitation fan for moving air within space. Separate and combined impact of every technique is analyzed and optimized to amass the cooling in space.

- 1. COLD Water Pipes Within The Wall** -Steel pipes in square shape are inserted vertically into the wall whereas construction of area. Length and diameter of pipes can rely on the peak and thickness of wall. Spacing between 2 consecutive pipes ought to be 0.5 m. Lower head of all the pipes is connected to a standard horizontal pipe and higher head is additionally connected to a standard horizontal pipe. Pipes square measure inserted into wall with a coating of corrosive resistive material in order that there could no probability of corrosion.
- 2. Spraying Cold Water On Roof** Whole roof of the space is sprayed by the cold water with the assistance of nozzles. Nozzles square measure mounted on higher horizontal pipe. Roof is sprayed in uniform manner in order that the impact ought to be same altogether space of area. Diameter of nozzle opening And no of nozzles can rely on space of roof. Roof dispenser be done by following 2 ways that..

(I)Roof spray on flat roof-



(II) Roof spray on inclined roof-



3. Using Exhaust Fan For Moving Air Inside Room.

Exhaust fan is principally used for purification of air in suffocated areas like industries. However during this analysis a cooling impact is obtained by victimization associate degree fan in a very area. fan is employed for moving the air within the area. It works on the density principle. According to that hot air can stand up as a result of it's lighter and cold air is serious therefore it'll be at lower components within the area. fan is employed with correct crossed ventilation, so natural air are available contact with temperature and it'll provide the correct cooling and contemporary atmosphere and hot air is blown out. Crossed ventilation is needed for victimization fan for cooling the space. Hot air is drawn outside and contemporary air is drawn within the space. Installation of fan once intake shutters ar properly opened, associate degree fan is put in at the higher space of area. Here it blows out the new air outside the room. And contemporary air enters the space through the intake shutters. Therefore contemporary and funky air is maintained within the space.

IV. METHODOLOGY

After arranging all equipments in proper places, water pump is started, it starts pumping the cold water into the steel pipe. Steel is thermal conductor material, having thermal conductivity 42w/mk, so pipes become cool by losing heat to water by forced convection process. If T_p is the temperature of pipe and T_w be the temperature of water then Total heat transfer to the water is $Q=h A (T_p - T_w)$ When temperature of pipe decreases, pipes being on contact with wall, decreases the temperature of wall. Heat transfer from wall to pipe takes place by conduction process. If temperature of wall and pipe is T_1 and T_p respectively then according to Fourier law of conduction total heat loss is $Q = -KA (dT/dX)$ Air inside the room comes in contact with the wall and because wall is colder than room air so heat transfer takes place. Heat transfer takes place by Newton's law of cooling (by convection). $Q=h A (T_a - T_1)$ Hence air inside the room started to cool. And temperature inside the room started to decrease. After that this water goes to roof where with the help of nozzles it is sprayed over the roof of room. Roof being colder also cools the air inside the room and at end exhaust fan is started which blows out hot air outside the room and temperature of room is decreased.

V. OUTCOME

Combined result of 3 techniques, cools the temperature of area. During this operating structure we've got used a pump having power rating of five hundred watt and a fan having power rating of 250 watt. These ar low power overwhelming devices and by victimization these temperature becomes cool. Therefore by victimization these 3 techniques simultaneously around seventieth power consumption is saved for cooling. From this it can be aforementioned that electricity bill is reduced up to one third of its original worth.

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