

A SOLAR VENTILATION SYSTEM FOR PARKED CAR-A REVIEW

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Abstract: This paper present the study the review of the existing solar car ventilation system by observing its effectiveness in reducing the temperature inside the car which is parked unroofed under the sun. The commercially available ventilator is only working as the exhaust fan and it was not cool down the temperature inside the car as we required. So This paper gives the idea about the how much existing ventilation work and reduce the temprature.

I. INTRODUCTION

In India most of the people drive car. While using their vehicles, sometimes the car has to be parked directly under the sun due to limited roofed parking area. So that because of the unroofed parking conditions the temperature inside the can is increased very much. Rise in temperature levels inside the car can be attributed to convection (volume of air inside), conduction (various metals and heat absorbing materials inside) and radiation (from the glass and body of the car), of which the most influencing factor in such heating is radiation [4, 5]. Because of the temperature increases inside the car it causes discomforted of passenger inside the car and also reduces the quality of plastic, rubber, seat cover, etc which is used in interior of the car [2]. Sometimes due to high temperature inside the car the glass of the car also brakes and also causes human health problem. As to reduce the heat inside the car, some drivers open a small gap of the car windows to provide some ventilation. However, study from [2] shows that the practice had minimal effect and it does not really improve the situation. That practice will also lead to safety and security issue due to theft and robbery [3,2]. Thus, there is a need to have a proper ventilation system inside a parked car. There are several tools that have been developed to assist the ventilation problem inside a parked car either via battery powered system or solar based system [3]. The use of solar based ventilation system sounds promising to be employed in India due to our present weather and sun radiation condition. In spite of the commercially available solar [5,6]. In this paper shows the analysis of the existing solar ventilation with different conditions and then compared with the developed car ventilation system. The setup for data collection for the purpose of analysis and observation will be also highlighted. Later the result and analysis from the finding are discussed. Finally the paper ends with conclusion supporting with recommendation for further research development [4].

Study of excessive cabin heats of the car parked in oman

Sudhir Chitrapady et al in october 2o13[3]. This paper demonstrates a heat measurements carried out inside a sedan car which was placed under the daylight to study the heat pattern inside a placed car. "Further investigation was carried

out to minimize the heat rise inside a placed car by developing & installing simple air circulation systems with a set of fans to purge cloth is submerged in water. When we switch on the battery the cooling fan is start rotating with the speed of 1500 rpm & also motor at 30 rpm. When motor is started to rotate the shaft is connected with the motor is also rotate & with the help of shaft rotation cloth is also start rotation at the speed of 12 rpm. The second shaft is submerged in water & upper & lower shaft is connected with cloth. So when upper shaft is rotate, the lower shaft also start to rotate with the same speed. By rotating lower shaft cloth also start to rotate. In this rotation some part of the cloth is submerged in water & it become wet after some time. So that air comes from the fan pass through the wet cloth & heat of the air will decreases.



Fig.1. Existing solar ventilation system.

The figure 2 and 3 shows the Result of their research work.

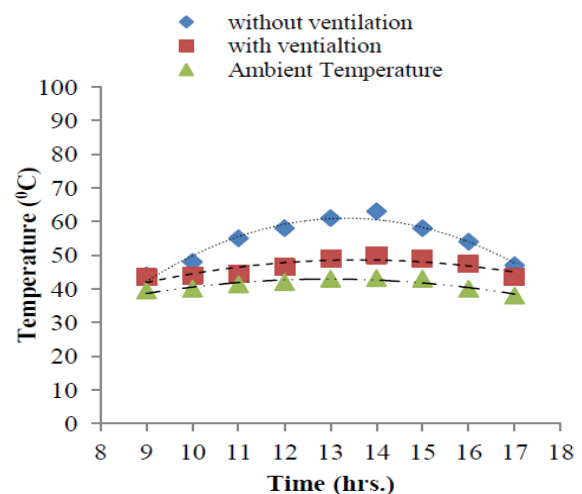


Figure 2 temperature measured at back side of the car.

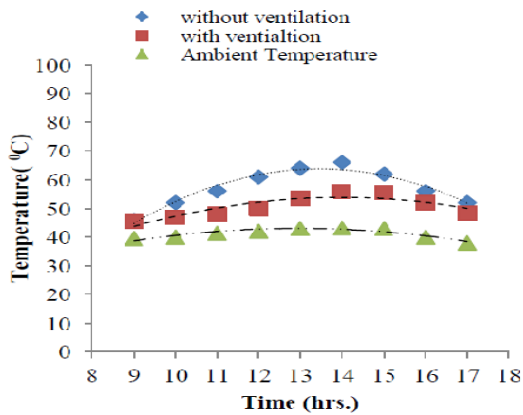


Figure 3 temperature measured at front side of the car.

II. PERFORMANCE OF AN IMPROVED SOLAR CAR VENTILATOR

R. Saidur, H. H. Masjuki et al in (2009), heat transfer & energy balance inside the car were investigated. Moreover power utilization of the motor, power produced from the solar panel, “the radiation effect & battery charging time were investigated. The present study shows that the motor in the existing ventilator should be changed with high speed motor. It is noted that more electricity is needed for high speed motor for improving ventilator”. In this paper, a commercially usable ventilator has been modified to improve its working. The modification has increased air flow rate from 20 cfm to 110.5 cfm. The improved ventilator provided at least 11% better result of reducing the heat inside a car compared to the existing one. [1]

The existing solar car ventilator:- It is shown in Diagram 4 is run with solar power. It can also be driven by energy supplied through the vehicle's battery. “The ventilator can keep functioning when the vehicle is placed under the daylight even if the vehicle engine is turned off since the ventilator is driven by the solar power. When daylight gets weak, the ventilator can be secondary driven by energy supplied from the vehicle's battery”. The battery can be charged using the sunlight..

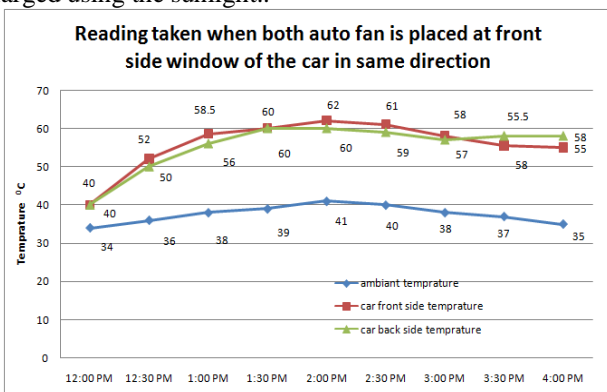


Fig.4. temperature inside the car cabin when both fan placed at same direction.

Alternative way in reducing car cabin heat using portable car cooling system.

This paper was researched by M.F. Basar et al in August

2013. In this paper, the design & development of movable car cooling system is described briefly. Electrical Motor, rechargeable battery, Peltier cell, rotating cloth; these are the components that have been combined in order to complete a simple cooling system. Based on the experimental activities' result, it is proven that the conducted research has a positive impact where it has successfully maintain the heat inside the car at room heat. For comparison, the heat inside the car can achieve up to 70°C without the proposed system. Furthermore, the simple proposed system provides comfort to users due to its capability in improving the quality of air & moisture in the car's cabin the figure 5 shows the block diagram of the improved ventilation system

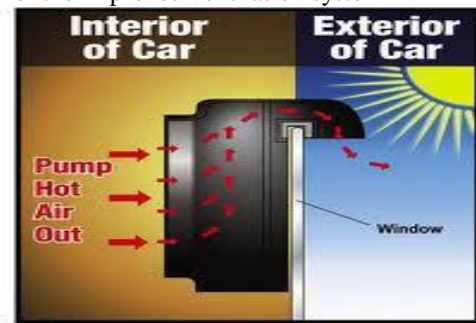


Fig.5. New ventilation system

The car air circulation fan as shown in figure 5 is using solar system & it can easily find in the market. This product was created for the purpose to keep car cool whenever it is overheated by the daylight or hot surrounding, but there are differences between this product & movable car cooling system proposed in this paper in terms of the product functions, structure of the product, system required, durability & many more”. The car ventilator fan shown in Diagram 5 required a solar panel & battery as a source of energy to run the air circulation fan, while movable car cooling system as shown in Diagram 2.12, applying Peltier cell as its source of energy. Besides that, the drawback of the car ventilator is only can be placed if the window's glass is slightly opened & this action can actually cause the things that are not desired to happen such as car theft.

working:- For the mechanism of this system, the hot air will be sucked into the movable cooling system due to low air pressure in the system. This is required by the high velocity of the propeller blades' rotation. Then, the hot air will hit the Peltier cell before the hot air is absorbed by the rolling cloth that has been wet & cold. Thus, the hot air is eliminated & the air with vapours of cold water is discharged into the car cabin.

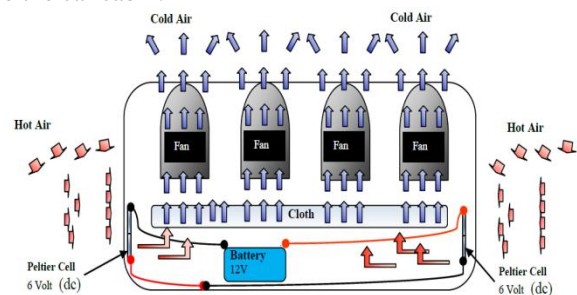


Diagram 6 working of portable car cooling system

With the help of this system we can reduce more temperature which is shown below in diagram no 7

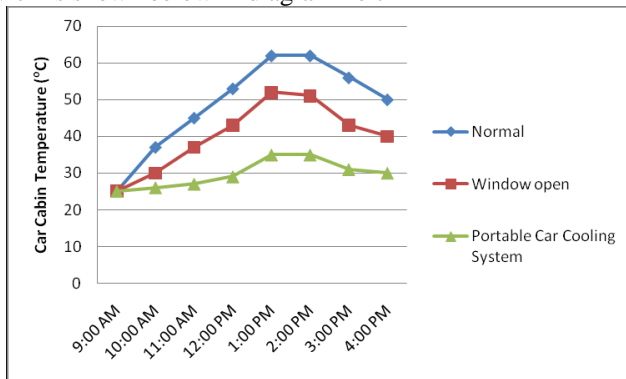


Diagram 7 temperature chart with the help of new ventilation system.

III. CONCLUSION

The new car ventilation system treatment has achieved an overall good performance in reducing the average maximum temperature at all interior locations of the test vehicle, with higher percentage of reduction at front and rear ambient locations. The new ventilation system reduced temperature inside the car cabin up to 9 °C at front of the car. The usage of wet cloth rotating mechanism is found to reduce the average maximum temperature for the ambient air inside the car. It is best for temperature reduction and very economical.

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