

Thermal Comfort Dress/Tent against Cold Climate

Mr.D.V. Praveen Kumar Reddy M.Tech. (A.M.S), Shaik
Iliyas Basha

Lecturer in Dept. Of Mechanical Engineering
B.Tech. Mechanical Engineering

Sri Krishnadevaraya University College Of Engineering And Technology Ananthapur-515003.

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ABSTRACT:

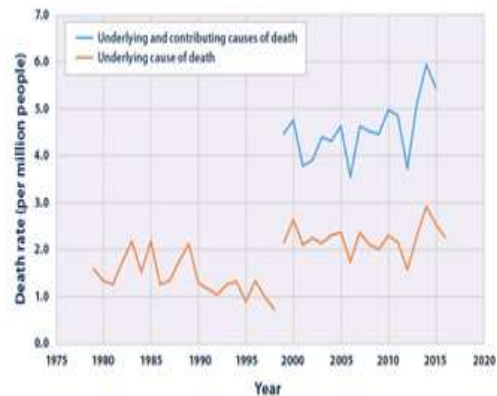
More than half of the population in the world living in cold climate and facing lot of health issues. Among them only 30 % have thermal comfort houses due to heavy cost of installation and maintenance. The persons those who didn't have thermal comfort houses and those who are working in open environment such as soldiers, police, drivers, guard etc. are more prone to such problems. With the aim to provide a better thermally comfort life to the poor houses and persons working in open environment, we designed a cold proof dress/tent with an additional heat layer at an affordable cost to Everyone.

KEYWORDS:

Cold climate –Hypothermia–Additional heat- Thermoregulation –Thermal comfort .

I. INTRODUCTION

People in cold climate regions such as USA, Argentina, Chili, almost all European Countries, china, magnolia, Himalayan region, Russia...etc. Are facing health issues due to extreme cold temperature in the atmosphere such as hypothermia, high risk of heart attacks ,respiratory problems ,clumsiness, tiredness ,memory loss, ...etc.& even death.In order to protect themselves from extreme cold climate, they are using heat pumps for their houses and insulated jackets for individuals working outside the house. Mainly for border security forces those who are working at high altitude and high latitude .For example soldiers working in siachen glacier where temperature falls upto minus 50 degree celcius or even more.first they need to fight with cold environment before they are fighting with enemy.



As per the statistics every year nearly 4.6 million deaths on an average occurred annually due to extreme cold weather .

II. EXPLANATION : PROBLEMS IN PRESENTLY EXISTING TECHNOLOGY

□ Insulated jackets :

Individual insulated jackets are only material of insulation, it just reduce the heat transfer from human body to surroundings but they didn't provide any additional heat . As we know that the temperature difference is the driver of heat Transfer, due to extreme low temperature in surroundings heat dissipated to surroundings is More than heat generation in the body. Hence it failed to provide constant temperature in the body ,which leads to various health issues that reduces the capability and efficiency of the individual .

□ Heat pumps:

For houses to maintain warm condition , we are

using heat pumps but installation of heat pump machinery is costly, in addition to this insulation for inner portion of house also required and high power consumption.

- To overcome these problems, we modified and redesigned a new cold proof dress/Tent with an additional heat layer.

MODIFICATIONS IN PRESENTLY EXISTING TECHNOLOGY

□ Addition of heat layer :

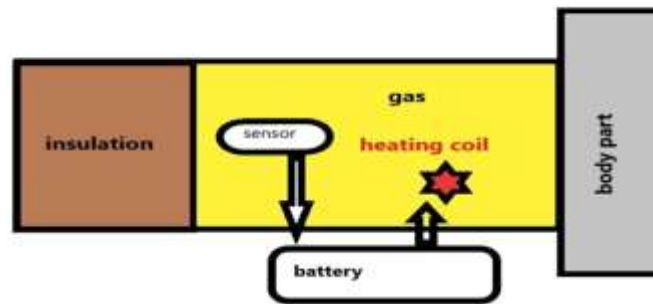


Figure .1

Heat layer consist of four components,theyare

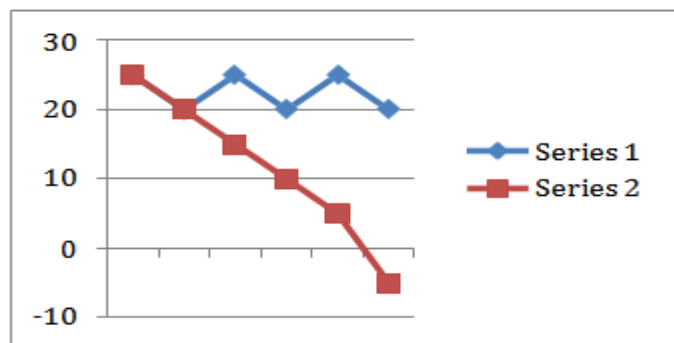
1. Temperature sensor
2. Battery
3. Heating coil
4. Air /inert gas

WORKING OF HEAT LAYER :

Heat layer is arranged at the inner side of the insulated material in direct contact with human body as shown in figure.

According to second law of thermodynamics, heat transfer takes place from high temperature body to low temperature body i.e. from human body to surroundings. When heat loss from body and heat layer temperature decreases in the gas present in heat layer, which is continuously detected by temperature sensor. When temperature reaches set point , (for example 24 degree centigrade) it will send signals to battery that inturn

connected with heating coil ,heating coil generates the heat in the gas present in heating layer. Heat layer maintains constant temperature throughout the day and night , whenever temperature decreases in the heat layer it will regains heat through coil. This warm heat layer is directly in contact with body that **maintains temperature of body with in Healthy and comfortable range** as shown in graph.



SERIES 1– INSULATED JACKET WITH ADDITIONAL HEAT LAYER .

SERIES 2 -INSULATED JACKET WITHOUT ADDITIONAL HEAT LAYER .

Not only for individual insulated jackets but this heat layer can be used for **creating a mini thermal comfort house within the house and outside the house such as base camps for security forces , rescue camps ,tourism and so on .**

For example We can use this method for creating mini sleeping house,while sleeping.By this volume of room need to be heated reduced to

confined place only and power consumption also reduces.As it is portable and compactness one product can be utilized at multiple places .

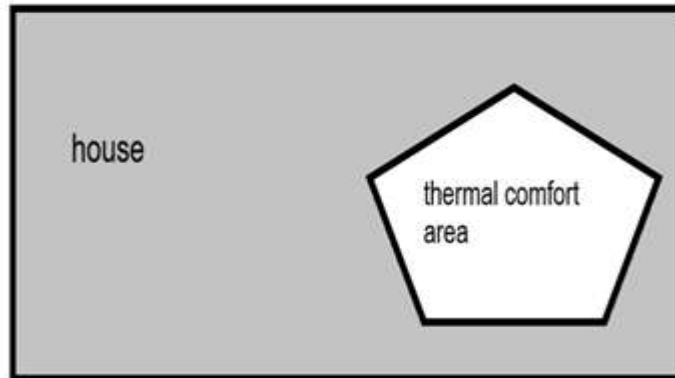


Figure.2

Volume of the room reduced by 90 %. There by reduction in power consumption up to 80% – 90 %.

ADVANTAGES:

1. No initial investment for machinery and Insulation of walls
2. Low power consumption
3. Portable
4. Affordable to everyone
5. Achieves thermal comfort to every outside the house for individuals
6. Achieves IEA goals i.e low power consuming technology
7. Achieves WHO goals i.e. thermal comfort to every one
8. Specially good for persons working in open environment
9. Reduces Max.health problems

III. CONCLUSION :

The main objective of thermal comfort dress/tent is to reduce the number of hypothermia deaths and other health issues that arises due to extreme cold climate conditions and there by improve the health condition ,efficiency and capability of the individual

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