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Design, analysis and fabrication of motorcycle helmet to enchange the rate of heat transfer using pin fins to make the helmet as human comfort

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ABSTRACT

To enchange the heat transfer rate from helmet to surrounding using pin fin as the air cooling system. In this paper we mainly in the top portion of the helmet. Here we arrange the pin fins to transfer the heat from inside to surroundings for convert the helmet as the human comfort. So we consider this as system. The air flow into the system with low temperature and leaves with the high temperature by absorbing the heat from the pin fins which are directly contact with top portion of the helmet. The design of pin fin helmet was simulated using the finite element software ANSYS as well as experimentally tested for the cooling purpose. Experiments are conducted on the prototype to analyze the performance of the cooling system.

Keywords: ANSYS, Enchange the heat transfer, Pin fin.

INTRODUCTION

The concern over the safety of vehicle drivers has pushed for invention of new equipment that can save lives. The continuous development of the automotive industries has revolutionized new invention, not only for the safety, but also comfort has been put into the picture. Nowadays, everything is made by evaluating the comfort of the user. Motorcyclists are among the major road users. The primary safety feature used by the latters is a hard shell helmet made of hard material with a thick foam material inside it. The equipment has been made compulsory to be worn; the user must endure the uncomforting causes by the device. Indeed, the liner has high heat insulation properties which results in low heat transfer between the head and the outside air this creates an uncomfortable and dangerous environment to the head, especially for long distance travel in hot conditions [1].

OBJECTIVES

To reduce the heat inside of helmet. To enchange the rate of heat transfer by using pin fins. Reduce the sweating. The air flow of helmet will increased at top portion of the helmet.

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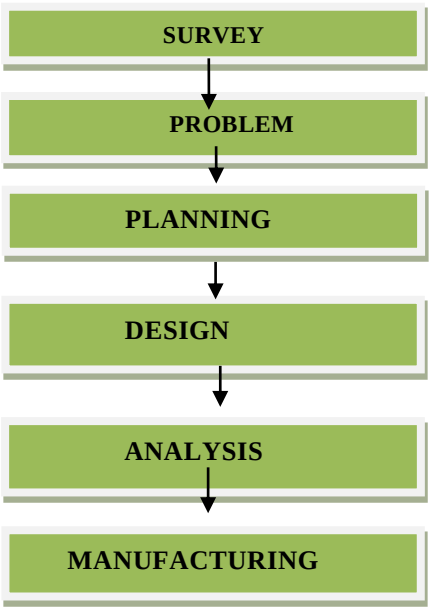
METHODOLOGY



Survey

In above mentioned methodology first step describes a survey which was taken from several cities with our project members then public has given some suggestion related to our project. As per the suggestion of public survey some cons was fined with the help of this cons our project moves to next step. Then project survey format was mentioned below [2-5].

Table. 1 Survey Format

NANDHA ENGINEERING COLLEGE, ERODE – 638 052
Autonomous
DEPARTMENT OF MECHANICAL ENGINEERING

Design, Analysis and Fabrication of Human Comfort Motorcycle Helmet with Pin Fins, to Enhance the Heat Transfer Rate from Helmet to Atmosphere

Bike Helmet Opinion Survey

Date

Name :	
Address :	
Contact No. (Optional)	
Age :	□ 18 to 29 □ 30 to 40 □ 41 to 50 □ 50 and above
Gender :	□ Male / □ Female / □ Transgender
Do You wear Helmet :	□ Yes / □ No
No. of Years wearing Helmet	□ 0 to 5 □ 6 to 10 □ 10 to 15 □ 16 and above
Do you have any health problem, while wearing Helmet	□ Yes / □ No
Please Answer the following Questions related to health problem, while wearing Helmet	
Do you have Neck pain	□ Yes / □ No
Do you have Hair loss	□ Yes / □ No
Do you have Head ache	□ Yes / □ No
Do you have Spinal injury	□ Yes / □ No
Do you have Vision problem	□ Yes / □ No
Any other suggestions, 1. 2. 3.	

LITERATURE SURVEY

- Anjana . B. S, Litto.Thomas, This paper deals with the Everyday many people are killed and injured on our roads. Despite national traffic legislation and known safety benefits of traffic laws, awareness remains low in Pakistan. Road traffic injuries are a growing public health issue, disproportionately affecting vulnerable groups of road users. Motorcycle crash victims form a high proportion of those killed or injured in road traffic crashes. Injuries to the head, following motorcycle crashes, are a common cause of severe morbidity and mortality according to the survey conducted. Major causes of non-wearing of safety helmet that are found by this research are low education level of riders, unawareness and severe weather effect in summer season.
- Amitavadas, Priti das et al, In present time many cases of bike accident can be seen around us. Peoples get injured or might be dead and one of the reasons is not wearing helmet. Many people could save their life in accident cases if they wearied helmet at the time of accident. Continuously road rules are violated. So as to overcome these problems, a Smart helmet is proposed having a control system built inside a helmet. Smart Helmet for Motorcyclist is a project undertaken to increase the rate of road safety among motorcyclists. Security system applied in this project meet the characteristics of a perfect rider and the application should be highlighted. The project is expected to improve safety and reduce accidents, especially fatal to the motorcyclist.
- Kalianshingane, Lochana Yelekar The prime objective of this paper is to force the rider to wear the helmet throughout. Considering the increasing number of motor cycle riders in our country and the number of accidents happening each year, it is evident that in most cases the

rider suffers injuries to the head and it leads to fatal causalities. This has thrown light on the importance of forcing the rider to wear helmet to reduce the extent of impact In this paper, we propose building a system that can be implemented by installing it on a bike which works with the helmet that is being worn to make the rider to wear the helmet before riding the bike.

- Merin Mathews, Simna Surendra This paper presents the smart helmet that ensures that the rider cannot start the bike without wearing it. This helmet uses simple cable replacement for wirelessly switching on a bike, so that the bike would not start without both the key and the helmet. The switching on and off of a led indicator will be used to demonstrate the working of the model.
- Nexon Samuel, Akshay Bawkar, The major goal of our project is accident detection, notification and prevention. This helmet makes rider to feel comfortable as well as with high protection and security. This smart helmet works on raspberry pi 3controller which is WIFI based, acts as a station for the networking system. Bluetooth and raspberry pi 3 was interfaced with cloud based services.
- Nitin Agarwal, Anshul Kumar Singh Traffic jams in India are very common and are so intense that it will take hours to travel for miles; also the average temperature inside the helmet is rather more, in such situation, the rider may feel discomfort. And more over accidents occurs by attending the calls while in driving. Even it is very difficult to find a person where he met with an accident in remote areas.
- PrabhakarV, Hunagund, The impact when a motorcyclist involves in an accident without wearing a helmet is very dangerous and can cause fatality. This paper will be designing helmet with some new innovative ideas. Like for accident purpose, alcohol detection, ignition concept. This helmet parameters are reliable for making any helmet to complete. Smart helmet is an innovative concept which makes motorcycle driving safer than before. The circuit in each helmet is designed in such a manner that the bike won't start unless the rider had not worn the helmet. Some author has discussed on speed of a vehicle and alcohol detection. As soon as the alcoholic rider wears the helmet alcohol will be detected. But alcohol is not the main reason for the accident many other circumstances we will be working on that issues also. The smart and safety helmet will be the combination of all the features which are been studied n applied by the other author and there will be many more other additional features developed by us in this paper.
- Rana Arslan Ghafo, An accident is a specific, unexpected, unusual and unintended external action which occurs in a particular time and place, with no apparent and deliberate cause but with marked effects. Carelessness of the driver is the major factor of such accidents [1]. The traffic authorities give a lot of instructions to the vehicle operators. But many of them do not obey the rules. Nowadays most of the countries are forcing the motor riders to wear the helmet and not to use the vehicles when the person is in drunken condition. But still the rules are being violated by the users. In order to overcome this we introduces an intelligent system, Smart Helmet, which automatically checks whether the person is wearing the helmet and has non-alcoholic breath while driving.
- Shah Asif Bashir, Aaqib Manzoor As the bikers in our country are increasing, the road mishaps are also increasing day by day, due to which many casualties, most of them are caused due to most common negligence of not wearing the helmets, and also many deaths occur due to lack of prompt medical attention needed by the injured person. The proposed system is an intelligent helmet. A module affixed in the helmet, such that, the module will sync with the module affixed on bike and will also ensure that biker has not consumed alcohol. Additional feature of accident detection module will be installed on the bike ,which will be able to detect accident and will be able to notify quickly the accident to police control room and in case if the accident is minor, rider can abort message sending by pressing the abort switch.
- Vishnupriya. S. M, Mirnalini. Y Wearing a helmet is important and required by the law in every country of the world. This paper discusses a simple system that makes it possible

for a motorcycle accident victim to get the timely medical attention. In this system we use the vibration sensors, pressure sensors, GPS and GSM to achieve this.

PROBLEM IDENTIFICATION

As per the survey taken from the public, the following problems has been identified, Head ache, neck pain, sweating, hair loss these are the major problem which was noticed in the survey. The present helmet was manufactured using polystyrene, so due this material helmet weight is increased. Another major problem occurs while wearing helmet is headache which is caused by stagnation of heat inside the helmet. Because there is no ventilation for circulation of air. Sweating and hair loss will be majorly occurred. Stress and uncomfortable due to overheat of helmet [6].

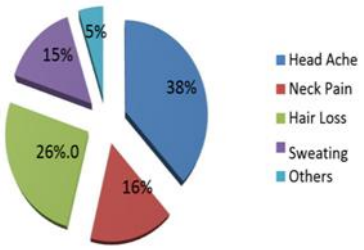


Fig. 1 Pie Chart

Planning

As per the survey taken from few cities some of the demerits were found in present helmet. So in order to eradicate that kind of demerits some steps had been taken to overcome those problems. From our survey result head ache, neck pain, sweating, hair loss is the major problem occurred while wearing helmet. So we have planned to use pin fin technology to dissipate the heat helmet. So we have planned to reduce the inlet helmet heat by using pin fins [7-10].

DESIGN

Fig. 2 Normal Helmet

Fig. 3 Modified Helmet

CONCLUSION

This project overcomes the present helmet disadvantages. Like over heat, swetting, head ache and hair loss etc. It leads to good results in transfer the heat from inside of helmet to surroundings to make this as human comfort while travelling long distance. And we are planned to manufacture it and distributing in market with low cost and with human comfort, poor people also can use this helmet at the low cost.

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