# Design and Fabrication of Motorcycle Seat incorporated With A System for Ventilation

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***Abstract-*** *Motorcycles are indispensable mode of transport for a large segment of middle-class people. Office-goers, students, self-employed persons and the entire spectrum of people belonging to small and middle-income group use motorcycles regularly, in one way or the other.*

*The daily usage and long hours of commutation on motorcycles affect the health of the rider as he will have to withstand the heat and discomfort to his buttock portion due to long hours of sitting and riding. This in turn, will lead to clogged blood supply to the bottom portion of the rider and may result in various health issues ranging from piles to back pain. At times, the heat, developed by the direct sunlight on the seat of a parked motorcycle cannot be immediately cooled down and the rider using such motorcycle will experience further discomfort. Hence, these conditions in the long run will definitely affect the rider posing serious health issues and deprive him from the pleasures of riding, be what-so-ever the higher-end model and cost of the motorcycle.*

*Especially, for the people with limited mobility, this kind of mounting pressure in areas that aren't well-padded with muscle or fat over a bone, viz., sit bones, the motorcycle riding will be rather really strenuous than enjoyable.*

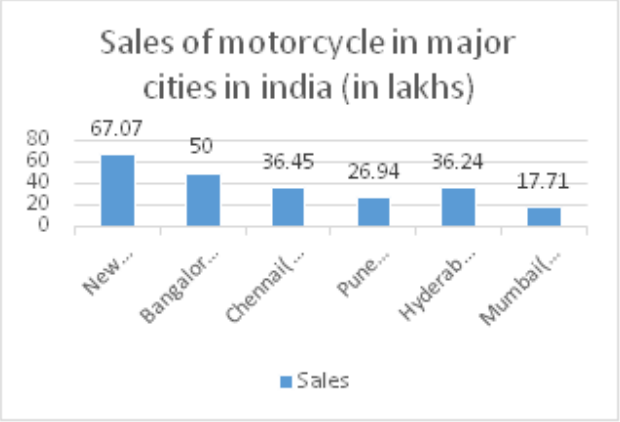
*The project involves channeling the surrounding air into the motorcycle seat, through the specially designed underneath portion of the altered foam and corresponding plate; providing for bringing down the heat of the surface of the seat by cooling and making the experience of motorcycle riding a comfortable and enjoyable one by reducing the pressure on the body of the rider.*

***Keywords***- Heat, Motorcycle seat, Channel air, Cooling.

## I. INTRODUCTION

The rapid urbanization calls for an efficient system of transportation. In spite of various modes of the mass transport systems in place, the motorcycles always retain its importance for their swift transportability, ease of parking, best way of reliable convenience on hand, cost-effectiveness, being only one means of carriers to the nooks and corners of the city… etc. Of late, even with lot of modernization and improvisation for making motorcycle ride comfortable, the long hour drive is becoming hilarious. This is due to the simple fact that the seats are not made respiratory. Though it sounds simple, there are resulting health hazards in the long run. The main and immediate health issue is "sore butt". The backache, physical and mental stress, blood-clogging in the butt portion and various other resulting health problems follows at a later stage. On an average, a person spends around 30-120 minutes of their day driving. This means, in a year, it is more than 360 hours. Imagine the kind of stress and unnecessary burden the person is heaping up on his body.

In a metropole city like Bangalore, there are about 50 lakh motorcycles. This number is increasing steadily with the variety of employment opportunities available in the city. The bustling life, burgeoning population, increasing various forms of pollution and global warming make motorcycle riding hell of an experience.




The above statistics is evident to the fact that motorcycles are indispensable part of the life of many students and office-goers in the metropole city like Bangalore. This project underlines its importance by making the rides of millions of motorcycle riders comfortable and at the same time healthy.

The concept of, 'ventilation to the seat of a Motorcycle' sounds to be a very small and insignificant. Yet,

when a motorcycle driver, who is caught in the tiresome traffic-jam of any metropole cities, say it might be due to heavy rains, accidents, or goes out on long drives understands its importance.

**Statement of problem**

"Design and fabrication of seat incorporated with a system for ventilation. It involves designing a new seat with vents for ventilation. Further the ventilation helps cooling of seat to improve the comfort of the ride".

**Component details**

The methodology proposed for design is inspired from the ventilation provided in helmets by providing ports that channel air into the helmets providing cooling to the head region. The following images showcase the 3D design of the seat and also its assembly over the bike.

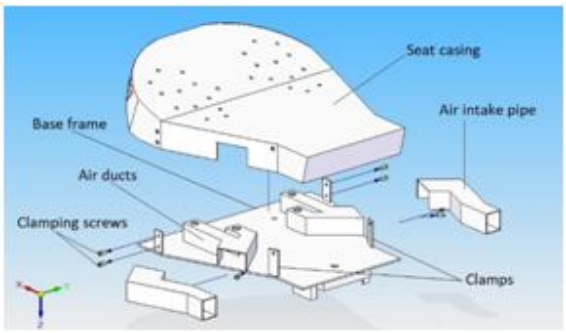



Figure 1: Design of seat with ventilation system (exploded view)

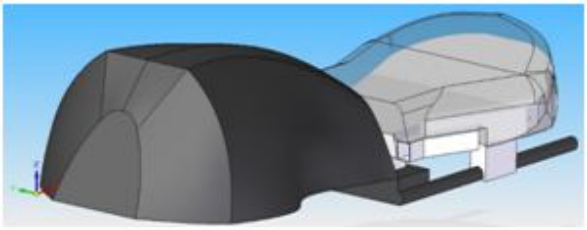
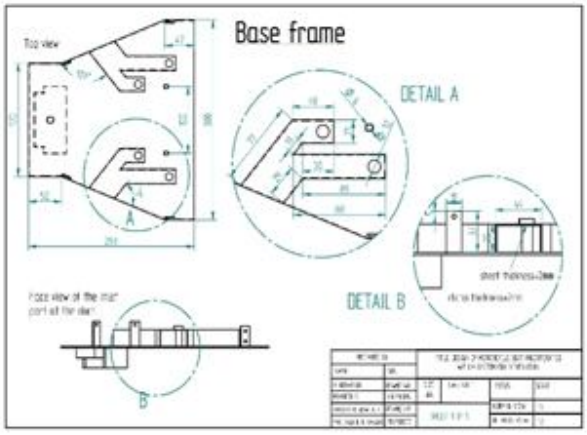
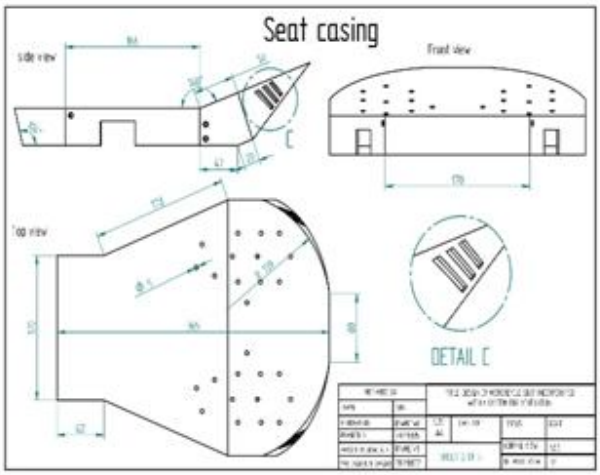


Figure 2: Seat assembly on chassis of the motorcycle




Base frame mounts on the chassis of motorcycle. It supports the whole seat assembly. Air ducts are designed to navigate the air from the inlet vents towards the casing surface. The lower section includes fixtures to hold the frame stable against ride movements. Seat casing is screwed to the base frame with the help of clamps, which restricts the movement the seat. Seat-casing forms an air chamber with its hollow design when mounted on the base frame. The top panel of the seatcasing is sculpted wider to enhance the area of contact for equal weight distribution and also it is inclined to provide clearance to sit-bones reducing stress to the body. Vents(slots) are provided at the rear to maintain continuous flow and excess air to escape. The holes on top act as path way for air to reach the foam cushion from chamber. Holes on the side section are used to screw the casing to the clamps provided on the base frame. The elbow shaped frame. The other end is left open for air intake. They are connected on either side of the seat to ensure equal supply of air to the chamber.




**Working of the system**

The surrounding air is drawn into the air chamber with the help of air intake pipes provided on either sides of the seat. Airducts on the base frame are designed to channel and direct the air towards the bottom of the seat. This will ensure continuous air supply to the seat through the pores in the cushion.

Figure 3: Seat structure assembly on the motorcycle

Figure 4: Foam arrangement on seat

**Simulations**

Case1: Foam was heated to 60 as shown in fig . It was left to cool normally exposed to atmosphere. Time was recorded for the temperature of foam to reach ambient temperature
of 38 .

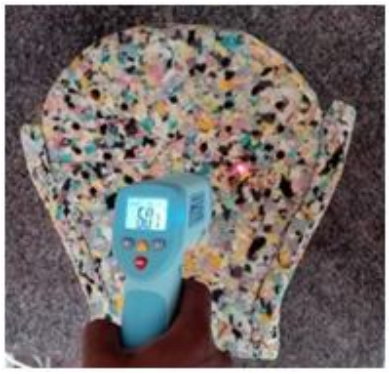


Figure 4: Temperature after heating

Figure 5: Temperature after cooling

Case2: The blower was positioned to blow air through the air inlet ports for simulating air flow inside the seat. Time was recorded for the temperature of foam to reach ambient temperature
of 38 .

Figure 6: Blower arrangement for air simulation

Figure 7: Temperature of heated seat

Figure 8: Temperature of seat after cooling with air blower arrangement

Table 1: Table showing temperature and time taken for cooling

| Type | Ambient temperature $T_a$ (°C) | Temperature $T_1$ (°C) |
|---|---|---|
| Normal cooling | 38 | 60 |
| Cooling with blower | 38 | 61.9 |
| Temperature $T_2$ (°C) | Cooling time (sec) | Temperature difference $T_1 - T_2$ (°C) |
| 38.4 | 90 | 21.6 |
| 38.3 | 60 | 23.6 |

## II. CONCLUSION

The cooling time required for the seat with external air flow (air blower) is less compared to the time required from normal cooling. Therefore, compared to the traditional motorcycle seat, with this system of ventilation, the seat gets the airflow at a faster rate resulting in effective cooling.

## III. WORK CITED

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