
# DESIGN FOR BEHAVIOUR CHANGE
# MOTORCYCLE HELMET

BY

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# Approval Sheet

The Design Research Seminar report titled as " Design for Behaviour change - Motorcycle Helmet" by Isaac Junior is approved in partial fulfilment of the requirement for the degree of ' Master of Design' in Industrial Design.

Guide :

# Disclaimer

The content produced in the project report is an original piece of work and takes due acknowledgement of referred content, wherever applicable. The thoughts expressed here in remain the responsibility of the undersigned author and have no bearing on or does not represent those of Industrial Design Centre, IIT- Bombay.

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I would also like to thank all the participants who took time out of their schedule to participate in the survey and Prof. Azizuddin Khan of Humanities and Social Science department for the guidence offered. I would also like to thank my friends and family for their support and guidance.

# Abstract

The design research was carried out to better understand the issues associated with helmet usage in two wheeler riders. Personal interviews were conducted to draw user perspectives. Insights from the discussions were utilized to bring forth concepts / ideas that would bring about regular usage of helmets. Ideas generated during the course of design research are being streamlined and conceived as part of final design project ( P3) to obtain user feedback.

# Contents

# Introduction

The Design Research aimed at understanding the reasons why the practice of wearing helmet ( Fig 1) was not followed by a section of two wheeler motorists. I was dismayed when in Kerala, the state which boasts the highest rate of literacy and a decent standard of living for majority of the people, even after making it mandatory by law for motorcyclists to wear helmets, there has been frequent incidents of people riding without them. This gave rise a scenario where police were asked to penalize the law breakers. Few such incidents lead to cases in which helmet-less motorists were chased by law enforcers that ended up in an accident. The scenarios in rest of the states or even the metros are no different. Just step out and have a look around on the road and I'm sure you would find an alarming frequency of motorists without helmet.

The pivotal question here is - are motorists vehemently against something that would ensure their safety on road? Are they aware of the potential risks involved? Is it ignorance? Or sheer neglect for their life? To understand various factors related to this behaviour, interviews were conducted among people


**Fig.1**: *SHOEI Quest passage helmet*

who use motorcycle in Indian roads. The questionnaire aimed at providing first hand data regarding the factors such as user outlook, safety concern, risk assessment, behaviour on road and helmet preferences.

There exist counter argument which highlights that the basic facilities are not being provided in terms of motorable roads, but that always seems secondary. As it is one's own responsibility to primarily safeguard his life as long as he chooses to ride a motorcycle.

Fig.2: *Spartan war helmet*


Fig.3: *Bell helmets from early 1960's*

# History of the product

The history of head protection dates back centuries to the time when it was used mainly during wars to save one's life [ Fig 2] . It's worthy to note that the purpose essentially remained same even back then. Pith, leather, beaten metal were few of the materials that were used to manufacture helmets back then.

To delve into the recent history of motorcycle helmets, one has to start from early 1914. Brooklands race track was the first purpose-built racetrack in the world, situated in Surrey, UK. A medical officer Dr Eric Gardner noticed riders suffering from head injuries at a frequent rate. His ideas regarding a protective head gear resulted in canvas and shellac helmets.

When these were presented to the Auto-cycle union, they initially condemned the creation, but later accepted it and made it mandatory in the greatest & deadliest race of all times – Isle of man TT. The notable difference was that none of the riders suffered from concussion during the race in 1914 – a first ever feat.

In 1935, T.E Lawrence – a very famous and highly decorated WWI British soldier lost his life 6 days after a motorcycle accident. Hugh Cairns, a neurosurgeon who attended Lawrence, began researching upon loss of life in motorcycle accidents. Cairns successfully persuaded the British govt. to make helmets mandatory and it became a civil law from then on.

During 1960s the usage of fibreglass shells and cork lining improved the quality of helmets than its predecessors but face protection was not given due consideration [ Fig 3] . Mid 1970s saw the advent and popularity of helmets with face protection. The basic types of motorcycle helmets present today include the

Full face [ Fig 1]

Off-road / Motocross [ Fig 4]

Modular / Flip-up [ Fig 5]

Open face / Three-fourth [ Fig 6]

Half helmet [ Fig 7]


Fig.4: *Motocross helmet*

Fig.5: *Modular helmet*

Fig.6: *Open face helmet*

Fig.7: *Half helmet*

# Literature review

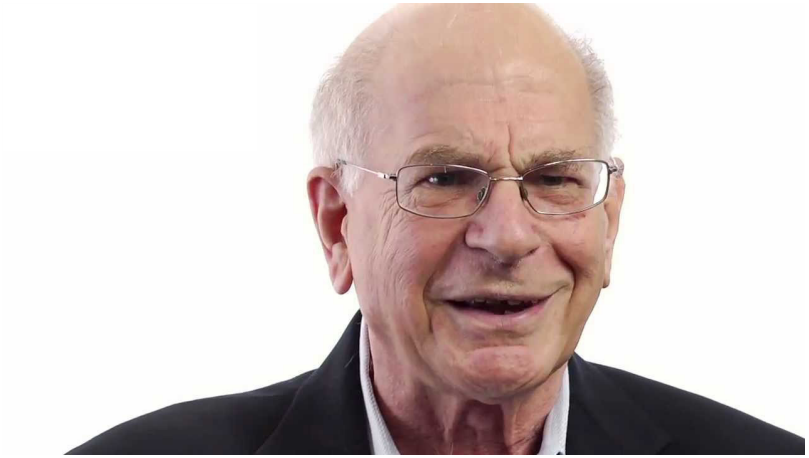

Fig.8: *Daniel Kahneman*

To approach the process of survey and to draw meaningful conclusions, a brief study into human psychology, choice architecture and cognitive biasing was required. Daniel Kahneman's ( Fig 8) book Thinking Fast and Slow ( fig 9) was real help in this regard. He was an Israeli-American psychologist who worked in the area of behavioural economics, for which he was awarded the Nobel Prize in 2002.

## Thinking Fast & Slow

The book focuses on two modes of thinking – Fast and Slow ( System one thinking & System two thinking) . To get familiarised, the moment we are given a question / a set of words ( e.g. Mother) / a particular problem such as 2+2 =? , certain reactions happen within us. These reactions are spontaneous and sometimes trigger emotions while being in the passive mode. Passive mode as in - we didn't have to consciously decide to compute 2+2 nor

evoke the emotion we associated with ' Mother'. This is an example for Fast thinking.

But when a particular arithmetic problem such as 34 x 23 is given, there occur a set of chain reactions within our mind which enables us not to find the correct answer instantaneously, but to draw the environment / probabilities associated with it. We may decide whether this could be calculated mentally or not, whether the answer lies between 100 or 10000 and so on. There are a set of such information which gets generated as part of Fast thinking, but in order to find the correct answer for the problem one must do mental work. Mental work is associated with effort which can be observed in terms of dilated pupils, increased heart rate etc. Another easier example would be when you restrain yourself from getting angry at someone, which is a product of slow thinking. These are examples of slow thinking.

The slow thinking involves the control of attention. Attention and effort is considerably employed in the above cases. System one is closely

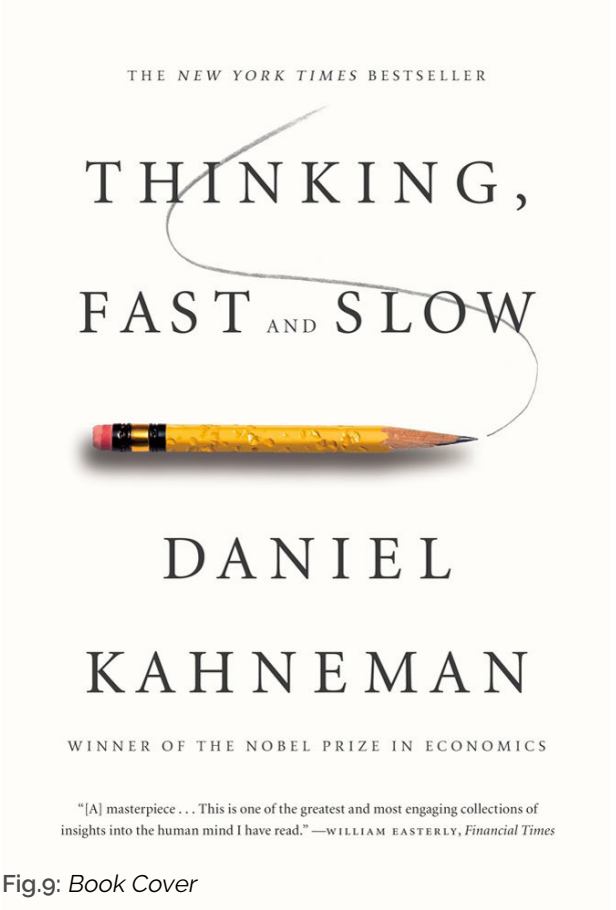


Fig.9: *Book Cover*

associated with skill behaviour. For example the activity of driving a motorcycle which was initially a system two operation becomes system one operation over a period of time. There are things you learn which over a course of time becomes automatic. Humans do approach activities generally by the principle of least effort. To attain a goal, we calculate the amount of physical as well as mental effort that's required in achieving it which in turn translates as a ' cost'.

While these two systems seem to equip one to perfectly deal with the world, they in turn create some problems. The reason being that in circumstances when slow thinking is appropriate, fast thinking kicks in, which manifests as our trusted intuition that leads us to the wrong answers and the wrong conclusions. Our drive us into conclusions, right or wrong and rarely do we take the time to second-guess our intuition. Thus, we make erroneous decisions and conclusions based on shortcuts we didn't even realize existed.

Fast thinking is not always wrong – and in many cases it's necessary. Kahneman is not arguing that we are making wrong decisions consistently, only that we are far less rational than we believe ourselves to be.

## Cognitive Bias

Cognitive bias is the characteristic of humans to think in particular ways. This behaviour causes deviations from the logical/rational standards - where the standards describe the commonly accepted notions. Whenever humans are required to make a decision [ cognitive bias does kick in] , it puts cognitive load on them. Heuristics is one way to quickly go about it. It's a speedy process based on previous experiences. The solution or decision that comes out of employing this method might not be the optimal one, but would guarantee to solve the problem at hand. Heuristics is a bunch of simple efficient rules laid out by evolutionary process within humans. Motivation or wishful thinking is another cognitive bias that comes up during decision making. When a precise catalyst [ motive] prompts specific behaviour, it can be called as Motivation / wishful thinking.

Several commonly debated biases occur during the process of decision making of which few are -

PRIMING – It can be defined as the increased sensitivity to a particular schema due to a recent experience. A schema can be defined as the mental framework or concepts that we use to organize and understand the world. An example for this would be the case wherein an expectant parent associates most of the events around him/her to babies.

AVAILABILITY HEURISTIC – It's a mental shortcut that helps us make decisions on how easy it is to bring something to mind. It manifests when we think of examples while making a decision or judgement. If several examples are readily available in our mind, the event we are about to address gets biased by them.

AMBIGUITY EFFECT – We end up selecting/choosing options of which the probable outcomes are known to us.

ATTENTIONAL BIAS – Our repetitive thinking process creates this bias in which we tend to focus on things we pay more attention to, while neglecting or ignoring other possibilities.

# User Survey

The primary research was conducted to understand the user perspectives regarding the use of helmet. A lot of 22 people were interviewed in detail - divided into four age groups of five members each, amongst which two wheeler usages were found to be considerably high. These were 20-25yrs, 25-30yrs, 30-35yrs and 35-40yrs. The survey included users who did and did not own a two wheeler. The sample included different segments of motorcycle users, mainly –

Streer racers

Enduro racers[#]

City commuters

Office commuters

Long distance tourers

There has been a steady growth in the amount of two wheeler market in India. Recently many acclaimed two wheeler

[#]Off road riders over long stretches

manufacturers having a major global presence have identified India as the ideal market for luxury and high end motorcycles. Their influx into our economy have given birth to many rider groups that consist of passionate riders who help spread the awareness about the importance of protecting oneself on the road, apart from pursuing their passion to ride.

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The survey dealt with people from metro cities, villages and small towns across India. They belonged to the middle class segment with an income that helps them afford a two wheeler. Discussions with the users were interesting as they were able to contribute varied driving behaviour, patterns, purposes and their experiences on the road & travel.

# User Study & Analysis

Different factors associated with the user, helmets and riding were subject to study. Different outlooks from the users were analysed to bring out a general characteristic pertaining to the different groups users were classified to.

## Perceived adherence to law

It is mandatory by law to wear helmet for all two wheeler riders. The user's perceived adherence to law is one of the factors that trigger the usage of helmet, apart from self-awareness of safety. Hence the same was subject to study. ISI / BIS standards ensure the safety and quality of the helmet that's purchased, but it was found that a minor percentage of riders ( 9%) did not find this as an evaluating criterion when they bought helmets. The tendency to take quality for granted when you purchase a helmet was widely observed. The scenario when you are caught for not

wearing helmet was associated with minor fines / pleading with the officer by the users. These instances were of petty importance as far as the majority of the users were considered. But due importance and compliance was given to the traffic lights by majority of the users.

## Behaviour on Roads

Indian roads and traffic are such that it demands the rider to adapt to the surroundings – surroundings that tend to shift quickly and frequently. The adherence to traffic laws is moderate in the country with increasing number of adherents every year. Whether it is to reach the destination quick, to avoid pollution on roads or to get the adrenaline rush, riders tend to break traffic law. This behaviour gives an idea regarding the amount of risk a rider is ready to take on road and the kind of protection he must have.

Even though overtaking another vehicle through the left side is

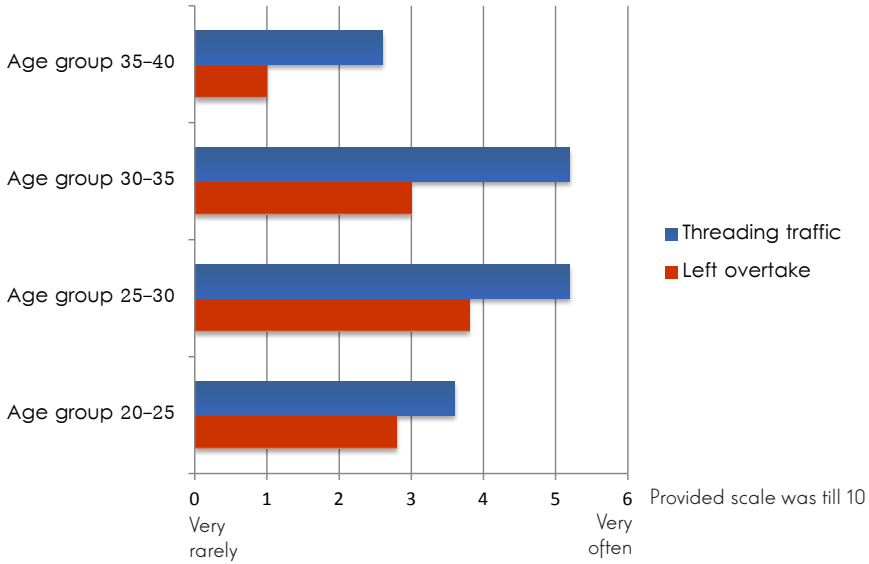



**Fig.10:** *Behaviour on roads*

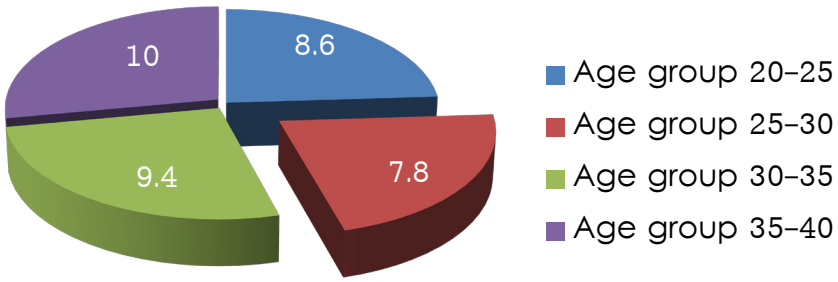



**Fig.11**: *Helmet usage*

not permitted by law, it's hard to find someone who has not broken the rule even once( Fig 10) . Such is the condition when it comes to threading through traffic too [ zig-zag riding pattern between other vehicles/lanes] . Traffic in our tier one and tier two cities would easily force a rider to thread through traffic.

Threading through traffic was found be mostly done by the age group 25-35yrs with most of them citing the reason as office commute. Risk averse nature explains the drop in both violations for the age group 35-40yrs.

## Helmet Usage

The helmet usage was found to be comparatively low for 20-30yrs. The helmet usage depended on many factors. For few riders helmet was a must every time they step out with a motorcycle, whereas for others it depended on traffic, police in the vicinity, grocery shopping nearby etc. The latter lot opted helmets only for long commutes as they believed short runs nearby are harmless.

## User caution / Risk level

The use of helmet is primarily for one's own safety and should not be associated to an enforced action as per the law. People who realize that helmet is for their own safety form the majority, but there exist a considerable segment of users ( 22%. Fig 12) who wear helmet out of compulsion or fear of authority.

Wearing protective gear while riding is also another scale with which we can analyse the amount of risk a rider takes on road. Sensible riders generally wear shoes while riding, and it was found that within the age group of 20 to 30 only 55% wore shoes regularly which increased to 70% for age group of 30 – 35. It declined for the age group 35 – 40 furthermore as people upgrade to four wheelers by that period.

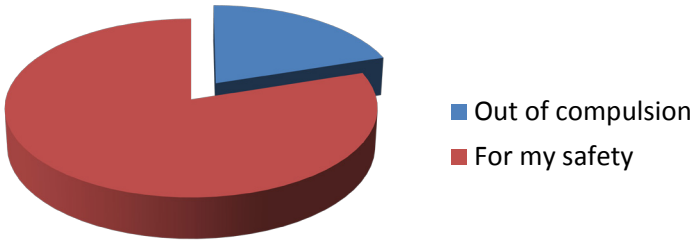



Fig.12: *Why wear a helmet?*

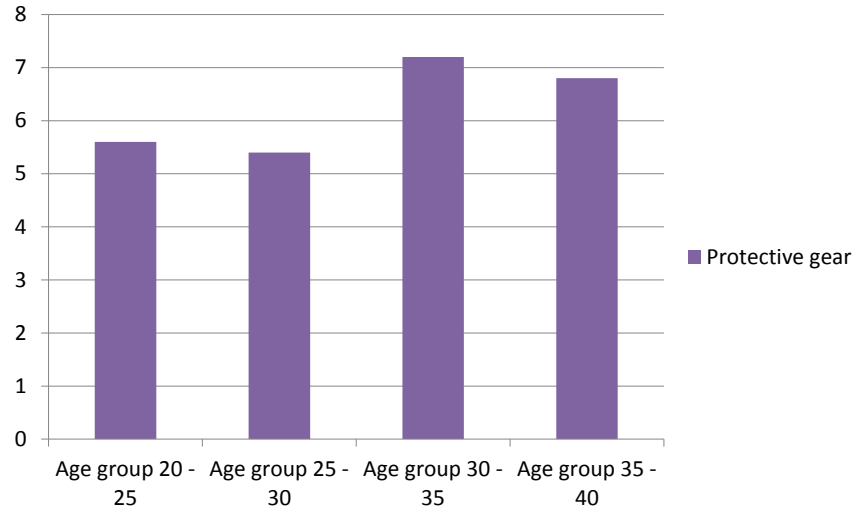



Fig.13: *Protective gear usage (on a scale till 10)*

## Value for life / pillion

Even though majority of the riders have a pillion, they seem to never ask the pillion to wear a helmet. Few of the users perceived it as a responsibility of the pillion rather than of themselves. The main idea of wearing helmet so as to avoid police checking seemed to take prominent place rather than the protection of life. Difficulty in carrying extra helmet was cited as another cause for not persuading the pillion to wear one. Few of the users were unaware of the fact that in case of an accident the pillion is at greater risk, and hence were blatant in suggesting that the pillion doesn't require a helmet.

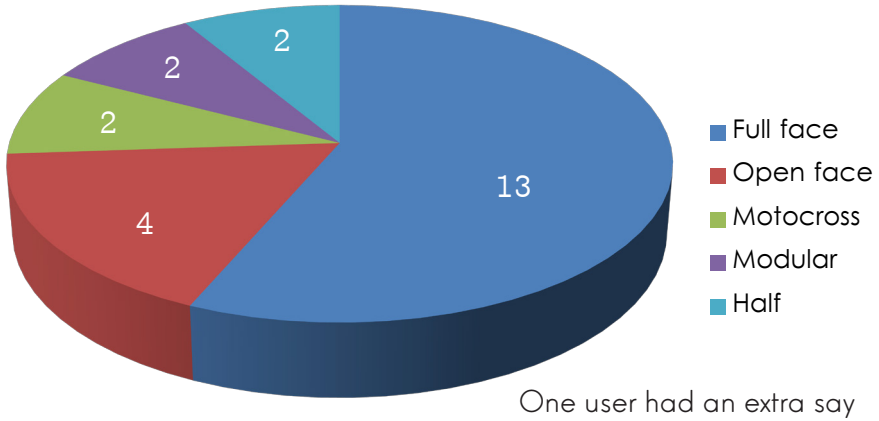
## Factors affecting Regular use

Most of the users interviewed did use two wheelers for their office commute and road trips. They were subjected to different

types of traffic and road conditions. Few of the users had a passion for street racing, enduro and off road riding.

The major problem affecting the regular use of helmet was its safe storage. They found it difficult to carry with and the existing helmet locking facility requires an additional attachment that gets mounted on to the tail grab or crash guard in two wheelers. The fear of getting looted if you own an expensive helmet was also a deterring factor.

There were many feedbacks related to the comfort level within a helmet. Sweating, weight, claustrophobia in a full face helmet, damaging hairdo, visibility issues, audible noise levels were few of the problems mentioned. Age group of 20 – 25 had least comfort in a helmet, but as soon as they upgraded to a new helmet as seen with the age group 25 - 30, their comfort levels soared up.




One user had an extra say

Fig.14: *Choice of helmet*

## Preferences

### Choice of helmet

Users were presented the basic options in motorcycle helmets to understand which one they opted for. Most of them chose the full face helmet ( Fig 12) for reasons of safety, comfort and sense of security. Users who opted for others had specific reasons to do so including hindrance to face, claustrophobia, visibility, styling etc. General pattern amongst female riders was the use of open face helmets.

### Various factors

Different factors that help user make a decision while intending to purchase a helmet was listed out after the sample survey. The factors were – Comfort, Safety standards, Brand, Style factor and Price. Users were then asked to rate the same according to the

importance it holds in the decision that they would make. The scale provided was from zero to ten, with zero being least important and ten the most( Fig 13)

The graph indicates the choice that Comfort and Safety standards rate as the important factors while buying a helmet across all age groups. The choices users made here can be related proportionally to their income and riding tenure. Age group 20-25yrs rated Style / Styling factors important after the above two, highlighting the desire to choose a trendy product. Amongst all the groups they rated Safety standards & Brand the least which seemed worrying as it gives the picture that they do are not concerned much about the quality of helmet.

As people mature the choices they take seem more composed, as the results of age group 25-30yrs say. They have an almost equal preference/rating about Brand, Style and Price. The group rated them as important, but not as much as Safety & Comfort.

Age group 30-40yrs have the higher rating for Safety than for Comfort which was funnily put by one of the interviewee as – " It's like aged whiskey. As the number of years increase, the better the bottle becomes". Age group 35-40yrs do have a heightened liking for styling too.

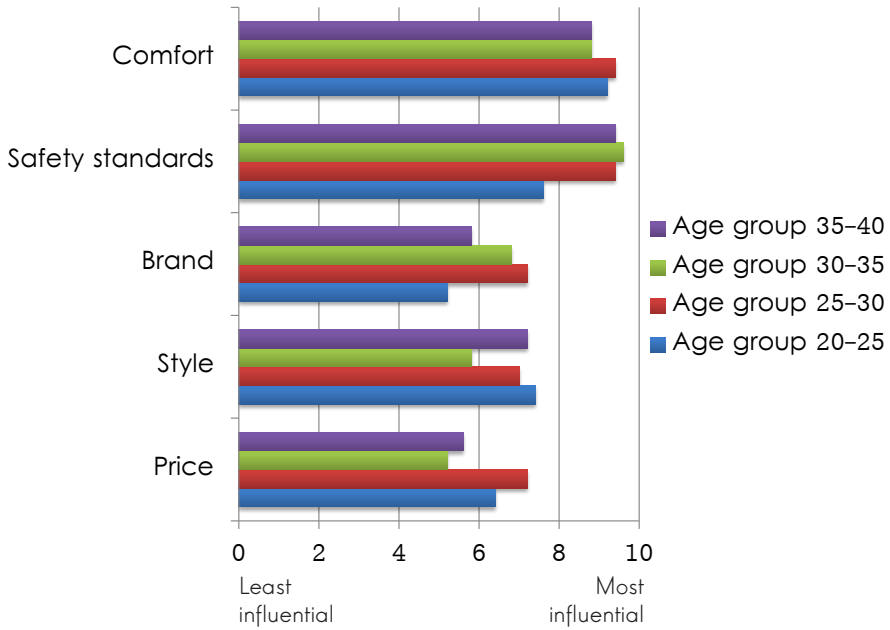



**Fig.15**: *Different purchasing factors*

# Insights

The survey undertaken had limitations as the sample set was less than 33, which is the minimum number of interviewees required to substantiate the drawn conclusions. But nevertheless the insights drawn from the survey did throw light upon the hassles faced by the riders with a helmet, riding patterns, safety considerations and accepted risk levels.

Considering the climatic conditions of our sub-tropical nation, the main reason why motorists tend not to wear the helmet would be the comfort issues posed by it. Comfort factor took the forefront while considering purchasing a helmet. Safety, even though was rated second highest, was taken for granted. Styling was the next leading factor in choice of a helmet. The different problems outlined by users were –

Sweating Storage Visibility Claustrophobia

Hair loss / Hairstyle Noise level Riding in rain

Communication troubles with pillion & phone calls

# Ideas

Within the current state of existing laws, roads, driving patterns and environment, enhancing the comfort level, safety and styling of helmet could trigger an increased use of helmets. Approaching the insights from a product design perspective, concepts/ideas were brought out that attempted to address factors above.

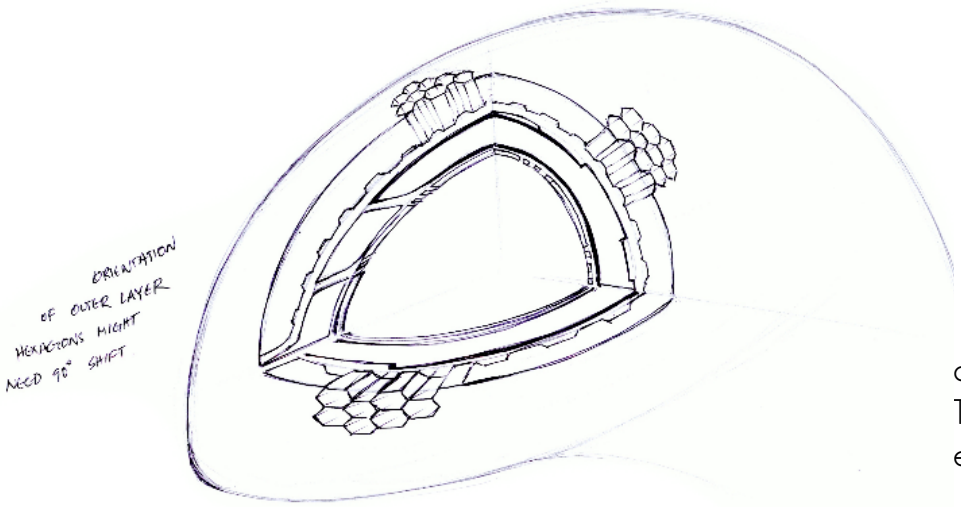
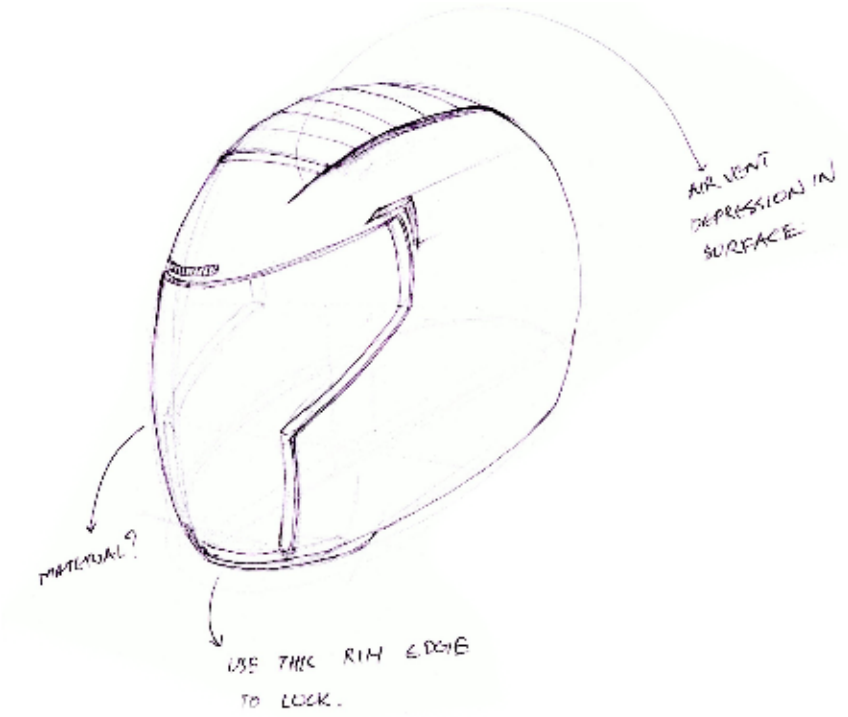
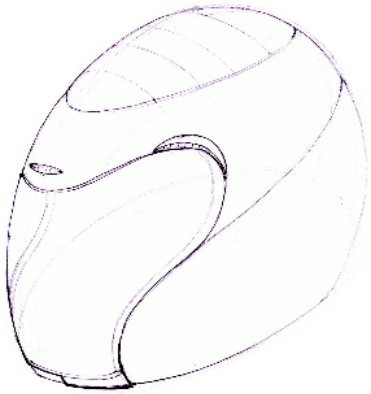


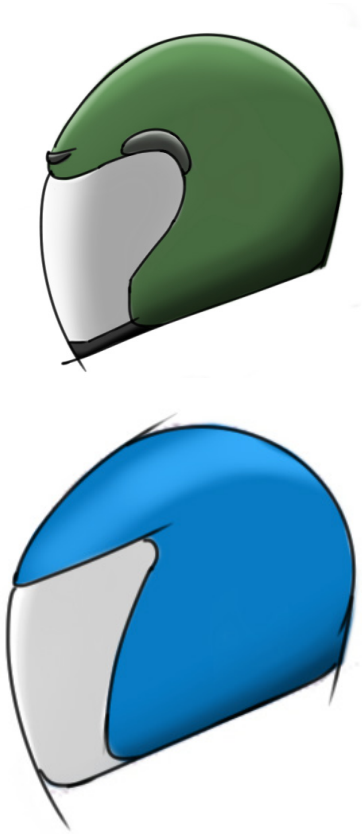

Fig.16: *Enhanced crumble zone*

Utilizing hexagonal profile as inner shell to decrease weight and offer better crash test results across slow and fast impacts. This structure has high crumble zone rating i.e. to neutralize impact energy

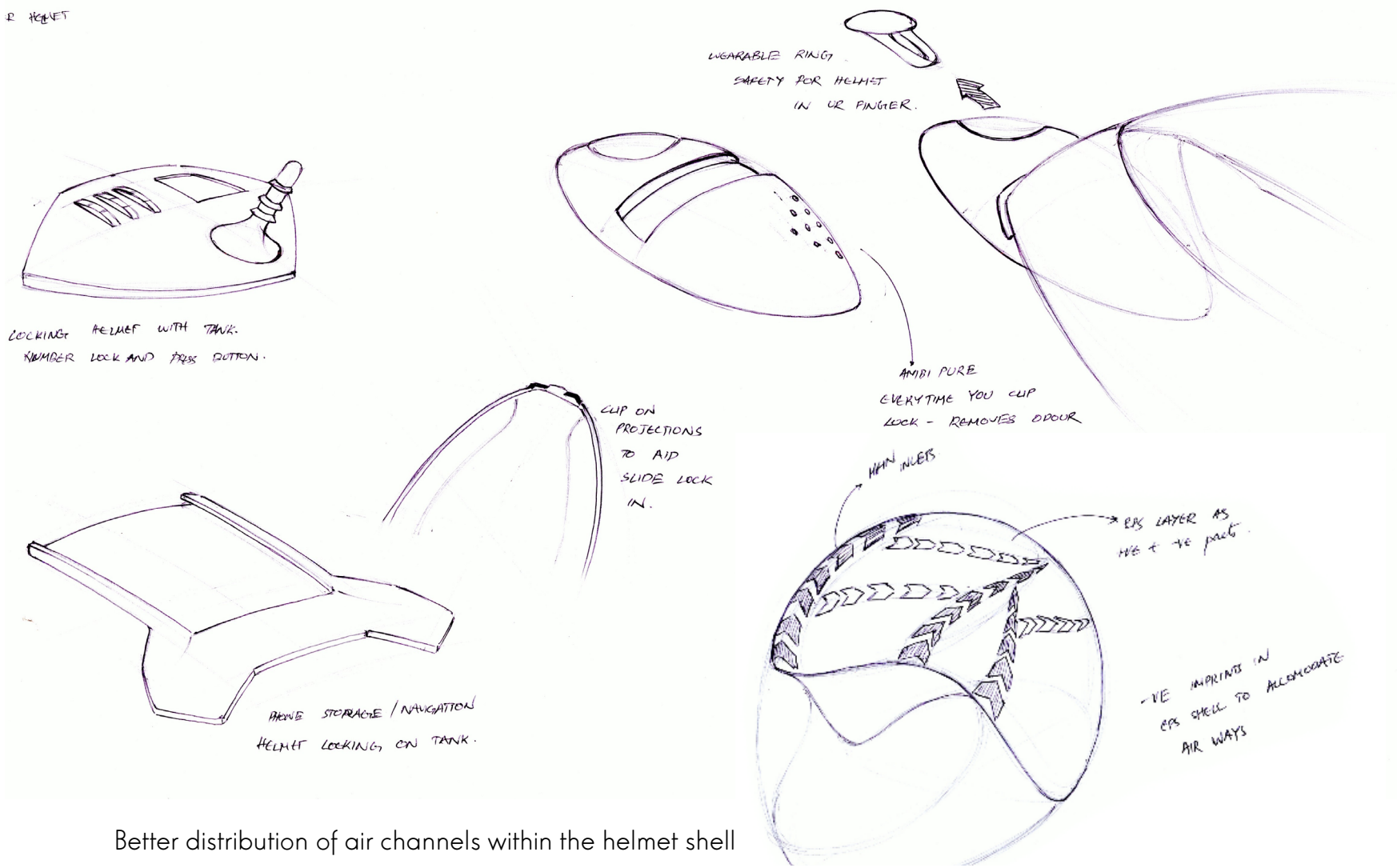



Wider visor with protective thin jawline – increasing visibility, reduce claustrophobia and easier acceptance for female riders.





Attachments that could be mounted on the fuel tank / flat surface to safe keep helmets




Better distribution of air channels within the helmet shell

# Conclusion

Behaviour patterns of different age groups of two wheeler users were familiarised. Users perspective of traffic law obedience, risk involved, value of life and preferences were observed. Factors that affect regular use helmet were looked upon. The behavioural change in two wheeler users towards regular use of helmet could be achieved through a better designed helmet. The ideas are being refined as part of my Project III. Way ahead would be conceptualizing and prototyping the idea to be tested for user acceptance.

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*Fig 4 < http://images.esellerpro.com/2189/I/312/91/Ricky-Dietrich-811-Monster-Motocross-Helmet-1.jpg >*
*Fig 5 <http://images.leatherup.com/images/product/large/ST-1198-matte-blk-1.jpg;/images/product/large/ST-1198-matte-blk-2.jpg>*
*Fig 6 <http://images.esellerpro.com/2189/I/438/55/Duchinni-D506-Force-Open-Face-Motorcycle-Helmet-Force-3.JPG>*
*Fig 7 <http://bikesreviews.biz/wp-content/uploads/2014/10/motorcycle-half-helmet.jpg>*
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*as seen on 3 / 03 / 2015*