Development of Industrial Design Relationship between Aesthetic and Engineering Parameters in Context of Design and Development of Motorcycles

THESIS

Submitted in partial fulfilment
of the requirements for the degree of
DOCTOR OF PHILOSOPHY

by

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2013

ACKNOWLEDGEMENTS

I wish to express deep sense of gratitude and sincere thanks to my thesis supervisor Prof. S.K. Atreya, Faculty In-charge , IDDC, I.I.T, Delhi for his able guidance, encouragement and suggestions throughout the period of this research work. It has been a privilege for me to work under his guidance.

Gratitude is also accorded to my employer M/S Hero Motocorp Ltd for providing all the necessary facilities to complete the research work and IIT, Delhi for allowing Prof Atreya to be my supervisor.

I express my sincere thanks to my colleagues Mr Rahul Jain and Mr Hari Om for helping out in conducting the research. I extend special thanks to all those who participated in surveys.

[Sushil Chandra]

ABSTRACT:

Motorcycle design is a study in contrast. On one hand, it is ultimate in mathematical reasoning i.e. engineering side of design. On the other hand it is an extension of human emotions in most raw form. Some people have gone to the extent of calling it not a functional mode of transport but an expression of man's love for adventure. In short, design of motorcycle is as much an exercise in engineering as in interplay of emotions. Interestingly, the emotions generated by a motorcycle are essentially, products of engineering parameters.

The first question that needs to be answered in this context is- how to measure, quantify and qualify emotions. The answer is provided by Russel's circumplex of emotions. This circumplex expresses emotions in terms of two coordinates valence (degree of pleasantness) and activation (degree of stimulation). Alternatively, aesthetics of a vehicle, as defined by the emotion it generates, can be expressed in terms of polar coordinates **r, θ** on the same circumplex (which we will call emotional coordinates), where **θ** represents a particular emotion and **r** represents intensity of that emotion. For example, **θ=0** expresses the emotion of Shringaara (love, beauty, romance) where as **r=1, 2 or 3** expresses the intensity of the same emotion (in that order).

This study attempts to deconstruct the motorcycle aesthetics into various engineering parameters i.e. color, form, design context, unity, dynamism and graphics. By identifying the prevalent emotions in context of a motorcycle, this study quantifies the emotion mix as result of the deconstructed parameters in terms of **r, θ.** The next exercise is to aggregate these values to calculate the final emotion mix of the whole motorcycle. The basic purpose is to devise a methodology to calculate the aesthetic value of a motorcycle so that a motorcycle design can verify the aesthetics of his design in quantitative way. The method adopted for this study is:

a. Determine the weightage for each design parameter through surveys.
b. Prepare visual engineering data representing all possible variations of each parameter.
c. Determine the intensity of the emotion mix for each visual data through surveys.
d. Sum up the final emotion mix using the weightages.

After determining the r, θ for each engineering parameter, the final mix was calculated for bikes available in market and results were verified by actually conducting physical survey for the same motorcycle. Both results matched to an extent that develops enough confidence on reliability of the method.

Of course, the values generated through this study are specific to the social and market context. For any other market, the same method can be repeated to generate the values. Important to note here is the fact the methodology of deconstruction applies universally.

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LIST OF SYMBOLS AND ABBREVIATIONS

Symbol/Abbreviation	Description
r	Intensity of an emotion
θ	Polar location of an emotion on Russel's Wheel
| |	Quantity to be summed without considering +/- sign (Modulus)
S	Emotion coefficient for 'Sober'
G	Emotion coefficient for 'Glamorous'
D	Emotion coefficient for 'Dynamic'
I	Emotion coefficient for 'Intimidating'
V	Value of an artifact in monetary terms
C	Cost of an artifact in monetary terms
H	Hassles in owning an artifact in monetary terms
x_1, x_2, x_3….	Weightages for design factors 1, 2, 3……
w	Weightages for design factors
r	Distance of visual element from optical centre
W	Visual weight
n	Number of visual grids
Subscripts	
l	Color
f	Form
t	Context
g	Graphics
s, g, d, i	Respectively for sober, glamorous, dynamic and intimidating

Code for colors

r	Red
g	Green
b	Blue
y	Yellow
bl	Black
gy	Gray
w	White

Abbreviations

No	Number
Max	Maximum
w.r.t	With respect
KES	Kansei Engineering System

LIST OF APPENDICES

Chapter 6 Verification of Results

Chapter1: Introduction

1.1 Background of the Work:

Motorcycle design is a study in contrast. On one hand, it is ultimate in mathematical reasoning i.e. engineering side of design. On the other hand it is an extension of human emotions in most raw form. Some people have gone to the extent of calling it not a functional mode of transport but an expression of man's love for adventure. In short, design of motorcycle is as much an exercise in engineering as in interplay of emotions. Interestingly, the emotions generated by a motorcycle are essentially, products of engineering parameters.

The first question that needs to be answered in this context is- how to measure, quantify and qualify emotions. The answer is provided by Russel's circumplex of emotions as described by Vittal et al [1] As shown in fig-1.1.This circumplex expresses emotions in terms of two coordinates valence (degree of pleasantness) and activation (degree of stimulation). Alternatively, aesthetics of a vehicle, as defined by the emotion it generates, can be expressed in terms of polar coordinates **r, θ** on the same circumplex (which we will call emotional coordinates), where **θ** represents a particular emotion and **r** represents intensity of that emotion. For example, **θ=0** expresses the emotion of glamour (love, beauty or romance) where as **r=1, 2 or 3** expresses the intensity of the same emotion (in that order).

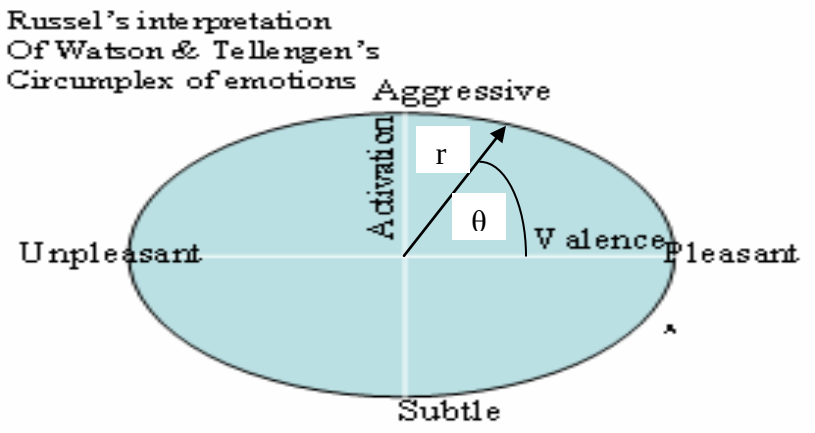

Fig-1.1, Russel's Interpretation of Circumplex of Emotions

To relate this context of emotions in business or marketing terms, Kotler [2] defines value of an artifact as the sum of tangible and intangible benefits and costs. Mathematically, this can be expressed as

$V_{Net} = V_{Aesthetic} + V_{functional} + V_{Snob} - C - H$ (1.1)

Here aesthetic value ($V_{Aesthetic}$) is what Krippendorf [3] describes as meaning in language, taking into account the narratives and character of the artifact. To be precise, this amounts to the type of emotion generated by it and the intensity of the emotion. Functional value ($V_{functional}$) is the notional monetary value the customer is willing to pay for the functionality and snob value (V_{Snob}) is the notional amount customer is willing to pay for the pride of possession. Similarly, cost of ownership (C) is the sum of price, maintenance cost, the cost of running (in our case, fuel, lubricants, battery, tires etc) and servicing cost. Hassle value (H) is the cost the customer attaches to the difficulties he expects to face as a result of owning the artifact. According to Kotler [2], if the net value (V_{Net}) is positive, the customer decides to buy. If the net value is negative, he decides not to buy.

The important point here is that all values are to be converted into notional monetary values, which is not the scope of this study. Our objective is to quantify the aesthetic value, before we convert into monetary value. We have earlier discussed that this quantification is in terms of the type of emotion (θ) and its intensity (r). Mathematically, we can express it as

$V_{aesthetic} = f(r, \theta)$ (1.2)

In words, this means that the aesthetic value of an artifact is the function of the type of emotions generated (θ) and their intensity (r).

Again, this is not the scope of this study to explore this relationship i.e. the relationship between the emotion and the notional monetary value. Here, we limit the scope to find a methodology to determine the value of r and θ.

Now the parameters which constitute to create a particular emotion characterized by coordinates **r,θ** are the various engineering factors like color, geometry of parts(form), the context of motorcycle (cruiser, sport or standard) etc. The contribution of all these factors is not equal. The extent to which each of these factors affects r, θ needs to be

established. This weightage can be expressed as x_1, x_2, x_3--------. (for which the methodology for determination and actual quantification will be investigated in later chapters).

Here x_1 is the relative contribution of first design factor in generating emotions, x_2 of second design factor, x_3 for third and so on. We will explore these factors and the values in the following chapters and our investigation, as this is the basic scope of this thesis.

Now we need to find a methodology to establish correlation between emotional coordinates and various design factors. For example, let us say emotional coordinates for a particular emotion due to different factors such as color, form, context etc are r_1, r_2, r_3 --- so that we can finally calculate the overall coordinate for a particular emotion by

$r=x_1r_1+ x_2r_2+ x_3r_3$------- (1.3)

Important point to note here is that, any artifact in fact has all four emotions but the intensity of the emotions is different. What characterizes an artifact is which emotions dominate the other ones. This is the starting assumption,

Fig-1.2, A Motorcycle

Besides the factors generic to the motorcycle (shown in fig-1.2) like color, form, context etc, there are other factors, which impact the aesthetics namely:

1. Wind resistance which has two form-dependent components:
    a. Area
    b. Drag coefficient
2. Engine specification
3. Environmental sustainability: As we discuss in following chapters, environmental concerns and regulations (relating to emissions, noises and electromagnetic

interferences) lead to changes in form, surface treatments and materials which affect the aesthetics.

4. Ergonomics: The human interaction of user (like rider's posture etc) with the machine lead to changes in the form.
5. Structural Strength: The considerations for structural strength lead to changes in form and materials.
6. Vehicle dynamics: The dynamic behavior of motorcycle relating to stability, maneuverability, braking etc lead to changes in vehicle geometry thus affecting aesthetics.

We will discuss these factors in detail in following chapters.

1.2 **Objectives of the Study:**

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1. To establish a method and parameters to express in quantitative terms, the aesthetics of an engineering object in general and a motorcycle in particular.
2. To establish a method to quantify the aesthetic parameters of a motorcycle through the engineering parameters adopted in design.

Here it is important to note that the fist objective explores the mathematical parameters of aesthetics, whereas the second objects deals with the quantification of parameters explored through the first

1.3 Scope of the Investigation

This study tries to find the aesthetic quantification of motorcycles for conventional motorcycles made in India and caters to the aesthetic sensibility of motorcycle users in India particularly in northern part of the country. Moreover, keeping in view the limitations of survey process, it uses the predominant parameters of motorcycle visual design only (i.e. very fine aspects like surface texture, surface roughness, and gloss values have not been considered in detail though their impact has been studied as aspects of visual balance)..

1.4 Methodology of the Study

The following figure shows the methodology of the study conducted and different phases as mentioned

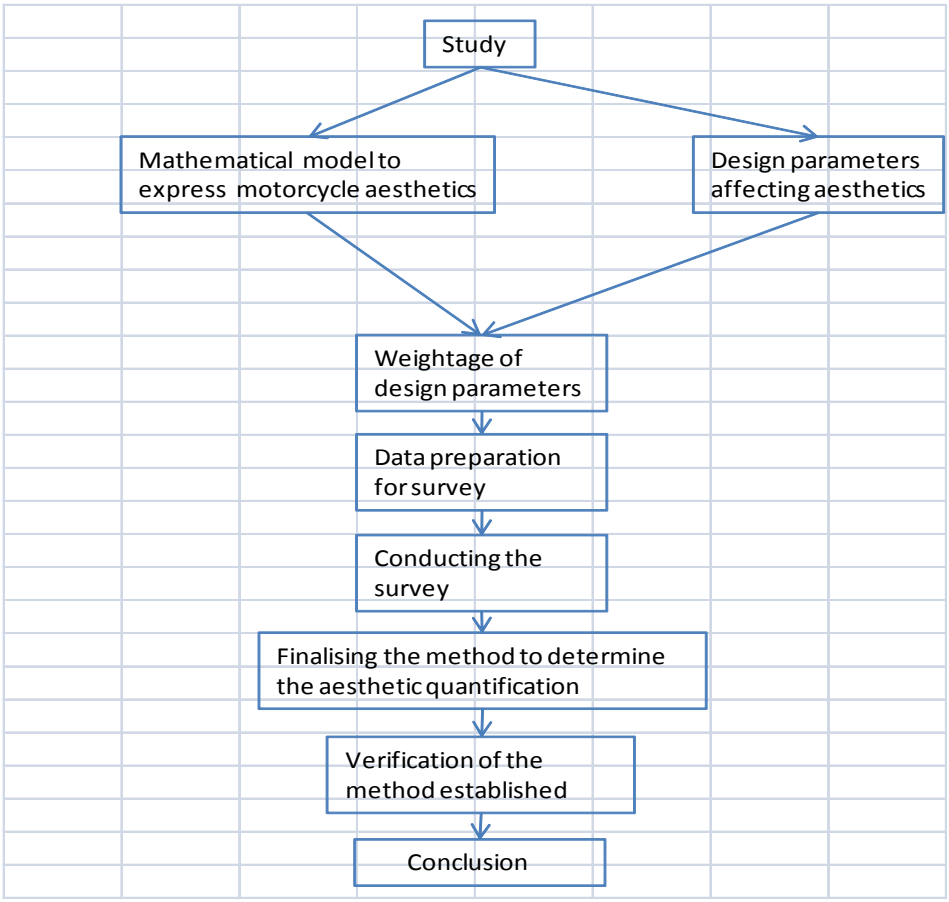


Fig-1.3, Methodology

As this flow chart shows, after studying the available literature on grammar and quantification of aesthetics from various resources in fields of design, management, psychology, philosophy and literature, we tried to explore the mathematical model to express the aesthetics of a motorcycle and the design parameters which contribute for quantification of this model. The next step is to find the weightages for each of these factors to establish their relative contribution. Thereafter, after preparing data for each of these factors, we conducted surveys to establish the effect of these factors on the aesthetic parameters and then complete the methodology for aesthetic quantification through a matrix... Next, we verified the accuracy of this matrix by using this for a

number of motorcycles and comparing the results with actual results to iterate the matrix and conclude the study.

Based on the above figure, the study was divided between following phases:

Phase 1: Literature review

Phase 2: Weightage of design parameters

Phase 3: To determine the impact of design parameters

Phase 4: To establish methodology for aggregating impact of design parameters

Phase 5: To verify the accuracy of the method

Phase 6: To conclude and determine the future scope of work.

1.5 Organization of the Thesis

The thesis has been divided between following chapters:

Chapter 1. Introduction: In this chapter, the background for the study and the structure has been discussed.

Chapter 2. Literature Review: In this chapter, the available literature has been scanned to find the elements of aesthetics and various theories to express and quantify aesthetics and emotions attached to an engineering design.

Chapter 3. Design Factors affecting emotion: In this various design factors, which affect the emotions caused by a motorcycle, their definitions, classifications and their elements have been discussed.

Chapter 4. Methodology: In this chapter the methodology for conducting the survey, to determine the impact of various design factors, data preparation and to aggregate the impacts to determine the overall aesthetic quantification of a motorcycle have been discussed.

Chapter 5. Result Analysis: In this chapter, the results of the survey and the final aggregation formulae have been discussed.

Chapter 6: Result verification: In this chapter, the surveys to authenticate the aggregation formulae and the results have been discussed.

Chapter 7. Conclusion and future scope of work: In this final chapter, the conclusions of the whole study and the future scope of work have been discussed.

Chapter 2: Literature Review

2.1 Overview

Today studies have been carried out in following areas:

a. Emotional design
b. Effects of frontal area design on aesthetics of motorcycle

The visual architecture of a motorcycle is very complex. With all its functional parts visible, the multiplicity of parts and their range of characters makes the visual design makes it far more complex, particularly if we compare with cars. The biggest challenge before the designer is to ensure that the performance aspects of a motorcycle correlate well with the visual design without dissonance between the two so that a coherent narrative is created.

The parameters of design for a desired narrative have been the crux of heated debates between practitioners and theorists of design. At the outset, two major theories have been dominating this debate – Gestalt theory and structuralism (King and Wertheimer) [3]. Gestalt theory is based on Gestalt psychology, which believes that in visual human perception, the whole is bigger than the sum of its parts and hence the overall perception of design cannot be deconstructed into various elements. In Pratt's [4] opinion, it is actually the subversion of the way the eye and mind actively manipulate what we see, that causes something to be aesthetically pleasing. There are various Gestalts like Gestalt of closure, proximity etc which provide the additional meaning, which cannot be realized if deconstructed. Way back in 1941, Campbell [5] argued against Hollingworth and Foley, who contended that the effect of the whole over the sum of the parts is negligible. On the other hand structuralist thinkers like Kotnik [6] define structure as a pattern resulting from the network of formal relationships between the elements of a set and a topological structure like design is about the geometric organization of elements. To put it simply, the difference between the whole and the sum of the parts is also a mathematical construct and can be expressed in terms of mathematical relationships. Durfeld [7] defines structuralism as a rule based design process translated into mathematical algorithms and resolved. This takes us to Derrida's deconstruction theory, which has been extensively applied in architecture but hardly in machine design. The basic hypothesis of this theory is that there is nothing beyond the text , and the sub-text (or the gestalten) is also a construct of the text, which

can be deconstructed through the relationship and interdependence between (a) the binary of words i.e. rich-poor, strong-weak etc and (b) the signifier and the signified (the symbol and its meaning). But the dilemma of the structuralist approach lies in its inability to understand the process of transformation (Cruickshank) [8]. There have been attempts to resolve this dilemma with the help of ornamentality through rhythm. These attempts, though all these debates took place in the realm of architecture and urban planning, can be particularly seen in the design architecture of motorcycles, where a conscious attempt is made to create rhythm through the monotony of large number of components. The reality or the ultimate solution, as always lies in the synthesis of these two extreme positions. As we discussed earlier, Gestalts themselves can be treated as mathematical constructs and algorithms generated to understand the process of transformation.

2.2 Design Perspective of Emotions:

The response of human being to an artifact depends on his interaction with the artifact. The purpose of interface is to make usable an artifact, the functionality of which is otherwise not understandable. The happiness (resulting from this interface) involves appraising an interaction with product as motive consistent and/or as intrinsically pleasant and being certain about the motive consistency (Hekkert et al) [9]. The interface results in stimuli and stimulus congruence facilitates impression formation which finally affect consumer responses (Rompay et al) [10]. According to Norman [11], a human being perceives an object at three levels:

1. Visceral level, at which the object appeals to five human senses.
2. Behavioral level, at which emotions are generated due to the functional behavior of the object.
3. Reflective level, which appeals to the human brain conditioned by cultural experiences and thinking process.

The ecological evolution of motorcycle design can be understood only with the help of tools of semantic approach. In fact, the approach to motorcycle design itself has evolved over time. Though the semantic approach came in vogue only in 1987 with the publication of “The Semantic Turn” by Krippendorff [12], the evolution itself has been largely semantic since 1903, when the first motorcycle was commercially available. While talking of meanings of an artifact, as seen by designer and user, Krippendorff [12] categorizes them as meaning in use, meaning in

language and meaning in ecology. While considering the meaning of motorcycles in use as seen by the user, it amounts to (1) the interface of rider with the motorcycle, (2) the visual metaphors and (3) the affordances of the motorcycle as a whole and in parts. More important in this context is second order understanding of the motorcycle as a whole, in parts and in parts constituting the whole. According to Ross and Wensveen [13], aesthetic interaction is an interaction experienced with a product or system that (1) has practical use next to intrinsic value (2) has social and ethical dimensions (3) has satisfying dynamic form and (4) involves the whole human being. In such an interdisciplinary area of research, Rust [14] argues that research in creative areas like art (which in our case is product aesthetics); provide a point of departure for others. Methodology for such research must acknowledge the role of tacit transmission or knowledge of the viewer. So far as the role of emotions in design is concerned, Bo Young Kim et al [15] have established that with time emotional design has come to occupy the leading role in new product development. The traditional approach to design takes into account the functionality, the durability, the aesthetics, the manufacturing process and the cost into account where as the modern approach goes into history, geography, psychology, sociology and politics of the artifact besides the engineering, whereas Chitturi et al [16] define design as a tradeoff between hedonic and utilitarian benefits and preventive and promotional emotions. In context of a motorcycle this applies in an even more complexity. Literature on the emotional side of motorcycle has mostly dealt with revolution (Brodman) [17], its cultural context (Mackinny) [18], feminism (Koerner) [19], (Conner)[20] romanticism of cold pastoral (Biberman) [21] and social context (Lagergren) [22].In fact the relationship between motorcycle and revolution has been immortalized by the “Motorcycle Diaries” by Che Guevara [23]. But all these studies are mostly narrative in nature do not provide help in the context of scientific correlation. At the same time Karjalainen [24] provides a methodology to link the visual brand recognition of a product to explicit and implicit design cues. But this study does not offer a solution to link design cues to specific emotions

Going through the scientific studies, conducted on emotions, Chang [25] has identified five basic forms (aesthetic, bio, cultural, novelty and ideo) and 14 basic characteristics and compared their capacity to elicit pleasures. This study gives an insight into different types of forms but does not provide a method to relate them to different types of emotions. On the other hand Casakin [26] in his study on metaphors and creativity establishes that of all factors of creativity, innovation and utility are more correlated to metaphors than beauty and fluency, thus discounting a strong

relationship between emotions and metaphors. Desmet and Heckert [27] categorize the user product interaction as emotional experience, aesthetic experience and experience of meaning. They further argue that emotions result from users concern about the product.

For a motorcycle, behavioral emotions are to be matched with visceral and reflective emotions. To relate emotions generated by an object, Schifferstein and Zwartskruis-Pelgrim [28] have correlated the types of consumer's self with the meaning implied by the product and the emotions generated thereby. Whereas Crilly et al [29] have developed a model to correlate the designer's intent with consumers' emotional experience. Warrel [30] describes a method for form syntactic analysis consisting of four steps : (1) Selection of design elements to be studied (2) Generation and implementation of syntactic variations of selected design elements (3) Assess of visual effect achieved by each variation (4) Evaluation and conclusion regarding syntactic functionality.

Plutchik [31] (fig-2.1) has designed a three dimensional model to describe emotions, on the pattern of a color wheel, where coordinates r,θ represent the range of emotions and the third vertical dimension represents the shade of emotions. This model has the extreme shade of various emotions on the top circle and as we move downwards, we find lighter shades of the emotion. For example, we have grief on the top circle and moving downwards, we have sadness and pensiveness in that order. So, on the top circle we have the emotion and its intensity and on the third axis we have the shades. Another aspect of this model is the dividing line for each hue of emotion. Between the hue of grief and amazement, we have the dividing line of disapproval. Similarly, between the hue of amazement and terror, there is the dividing line of awe.

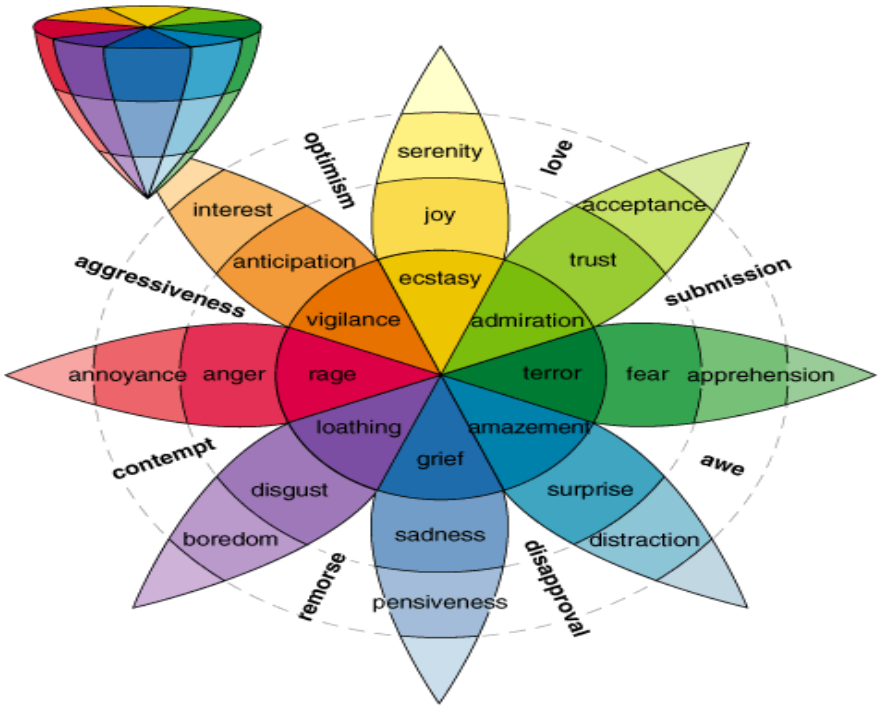


Fig 2.1, 3 Dimensional Model for Emotions by Plutchik [15]

In their paper on Psychology utilities and capabilities, authors Vitters et al [1] have discussed various models to accurately plot and quantify emotions and their respective strengths and weaknesses. They argue that the neurological model by Panksepp (Reubenstrunk)[32], where human emotions can be described as seven basic traits i.e. fear, anger, sorrow, anticipatory eagerness, sexual lust and maternal nurturance. The authors find this model neurologically adequate as it is coherent with the brain system but psychologically inadequate.

Vitters et al [1] then argue that the model offered by Communicative Theory of Emotions by Oatley and Johnson-Laird (Changeux) [33] gives a suitable perspective of basic emotions. The authors finally argue that besides neurological and psychological perspectives a third socially oriented perspective is required, which provided d by Russel and Barret model is known as Circumplex of Emotions. This model geometrically defines emotions in terms of two axes, i.e. deactivation to activation and unpleasant to pleasant.

From the above discussion we conclude that though the Plutchik model is most accurate to measure the exact hue and intensity of emotion, it is too complex for our purpose. The

neurological and psychological models are mathematically inadequate hence the Russel and Barret model is most appropriate.

Here, we observe an interesting convergence of ideas between different and seemingly unrelated disciplines i.e. design, psychology and literature. While going through 'Rasa-Siddhant' by Bharat, we come across the theory of generation of rasa (i.e. emotion), (Barlinge) [34].

"विभावानुभाव व्यभिचारी संयोगात् रस निष्पत्तिः।"

This defines three elements for generation of emotions:

a. विभावानुभाव: actions and situations generating emotions
b. व्यभिचारी: communication of emotions
c. संयोग: the first two elements combining with permanent emotions residing in the recipient

This means actions and situations stimulating an emotion are communicated to the recipient, where the codes for various emotions get activated after receiving the communication.

Further as Barlinge [34] quotes from 'Rasa Siddhant', Bharat defines the points of communication process for any art form:

a. कलाकार i.e. The artist
b. वस्तुनिष्ठ i.e. the creation or the work of art
c. सहृदय i.e. the recipient

This perfectly matches with the design process defined by Krippendorf [12], who identifies the three points of this process as:

a. The designer
b. The artifact
c. The user

But the most remarkable convergence is observed between Bharat and Watson and Tellegen, where Bharat defines 'siddhi' as basic element of 'rasa' having two types i.e. (a) 'manushi siddhi' (b)'daiviki siddhi' . The first one has two extremes- हर्ष and विषाद. The second one also has two extremes- भावातिरेक and आत्मलीन. These can be compared with the two axes of the circumplex of emotions- valence and activation.

Having established this convergence, the next point is to locate the emotions on the circumplex which means it is necessary to relatively quantify the elements of valence and activation for each

emotion. For this purpose two types of tools have been suggested in various studies- (1) Psycho-physiological tools and (2) Constructivist psychological tools.

(a) Psycho-physiological tools: Levy [35] categorizes these tools based on types of physiological responses:

   a. Central nervous responses through Electroencephalograms (EEG) or Functional Magnetic response Imagery (fMRI) or near-infrared spectroscopy.
   b. Peripheral responses like heart-beats using electrocardiograms (ECG) or body temperature through infrared thermography.
   c. Motor responses like eye-movements and pupil dilatation through electromyography: Rauterberg [36] also talks about EEG and fMRI to monitor brain activity variations but prefers electromyography as more practical.

Wollmer et al [37] in his paper introduces a new technique for continuous emotion recognition in a 3D space spanned by activation, valence and time using Long Short Term Memory Recurrent Neural Networks (LSTM-RNN) finds it better than another technique called Support-vector-regression (SVR) as the former gives results matching to human perception.

Dzogang et al [38] mapped the central nervous responses conducting two different exercises. In first one, two songs ‘Ode to Joy’ that was full of love and happiness, and a sad song ‘You are not Alone’ were used for mapping valence and activation. In another exercise, a movie ‘Little Miss Sunshine’ was fragmented into 24 sequences with different emotions and each sequence was mapped for valence and activation. We translated the results in following table on a scale of 1 to10.

Exercise-1

Table-2.1, Dzogang's Valence and Activation Mapping for Songs

Song	Emotion	Score	
		Valence	Activation
Ode to Joy	Love, happiness	10	5
You are not Alone	Sorrow	4	2

Exercise-2

Table-2.2, Dzogang's Valence and Activation Mapping for Movie Sequences

Sequence	Emotion	Score	
		Valence	Activation
3	Anger	4	8
5	Anger	4	9
7	Courage	5	10
8	Anger	4	7
9	Sorrow	6	2
11	Revulsion	3	7
13	Love	10	5
14	Wonder	7	6
15	Anger	4	6
16	Anger	4	8
18	Ugliness, hatred	1	5
20	Humour	8	3
23	Introspection, Quiet	4	1

(The sequences 1, 2, 4 etc have not been discussed in the paper)

(b) Constructivist psychological tools: For this we conducted a small experiment with college professors (at Dronacharya College, Gurgaon) specializing in Hindi literature, well versed in rasa-siddhant and with intricacies of poetry. They were given poems representing different emotions and were asked to rate the elements of Aanand (pleasure)] uttejanaa (arousal) on a scale of 1 to 10. The results were tabulated as follows:

Table-2.3, Estimation of Valence and Activation for Poems

Poem	Emotion (Rasa)	Score	
		Valence	Activation
मैं नीर भरी दुख की बदली -महादेवी	Karun	3	2
मर्त्य मानव की विजय का तूर्य हूं मैं- दिनकर	Veer	4	8
बीती विभावरी जाग री- प्रसाद	Shaant	5	1
एनार्की- दिनकर	Haasya	8	2
कह दो शंकर से आज करें -दिनकर	Raudra	3	8
प्रभु तुम कर दो वमन- नागार्जुन	Vibhatsa	2	6
धीर समीरे यमुना तीरे -जयदेव	Shringaara	10	5
मानस में लंका दहन- तुलसीदास	Adbhuta	8	8

Now if we superimpose Bharata's rasa-siddhant on to Russel's emotion wheel using the above results, the nine rasas are mapped on the two coordinates of valence and activation as shown (fig-4).

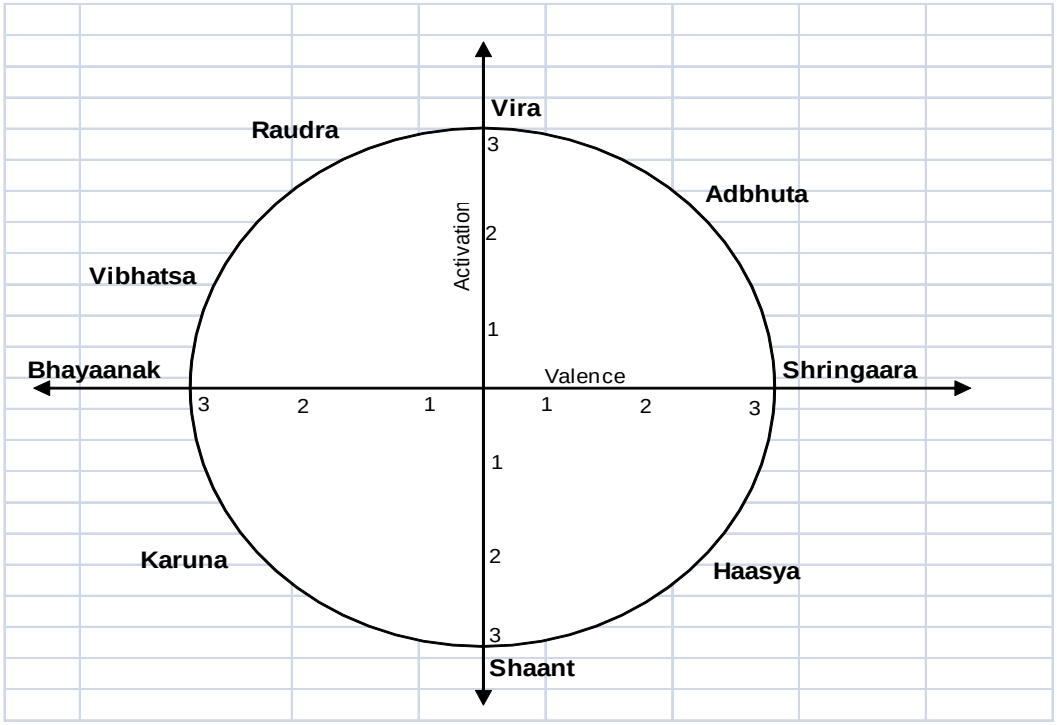


Fig -2.2, Rasas on Russel's emotion wheel

From the designer's perspective, it can be safely concluded that no designer designs a motorcycle with the emotions 'Bhayanak', 'Vibhatsa', "Karuna' and 'Haasya'. Now the emotion 'Adbhuta' relates to the element of wonder, which in essentially the result of novelty of other emotions. So this emotion is a derivative of other emotion. So we are now left with the emotions of Shaant (which can be translated as 'Sober' in context of motorcycle, Shringaara (Glamour), Vira (Dynamism, and Raudra (Intimidation).

Having established the basis for quantification of emotions, another challenge remains for an artifact designer – that of relating the emotional coordinates to the market value, he seeks to generate. This is an extremely complex area due to the vagaries of subjectivity, cultural, geographic and demographic variations. Prinz [39] identifies three elements here which are different but related – emotion, appreciation and aesthetic value. They are related as emotion plays a role in directing our aesthetic preferences and appreciation is an emotional state. But, ironically, there can be situation where one can appreciate without being emotional and conversely, emotions can be generated without appreciation. Lee et al [40] add a fourth dimension to this three dimensional paradigm – that of culture. Now, any artifact used by a user is a cultural object, which is defined by the authors as:

"Cultural products are the final outcome, produced in the process of industrial activity using cultural materials. It is an idea-intensive and technology-intensive undertaking to produce high value added products. As a product of culture, technology and creation, it has the characteristics of multiplicity, diversity and high added value."

The authors then classify the cultural products as endogenous (which use the cultural identities) and exogenous (which generate their own cultural identities e.g. Harley Davidson, which has become an icon of American culture).

Now this four-dimensional paradigm of value, emotion, appreciation and culture gives us an insight into the complex web of relationships leading to the artifact's aesthetic value in market-place. Among those, who have tried to translate these relationships into mathematical algorithms, Carter [41] has suggested that various stake-holders in the product have to be taken on board and their responses have to be summed up giving due weightage. Schummer et al [42] enumerate three basic elements for determination of aesthetic value- symmetry, mathematical simplicity and style of experimentation. But they don't provide a mathematical model. Jones et al [43] have indeed given an equation for visual quality, but in context of a township.

$VQ = (I+V+Q)/3$ (2.1)

Where VQ= Visual quality I= Intactness V= Vividness U= Unity

They further quantify the change in visual quality (before and after) as

$R= (VQ_{Final}- VQ_{Initial})/VQ_{Initial}$ (2.2)

Where

R= Ratio of change in visual quality

The visual impact measured at given viewpoints is

Visual Impact= R.P (2.3)

Where

P=Population viewer contacts per year.

The problem with this methodology in context of motorcycles and the scope of our study is twofold:

1. It considers visual quality completely unrelated to emotions.
2. Market segmentations of motorcycles are not taken into considerations. As this method applies the same yardstick to all motorcycles.

A significant study was conducted by Grimm [44] for quantification of aesthetic value in context of wind farm landscape. Here, the author has formulated the following quasi-static parameters:

1. Visual Landscape Character Value (VCLV) : Here the whole landscape is looked from various viewpoints and assessed in terms of:
    a. Relief: Complexity of topographic variation
    b. Vegetation Cover: Vegetation extent and potential to screen and cover views
    c. Infrastructure and built form
    d. Culture landscape

    Each parameter is defined on an objective scale of 0 to 9 and overall character is summed up both as percentage and out of 20 as an aggregate for each viewpoint.
2. Detailed Visual Effect of Development Form (VEDF): Here also the visual effect of the development (the differential of with and without the development) is assessed in terms of :
        1. Horizontal Visual Effect
        2. Vertical Visual Effect
        3. Distance visual effect

Each effect is calculated in terms of with and without and differential percentage is averaged.

3. Percentage of Visual Change (PVC): This is the co-efficient of visual change to the baseline VCLV for each viewpoint i.e.

   PVC= VEDF (as percentage). VCLV (expressed as value out of 20)

Though this method is quite objective and least influenced by subjectivity, here also we face the same problem as that for Jones method i.e. - (1) No relation to emotions and (2) No relation to market segmentation.

Since the studies conducted so far does not fit in case of motorcycles where value is to derived from emotions based on market segmentation, let us refer back to equation (1.2),

$V_{aesthetic} = f(r, \theta)$

$= f[r]_{s,g,d,i}$ (2.4)

Here, we have to make an assumption, that before the design process starts, the marketers define $[r]_{s, g, d, i}$ to ensure that the product is able to generate the desired emotions leading to desired appreciation leading to desired value proposition for the customer. Now if the designer is able to generate exactly the same emotional coordinates through his creation, he is able to generate the aesthetic value of 1 which we decide to be maximum value on the scale. Deciding 0 to be minimum value on the same scale, we can mathematically decide the relationship as

$V_{aesthetic} = 1 - ([\sum \delta r]_{s, g, d, i} / [\sum r_{max}]_{s, g, d, i})$ (2.5)

Where

$$\delta r = \left[\left| r_{desired} - r_{actual} \right| \right]_{s, g, d, i}$$

i.e. $\delta r = \left[\left| r_{desired} - r_{actual} \right| \right]_s + \left[\left| r_{desired} - r_{actual} \right| \right]_g +$ ----------

(Please note here that δr is the differential of desired and actual value irrespective of positive or negative signs. This caution is essential to ensure positive and negative values do not balance out.)

And

$$[\sum r_{max}]_{s,g,d,i} = 3+ 3+ 3+ 3 = 12$$

So we have

$$V_{aesthetic} = 1- ([\sum \delta r]_{s,g,d,i} / 12) \qquad (2.6)$$

Using this equation, the designer can estimate the aesthetic value mathematically on a scale of 0 to 1.

To summarize the discussion, the logical sequence of the discussion can be represented by a block diagram:

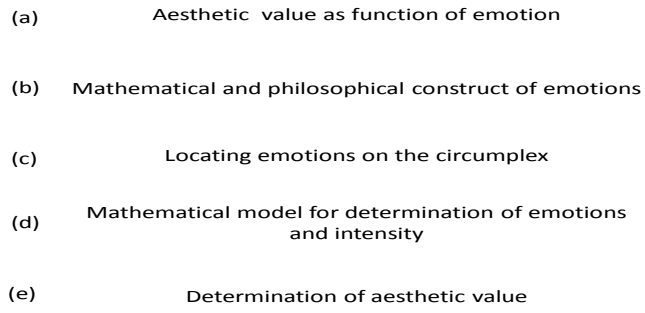


Fig -2.3, Steps for Deriving Aesthetic Value

All the above steps need a separate study, the scope of this study is block (d), i.e. deriving a methodology to determine the intensity of emotions generated by a motorcycle.

As we have seen that the emotion coordinates of an artifact are in fact continuums between opposites. In this study we will identify the predominant emotions applicable for motorcycles and will characterize different class of motorcycle through co-ordinates represented by these emotions. Then we will identify the chief design attributes in motorcycles contributing to these emotions.

2.3 Design Method:

Various models have been developed to synthesize the creative process relating to cognitive psychology and engineering design. Howard et al [45], after comparing these models has prescribed his own divergent-convergent model, where he has defined three basic elements for

creative output- originality, appropriateness and a third element, which is unexpected, unobvious and involves leap change. But this model does not account for the elements of emotions in design.

Kansei Engineering System, a methodology to develop the engineering attributes from the emotional requirements of an artifact is a useful tool in this direction. Nagamachi [46] explains the following diagram as the basis of Kansei Engineering.

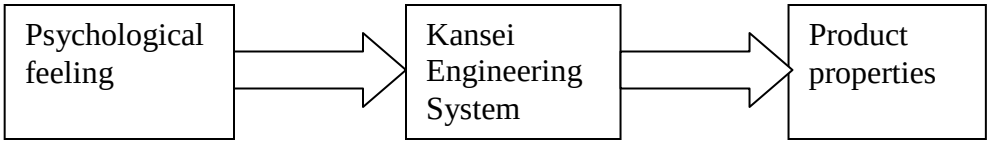


Fig 2.4: Kansei Engineering Framework

Schutte [47] explains the following different approaches to Kansei engineering:

(a)Approach 1: Category classification

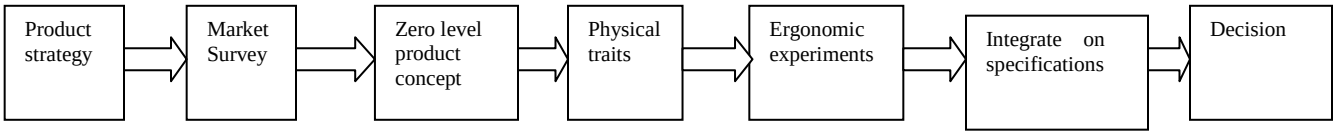


Fig 2.5: Approach 1

This is the traditional approach, where the product strategy outlined by marketing is translated into product concepts after market survey, which is later defined in terms of physical traits. After conducting ergonomic experiments, these traits are translated into quantitative specifications leading to the final design.

(b) Approach 2:Kansei Engineering System

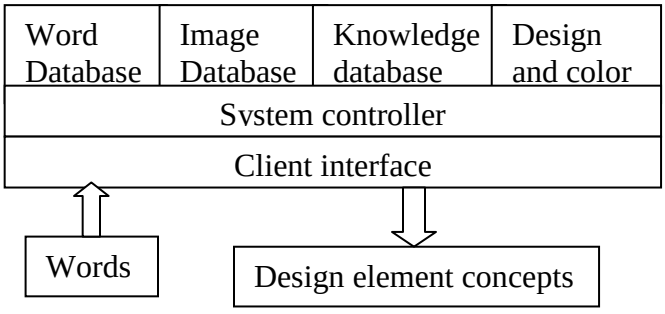


Fig 2.6: Approach 2

This approach is useful in catering to clients where a system maintains a database of keywords, images, knowledge of technology and processes and various designs and colors. The client provides the feedback in terms of his reactions and gets the outcome in terms of design concepts.

(c) Approach 3: Hybrid KES

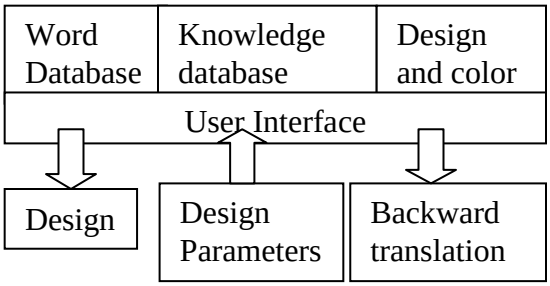


Fig 2.7: Approach 3

This approach deals with the mass market, where the designer interfaces with users directly with a database words, knowledge, design and colors to establish relationship between them. With the help of the users themselves, he establishes relationship between users' feelings and the design as a backward translation which he uses to create the design.

(d) Approach 4: Mathematical modeling

(e) Approach 5: Virtual Kansei Engineering

(f) Approach 6: Collaborative Kansei Engineering System

Bouchard et al [48] describe KES as a 3 stage process involving information, generation and evaluation phases and explores the possibility of using conjoint trend analysis for the purpose. In our case instead of using trend boards, we have identified basic trends for creating images of motorcycles for weightage study and impact of unity and dynamism on characters. Schutte [49] has done a similar study to use KES for evaluating 3 trucks w.r.t an ideal one. Here our purpose is to create a general purpose design framework for motorcycles using KES. Hence have chosen hybrid KES (approach 3) as our method.

2.4 Conclusions and Summary

Going through the available material on quantitative interpretation of aesthetics, we can summarize the results as follows:

1. There are two theories for relating the overall emotions generated by an artifact to elements of design- Gestalt theory and structuralist theory. The later have evolved to co-opt the elements of gestalt theory as well and hence is well equipped to deal with the problem of quantifying aesthetics.
2. The study of modern neuro-psychology and ancient Indian literature concludes that emotions can be expressed mathematically on two rectangular co-ordinates- valence and activation and can be expressed as polar co-ordinates- emotions or rasas (expressed as θ) and intensity (expressed as r). The nine rasas, as enumerated by Bharata's natya-shastra, provide the basic foundation for quantifying emotions and are plotted as various values of θ.
3. The Kansei Engineering System (KES) provides the basic framework for relating the desired emotions into the design of an artifact, where the prospective users have to be included in the design process itself.
4. The methods available till now, to relate the design factors to calculate the aesthetic parameters are not sufficient in context of motorcycles, which is too complex for these methods.

2.5. Gap in research:

Till now based on research material publicly available work has been done in following areas:

1. Different aspects of design relating the user's emotions, ways to express them and plot them as mathematical coordinates.
2. Very clear definition of color and form to express them as mathematical entities.
3. Work on wind resistance particularly at very high speeds and determination of drag coefficients (Reeve) [50].

With the above studies we have not been able to establish, which forms the scope of this thesis:

1. The exact design factors, which contribute to the emotions generated by a motorcycle.
2. The sub-factors for each design factor.
3. The elements, which help in quantitative determination of emotions generated by each design factor and sub-factor.
4. The quantitative weightage of each design factor's contribution to emotional coordinates of a motorcycle.
5. A method to aggregate the impact of these factors on each part of motorcycle to get the combined emotional quotient of motorcycle.
6. A particular part of a motorcycle is combination of colors and forms. A methodology to aggregate these impacts is not available.
7. A method to translate the semantics of a motorcycle into a mathematical entity is not available. Semantics itself is a combination of character of the motorcycle and the features. What we are looking for is a way to combine the effects of all the above into one single coordinate.

Chapter3: Design Factors Affecting Emotions

Introduction

Referring to fig-2.2 in chapter-2, once we have determined the emotions representing θ in context of a motorcycle i.e. glamour (θ=0), dynamism (θ=90), Intimidating (θ=120) and sober (θ=270), we face the task of determining the intensities of these emotions i.e. 'r'. Since the intensities for these emotions, i.e. s (sober), g (glamour), d (dynamism) and i (intimidation), is the weighted sum of different factors we can express it in terms of an equation:

$$[r]_{s,g,d,i} = [\sum w_x r_x]_{s,g,d,I} \qquad (3.1)$$

Where 'w' is the weightage for various design factors and 'x', represents various design factors which we will establish in subsequent chapters.

Again, r_x for a design factor also is a weighted sum of different sub factors, the equation can be further broken down into:

$$[r_x]_{s,g,d,i} = [\sum w_a r_{xa}]_{s,g,d,i} \qquad (3.2)$$

Where 'a' represents various design factors which we will establish in this chapter.

Now what are these factors, which determine the emotional coordinates of a motorcycle? One is of course, the context of the motorcycle i.e. the type of motorcycle and the features therein. Several authors like Leborg[51], Reid[52], Young[53] and Elam[54] have enumerated and defined these factors as color, form, Unity, dynamism, visual balance , symmetry etc.

3.1 Context:

Zangwill [55] in his article "Music, Metaphor and Emotion" contrasts the two theories of relationships between object and emotion namely literalism (where emotion is direct literal product of the object) and metaphorism (where emotion is a derivative of object's metaphorical implications) and argues in favor of the later. At the same time Carrol [56] in his article "Limits of sublime, sublime of limits: Hermenutics as a critic of postmodern sublime", prefers the subliminal approach of affirmative openness of meaning on joyous sublime to the immanent approach of refusing to refer beyond itself i.e. negative constriction of arts meaning-function. Simplifying both the above arguments boils down to the fact that emotion generated by an object is the product of metaphors it evokes. In context of a motorcycle, these metaphors vary depending on the following three factors:

a. Type and construction of motorcycle i.e. cruiser, commuter or sports

b. Front facia of the motorcycle constituting the head light, speedometer and visor

c. Type and size of the wheel

3.2 Color:

Color has two aspects, technical and psychological. Technically there are three models available to mathematically quantify a color- Munsell's [57], Prang's [58] and Ostwald's [59]. All the three models express a given colors in terms of different scales. Most popular among them is Munssel's color wheel, which expresses color in terms of three scales-hue, value and chroma. The psychological aspect of color is in fact complex and is to be seen in context of socio-cultural milieus of a society.

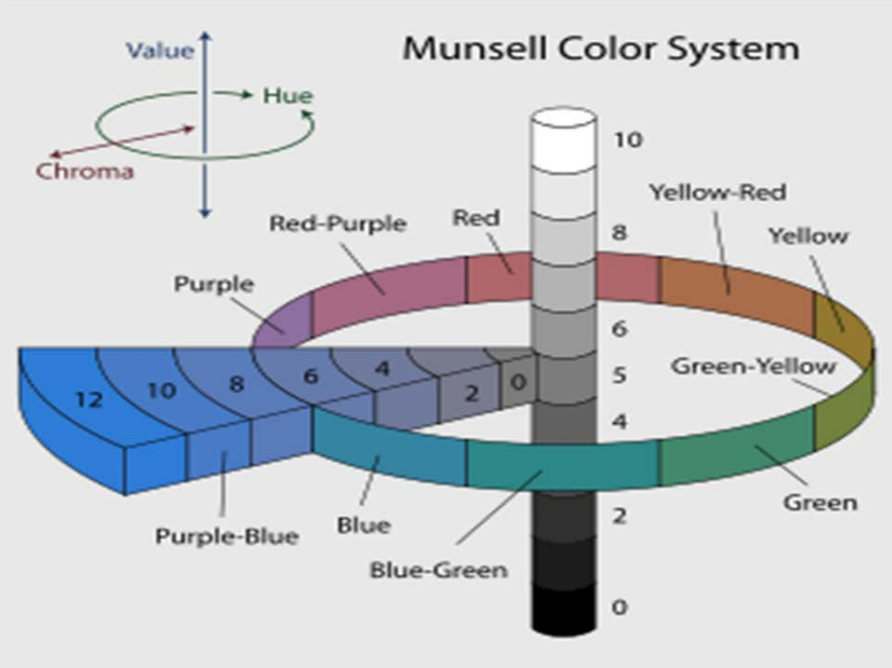


Fig -3.1, Munsell's Color Wheel

From manufacturing perspective, color is a product either the coating process or finishing process (in case of uncoated parts). For plastics it comes either from pigmenting (in-mould colors) or painting. For metallic surfaces it comes either from plating or painting. In some cases, it is the natural color of the material itself.

But the visual impact of color is always coupled with the visual impact of the surface texture. Zuo and Jones [60] define texture on two planes- technological and perceptual. Technologically, as the term 'texture' is known in material science, it means a particular

orientation distribution in microstructure. They go on to define the perceived texture as “the synthesis of physiological and psychological responses to the geometrical configuration (of microstructure) and the physical-chemical attributes of the surface”. These two definitions are related as the perception is a result of geometrical configuration, but for our purpose, we will go with the definition of perceived texture only as the very purpose of this study is to know the perceptual impact.

In context of motorcycles, the textures of surfaces can be roughly classified as- plain, rough and glossy. (It is a very rough classification, but if we go into finer classifications, it will need a separate study, outside the scope of this study. Moreover, with more classifications, the number of permutations and combinations along with colors will become too unwieldy for a survey). These texture result from two sources:

(a) Coatings and finishing on metallic surfaces: Chrome plating generated gloss. Zink plating generates glossy or plain textures. Paints generate glossy or plain textures. Powder coating generates all three kinds of surfaces. Moreover, the texture depends also on the surface finish of the surface.

(b) Coatings and finishing on plastic surfaces: Plastics are pigmented, painted or plated. In case of pigmenting, the texture depends on die-polishing and grain-finish. In case of painting, it can be solid or glossy depending on the type of paint. Plating on plastics generates gloss.

The visual impact of texture on emotions can be studied only in combination with colors.

3.3 Form:

Sukhatme [61] and designer Reid[52] classify the forms in two basic categories- geometric and organic which have a bearing on emotional aspect of an object. Mathematically any surface consisting of curves defined by more than one equation is organic surface. But a motorcycle is not a single surface. It is formed by many objects, each of which is a combination of many surfaces. How these surfaces relate to each other is a major factor contributing to the emotion it generates. All the visible parts of a motorcycle can be divided in two categories, those constituting the style of a bike and the visible functional parts. Sure, the functional parts also play a major role in deciding the character of a motorcycle, but that aspect is covered in the

factor ‘context’. Here the styling parts, where form is designed to evoke an emotion are visor, fuel tank, side cover and seat.

3.4 Unity:

Both Young [53] and Elam [54] have defined unity, dynamism and symmetry as significant visual factors. Whereas symmetry is inherent in the motorcycle design as the left and right side are always symmetric, unity and dynamism are complex concepts which need to be geometrically defined in the context of motorcycles. McClurg-Genevese [62] defines unity as a concept that describes the relationship between individual parts and the whole of a composition. Jirousek [63] defines it as an underlying principle that refers to the coherence of the whole, the sense that all of the parts are working together to achieve a common result. Lauer et al [64] define unity of design as a concept wherein a congruity or agreement exists among the elements in a design; as though a visual connection beyond mere chance has caused them to come together. Zelanski et al [65] define it as a property of art or design, where the whole will seem to be more than the sum of its parts

Unity in the context of motorcycle can be defined as the mutual compatibility between five factors- unity of form, continuity of parts, character lines, feature lines and graphics:

a. Unity of form: Two objects are having unity of form if they have either similar or complimentary forms. Form, as we know are either geometric or organic; can have one or more surface with positive –positive or positive-negative spaces. Besides the similarity or complementation should be visibly distinct. The illustration below is a good example of unity of form where all elements are having different sizes and colors but are having same form.

Fig -3.2, Example of Unity of Form

b. Continuity: When two objects appear to be extensions of each other visually and coherently, they have continuity. The motorcycle illustration below gives a good example of continuity, where fuel tank, seat, side cover and rear cowl appear as extensions of each other.

Fig -3.3, Continuity, Character Lines and Feature Lines

c. Feature lines: Feature lines are lines formed by visible boundaries of parts.
d. Character lines: Character lines are distinctly visible lines formed by intersection between two surfaces.
e. Graphics: Graphics, as we know are visual predominantly two dimensional images added to the visible surfaces.

Unity of design in a complex machine can be derived by combination of above parameters and unity between these parameters themselves.

3.5. **Dynamism**:

One important factor needs to be noted. Motorcycle is a dynamic object and its dynamism cannot be established merely on the basis of static visual factors. The experience that a rider gets while driving the motorcycle plays an important role in evaluating the dynamism inherent in a vehicle. But, these aspects get covered in the ‘context‘ factor, where the type of motorcycle covers the engine performance, acceleration and the rider’s posture.

Therefore in this section, we cover only the visual aspect of dynamism. Visually dynamism can be defined as the element of visual tension created by the impression that the visual we are seeing is not going to remain static and something is going to change immediately. This tension is generated by three elements of the visual:

a. The divergence and alignment of lines: We will call it visual dynamism. We can illustrate this example by contrasting the image of a standing tiger with a galloping tiger. Whereas in the first case the four legs of the tiger as vertically parallel and the torso is horizontal, in the case of the galloping tiger the four legs are diverging and the torso is inclined upwards in the direction of the movement. This divergence immediately makes us feel the possibility of imminent change. Here also character lines, feature lines and graphics play an important role. But, what matters more here is their orientation and alignment with each other.
b. The visual impression of centre of gravity: This impression is generated by the height and length ratio. The more is this ratio, the more is the perceived height of the centre of gravity and thus the possibility of falling.
c. The visual imbalance: Any balanced visual gives us the sense of stability. Conversely, visual imbalance creates the sense of instability and hence generates the visual tension.

3.5.1. Balance

Visual balance results from two major factors- (a) Visual weight and (2) Visual direction.

a. Visual weight: It is the perceived weight of a visual element. It is a measure of how much; anything in a visual attracts the eye of the viewer.
b. Visual direction: It is the perceived direction of the visual forces. It is the direction we perceive an element to be moving in, if it was given a chance to move based on the forces acting on it.

This discussion on the visual direction takes us to the visual or optical centre which further takes us to symmetry. On the basis of symmetry, we can classify visual balance in two categories- (a) Symmetrical balance (2) Asymmetric balance. Since two terms are self-explanatory, we will not go into their definitions. What we can safely say (ignoring rare exceptions) is that all motorcycles are symmetrically balanced in top and front views along the centre-line. So what actually matters is the asymmetric balance in the side view. To determine this asymmetric balance we need to find the centre-line for which we need to find the centre. This takes to a very important question as to what is the centre.

Optical Centre: Objects and elements balance around a point which is the optical centre of image. Bradley [66] defines it as a point that attracts the viewer's eye unless it is pulled elsewhere. By default, the viewer's eye starts from the upper left of the image and travels towards the lower right, passing through the optical centre. The centre is the point of intersection between the path of this travel and the vertical geometric centre-line.

Now for mathematical quantification of visual balance, let us consider the analogy with mechanical balance. For an object to be mechanically balanced, the sum of moments of various elements should be zero. i.e.

$\sum m.r = 0$ where m= mass of element r= distance of the element from the centre

But in case of visual balance, the impact of an element on visual balance is inversely proportional to its distance from centre. So in this case

$\sum W/r=0$ Where W= total visual weight= wn where w= visual weight of unit size, n= number of units, r= distance of the element from optical centre

Finally, we come to the basic question of quantification of the visual weight of a unit size. Bradley [66] lists the following factors impacting the visual weight:

a. Color: As we have discussed elsewhere, color has three elements- hue, value and chroma. Steven assigns maximum weight to red and minimum to yellow and says that weight increases from cool to hot colors. Based on this we have the following scale (high to low from left to right.

Fig-3.4: Color Spectrum for visual Balance

Besides hue, the weight decreases with increasing value (darker color means more weight) and increases with chroma (deep color means more weight).

b. Value contrast: The same element has more weight when difference of values between figure and ground is more.

c. Roughness: Visual perception increases the weight, whereas it reduces with transparency. On a scale of high to low from left to right, it can be represented as follows:

Fig-3.5: Roughness Spectrum for Visual Balance

d. Space: Positive space increases the weight and negative space decreases it.

Based on the above considerations, following scale can be generated for the weight of a unit.

3.6. Graphics:

Though, graphics are not an engineering parameter in the strict definitive sense, it is an important contributor to the overall aesthetics of a motorcycle. Sometime it has been observed that the same motorcycle with different graphics revolutionizes its aesthetic character. Motorcycle graphics have two important elements- logo and illustrations. Sometimes, they are separated and sometimes integrated.

Logo: Logos are used to inform the user about the manufacturing company and the product name. But more than this purpose, they are important carriers of company and product's brand image. They are either three dimensional objects (either plastic or metallic) wrapped around a prominently visible parts.

Typography: The most important aspect of logo is its typography (both for model name and company name). Typography is a science developed through centuries and various typographical styles have evolved. The different stylistic aspects of typography, which decide the character of the bike, are:

a. The size
b. The continuity or flow
c. The sharpness of joints
d. The number of geometric elements
    a. The number of straight elements
    b. The number of curved elements

All these elements with their various combinations are covered in typographical styles evolved through years. Sarkar [67] describes these styles to be divided in four groups:

Table -3.1, Hierarchy of Typographical Styles

Classical	Text	
	Roman	Old Style
		Transitional
		Modern
Lineal	Sans Serif	
	Square Serif	
Fancy	Ornamental	
	Novelty	
Handwritten	Cursive	
	Script	

Starker further describes the criterion for choosing a typeface:

a. Appropriateness
b. Readability and legibility

The aspects which need to be decided for a typography design are:

a. Capital vs. lower case
b. Size
c. Spacing

Illustrations: They are two dimensional artistic illustrations on prominently visible areas of a motorcycle. They are either decals wrapped around parts or screen printings on the parts.

What impacts the visual aesthetics and determines the emotional character of the motorcycle is various combinations of logo and illustrations, their visual design concept and the color combinations.

3.7 Other Engineering Parameters:

Besides the visual parameters discussed above, the functional engineering parameters which also affect the aesthetics of a motorcycle are:

1. Wind Resistance
2. Engine specification

3. Environmental sustainability
4. Ergonomics
5. Structural Strength
6. Vehicle dynamics

3.7.1 Wind Resistance: Wind resistance of the vehicle is predominantly a function of front facial design. It is given by:

$$\mathbf{F_d = 1/2.\ C_{od}\ .A.D.v^2} \quad (3.3)$$

Where F_d=Wind resistance C_{od}=Drag coefficient A=Area D=Density of the medium v=velocity of the medium (Richard) [68]

Though the drag coefficient for the visor is largely dependent on the Reynolds number (R_e), the relationship is complex and varies for different shapes. But largely it can be said to be an inverse relationship. (Munson et al) [69-70]

Now, Re itself is a function of object shape, density (D), viscosity of the medium (n) and velocity of the medium (v) as given below:

$$\mathbf{R_e = DvL\ /n} \quad (3.4)$$

Where L= Length of contact between object and medium

For high turbulent flows, C_{od} becomes approximately constant and velocity becomes largely irrelevant, we conclude that C_{od} is largely a function of length of contact as D and n are independent of shape.

There are following engineering and aesthetic parameters and their inter-relationship with each other. All parameters have been placed on horizontal and vertical axis of the matrix and their dependence on other factors has been noted. If there is no dependence, it has been marked as 'X' and if there is a dependence, it has been marked with a relationship number e.g. R1, R2 etc. Of course the cells for the dependence of a factor with itself are empty.

Table -3.2, Correlation of Engineering Parameters for Front

	Frontal Area	Frontal Shape	Character lines	Unity	Dynamism	Wind resistance	Natural frequency
Frontal Area		x	x	x	x	R1	R2
Frontal Shape			R3	R4	R5	R6	R7
Character lines				R8	R9	X	X
Unity					X	X	X
Dynamism						X	X
Wind resistance							X
Natural frequency							

The relationships R2 and R7 are definitely technically affected by area and shape but they are not the major concerns as the natural frequency is controlled by thickness, and internal designing of mountings, ribs and lugs. If, natural frequency needs to be changed to avoid resonance, the designer concentrates on the above factors rather than changing the area and shape as they can have major consequences on aesthetic parameters.

The dependence of wind resistance of motorcycle on area and shape is controlled by following equation:

$F_d = ½ \rho C_d A u^2$ (3.5)

Where, F_d - force of drag, ρ - density of fluid, u - velocity of object relative to fluid, A - reference area, C_d - drag coefficient

Now, the area A in this equation is the total frontal area of which a major portion is taken by the rider's body. Moreover the visor area is very small compared to the overall frontal area as seen from the following table

Table -3.3, Relationship between Frontal Area and Visor Frontal Area

Model	Frontal area(Dm^2)	Visor frontal area(Dm2)	% of Visor area
CD-dlx	66	7.9	12
Glamour	78.8	10.4	13.2
Passion Plus	80	10	12.5
Splendor +	67	7.5	11.2

Since the total share of visor area is very small, the impact of shape on wind resistance is also very small and hence R2 an R7 can be ignored.

The remaining relationships can be seen from the following table

Table -3.4, Unity and Dynamism vs Frontal Area

	Character lines				Feature lines matching				Graphics matching			Unity level	Dynamism level	Area Dm^2
	None	Sharp /large fillet	Aligned with other lines	Diverging /straight/ curve	character line	Fuel tank	Seat	Side cover	Feature line	other graphics	Character line			
Hunk		S	Y	D	Y	Y	Y	Y	NA	NA	NA	3	3	38
Splendor +	o				NA	Y	N	N	Y	y	NA	2	1	28
CD-Deluxe	o				NA	Y	N	N	Y	N	NA	2	1	17
TVS Flame												2	2	24
TVS Star City												2	1	21
Passion Pro	o				NA	Y	N	Y	Y	Y	NA	3	1	30
Splendor NXG	o				NA	Y	N	Y	Y	Y	NA	2	1	
Glamour		LF	Y	C	Y	Y	NA	Y	Y	Y	Y	3	1	31
Discover		LF	Y	D	Y	Y	N	N	Y	N	Y	2	2	28
CBZ		S	Y	D	Y	Y	Y	Y	Y	Y	Y	3	2	30
Pulser		S	Y	D	Y	N	N	N	NA	NA	NA	2	3	26
Apache		S	Y	D	Y	Y	Y	Y	NA	NA	NA	2	3	23
		S: Sharp Fillet LF: Large fillet C: Curve D: Diverging												

It can clearly be observed that character lines and feature lines of the visor are greatly influencing the overall unity and dynamism levels of the vehicle. Whereas area has got an indirect relationship with unity where vehicles with a unity level of 2 have a range of 17-28 Dm^2 and those with a unity level 3 have area in the range from 30-38 Dm^2. Similarly vehicle with dynamism 1 have area range 17-28, with dynamism range 2 have area range 24-30 and those with dynamism level 3 have a range 26-38. So this is a very clearly identifiable trend.

Hence, whereas wind resistance as a factor does not affect significantly, the factors causing wind resistance like character and feature lines affect unity and dynamism, so they have been considered as elements of unity and dynamism.

3.7.2 Engine Specification:

In context of a motorcycle, the factors which affect the visual of a motorcycle are: the number of cylinder, cylinder size, the cylinder arrangement and the power and torque curve. So far as the first three are concerned, it gets covered by the context of a motorcycle. If it is a single cylinder, it is a lean sized motorcycle and in case of a multi-cylinder bike it is a bulky-sized motorcycle. But why should the power and torque curve be affecting the visual design. Here we can see the following diagram, where the peak torque/100cc (this is necessary for a comparison between engines of varying capacities) is plotted against crank-shaft rpm for various bikes (The values have been taken from their respective brochures)

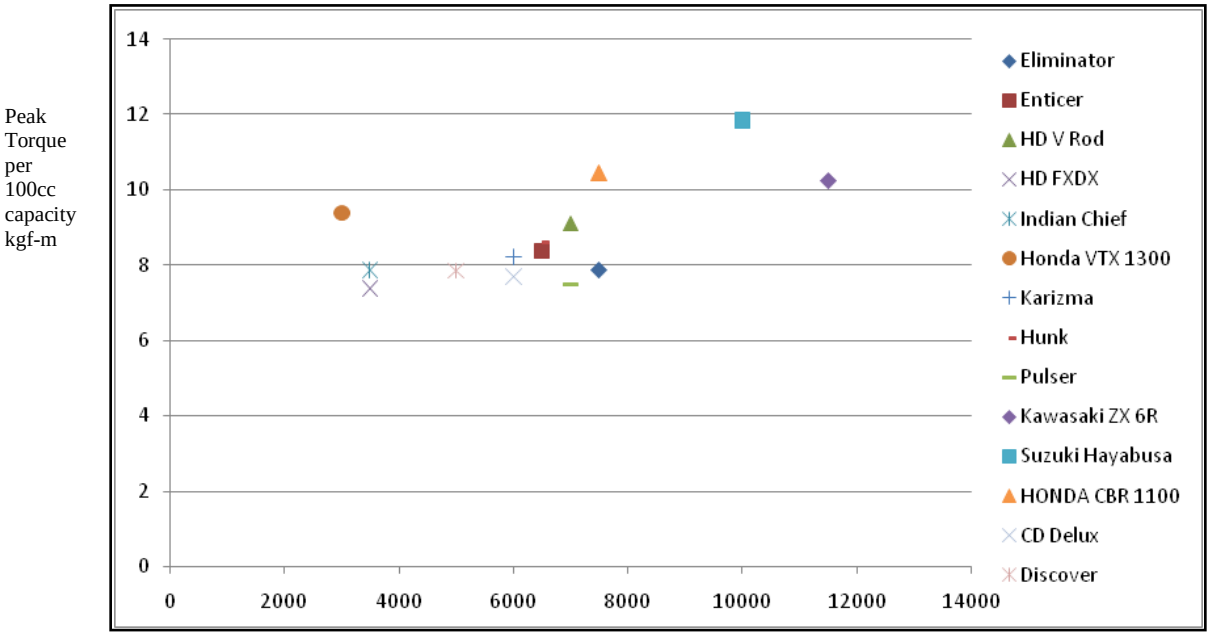


Fig-3.6: Peak Torque (per 100cc) vs Crankshaft Rpm

The sharp differentiation very clearly observed here is cruiser bikes like Harley Davidson FXDX, Indian Chief and Honda VTX 1300 have their peak torques at very low rpms, whereas high powered sports bikes have peak torques at very high rpms. The first category are generally V twin engines with higher bore and stroke and relatively lower compression ratio and the basic objective is to provide high gradeability without lowering the gears to match with the experiential narrative of relaxed feeling at high speeds. The second category bikes are generally four cylinder engines with lower bore and stroke and higher compression ratio, to provide high torque at very high speed to have maximum power, to match with the experiential narrative of

thrill and acceleration at high speeds .The bikes falling in the middle segment are single cylinder commuter bikes. One interesting interloper is Harley Davidson VRod, which is a cruiser designed to give a sporty performance. Another interesting observation is single cylinder Indian cruiser bikes like Enticer and Eliminator are actually designed to perform like a standard bike but the styling and ergonomics of a cruiser. Similarly Indian sports bikes like Pulsar and Karizma also are having styling and ergonomics of sports bike but perform like a standard bike. This shows that the engine characteristics have a strong bearing on the type of a bike i.e. cruiser, sports or standard. This, again, gets covered in the parameter of 'context'.

3.7.3. Environmental Sustainability:

Here we face some very basic questions relating to motorcycle emissions. Of all sustainability challenges, two aspects i.e. effects of pollutants on human health and ozone layer depletion dominate the debate. The transport emissions that affect human health are mainly CO, NO_X, HC, particulate matters; suspended particles, VOC_s and lead. Whereas lead has been prohibited, in context of motorcycles, it is CO, HC and NO_X that have been covered by regulations worldwide. But for ozone layer depletion it is CO_2 besides methane that constitutes the major chunk of greenhouse gases. Since methane is absent in motorcycle emissions, it is CO_2 which is the largest culprit in our context. Here we face a major paradox. Since two wheeler regulations today control CO, HC and NOX, all two wheeler manufacturers have adopted mostly three strategies to meet these regulations: (1) Replacing 2-stroke engines with 4-stroke engines (2). Air injection systems where additional air is injected into exhaust gases to oxidise CO to CO_2 thus reducing quantity of CO and (3) Catalytic converters in exhaust mufflers, so that the presence of catalyst in contact with exhaust gases cause CO to oxidise to CO_2

Ironically, all these countermeasures actually increase the amount of CO_2 in atmosphere, which is a major contributor to ozone layer depletion. Now lawmakers all over the world, particularly for car industry, have started concentrating on total carbon emissions, including CO_2. In the area of vehicle design, the major strategy is regulating improvements in fuel efficiency, for which the most potent countermeasure is reducing drag and weight. In fact the current trends in regulation emphasise on weight vs. CO_2 relationship as the diagram below (refer Fig-3.7) showing the regulatory framework for Europe as given in AEC Memo/07/597 [71]. Another joint study by TNO Science and Industry, Institute for European Environment Policy and Laboratory of Applied Thermodynamics (Goren) [72] enumerates the various countermeasures for cars and

their potential for CO_2 reduction, which says that CO_2 can be reduced up to 11% by drag and weight reduction.

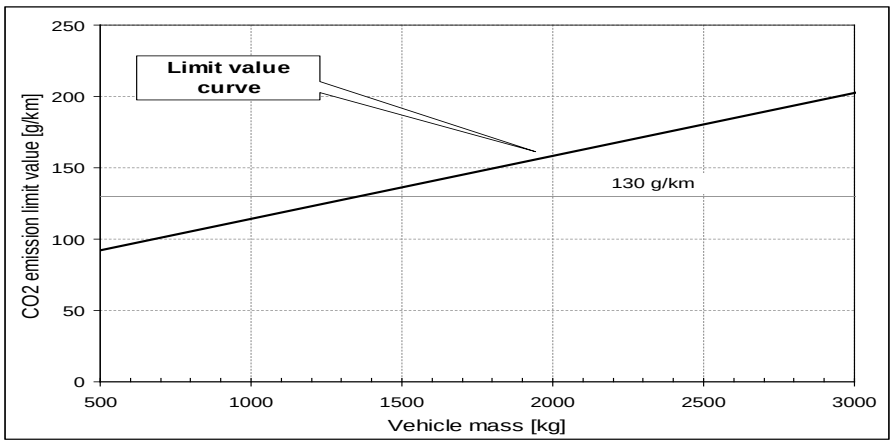


Fig 3.7: EC Regulatory Framework for CO_2

So long as the emphasis was on CO, the stylist had very little to do. But as soon as CO_2 becomes the target, both the parameters- drag and weight fall in the lap of the stylist. In the lifecycle of a motorcycle i.e. design-manufacturing-use-disposal, design is the focal point, which dictates the subsequent processes. Again, in the design cycle i.e. styling- engineering design-prototyping-testing, styling becomes central dictating the whole design cycle, which in turn dictates the lifecycle of motorcycle, which dictates the environment vs. growth equation of emerging economies.

Now the question that inevitably arises is how styling relates to sustainability. Or, in other words, what are those aspects of styling, which affect sustainability of life on earth. Let us consider different aspects of styling and see their effects on sustainability.

Table-3.5, Design Aspects and their Effects on Sustainability

Aspect	Effect	Remarks
Form	Dictates the amount of material which affects weight which affects fuel efficiency which affects carbon emission and use of natural resources	O
Colour	Dictates the amount of paints and plating and affects water air and soil contamination during manufacturing	O
Graphics	Dictates the use of non recyclable material.	O
Materials	Dictates weight , fuel efficiency, carbon emission and recyclability.	O
Surface treatment	Dictates the amount of paints and plating and affects water air and soil contamination during manufacturing	O
Body architecture	Dictates the amount of material which affects weight which affects fuel efficiency which affects carbon emission and use of natural resources	O
Unity	Does not affect directly	X
Dynamism	Does not affect directly	X
Balance	Does not affect directly	X
Gloss	Dictates the amount of paints and plating and affects water air and soil contamination during manufacturing	O
Texture	Dictates the amount of paints and plating and affects water air and soil contamination during manufacturing	O

The relationship needs to be explored further as to how, how much, when and where does a design affect the environment. The design of a motorcycle (or for that matter any artefact) essentially affect the sustainability of earth in three stages- manufacturing, use and disposal. The table (refer table-3.6) shows these aspects of manufacturing and their effects. Further, a World Bank study (Ksenia et al) [73] shows that besides automobiles, emissions from power plants are major global contributors to climate change. Moreover, as a planning commission strategy paper [73] shows coal based power plants will remain our major source of power in near future. All this makes it clear that not only motorcycle emissions contribute to climate change; the motorcycle manufacturing also is a major contributor.

Table-3.6: Effects of Manufacturing on Sustainability

Aspect	Effect on environment
Electricity consumption	Directly related to CO_2 as powerplants are mostly coal based in India and emit CO_2
Water consumption	Loss of water table and electyricity cosumption for extraction. Also affects availability for human consumption and vegetation.
Air pollution	Global warming, ozone layer depletion and effects on human health.
Water contamination	Effects on human health, vegetation and ecological cycle.
Soil contamination	Effects on human health, vegetation and ecological cycle.

During manufacturing, painting and plating are the two processes, which need more discussion due to their environmental impact. Not only does painting consume huge amounts of water and electricity (for curing ovens), they generate hazardous emissions in form of VOCs and waste (in form of sludge), contaminating groundwater and soil. Though, the new worldwide regulations bring down the emissions and wastes by using capital equipments (e.g. for reconversion of sludge to paint primers) or by using low solvent paints, better strategy is to eliminate painting altogether in styling stage by using (i) powder coating for sheet-metal external parts (ii) stainless steels or aluminium for frames and (iii) in-mould painted (pigmented) plastics (Howard et al) [75]. So far as plating is concerned, the most commonly used process in Nickel Chromium plating, which is already most energy efficient among plating processes (Brooman) [76]. Moreover, the more carcinogenic hexavalent chrome plating is already replaced by trivalent chrome by manufacturers (Ohio, EPA) [77] and the impact of hazardous waste is minimised by landfill, incinerators or deep well injections (Smukowski) [78]. Still, high energy and water consumption and the residual hazardous emissions and wastes make it imperative that we minimise chrome plating in our styling decisions my using more recyclable plastics and stainless steels. Similarly, direct or indirect effects of design in use and disposal phases can be seen in table (Ref table-3.7).

Table 3.7: Effects of Design in Use and Disposal Phase

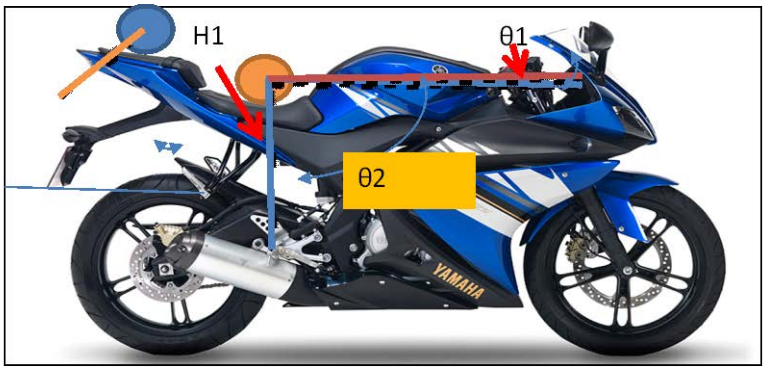
Aspect	Effect on environment
Consumption of resources	The material used in the motorcycle directly deplete the natural resources.
	Minerals: Iron ore, aluminium,chrome, nickel, manganese etc
	Plastics:Directly depletes the fossil fuels as plastcs are hydrocarbon products.
	Rubber: Vegetation
	Fuels: Directly depletes the fossil fuels.
Emissions	Pollutants emitted by the motorcycles directly affect the health of humans, animals and vegetation besides leading to ozone layer depletion, global warming and melting of glaciers leading to rising sea levels.
Recyclability	Use of non-recyclable like plastics results in non-biodegradability leading to depletion of resources and soil erosion.

Now, thereason we are discussing this issue here is to show that environmental concerns have a strong bearing on the visual design of a motorcycle. But the aspects getting affected by environment are covered by other factors like form , context, color and graphics. So we need not any other parameter.

3.7.4. Ergonomics:

Though, ergonomics covers the whole range of human interaction with machine, which includes, handling the switches, levers and mirrors, the vision analysis, mounting and dismounting comfort, the reach and clearances for the human organs and rider and pillion posture. But it is mainly it is the posture which affects the aesthetics - because other aspects relate to the finer engineering details and dimensions which do not affect the look, at least in a significant way. The posture of the rider depends on three points on the bike- the hip point located on the seat, the handle bar grip point and the rider’s foot peg. These points for various bikes form a triangle known as the ergonomic triangle of a bike and can be expressed in terms of two angles and a height. This triangle for various bikes is tabulated in the following table:

Table 3.8: Ergonomic Triangle for Bikes



Company	Model	θ1	θ2	h1
Hero Honda	CD-100	14.28	68.4	592.6
	SLEEK			
	STREET			
	CBZ	11.84	81.74	628.77
	PASSION+	17.00	70.35	621.99
	PASSION PRO	13.24	65	592
	SPLENDOR+	14.97	69.26	627.47
	SPLENDOR NXG	11.73	63.9	577
	SUPER SPLENDOR	14.14	17.02	621.18
	GLAMOUR	16.66	68.78	605.22
	CBZ EXTREME	12.51	77.8	579
	HUNK	12.85	78.8	574
	KARIZMA	8.24	50.8	578
	KARIZMA ZMR	8.24	50.8	578
Bajaj	Platina 100	12.84	57.6	560
	Platina 125	12.55	63.87	597
	Discover 100	12.84	57	545
	Discover 150	8.34	56.4	587
	Pulsar 150	8.63	65.8	579
	Pulsar 220	1	78.6	552
	Avenger 220	23	46.18	530
	Ninja 250R	6.29	78.03	548.11
	Ninja 650R	8.57	60.81	597.36
TVS Auto	Apache RTR FI 160	6.92	75.92	578.3
	Apache 160 Hyper Edge	6.92	75.92	578.3
	Apache RTR 180	2.2	72.6	561
	Flame 125	9.23	66.96	512.89
	Jive	15.94	66.46	629
	Star City	11.67	55.1	560
Yamaha India	V Max	21.83	71	618.68
	MT01	11.12	85.12	575.54
	YZF-R1	-6.50	66.1	618.26
	YZF-R15	1	81.63	565.58
	FZ	12.43	70.94	553
	FZ-1	9.64	81.36	561
	FZ-S	7.06	75.4	577
	Fazer	7.06	75.4	577
	SZ	11.76	79.79	606.35
	SZ-R	11.76	79.79	606.35
	SZ-X	11.76	79.79	606.35
	YBR-110	18.54	66.13	578.31
	YBR-125	16.19	64.15	600.89
	Crux	18	67.67	597.5

Comparison of these ergonomic triangles results into an interesting insight into the design attributes. There is a clear distinction of postures for three types of bikes. Whereas for cruiser

bikes (e.g. Avenger), θ_1 is highest and $\theta_{2\ is}$ lowest, for sports bikes like pulsar or Ninza, the case is just the opposite. The standard bike, lie somewhere midway. This trend is shown in the diagram shown below.

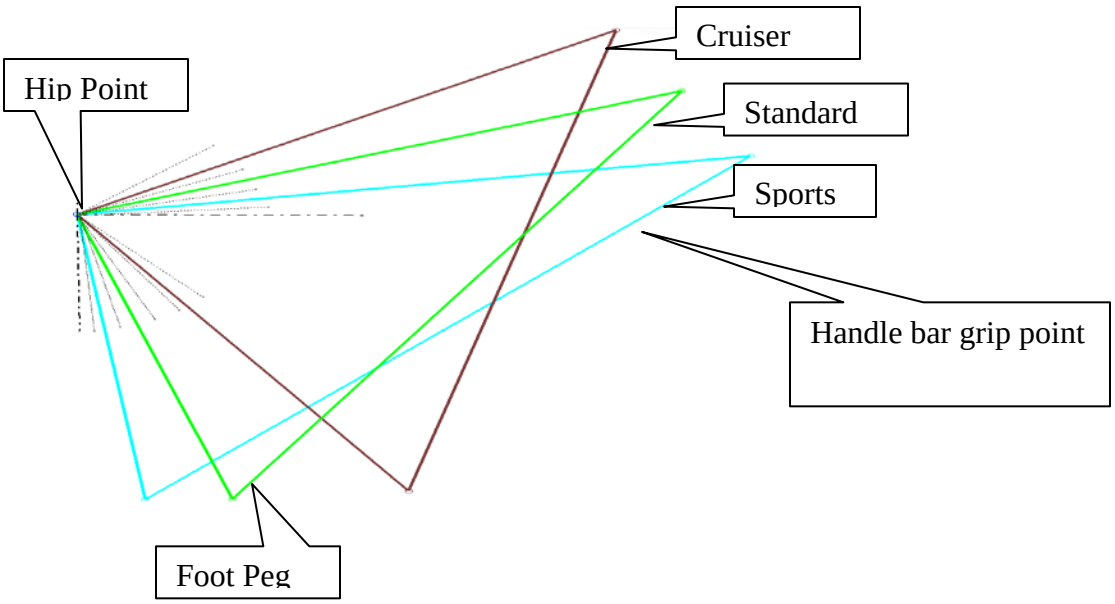


Fig 3.8: Comparison of Ergonomic Triangles

This analysis ultimately concludes that the aesthetic aspect of ergonomics can be decided by the type of the bike i.e. cruiser, sports or standard.

3.7.5. Structural Strength:

The component, single-handedly responsible for the structural strength is frame-body. In the following table, the types of frames used for various bikes are tabulated:

Table 3.9: Frames for Bikes

		Engine			Frame
Company	Model	Capacity	Cyl qty	Orientation	
Hero Honda	CD Dlx	97	1	Horizontal	Tubular Double Cradle
	Passion+	97	1	Horizontal	Tubular Double Cradle
	Passion Pro	97	1	Horizontal	Tubular Double Cradle
	Splendor+	97	1	Horizontal	Tubular Double Cradle
	Splendor NXG	97	1	Horizontal	Tubular Double Cradle
	Super Splendor	125	1	Horizontal	Tubular Double Cradle
	Glamour	125	1	Horizontal	Tubular Double Cradle
	CBZ Extreme	149.2	1	Vertical	Tubular, Diamond, stressed engine
	Hunk	149.2	1	Vertical	Tubular, Diamond, stressed engine
	Karizma	223	1	Vertical	Tubular, Diamond, stressed engine
	Karizma ZMR	223	1	Vertical	Tubular, Diamond, stressed engine
Bajaj	Platina 100	99	1	Vertical	Single down tube
	Platina 125	125	1	Vertical	Single down tube
	Discover 100	94	1	Vertical	Single down tube
	Discover 150	145	1	Vertical	Single down tube
	Pulsar 150	149	1	Vertical	Single down tube
	Pulsar 220	220	1	Vertical	Single down tube
	Avenger 220	220	1	Vertical	Single down tube
	Ninja 250R				
	Ninja 650R	649	2	Vertical	
TVS Auto	Apache RTR FI 160	160	1	Vertical	Double cradle
	Apache 160 Hyper Edge	160	1	Vertical	Double cradle
	Apache RTR 180	180	1	Vertical	Double cradle
	Flame 125	125	1	Vertical	Single down tube
	Star City	100	1	Vertical	Single down tube
Yamaha India	V Max	1679	4	V	Al-diamond
	MT01	1670	2	V	Al-double cradle
	YZF-R1	998	4	V	Diamond
	YZF-R15	150	1	Vertical	Delta-box
	FZ-1	998	4	V	Diamond
	FZ-S	153	1	Vertical	Diamond
	Fazer	153	1	Vertical	Diamond
	SZ	153	1	Vertical	Diamond
	SZ-R	153	1	Vertical	Diamond
	SZ-X	153	1	Vertical	Diamond
	YBR-110	106	1	Vertical	Double cradle
	YBR-125	123	1	Vertical	Diamond
	Crux	106	1	Vertical	Double cradle
Royal Enfield	Bullet 350 Twinspark	346	1	Vertical	Single down tube , stressed engine
	Bullet 500	499	1	Vertical	Single down tube , stressed engine
	Bullet Electra 350 Twinspark	346	1	Vertical	Single down tube , stressed engine
	Bullet Electra Del	499	1	Vertical	Single down tube , stressed engine
	Classic 500	499	1	Vertical	Single down tube , stressed engine
	Classic 350	346	1	Vertical	Single down tube , stressed engine
Ducati	Superbike	1198	2		Trellis
	Hypermotard	1100	2		Trellis
	Monster	1100	2		Trellis
	Multistrada	1200	2		Trellis
	Streetfighter	1200	2		Trellis
Harley Davidson	Super Low	883	2		Tubular-down tube
	Iron	883	2		Tubular-down tube
	Sportster	883	2		Tubular-down tube
	Nightster	1200	2		Tubular-down tube
	XR 1200X	1200	2		Tubular-down tube
	Roadster	883	2		Tubular-down tube
	Street BOB	1584	2		Tubular-down tube
	Super Glide	1584	2		Tubular-down tube
	Fat Boy	1584	2		Tubular-down tube
	Fat Boy Special	1584	2		Tubular-down tube
	Noght Rod	1247	2		Tubular-down tube

Table-3.10 clearly shows that the type of frame, in combination with the size and no of cylinders in the engine, clearly indicate the type of motorcycle. We can summarise this as follows:

Table 3.10: Summary of Bike Frames

Frame Type	Engine	Motorcycle type
Tubular Double cradle	Single cylinder -small capacity	Standard lean naked or ornamental
Diamond-stressed		
Single Down tube		
Single Down tube	Single cylinder high capacity	Cruiser lean
Down Tube	Multi cylinder	Cruiser, naked, bulky
Diamond Stressed	Multi cylider	Sports, bulky, ornamental
Trellis	Multi cylider	Sports, bulky, naked

Important point to note here, is that even in case of naked bike, the frame is visible only minimally and affects the aesthetics only to a limited extent. Except, of course, in the case of trellis frame, where it becomes an important visual member.

Fig 3.9: Trellis Frame

Besides, the type of frame and colour, other aspects like sectional dimensions, the thickness of material, the welding specifications etc are not visual aspects and therefore, do not affect the aesthetics. The type of frame, as has been illustrated, gets covered by the aspect, of context. Another aspect, i.e. colour gets automatically covered by the aspect of colour.

3.7.6. Vehicle Dynamics:

The dynamic behaviour of motorcycle basically covers two aspects: stability and manoeuvrability. Stability and maneuverability of a bike are broadly determined by two factors- yawing moment (stability decreases with increase) and steering ratio.

Yawing moment=twisting moment-self aligning moment (Cossalter) [79]

Self aligning moment=a_t x cornering force where a_t=trail

$a_t=a_{t0}$ $(1-\lambda/\lambda max)$ where a_{t0}=maximum trail, λ =side slip angle λmax=maximum side slip angle

Since maximum trail is a function of rake angle, wheel size and front fork offset, largish rake provides maximum stability.

Now, steering ratio which indicates the steerability of the vehicle is given by expression

$$\xi = \frac{1}{1-(\frac{1-k_{\psi r}}{k_{\lambda r}}-\frac{1-k_{\psi f}}{k_{\lambda f}})\frac{V^2}{gp}} \qquad (3.6)$$

Where ξ =Steering ratio, $k_{\psi r}$=camber stiffness coefficient of front tire, $k_{\psi r}$=camber stiffness coefficient of front tire, $k_{\lambda r}$=cornering stiffness of front frame, $k_{\lambda r}$=cornering stiffness of front frame, V=vehicle velocity, P=wheel base

As per Cossalter, ξ <1 means under steering and ξ >1 means over steering. This means, smaller wheel base results in higher ξ hence better steerability.

Hence the factors, which affect the dynamics of a bike, are:

a. Height of centre of gravity
b. Wheel base
c. Wheel sizes
d. Rake angle
e. Trail

Out of these factors, the centre of gravity and the wheel base are covered in ‘dynamism’ in form of L/H ratio. At the same time, the wheel size, wheel base, rake and trail combine to form a factor called r_n factor which is defined as

r_n = front trail / (front trail + rear trail)

Now, the following tabulation clearly indicates that the r_n factor actually decides the type of bike.

Table 3.11: Dynamics Parameters for Bikes

		Drivability						
Company	Model	Rake angle	Offset	Fr wheel size	Rr wheel size	Wheel base	Trail	Rn
Hero Honda	CD-100	26°	55	2.5-18	2.75-18	1217	83	0.06
	SLEEK	26°	55	2.75-18	2.75-18	1210	84	0.06
	Street	26°	32.5	2.25-17	2.50-17	1205	68	0.05
	CBZ	26°	45	2.75-18	100/90-18	1326	96	0.06
	Passion+	26°	55	2.75-18	2.75-18	1226	98	0.07
	Passion Pro	26°	55	2.75-18	3.00-18	1235	85	0.06
	Splendor+	26°	55	2.75-18	2.75-18	1226	98	0.07
	Splendor NXG	26°	55	2.75-18	2.75-18	1235	89	0.067
	Super Splendor	26°	55	2.75-18	2.75-18	1267	87.6	0.06
	Glamour	26°	55	2.75-18	3.00-18	1264	86.3	0.06
	CBZ Extreme	26°	45	2.75-18	100/90-18	1326	96	0.07
	Hunk	26°	45	2.75-18	100/90-18	1326	96.2	0.07
	Karizma	26°	45	80/100-18	100/90-18	1349	94	0.07
	Karizma ZMR	26°	45	80/100-18	100/90-18	1349	94	0.07
Bajaj	Platina 100	26°		2.75-17	3.00-17	1275	87	0.064
	Platina 125	26°		2.75-17	3.00-17	1275	88	0.065
	Discover 100	26°		2.75-17	3.00-17	1305	89	0.064
	Discover 150	26°		2.75-17	100/90-17	1305	88	0.063
	Pulsar 150	26°		2.75-17	100/90-18	1330	93	0.065
	Pulsar 220	26°		90/90-17	120/80-17	1350	95	0.066
	Avenger 220	26°		90/90-17	130/90-15	1475	137.5	0.085
	Ninja 250R	26°		110/70-17	110/70-17	1400	81.5	0.055
	Ninja 650R	26°		120/70ZR17	160/60ZR17	1410	107	0.071
TVS Auto	Apache RTR FI 160	26°		90/90-17	100/80-18	1300	95	0.068
	Apache 160 Hyper Edge	26°		90/90-17	100/80-17	1300	95	0.068
	Apache RTR 180	26°		90/90-17	110/80-17	1326	89	0.063
	Flame 125	26°		90/90-17	100/90-17	1260		
	Jive	26°		2.75-17	3.00-17	1260	88	0.065
	Star City	26°		2.75-17	3.00-17	1240	88	0.066
Yamaha India	V Max	31	38	120/70-18	200/50-18	1699.26	147.32	0.08
	MT01			120/70 ZR17	190/50 ZR17	1525	103	0.063
	YZF-R1	24	42	120/70 ZR17	190/55 ZR17	1414.78	101.6	0.07
	YZF-R15	26	62	80/90-17	100/80-17	1290	100	0.07
	FZ							
	FZ-1	25	30.5	120/70 ZR17	190/50 ZR17	1460	109	0.07
	FZ-S	25	37	100/80-17	140/60-17	1334	101	0.07
	Fazer	25	37	100/80-17	140/60-17	1334	101	0.07
	SZ	26	39.9	2.75-17	100/90-17	1320	99	0.07
	SZ-R	26	39.9	2.75-17	100/90-17	1320	99	0.07
	SZ-X	26	39.9	2.75-17	100/90-17	1320	99	0.07
	YBR-110			2.75-18	3.00-18	1290		
	YBR-125	26.4	50	2.75-18	3.00-18	1300	90	0.06
	Crux	26.4	51.2	2.50-18	2.75-18	1260	83.4	0.06
Royal Enfield	Bullet 350 Twinspark	27	40			1370	124.52	0.08
	Bullet 500	27	35			1370	118.42	0.08
	Bullet Electra 350 Twinspark	28	40			1370	131.49	0.09
	Bullet Electra Del	28	40			1370	131.49	0.09
	Classic 500	27	45			1370	113.82	0.08
	Classic 350	27.5	40			1370	127.99	0.09
Ducati	Superbike	24.5	40			1430	92.76	0.06
	Hypermotard	24	40			1455	89.78	0.06
	Monster	24	35			1450	89.91	0.06
	Multistrada	25	40			1530	95.76	0.06
	Streetfighter	25.6	40			1475	99.38	0.06
Harley Davidson	Super Low	31	35			1506	145.00	0.09
	Iron	31	45			1519	145.00	0.09
	Sportster	29.6	50			1516	132.00	0.08
	Nightster	30.4	55			1519	130.00	0.08
	XR 1200X	29	35			1524	132.00	0.08
	Roadster	31	45			1519	145.00	0.09
	Street BOB	29	55			1630	119.00	0.07
	Super Glide	29	55			1625	119.00	0.07
	Fat Boy	32	40			1638	147.00	0.08
	Fat Boy Special	31.6	40			1630	147.00	0.08
	Noght Rod	34	40			1707	170.00	0.09
	Electra Glide	29	30			1625	140.00	0.08

This table clearly identifies that sports bikes have r_n factor between 0.05 to 0.07, whereas for cruiser bike this factor is above 0.08. For standard bikes it is between 0.06 to 0.07. This clearly establishes our contention that the dynamic behaviour of a bike decides its context.

Considering all factors, which have been discussed in section 3.7, we can safely conclude that though these factors indirectly affect the emotions generated by a motorcycle, these indirect effects are accounted for by the factors already selected i.e. context, color, form, graphics, unity and dynamism.

3.8 Conclusions

Now that, the design factors and sub factor are identified, we can revisit equations (2) and (3) in chapter 1 a. $[r]_{s, g, d, i} = [\sum w_x r_x]_{s, g, d, I}$ (3.7)

Where r and w are the intensities of the four emotions and weightage for a design factor respectively.

Now, we can exactly describe 'x' as l (color), f (form), t (context), g (graphics) and u (unity and dynamism).

We can further describe the sub-factors embedded in equation (5) i.e.

$[r_x]_{s, g, d, i} = [\sum w_a r_{xa}]_{s, g, d, i}$ as

$[r_l]_{s, g, d, i} = [\sum w_a r_{la}]_{s, g, d, i}$ (3.8)

Where l = color and texture as sub-factors of color.

$[r_f]_{s, g, d, i} = [\sum w_a r_{fa}]_{s, g, d, i}$ (3.9)

Where f = fuel tank, seat, side cover and visor as sub-factor of form.

$[r_t]_{s, g, d, i} = [\sum w_a r_{ta}]_{s, g, d, i}$ (3.10)

Where t = type, front facia and wheels as sub-factors of context.

$[r_g]_{s, g, d, i} = [\sum w_a r_{ga}]_{s, g, d, i}$ (3.11)

Where g = typography and stripes as sub-factors of graphics.

Since unity and dynamism has no sub-factor, equation 3.7 holds good.

3.9 Summary

In this chapter, we have explored the design factors contributing to the emotions generated by the design of a motorcycle. This has been done in two parts:-

a. The first part consisting of sections 3.1 to 3.6, deals with the design factors, which have later been adopted as components for calculation of emotions. These are context, color, form, unity, dynamism, and graphics. These factors have been defined scientifically, so that it is possible to quantify these factors using these definitions. Further, we have explored the sub-elements and their engineering manifestations, which can further help in quantification.
b. The second part consists of other design factors (section 3.7), which do not contribute significantly or directly to the emotions generated by a motorcycle. For example the dynamic behavior of a motorcycle certainly contributes but it contributes indirectly to the extent that it affects the visual dynamism factors like balance and height to width ratio. In this section, we have first defined these factors and then investigated, whether they contribute significantly or directly to the emotions. Here, we have also investigated environmental factors to know, whether ongoing developments and regulations can impact the emotions generated by motorcycles. So the section 3.7 forms an important part to remove any doubt as to why a particular factor has not been included as a component of emotion.

Overall, this chapter forms the step-stone to the scope of this thesis, where we formulate the scale and calculation method to quantify emotions using these factors.

Chapter 4: Methodology

Introduction

Revisiting the gap in existing research and the objectives and scope of our study in earlier chapters, we have already achieved the first objective of establishing a method to express the aesthetics of an object in quantitative terms through equations 3.1 and 3.2. This chapter discusses the methodology to achieve the second objective i.e. to determine the aesthetic quantification in terms of equation 3.1 and 3.1 (in other words, to determine value of $r_{s, g, d, i}$ for a motorcycle).

On the question of method and confirmation of scientific principles in art criticism, Greacyk [80] argues that reflective equilibrium in philosophical debate require endorsement by community for principles that survive a robust examination of candidate concepts. Kyffin et al [81] argues that socio-cultural trends and narratives are at the core of innovative design research. Goldie [82] further classifies the emotional import and emotional response into two kinds- internal and external, where external is due to an external cause- in our case the design factors of the motorcycle. This view necessitates a survey from respondents, where strong correlation is required between artistic concepts.

To combine the various stimuli generated by one part and aggregating those for all parts Chuang and Chen [83] have discussed two models in their study i.e. hierarchical sorting method and Divide and Conquer method. The second method is complex and needs the help of computer algorithms but is suitable where no of stimuli is very large. In our context, the first method i.e. Divide-Conquer-Merge-Confirm is suitable because (a) the number of stimuli is manually manageable and (b) the approach is closest to our objective.

Taking the cue from Hybrid KES approach of Kansei engineering, we start with the following databases:

Table -4.1, Kansi Engineering Databases

Word Database (refer appendix-1)			
All rasas			
Words representing rasas:			
Beautiful	Sober	Dynamic	Muscular
Erotic	Quiet	Aggressive	Dominating
Glamorous	Seren	Dashing	Intimidating
	Classy		and others

Knowledge Database
Motorcycle contexts
Color hue value and chroma
Textures
Forms of various style parts
Graphics and typography styles
Unity and dynamism parameters

Design and colors
Hue value and chroma combinations for colors
Texture and color combinations
Form variations for style parts
Context combinations
Graphics database
Typographical styles
Motorcycls with unity and dynamism combinations

.After the user interface in form of surveys, the backward translation in form of the methodology has to be evolved, which will provide the basis for styling design.

4.1. Methodology Options:

The crux of the whole study is collection, collation and analysis of data on generation of emotions as a result of response to design inputs. There are basically two streams of methods available for this purpose:

a. Physio-neurological methods, where physical or neurological responses to design inputs are mapped using diagnostic instruments.
b. Survey methods where respondents are asked to state their feelings about design inputs.

For comparing these two methods, following considerations must be taken into account:

a. Accuracy: Physio- neurological methods are definitely more accurate but chances of inaccuracy of results in minimized using a good sample size.

b. Repeatability: Physio- neurological methods have better repeatability but chances of inaccuracy of results due to this in minimized using a good sample size.
c. Coverage over a large sample: Survey methods can cover large sample size whereas for physio-neurological methods each respondent must appear physically, which is practically not possible.
d. Feasibility: Availability of instruments is not there. For survey, no special facility is required.

To summarize these comparisons, we use a 3-point scale where

0: Not good

1: OK

2: Good

Table -4.2, Comparison of Methodology Options

	Physio-neurological	Survey
Accuracy	2	1
Repeatability	2	1
Coverage	0	2
Feasibility	0	2
Total	4	6

Based on this comparison we chose survey method.

4.2. Survey Method:

The catalogue 'Survey Method and Practices' [84] lists three major aspects of survey methodology:

a. Questionnaire design
b. Data collection method
c. Survey Frame

4.2.1. Questionnaire Design:

Several types of questionnaires have been suggested in the catalogue mentioned above:

a. Open questions
b. Two choice questions
c. Multiple choice questions
d. Checklist questions
e. Rating questions

For rating questions, Albaum [85] suggests two scale Likert scale, whereas Ockert [86] suggests an Ockert scale to precede the Likert scale to make the survey more authentic.

In our case, basic objective is two-fold – (1) to identify the correct emotion related to a design factor and (2) to find the intensity of the emotion. For this we also adopt a two scale questionnaire where the first one is a multiple choice, giving the keyword reflecting the possible emotion and second a three point Likert scale identifying the intensity of the chosen emotion.

Keyword Selection:

Type of emotion: For easy understanding of the respondents the four most prevalent emotions for motorcycles were converted into easily identifiable words

A list of all possible adjectives was made and respondents were asked to rate different motorcycle on scale of 1 to 3 (Refer appendix 1.a) for suitability of adjectives to those motorcycles. The results of total score were compiled (appendix 1.b) and the keywords were selected through an affinity diagram.

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Table -4.3, Key Words for Survey

Rasa	Word
Shaant	Sober
Shringaar	Glamorous
Veera	Dynamic
Raudra	Intimidating

After identifying the emotion, respondents were asked to write the intensity of the chosen emotion on scale of 1 to 3.

4.3. Design Inputs for Survey

a. Context:

After observing many motorcycles, following factors were found to be affecting the observer's emotion based on the context of the motorcycle, i.e. factors which affect the user due to the usage and its context:

1. Type: Cruiser, sports and standard
2. Construction: Bulky and lean, naked and ornamental
3. Fr Facia: With and without visors and shape of head lights i.e. circular, rectangular and trapezoidal
4. Wheels: Big and smaller wheels, wider and narrower tires, spoke and cast wheel

Matrices for these factors were prepared with photographs and handmade sketches.

b. Color:

The matrix for colors has to cover various colors and their combinations with variations in hues, value and chroma. The challenge here was to limit the number of sheets without leaving any significant combination.

a. Single color sheets with variations of hue, value and chroma
b. Dual color sheets: For all sets of value and chroma combinations of two colors, we have two types of combinations- equal and figure/ground. In equal combination, both colors occupy equal space. In fig/ground type we have two combinations for each set of colors A and B- Fig A on ground B and fig B on ground A.

In order to decide the number of hue, value and chroma, the total no of combinations calculated with the help f the following table:

a. In case of 4 primary colors with black white and gray and nine combination for value and chroma for each primary color:

Table -4.4, Color Combinations 1

Colour	v/c	Black		White		Gray		Green			Red			Yellow			Blue			Total
		E	F/g	E	F/g	E	F/g	S	E	F/g	S	E	F/g	S	E	F/g	S	E	F/g	
Black	1	1	0	1	2	1	2	0	9	18	0	9	18	0	9	18	0	9	18	115
White	1	0	0	1	0	1	2	0	9	18	0	9	18	0	9	18	0	9	18	112
Gray	1	0	0	0	0	1	0	0	9	18	0	9	18	0	9	18	0	9	18	109
Green	9	0	0	0	0	0	0	9	36	72	0	81	162	0	81	162	0	81	162	846
Red	9	0	0	0	0	0	0	0	0	0	9	36	72	0	81	162	0	81	162	603
Yellow	9	0	0	0	0	0	0	0	0	0	0	0	0	9	36	72	0	81	162	360
Blue	9	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	9	36	72	117
Total																				2262
Where	v/c=no of value and chroma combinations for each colour																			
	S=No of single colours																			
	E=No of equal cobination for dual colours																			

Adding one more hue will add more than a thousand combinations and reducing one hue will make the survey incomplete. Similarly adding triple combinations to dual ones will take the number infinitely high. Now since 2262 is an impractical number for a survey, reducing the number of value and chroma combinations is the only option.

Table -4. 5 Color Combinations 2

Colour	v/c	Black		White		Gray		Green			Red			Yellow			Blue			Total
		E	F/g	E	F/g	E	F/g	S	E	F/g	S	E	F/g	S	E	F/g	S	E	F/g	
Black	1	1	0	1	2	1	2	0	3	6	0	3	6	0	3	6	0	3	6	43
White	1	0	0	1	0	1	2	0	3	6	0	3	6	0	3	6	0	3	6	40
Gray	1	0	0	0	0	1	0	0	3	6	0	3	6	0	3	6	0	3	6	37
Green	3	0	0	0	0	0	0	3	3	6	0	9	18	0	9	18	0	9	18	93
Red	3	0	0	0	0	0	0	0	0	0	3	3	6	0	9	18	0	9	18	66
Yellow	3	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6	0	9	18	39
Blue	3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	3	6	12
Total																				330
Where	v/c=no of value and chroma combinations for each colour																			
	S=No of single colours																			
	E=No of equal cobination for dual colours																			

Since 330 is a manageable number, this combination is acceptable.

c. **Texture**: Images of various hues i.e. red, yellow, blue, green, black, white, silver and chrome with combination of value and chromatin different textures i.e. glossy, plain and rough were prepare in adobe illustrator and converted into PPT sheets.

d. **Form**:

The body parts, which largely decide the emotional coordinates of a motorcycle, are:

a. Fuel Tank
b. Side Covers
c. Visor
d. Seat

Fuel Tank: Fuel tank has three sides, which are visually available- left, right and the top side, where left and right sides are mirror images of each other. Hence practically we are left with two faces. Based on observation of various models worldwide, following considerations for categorization emerged:

1. Fillets: Sharp , medium and large
2. Surfaces: Flat, convex and concave
3. Space combinations: positive/positive, positive/negative
4. Curvature: Fast and slow curves

Based on these categories and their combinations, basic shapes were created in CATIA and tabulated.

Side Cover:

Side covers are parts which are used to cover various functional parts below the frame... Generally, only one face of the cover is visible with side edges all over the periphery. By observing various motorcycles, following classifications emerged:

1. Shape: Triangular, polygonal
2. Spaces: Positive, Positive/negative
3. Fillets: Sharp, large
4. Surfaces: Flat, convex, concave, flat-step, flat/flat-angle, flat concave, flat convex, convex concave.

Based on these classifications, basic shapes were created in CATIA and tabulated.

Seat:

Seat is an important part which defines the visual character of a motorcycle. It has two important components- top face and the side face.

Top face:

Single edge: Flat, inclined and curved with straight edge and curved edge.

Polygonal top edge: Stepped, inclined - flat, flat -curve and inclined-curved

Side face:

Flat bottom, inclined bottom, stepped bottom

Based on these classifications, basic shapes were created in CATIA and tabulated.

Visor:

Visor form has three basic elements – top contour, head light shape and surface

Top contour: Flat, convex and concave

Head light shape: Circular, rectangular and trapezoidal

Surface: Flat, convex, convex-concave and convex-convex

Based on these classifications, basic shapes were created in CATIA and tabulated.

e.Unity and dynamism:

These two are holistic parameters and complex to define. Moreover, their visual impact is not possible to separate. In order to study their impact, three levels of each were defined so that different levels can be identified. Base on these levels different motorcycle with the combination characteristics were chosen and tabulated.

The first challenge is to decide the unity level of a motorcycle. The method adopted for this was to determine the unity of five factors of different parts and the compatibility of these factors with each other and assign marks as per the following table:

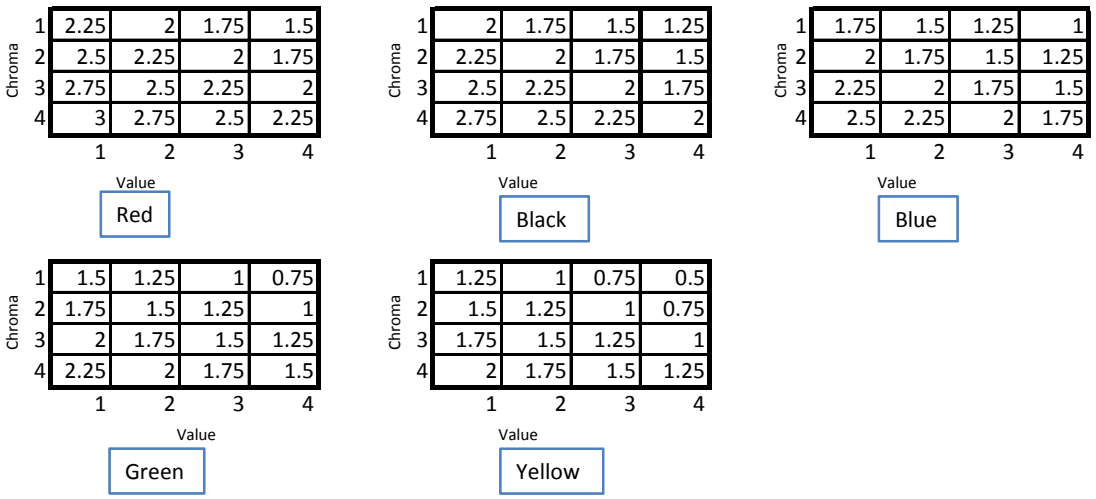
Table -4.6, Unity Level Calculation

Factor	Sub Factor	Marks	Explanation
	Visor/ Fuel Tank	0-1	
	Fuel Tank/Seat	0-1	
	Fuel Tank/Side Cover	0-1	0: Not similar or complimentary
Unity of form	Side Cover/ Side Cowl	0-1	1: Similar or complimentary
			0: No continuity 1: Just touching 2: End Profile merging
	Fuel Tank/Seat	0-3	3: Visually united
	Fuel Tank/Side Cover	0-1	0:No continuity
Continuity	Side Cover/ Side Cowl	0-1	1: Continuity
			2:Continuity or alignment 1: No character lines
Character lines		0-2	0:Dissonance
	Visor/ Fuel Tank	0-1	
	Fuel Tank/Seat	0-1	
	Fuel Tank/Side Cover	0-1	0:No alignment
Feature lines	Seat/ Muffler	0-1	1: Aligned
			0:No alignment
Graphics	Alignment	0-1	1: Aligned
	Visor	0-1	
Character lines	Fuel Tank	0-1	0:No alignment
vs feature lines	Side Cover	0-1	1: Aligned
	Visor	0-1	
Character lines	Fuel Tank	0-1	0:No alignment
vs graphics	Side Cover	0-1	1: Aligned
	Visor	0-1	
Feature lines vs	Fuel Tank	0-1	0:No alignment
graphics	Side Cover	0-1	1: Aligned

After aggregating all score, if overall score is less than 50%, the level is 1, if it is between 50% and 80%, the level is 2 and above 80%, level is 3.

Dynamism: The dynamism was calculated by aggregating the three components of dynamism- balance, ratio and visual dynamism. For calculating balance visual weight factors were assigned for different colors based and value and saturation matrix.

Table-4.7: Visual Weight Factor for Colors



Chroma \ Value	1	2	3	4
1	2.25	2	1.75	1.5
2	2.5	2.25	2	1.75
3	2.75	2.5	2.25	2
4	3	2.75	2.5	2.25

Chroma \ Value	1	2	3	4
1	2	1.75	1.5	1.25
2	2.25	2	1.75	1.5
3	2.5	2.25	2	1.75
4	2.75	2.5	2.25	2

Chroma \ Value	1	2	3	4
1	1.75	1.5	1.25	1
2	2	1.75	1.5	1.25
3	2.25	2	1.75	1.5
4	2.5	2.25	2	1.75

Chroma \ Value	1	2	3	4
1	1.5	1.25	1	0.75
2	1.75	1.5	1.25	1
3	2	1.75	1.5	1.25
4	2.25	2	1.75	1.5

Chroma \ Value	1	2	3	4
1	1.25	1	0.75	0.5
2	1.5	1.25	1	0.75
3	1.75	1.5	1.25	1
4	2	1.75	1.5	1.25

Then, roughness and space quotients were assigned based on their effect on visual weight.

Table-4.8: Roughness and Space Quotients

Roughness quotient (add)

Rough	0
Glossy	-0.25
Plain	-0.5
Transparer	-0.75

Space quotient (Multiply)

High positive	1.5
Positive	1.25
Flat	1
Negative	0.75
High negative	0.5

The horizontal and vertical imbalances are calculated by dividing the side view image of a motorcycle into grids of equal squares and calculating the visual weights and imbalances using the following table. The various symbols are signified as follows:

n: no of squares

r: Distance from the optical centre in terms of no of squares

a: Color weightage based on hue, value and chroma (refer Table 5.4)

b: Value contrast factor

c: Surface texture factor

d: Space factor

w: Visual weight

W: Weighted visual weight

f: Multiplication factor based on no of squares as the value will be different if each square is considered separately. This factor removes this calculation error.

TVW: Total visual weight on one side = $\sum W.f$

Horizontal Imbalance (%) = $(TVW_{front}-TVW_{rear})/ (TVW_{front}+TVW_{rear})$

Vertical Imbalance (%) = $(TVW_{upper}-TVW_{lower}) / (TVW_{upper}+TVW_{lower})$

Table-4.9: Table for Calculation of Balance

Model	Side	Details						n	r	w					W=w.n/r	Multi Factor (f)	W.f	∑W.f	Imbalance
		Hue	Value	Chro	VC	Surf Texture	Space			a	b	c	d	w=(a+b-c)d					
Hunk	Lower	Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	76.01875	14.86923
		Black	1	4	0	Plain	Flat	6	2.5	2.75	0.00	0.50	1.00	2.25	5.4	1.90	10.26		
		Black	1	4	0	Glossy	Flat	2	2	2.75	0.00	0.25	1.00	2.5	2.5	1.00	2.5		
		Red	3	4	0	Glossy	Flat	1	0.5	2.50	0.00	0.25	1.00	2.25	4.5	1.00	4.5		
		Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		
		Grey	1	1	0	Plain	Flat	6	1.5	2.00	0.00	0.50	1.00	1.5	6	1.50	9		
		Silver	4	3	0	Glossy	.+ve	5.5	2.5	1.75	0.00	0.25	1.25	1.875	4.125	1.90	7.8375		
		Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
		Black	1	4	0	Plain	Flat	3	2.5	2.75	0.00	0.50	1.00	2.25	2.7	1.00	2.7		
		Red	3	4	0	Glossy	.+ve	0.5	1	2.50	0.00	0.25	1.25	2.8125	1.40625	1.00	1.40625		
		Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25		
		Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
	Upper	Black	1	4	0	Rough	Flat	4.5	2.5	2.75	0.00	0.00	1.00	2.75	4.95	1.00	4.95	56.33827	
		Red	3	4	0	Glossy	.-ve	5	1.5	2.50	0.00	0.25	0.75	1.6875	5.625	1.50	8.4375		
		Red	3	4	0	Glossy	.+ve	7	2	2.50	0.00	0.25	1.25	2.8125	9.84375	1.00	9.84375		
		Red	3	4	0	Glossy	.+ve	3	2	2.50	0.00	0.25	1.25	2.8125	4.21875	1.00	4.21875		
		Grey	1	1	0	Plain	Flat	4	0.5	2.00	0.00	0.50	1.00	1.5	12	1.00	12		
		Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
		Red	3	4	0	Glossy	.+ve	2.5	3	2.50	0.00	0.25	1.25	2.8125	2.34375	1.00	2.34375		
		Black	1	4	0	Transparent	.+ve	0.5	3	2.75	0.00	0.75	1.25	2.5	0.4166667	1.00	0.416667		
		Silver	4	3	0	Glossy	Flat	1.5	1.5	1.75	0.00	0.25	1.00	1.5	1.5	1.00	1.5		
		Black	1	4	0	Plain	Flat	2	3.5	2.75	0.00	0.50	1.00	2.25	1.2857143	1.00	1.285714		
		Grey	2	2	0	Plain	Flat	2	3.5	2.00	0.00	0.50	1.00	1.5	0.8571429	1.00	0.857143		
		Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		

Ratio

Length to width ratio of any object is an important visual indicator of its dynamism or stability and it has a significant engineering implication. The length to width ratio is a direct indicator of its centre of gravity. The higher the centre of gravity, the human perceives it to be more unstable and vice-versa. On the other hand, the golden ratio is supposed to be the ideal ratio for a rectangle.

Visual Dynamism

Visual dynamism is characterized by the interplay of character lines, feature lines and graphics

a. Feature lines: Feature lines are lines formed by visible boundaries of parts.

b. Character lines: Character lines are distinctly visible lines formed by intersection between two surfaces.

c. Graphics: Graphics, as we know are predominantly two dimensional images added to the visible surfaces.

Table-4.10: Calculation of Visual Dynamism

Factor	Sub Factor	Marks	Explanation
Character lines	Visor	0-2	2: Diverging sharp 1:Diverging large fillet 0:Curve / straight/ none
	Fuel Tank	0-2	
	Side Cover	0-2	
	Muffler	0-2	
Character lines alignment	Fuel tank/visor	0-1	1: Diverging and aligned 0:Straight or non aligned
	Fuel tank/ Side cover	0-1	
Feature lines	Fuel Tank	0-1	1: Inclined 0: Straight or curve
	Side Cover	0-1	
	Seat	0-1	
	Muffler	0-1	
Character line and feature line matching		0-2	2: Fully matching(Diverging) 1: Partially matching (Diverging) 0: Not matching/straight
Graphics		0-2	2: Diverging horizontal 1:Diverging vertical 0:Straight or curve
Graphics and character lines matching		0-2	2: Fully matching(Diverging) 1: Partially matching (Diverging) 0: Not matching/straight
Graphics and feature lines matching		0-2	2: Fully matching(Diverging) 1: Partially matching (Diverging) 0: Not matching/straight

f. Graphics:

Each graphic is unique and difficult to characterize. But two very distinct components are company and name logo and stripes.

Logo: Metallic and stripes, chrome, gold, deep bright and dark colors, straight and inclined, capital and cursive letters

Strips: Unified, separate, horizontal, vertical and random and various color combinations.

Based on various combinations of stripes and logos, various graphics were chosen from various motorcycles and tabulated.

4.4 Data Preparation:

Images were prepared with CATIA, Adobe Illustrator, photographs and hand sketches.

Weightage: Images were prepared with variations in form, color, type of motorcycles, unity, dynamism and graphics.

a. Overall weightage: In order to study the impact of these factors, a matrix of motorcycle photographs with following variations was created:

a. Color: Red and green body colors
b. Form: Geometric and organic forms
c. Context : Cruiser and sports
d. Graphics: Same motorcycles with different graphics
e. Unity: High unity and low unity
f. Dynamism : Low dynamism (horizontal muffler and seats) and high dynamism (Inclined muffler and seats)

With above variation a matrix was created with the help of Adobe Photoshop (refer appendix-2) and converted into a PPT and respondents were asked to give their rating.

b. Weightage of forms: Images of motorcycles with variations in form of fuel tank, seat, side cover and visor prepared (refer appendix-3).

c. Weightage of context: Images of motorcycles with variation in type, front facia and wheels were prepared (refer appendix-4).

d. Weightage of typography and graphics: Images were prepared with combinations of different types of typography and graphics (refer appendix-5)

e. Weightage of color and texture: Images with combination of different colors and texture were prepared (refer appendix-6).

f. Color: Images with variations in hue, value and chroma with combinations of maximum two colors were prepared. (Refer appendix-7.a, 7.b and 7.c)

g. Form: Images of fuel tank (appendix-8), seat (appendix-9), side cover (appendix-10) and visor (appendix-11.a and 11.b) with variations in form were prepared.

h. Graphics: Photographs of different types of graphics and logos were prepared (appendix-12).

i. Typography: Images of typographical styles with variations in size and case were prepared (appendix-13).

j. Context: Images of motor cycles with variation in types (appendix-14.a), front facia (appendix-14.b) and wheels and tires (appendix-14.c) were prepared.

k. Unity and dynamism: Images of motorcycles with all combinations of unity and dynamism level were prepared. For this exercise, the unity and dynamism of subject motorcycles was determined method given in chapter 5.

All images were arranged in a power-point presentation for the purpose of survey.

Moreover, a questionnaire with multiple choices and Likert scale was prepared for each of the above data sets. (Appendix- 16.a to 16.p)

4.5 Data Collection:

The catalogue suggests the following methods for data collection:

a. Self enumeration: Where the respondent comes to a place and files his responses.

b. Personal interview

c. Telephone interview

d. Online data collection

For selecting our method of data collection, there were two main considerations:

a. Spread of the correspondents: This makes self-enumeration non-feasible.
b. Prevalence of images: Respondents have to respond to images. This rules out telephone interview.
c. Prevalence and relevance of colors: This rules out printed questionnaires as the choice of colors in printers depends on the cartridges, and the combination of hue, value and chroma cannot be reflected correctly in print.

All the above considerations dictated that that online data collection is the most suitable method.

4.5.1. Survey Frame:

Respondents:

Based on data available, the respondents were selected from work area, student groups and neighboring villages. The market data available with us is:

Age:
Below 25yrs: 25% Above 25 yrs: 75%
Urban/rural:
Urban: 70% Rural: 30%
Occupation:
Student: 20% salaried class: 50% Others: 30%

The analysis of the respondent's data shows the matching between actual and required distribution as follows:

Table -4.11, Verification of Respondent Data

Total number of respondents=238 (refer Appendix-17 for list of respondents)

Factor	Group	Market data	Respondent data
Age	<25	25%	23.50%
	>25	75%	76.50%
Background	Urban	70%	67.70%
	Rural	30%	32.30%
Occupation	Student	20%	18.10%
	Salaried	50%	54.60%
	Others	30%	27.30%
Gender	Male	99%	97.40%
	Female	1%	3.60%

All images constituting CATIA models, hand sketches, ADOBE illustrations and photographs were converted into Power-point sheets with a definite number. For each of the survey, questionnaires were prepared (ref annex). These PPT presentations and the questionnaires were sent to respondents, and asked to fill the response sheets. Respondents were supposed to give their emotional response to each sheet on two counts- type of emotion(S, G, D or I) and intensity of emotion(1,2 or 3).

4.6. Mathematical modeling for aggregation

Weightage:

To decide the weightage of each factor, the impact of variation in each factor (X_1, X_2 etc) was calculated by aggregating separately the difference in S, G, D and I scores.

Example: The scores for S, G, D and I for a particular motorcycle for red and color are a_{1gs}/a_{1rs}, a_{1gg}/a_{1rg} …. .

Impact of color variation X1= $(a_{1gs}-a_{1rs}) + (a_{1gg}-a_{1rg}) +……..+ (a_{2gs}-a_{2rs}) + (a_{2gg}-a_{2rg}) +…$

Similarly impact of form variation (X_2), context variation (X_3), Unity variation (X_4), Dynamism variation (X_5) and graphic variation (X_6) was calculated. Now weightage for color was calculated

as $X_1/(X_1+X_2+X_3+X_4+X_5+X_6)$. Similarly weightages for other factors were calculated. The final weightage calculated was as follows (Refer appendix-18.a to 18.h):

Table -4.12, Weightages for Design Elements (Unaltered)

Factor	Weightage %
Color	12
Form	18
Graphics	15
Context	25
Unity	16
Dynamism	14

Since the impact of unity and dynamism has been combined for the purpose of survey, the weightage table has been modified as:

Table -4.13, Weightages for Design Elements (Alltered)

Factor	Weightage %
Color	12
Form	18
Graphics	15
Context	25
Unity and dynamism	30

Similarly the weightage for color and texture (Appendix-19.a and 19.b), form (Appendix-20), Context (appendix-21) and typography and graphics (appendix-22) were calculated as:

Table -4.14, Weightages for Color and Texture

Color	50%
Texture	50%

Table -4.15, Weightages for Form of Components

Fuel Tank	31%
Seat	34%
Visor	31%
Side Cover	4%

Table -4.16, Weightages for Context Elements

Type	54%
Fr facia	23%
Tyres and wheels	23%

Table -4.17, Weightages for Typography and Graphics

Typography	75%
Graphics	25%

Impact scores: For evaluating the overall S, G, D and I score, following table was designed based on the weightages determined. This scale shows empty cells for S, G, D and I, which are to be filled while calculating the overall scores for a motorcycle. The values to be filled are to be generated after the surveys (The values shown in the following table are for example only).

Table -4.18, Motorcycle Evaluation Table

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	
Body/seat comb	0.33	0.62	1.45	1.45	0.93	
Body/stripe comb	0.33	0.62	1.45	1.45	0.93	
Mean(a)	0.5	1.02	1.42	1.33	0.65	
Texture(b)	0.5	0.98	2.43	2.00	2.15	
Weighted Mean		0.998677	1.923033	1.664922	1.397682	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	1.31	0.95	0.58	0.21	
Seat	0.34	1.12	1.04	0.87	0.04	
Visor	0.31	0.47	1.66	1.28	1.09	
Side Cover	0.04	0.59	0.83	2.26	0.83	
Weighted Mean		0.9562	1.1959	0.9628	0.8162	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.855	0.57	0.52	0.585	N14/H21
Graphics	0.25	0.92	0.68	1.99	0.44	
Weighted Mean		0.87125	0.5975	0.8875	0.54875	

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.14	0.74	2.87	1.39	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.2	1.9	0.93	0.24	
Weighted Mean		0.1837	1.2644	2.9973	0.8748	

e.Unity and Dynamism

S	G	D	I	
0.64	1.36	2.25	1.88	U3D3

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	0.998677	1.923033	1.664922	1.397682	
Form	0.18	0.9562	1.1959	0.9628	0.8162	
Graphics	0.15	0.87125	0.5975	0.8875	0.54875	
Context	0.25	0.1837	1.2644	2.9973	0.8748	
Unity and Dynamism	0.3	0.64	1.36	2.25	1.88	
Weighted Mean		0.66057	1.259751	1.930545	1.17965	

For calculating the individual S,G,D and I scores , for a particular survey sheet all score for S, G, D and I were aggregated and tabulated. Each of the aggregate score was divided by the number of respondents and tabulated for all sheets. Finally, the maximum of the scores was equated to 3.00 and each of the individual scores was accordingly adjusted by multiplying each score by 3/max score. Example can be seen from the following table.

Table -4.19, SGDI Score Calculation Method

No of respondents: n(=5 e.g.)												
Sheet no	Aggregate score (a)				Mean score (x=a/n)				Weightd score ($X=x*3/x_{max}$)			
	S	G	D	I	S	G	D	I	S	G	D	I
1	12	10	7	4	2.4	2	1.4	0.8	2.57	2.14	1.50	0.86
2	5	8	11	7	1	1.6	2.2	1.4	1.07	1.71	2.36	1.50
3	14	11	3	10	2.8	2.2	0.6	2	3.00	2.36	0.64	2.14
4	7	12	7	13	1.4	2.4	1.4	2.6	1.50	2.57	1.50	2.79
5	3	4	12	14	0.6	0.8	2.4	2.8	0.64	0.86	2.57	3.00

These SGDI scores were tabulated against each of the sheets.

4.7. Verification of the accuracy of the methodology:

Having established the method for determination of SGDI scores for a motorcycle, it needs to be verified against actual results. The activity flow for this verification is as follows:

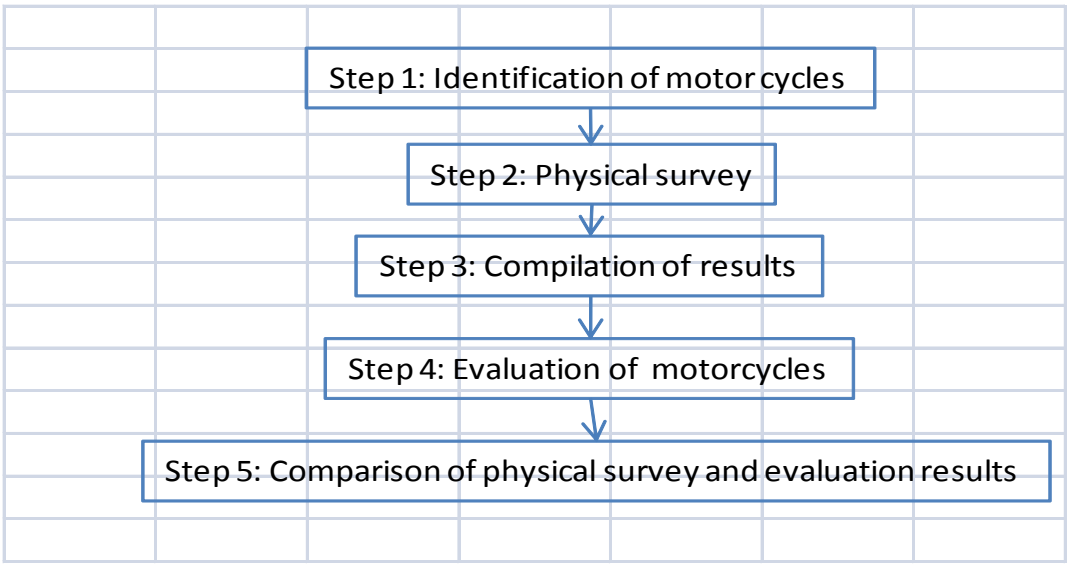


Fig -4.1, Verification Methodology

Step 1. Identification of motorcycles: Motorcycles from different Indian motorcycle manufacturers were selected. All of them should be with visors and contemporary.

Step 2. Physical survey: This most important step involves following steps:

a. Physically lining up all motorcycles at one location
b. Preparation of survey sheet, listing all motorcycles and options available to participants.
c. To collect all respondents and to brief them about the objectives of the survey and instructions.
d. Respondents filling the survey sheet and giving their overall rating about the motorcycle . Here they have to rate the motorcycles as one of the characters and give the intensity of the character.

Step 3. Compilation of results: Respondents responses are to be tabulated and calculated as per the following table.

Table -4.20, Physical Survey Result Compilation

No of respondents: n(=5 e.g.)												
Sheet no	Aggregate score (a)				Mean score (x=a/n)				Weightd score ($X=x*3/x_{max}$)			
	S	G	D	I	S	G	D	I	S	G	D	I
1	12	10	7	4	2.4	2	1.4	0.8	2.57	2.14	1.50	0.86
2	5	8	11	7	1	1.6	2.2	1.4	1.07	1.71	2.36	1.50
3	13	11	3	10	2.6	2.2	0.6	2	2.79	2.36	0.64	2.14
4	7	12	7	13	1.4	2.4	1.4	2.6	1.50	2.57	1.50	2.79
5	3	4	12	14	0.6	0.8	2.4	2.8	0.64	0.86	2.57	3.00
6	12	14	5	9	2.4	2.8	1	1.8	2.57	3.00	1.07	1.93

Step 4. Evaluation of motorcycles: Now each motorcycle is to be evaluated as per the evaluation table and the SGDI scores of each motorcycle is to be calculated.

Step 5. Comparison of physical survey and evaluation results: Now, the results of step 3 and step 4 are to be tabulated against each other and compared.

All of them were physically lined up and evaluated by respondents to give their final score in terms of emotion and intensity. These score were again tabulated and equated score were calculated as per the above table.

Finally each of the motorcycle was evaluated as per the evaluation table and final S, G, D and I values were calculated. Their unity and dynamism level were evaluated as per appendices. Finally the two SGDI scores were compared.

Statistical Tools for Collating Data: In our case, the chief objective is to reach at a single value for SGDI coefficients. So the simplest and most effective tool is 'mean'. Another challenge is to equalize all SGDI coefficients between minimum and maximum of 0 and 3. This has been achieved by dividing the mean by the maximum value and multiplying by 3.

Other tools like standard deviation, regression analysis , distribution curves etc. do not help us in meeting our objective. So we decided against using them.

4.9. Conclusions and Summary:

This chapter discussed the methodology for the research, which in short, consists of the following steps:

1. Choose a method for study between physio-neurological methods and survey method. We chose survey method.
2. Choose method for survey considering three aspects-(a) Questionnaire design (b) Data collection method and (c) Survey frame.
3. Decide the method of mathematical modeling for aggregation of all component factors discussed in chapter 3. This consisted of deciding the most important question i.e. how to express the emotions generated by a motorcycle- whether in terms of a single dominant emotion and its intensity or a combination of all four emotion quotients S, G, D and I. Finally we decided for the latter option. Moreover, this chapter discussed the method for deciding the relative importance of various factors i.e. weightages.
4. Create images for the survey which required tabulations of all combinations of sub-factors and conditions for- (1) deciding the weightages for factors and sub-factors and (2) calculating the emotion quotient for each combination. This generation of images was by photographs, photo-shopping, illustrations and CAD modeling.
5. Conducting the survey.
6. Collecting, collating and translating the data into emotion quotients.
7. The final and most important part is the verification of results, which consisted of deciding the method for collecting actual data and comparing with the actual results.

This chapter is very important as it forms the backbone of the whole study.

Appendix-1: Keyword Database and Questionnaire

Possible Keywords																			Not applicable
Strong	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Dynamic	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
New	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Glamorous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Boring	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Quiet	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Ferrocious	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Honest	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Criminal	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Corrupt	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Adventurous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Couragous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Aggressive	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Sofisticated	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Subtle	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Flamboyant	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Shoddy	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Cool	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Hot	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Brittle	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Tough	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Ridiculous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Amusing	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Ridiculous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Laughable	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Erotic	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Sensible	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Minimal	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Extravagant	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Decorative	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Intimidating	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Muscular	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Flexible	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Argumentative	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Cooperative	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Fast	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Big	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Lean	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Fit	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Cute	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Pompous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Modest	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Confident	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Royal	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Sober	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	

Dry	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Humorous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Serious	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Colourful	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Simple	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Graceful	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Monstrous	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Loud	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Sensible	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Kind	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Hard	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Mean	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Pure	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	
Dirty	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	

Appendix-1.b: Keyword Selection

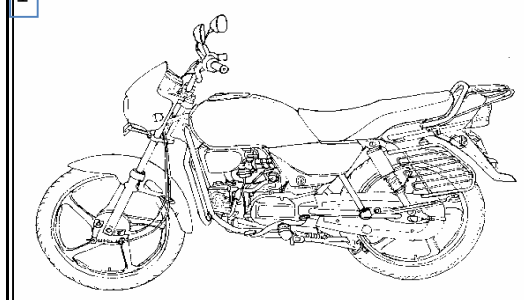
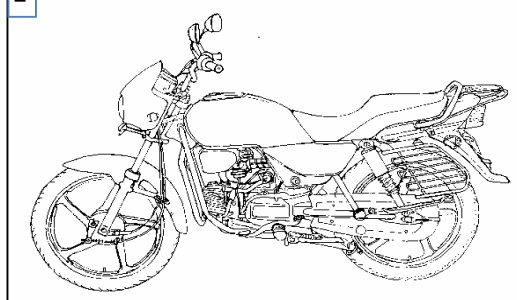
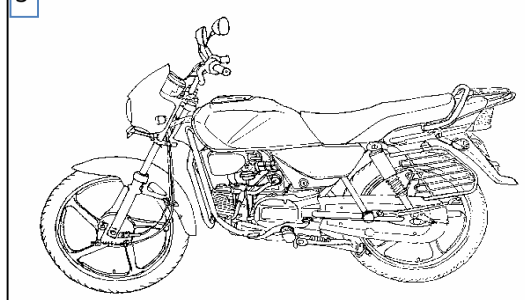
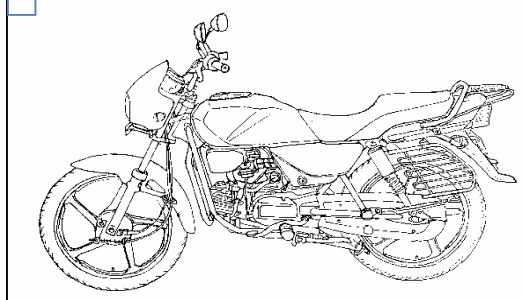
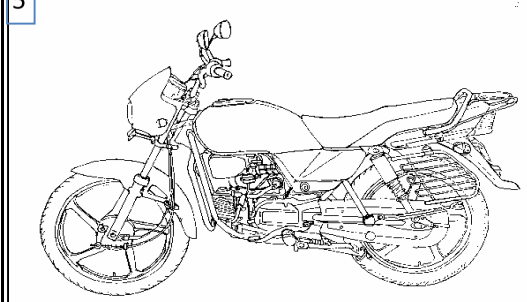
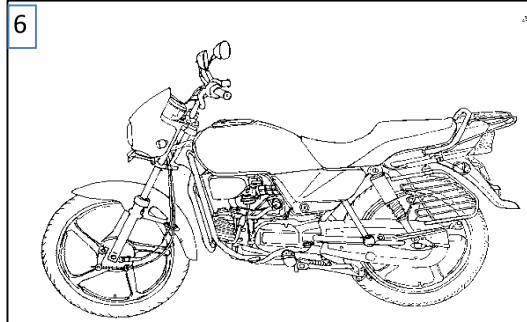
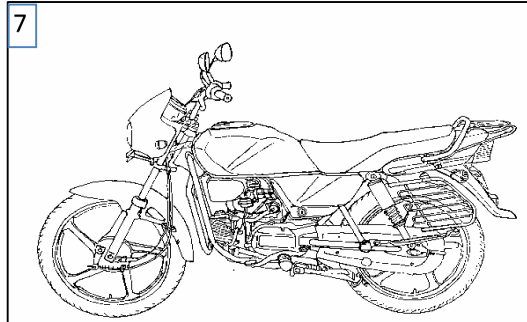
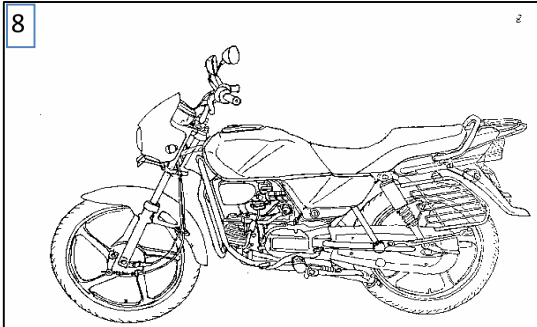
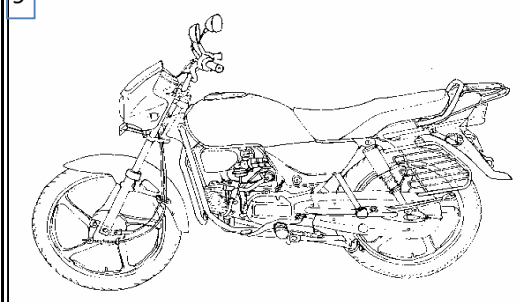
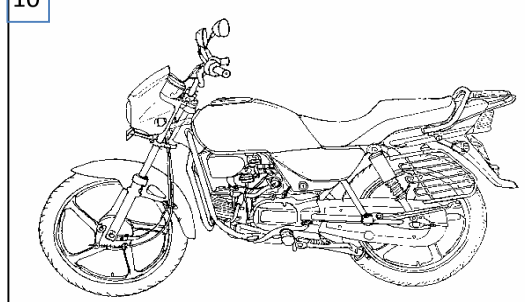
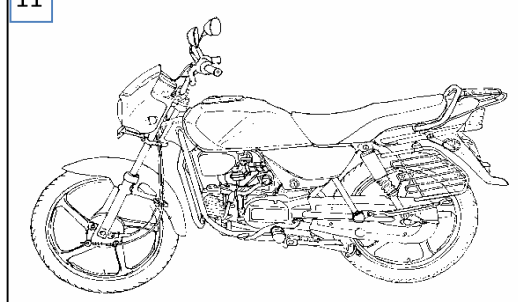
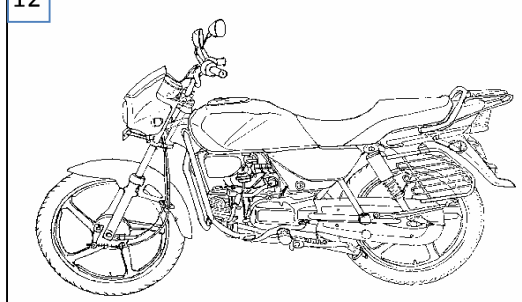
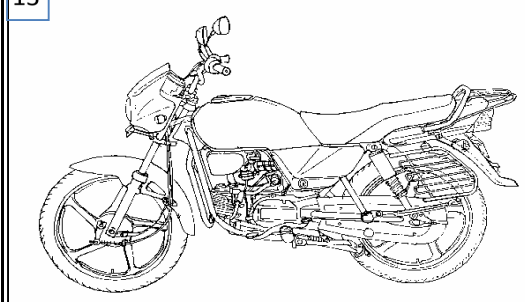
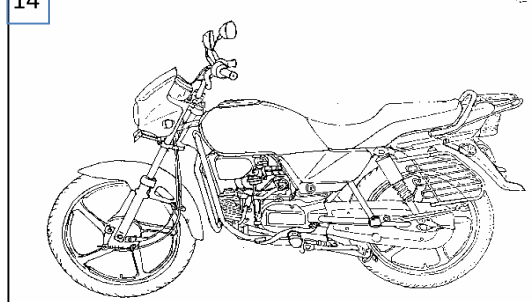
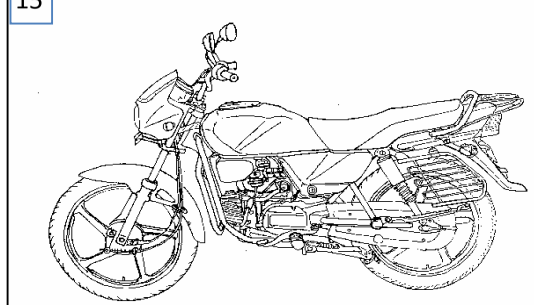
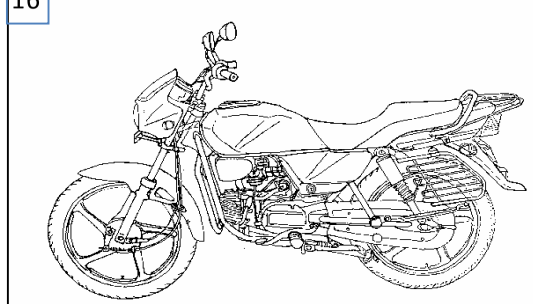
	Standard		Sports		Cruiser		
	Score	Rating	Score	Rating	Score	Rating	Total Score
Strong	84	1.56	119	2.20	105	1.94	308
Dynamic	68	1.26	129	2.39	119	2.20	316
New	61	1.13	106	1.96	105	1.94	272
Glamorous	68	1.26	120	2.22	106	1.96	294
Boring	85	1.57	64	1.19	56	1.04	205
Quiet	101	1.87	78	1.44	62	1.15	241
Ferrocious	51	0.94	82	1.52	82	1.52	215
Honest	118	2.19	86	1.59	88	1.63	292
Criminal	47	0.87	83	1.54	94	1.74	224
Corrupt	40	0.74	55	1.02	59	1.09	154
Adventuro	68	1.26	122	2.26	119	2.20	309
Couragous	68	1.26	113	2.09	120	2.22	301
Aggressive	66	1.22	122	2.26	114	2.11	302
Sofisticated	82	1.52	79	1.46	84	1.56	245
Subtle	75	1.39	70	1.30	84	1.56	229
Flamboyan	54	1.00	99	1.83	99	1.83	252
Shoddy	54	1.00	66	1.22	62	1.15	182
Cool	92	1.70	95	1.76	100	1.85	287
Hot	53	0.98	111	2.06	107	1.98	271
Brittle	78	1.44	79	1.46	83	1.54	240
Tough	76	1.41	114	2.11	125	2.31	315
Ridiculous	36	0.67	37	0.69	56	1.04	129
Amusing	45	0.83	68	1.26	75	1.39	188
Laughable	42	0.78	42	0.78	44	0.81	128
Erotic	42	0.78	73	1.35	75	1.39	190
Sensible	88	1.63	90	1.67	91	1.69	269
Minimal	94	1.74	69	1.28	60	1.11	223
Extravagan	61	1.13	104	1.93	110	2.04	275
Intimidatin	64	1.19	95	1.76	96	1.78	255
Muscular	57	1.06	124	2.30	112	2.07	293
Flexible	90	1.67	84	1.56	78	1.44	252
Argumenta	40	0.74	81	1.50	69	1.28	190
Cooperativ	104	1.93	84	1.56	78	1.44	266
Fast	63	1.17	121	2.24	107	1.98	291
Big	52	0.96	115	2.13	125	2.31	292
Lean	93	1.72	66	1.22	68	1.26	227
Fit	92	1.70	91	1.69	82	1.52	265
Cute	66	1.22	68	1.26	69	1.28	203
Pompous	43	0.80	75	1.39	86	1.59	204
Modest	87	1.61	92	1.70	85	1.57	264
Confident	85	1.57	105	1.94	99	1.83	289
Sober	68	1.26	97	1.80	112	2.07	277
Drab	53	0.98	52	0.96	63	1.17	168
Dry	57	1.06	55	1.02	54	1.00	166
Humorous	46	0.85	57	1.06	57	1.06	160
Serious	63	1.17	68	1.26	75	1.39	206
Colourful	75	1.39	90	1.67	88	1.63	253
Simple	109	2.02	65	1.20	64	1.19	238
Graceful	89	1.65	92	1.70	91	1.69	272
Monstrous	50	0.93	95	1.76	102	1.89	247
Loud	51	0.94	101	1.87	108	2.00	260
Kind	80	1.48	64	1.19	64	1.19	208
Hard	67	1.24	110	2.04	108	2.00	285
Mean	76	1.41	88	1.63	80	1.48	244
Pure	95	1.76	70	1.30	71	1.31	236
Dirty	46	0.85	55	1.02	60	1.11	161

Shaant		Shringaar		Veer		Raudra	
Quiet	241	Glamorous	294	Strong	308	Ferrocious	215
Sofisticated	245	Erotic	195	Dynamic	316	Intimidatin	255
Subtle	229	Colorful	253	Adventuro	309	Monstrous	247
Sensible	269	Cool	287	Aggressive	302		
Sober	277			Flamboyan	252		
Serious	206			Hot	271		
Simple	238			Tough	315		
Graceful	272			Muscular	293		

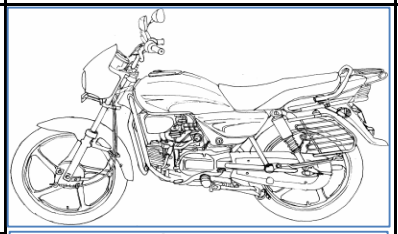
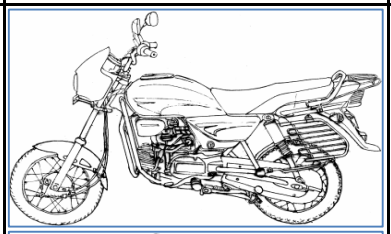
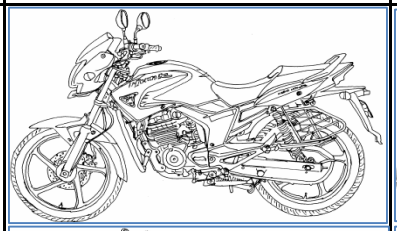
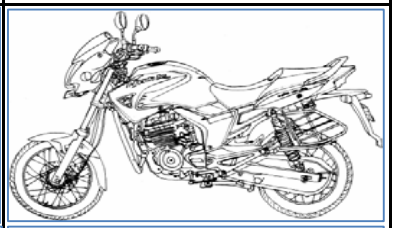
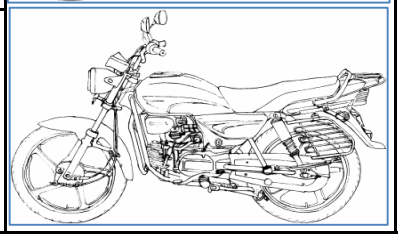
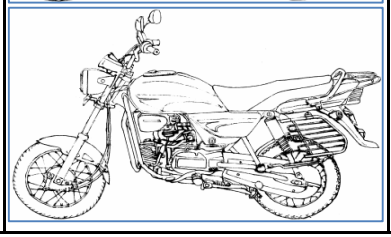
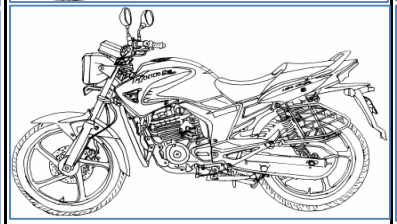
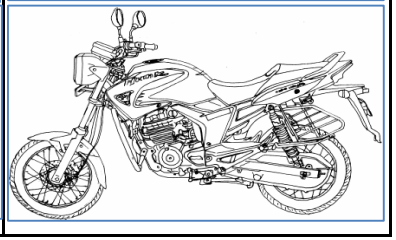
Appendix-2: Weightage Matrix for Color, Form, Unity, Dynamism, Context and Graphics

		Green				Red				Green with changed graphics			
		Low dynamism		High Dynamism		High Dynamism		Low dynamism		Low dynamism		High Dynamism	
		Low unity	High Unity	Low unity	High Unity	Low unity	High Unity	Low unity	High Unity	Low unity	High Unity	Low unity	High Unity
Cruiser	Geometric	CGGL1 1	CGGL2 2	CGGH1 3	CGGH2 4	CGRH1 5	CGRH2 6	CGRL1 7	CGRL2 8	CGGL1 9	CGGL2 10	CGGH1 11	CGGH2 12
	Organic	COGL1 13	COGL2 14	COGH1 15	COGH2 16	CORH1 17	CORH2 18	CORL1 19	CORL2 20	COGL1 21	COGL2 22	COGH1 23	COGH2 24
Sports	Geometric	SGGL1 25	SGGL2 26	SGGH1 27	SGGH2 28	SGRH1 29	SGRH2 30	SGRL1 31	SGRL2 32	SGGL1 33	SGGL2 34	SGGH1 35	SGGH2 36
	Organic	SOGL1 37	SOGL2 38	SOGH1 39	SOGH2 40	SORH1 41	SORH2 42	SORL1 43	SORL2 44	SOGL1 45	SOGL2 46	SOGH1 47	SOGH2 48

Appendix-3: Weightage Matrix for Form

		FUEL TANK TYPE-1		FUEL TANK TYPE-2	
		SEAT TYPE-1	SEAT TYPE-2	SEAT TYPE-1	SEAT TYPE-2
VISOR TYPE-1	SIDE COVER TYPE-1	1 	2 	3 	4 
	SIDE COVER TYPE-2	5 	6 	7 	8 
VISOR TYPE-2	SIDE COVER TYPE-1	9 	10 	11 	12 
	SIDE COVER TYPE-2	13 	14 	15 	16 

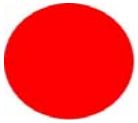
Appendix-4: Weightage Matrix for Context

		1	2	3	4
		STANDARD		SPORTS	
		BIG CAST WHEEL	SMALL SPOKE WHEEL	BIG CAST WHEEL	SMALL SPOKE WHEEL
1	WITH VISOR				
2	WITHOUT VISOR				

Appendix-5: Weightage Matrix for Typography and Graphics

		Strpe-1	Strpe-2
Typography-1	2D	1 	5 
	3D	2 	6 
Typography-2	2D	3 	7 
	3D	4 	8 

Appendix-6: Weightage Matrix for Colour and texture

Value	Chroma	Texture	Red	Green	Yellow	Blue	Black
Medium	Low	Plain					
		Glossy					
		Rough					
	High	Plain					
		Glossy					
		Rough					
Low	Low	Plain					
		Glossy					
		Rough					

Appendix-7.a: Color Matrix

1	b3/b1	26	b3.g2	51	g3	76	g2.r3	101	b2.r1	126	r2.r3	151	b3.y3	176	g1/y1	201	y3/g2	226	y2/r3
2	b3/b2	27	b3.g3	52	b1/w	77	g1.r1	102	b2.r2	127	r3.r1	152	y1/b1	177	g1/y2	202	y3/g3	227	y3/r1
3	b2/b3	28	b1.g1	53	b2/w	78	g1.r2	103	b2.r3	128	r1.w	153	y1/b2	178	g1/y3	203	r1/y1	228	y3/r2
4	b2/b1	29	b1.g2	54	b1.w	79	g1.r3	104	b3.r1	129	r2.w	154	y1/b3	179	g2/y1	204	r1/y2	229	y3/r3
5	b1/b3	30	b1.g3	55	b2.w	80	r3/g1	105	b3.r2	130	r3.w	155	y2/b1	180	g2/y2	205	r1/y3	230	y1
6	b1/b2	31	g1/b1	56	g3/w	81	r3/g2	106	b3.r3	131	r1	156	y2/b2	182	g2/y3	206	r2/y1	231	y2
7	b2.b3	32	g1/b2	57	g2/w	82	r3/g3	107	r1/b1	132	r2	157	y2/b3	183	g3/y1	207	r2/y2	232	y3
8	b1.b2	33	g1/b3	58	g1/w	83	r2/g1	108	r1/b2	133	r3	158	y3/b1	184	g3/y2	208	r2/y3		
9	b1.b3	34	g2/b1	59	g3.w	84	r2/g2	109	r1/b3	134	b1/y1	159	y3/b2	185	g3/y3	209	r3/y1		
10	b3	35	g2/b2	60	g2.w	85	r2/g3	110	r2/b1	135	b1/y2	160	y3/b3	186	g1.y2	210	r3/y2		
11	b2	36	g2/b3	61	g1.w	86	r1/g1	111	r2/b2	136	b1/y3	161	y1/w	187	g1.y1	211	r3/y3		
12	b1	37	g3/b1	62	g3/r1	87	r1/g2	112	r2/b3	137	b2/y1	162	y2/w	188	g1.y3	212	r1.y1		
13	b3/g3	38	g3/b2	63	g2/r1	88	r1/g3	113	r3/b1	138	b2/y2	163	y3/w	189	g2.y1	213	r1.y2		
14	b2/g3	39	g3/b3	64	g1/r1	89	b1/r1	114	r3/b2	139	b2/y3	164	b1.w	190	g2.y2	214	r1.y3		
15	b3/g2	40	g1/g3	65	g3/r2	90	b1/r2	115	r3/b3	140	b3/y1	165	y2.w	191	g2.y3	215	r2.y1		
16	b2/g2	41	g1/g2	66	g2/r2	91	b1/r3	116	r3/r1	141	b3/y2	166	y3.w	192	g3.y1	216	r2.y2		
17	b3/g1	42	g2/g1	67	g1/r2	92	b2/r1	117	r3/r2	142	b3/y3	167	y1/y2	193	g3.y2	217	r2.y3		
18	b2/g1	43	g2/g3	68	g3/r3	93	b2/r2	118	r3/w	143	b1.y1	168	y1/y3	194	g3.y3	218	r3.y1		
19	b1/g1	44	g3/g1	69	g2/r3	94	b2/r3	119	r2/r1	144	b1.y2	169	y2/y1	195	y1/g1	219	r3.y2		
20	b1/g2	45	g3/g2	70	g1/r3	95	b3/r1	120	r2/r3	145	b1.y3	170	y2/y3	196	y1/g2	220	r3.y3		
21	b1/g3	46	g1.g2	71	g3.r1	96	b3/r2	121	r2/w	146	b2.y1	171	y3/y1	197	y1/g3	221	y1/r1		
22	b2.g1	47	g2.g3	72	g3.r2	97	b3/r3	122	r1/r3	147	b2.y2	172	y3/y2	198	y2/g1	222	y1/r2		
23	b2.g2	48	g3.g1	73	g3.r3	98	b1.r1	123	r1/r2	148	b2.y3	173	y1.y2	199	y2/g2	223	y1/r3		
24	b2.g3	49	g1	74	g2.r1	99	b1.r2	124	r1/w	149	b3.y1	174	y2.y3	200	y2/g3	224	y2/r1		
25	b3.g1	50	g2	75	g2.r2	100	b1.r3	125	r1.r2	150	b3.y2	175	y3.y1	201	y3/g1	225	y2/r2		

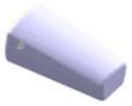
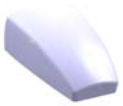
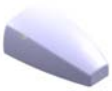
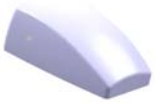
Appendix-7.b: Colour Matrix

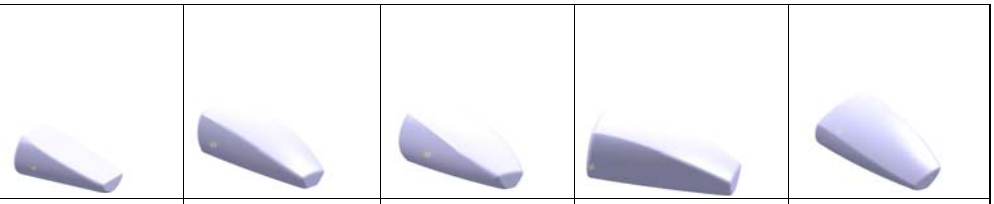
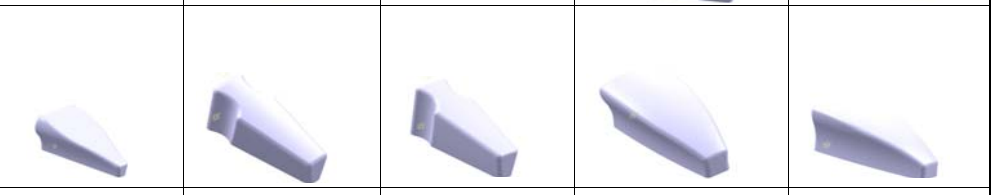
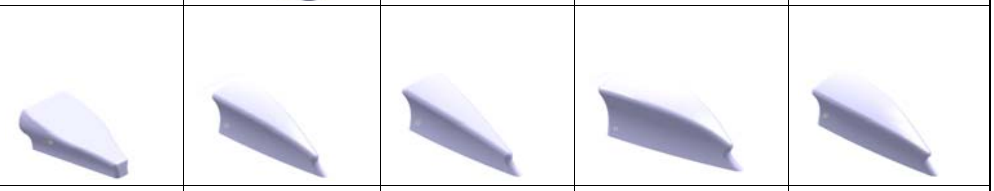
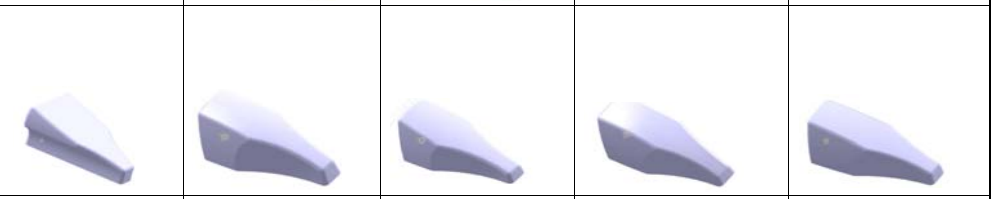
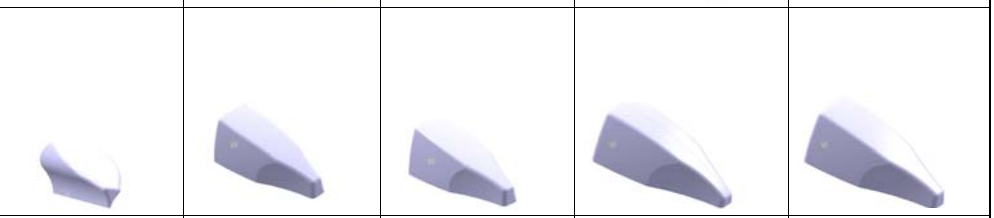
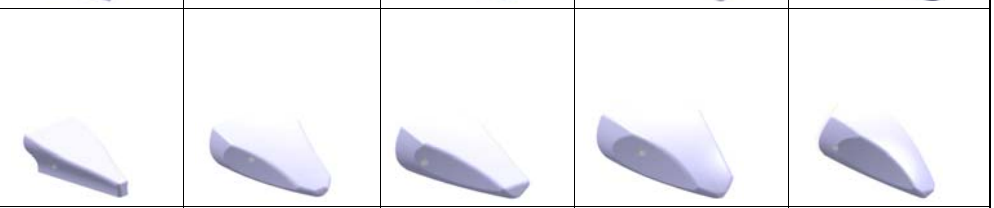
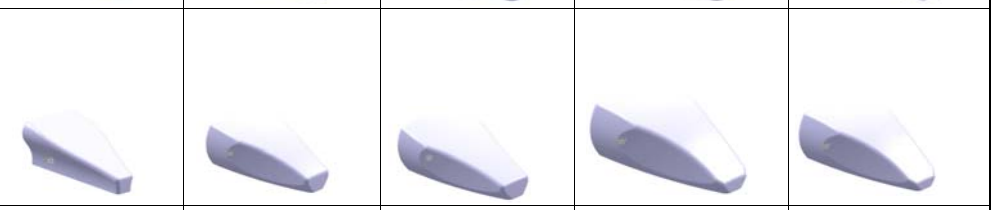
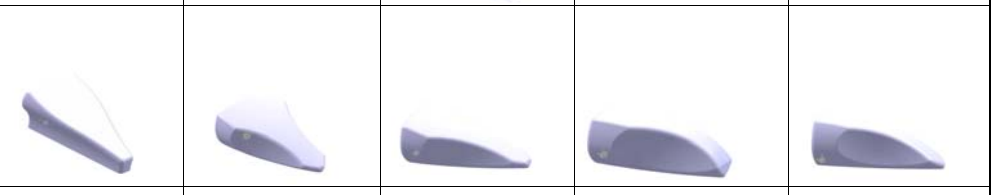
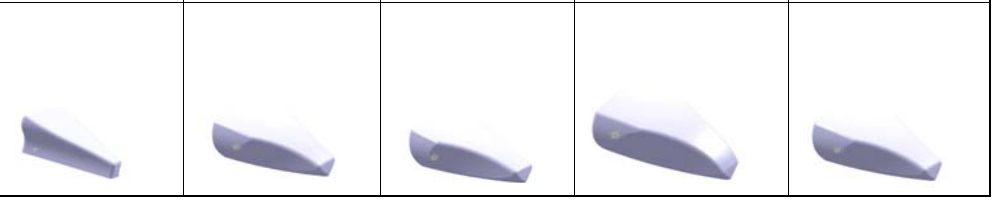
1	b3/w	26	y1/bl	51	bl/r2	76	bl.r1				
2	b3/bl	27	gy/bl	52	bl/r1	77	bl.y3				
3	b3/gy	28	w/bl	53	bl/y3	78	bl.y1				
4	b2/bl	29	gy/w	54	bl/y2	79	bl.y2				
5	b2/gy	30	w/bl	55	bl/y1	80	bl.w				
6	b1/bl	31	y1/gy	56	gy/b3	81	bl.gy				
7	b1/gy	32	w/b3	57	gy/b2	82	gy.b3				
8	g3/bl	33	w/b2	58	gy/b1	83	gy.b2				
9	g3/gy	34	w/b1	59	gy/g3	84	gy.b1				
10	g2/bl	35	w/g3	60	gy/g2	85	gy.g3				
11	g2/gy	36	w/g2	61	gy/g1	86	gy.g2				
12	g1/bl	37	w/g1	62	gy/r3	87	gy.g1				
13	g1/gy	38	w/r3	63	gy/r2	88	gy.r3				
14	bl/w	39	w/r2	64	gy/r1	89	gy.r2				
15	bl/gy	40	w/r1	65	gy/y3	90	gy.g1				
16	r3/bl	41	w/y3	66	gy/y2	91	gy.y3				
17	r3/gy	42	w/y2	67	gy/y1	92	gy.y2				
18	r2/bl	43	w/y1	68	bl.b3	93	gy.y1				
19	r2/gy	44	bl/b3	69	bl.b2	94	gy.w				
20	r1/bl	45	bl/b2	70	bl.b1						
21	r1/gy	46	bl/b1	71	bl.g3						
22	y3/bl	47	bl/g3	72	bl.g2						
23	y3/gy	48	bl/g2	73	bl.g1						
24	y2/bl	49	bl/g1	74	bl.r3						
25	y2/gy	50	bl/r3	75	bl.r2						

Appendix-7.c: Colour Matrix

1	w
2	bl
3	gy

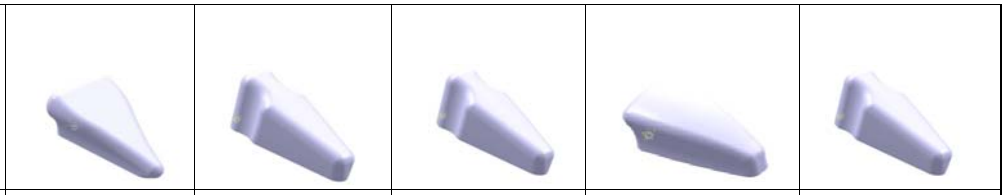
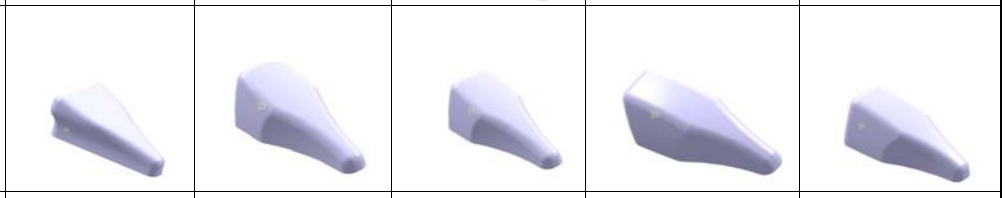
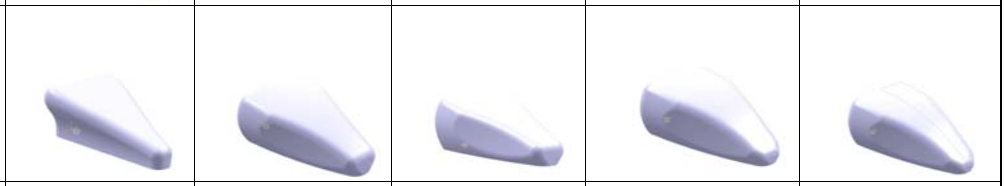
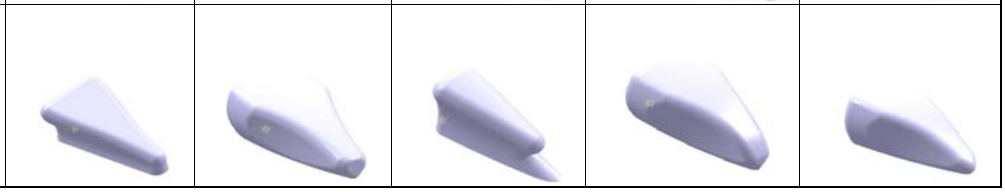
Appendix-8: Fuel Tank

	Sharp fillet		1	2	3	4	5
			Flat	Mild convex		High convex	
				Fast	Slow	Fast	Slow
A	Flat flat						
B		fast					
C	Flat mild convex	slow					
D		fast					
E	Flat high convex	slow					
F		fast					
G	(Mild + mild) convex	slow					
H		fast					
I	(Mild + high) convex	slow					
J		fast					

K	(high + high) convex	slow					
L		fast					
M	Mild convex, high concave	slow					
N		fast					
O	Mild convex, mild concave	slow					
P		fast					
Q	High convex, mild concave	slow					
R		fast					
S	High convex, high concave	slow					

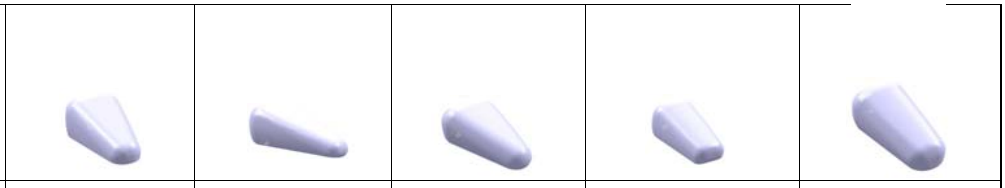
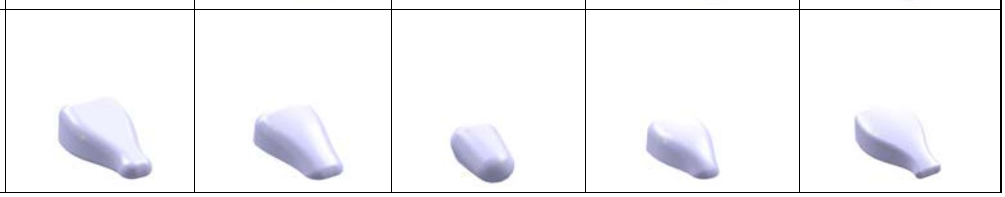
Medium fillet		1	2	3	4	5
		Flat	Mild convex		High convex	
			Fast	Slow	Fast	Slow
A	Flat flat					

B		fast					
C	Flat mild convex	slow					
D		fast					
E	Flat high convex	slow					
F		fast					
G	(Mild + mild) convex	slow					
H		fast					
I	(Mild + high) convex	slow					
J		fast					
K	(high + high) convex	slow					

L		fast					
M	Mild convex, high concave	slow					
N		fast					
O	Mild convex, mild concave	slow					
P		fast					
Q	High convex, mild concave	slow					
R		fast					
S	High convex, high concave	slow					

Large fillet 1 2 3 4 5

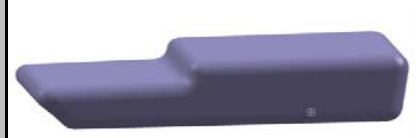
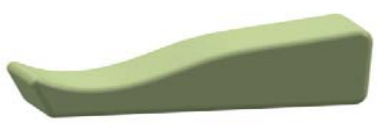
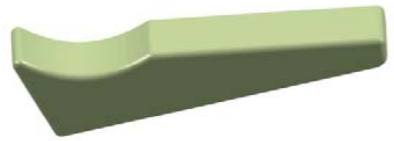
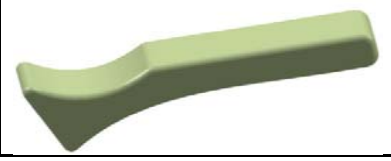
		Flat	Mild convex		High convex	
			Fast	Slow	Fast	Slow
A	Flat flat					
B		fast				

C	Flat mild convex	slow					
D		fast					
E	Flat high convex	slow					
F		fast					
G	(Mild + mild) convex	slow					
H		fast					
I	(Mild + high) convex	slow					
J		fast					
K	(high + high) convex	slow					
L		fast					
M	Mild convex, high concave	slow					

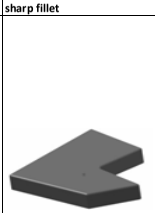
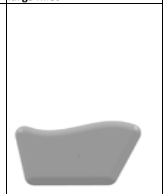
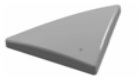
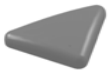
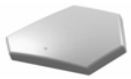
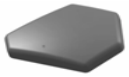
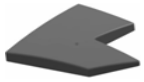
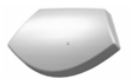
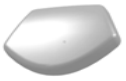
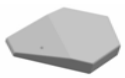
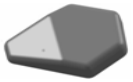
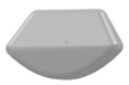
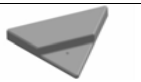
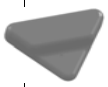
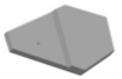
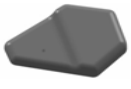
N		fast					
O	Mild convex, mild concave	slow					
P		fast					
Q	High convex, mild concave	slow			S 		
R		fast					
S	High convex, high concave	slow					

Appendix-9: Seat

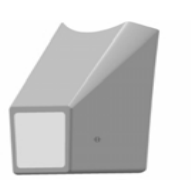
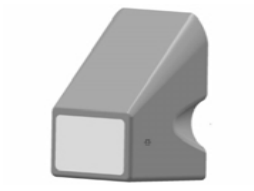
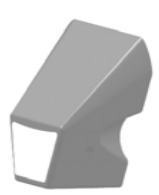
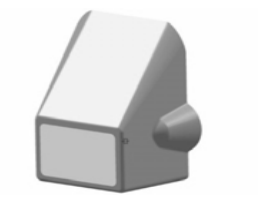
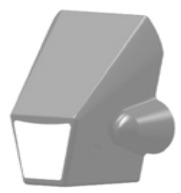
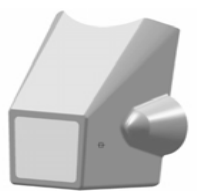
	A	B	C	D	E
	Rectangular	Flat	Flat with Ends Curved	Inclined	Inclined with ends Curved	Fast Curve
1	Bottom Flat					
2	Top & Bottom Inclined					
3	Top Flat & Bottom Stepped					

	Polygonal	Stepped	Inclined Flat	Inclined Curve - SHALLOW	Inclined Curve - DEEP	Flat Curve - SHALLOW	Flat Curve - DEEP
4	Flat Bottom						
5	Inclined Bottom						
6	Stepped Bottom						
7	Curved Bottom						

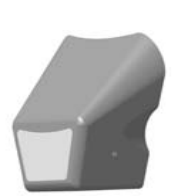
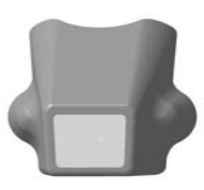
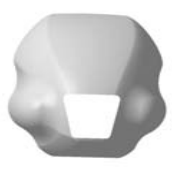
Appendix-10: Side Cover

	A	B	C	D	E	F	G	H	I	J
SIDE COVER	Triangular		Polygon +/+		Polygon +/-		Recto-curvilinear +/+		Recto-curvilinear +/-	
	sharp fillet	large fillet	sharp fillet	large fillet	sharp fillet	large fillet	sharp fillet	large fillet	sharp fillet	large fillet
Flat										
Convex										
Flat / Flat-angle										
Flat / Flat-step										
Flat concave										
Flat convex										
Convex-concave										

Appendix-11.a: Visor

		1	2	3	4	5	6
	VISOR (small fillet)	**FLAT CONTOUR**		**CONVEX CONTOUR**		**CONCAVE CONTOUR**	
		RECTNGULAR H/L	TRAPEZOIDAL H/L	RECTNGULAR H/L	TRAPEZOIDAL H/L	RECTNGULAR H/L	TRAPEZOIDAL H/L
1	FLAT						
2	CONVEX						
3	FLAT CONCAVE						
4	FLAT CONVEX						
5	CONVEX CONCAE						
6	CONVEX CONVEX						

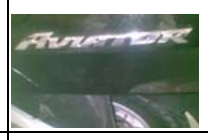
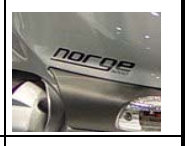
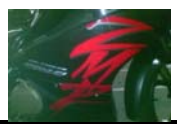
Appendix-11.b: Visor

		1	2	3	4	5	6
	VISOR (small fillet)	**FLAT CONTOUR**		**CONVEX CONTOUR**		**CONCAVE CONTOUR**	
		RECTNGULAR H/L	TRAPEZOIDAL H/L	RECTNGULAR H/L	TRAPEZOIDAL H/L	RECTNGULAR H/L	TRAPEZOIDAL H/L
7	FLAT						
8	CONVEX						
9	FLAT CONCAVE						
10	FLAT CONVEX						
11	CONVEX CONCAE						
12	CONVEX CONVEX						

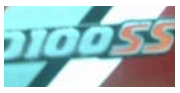
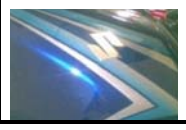
Appendix-12: Graphics

1 2 3 4 5 6 7 8 9

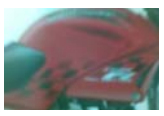
Logo

		Straight				Aligned			
		Chrome	Yellow	Coloured-Bright	Coloured-dark	Chrome	Yellow	Coloured-Bright	Coloured-dark
Metallic	Flowing								
	Separated								
Stripe	Flowing								
	Separated								

Logo with stripe

		Straight				Aligned			
		Chrome	Yellow	Coloured-Bright	Coloured-dark	Chrome	Yellow	Coloured-Bright	Coloured-dark
Metallic	Flowing	S,2.1 			G,1.7 	G,2.1 		S,2.1 	
	Capital		S,1.7 	S,1.6 		S,1.7 	S,1.6 	S,1.7 	
Stripe	Flowing								
	Capital								

Stripe

		Horizontal			Vertical			Random		
		Rectilinear	Curvilinear	Recto curvilinear	Rectilinear	Curvilinear	Recto curvilinear	Rectilinear	Curvilinear	Recto curvilinear
Seaparate	Grid									
	Straight									
	Spiral									
	Diverging									
Unified	Grid									
	Straight									
	Spiral									
	Diverging									

Appendix-13: Typography

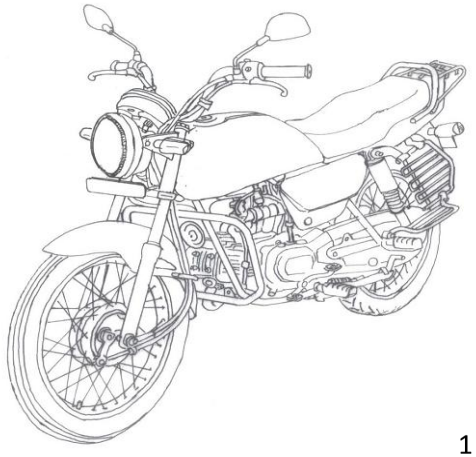
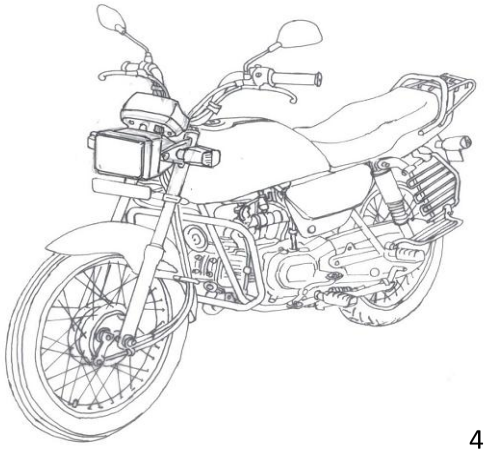
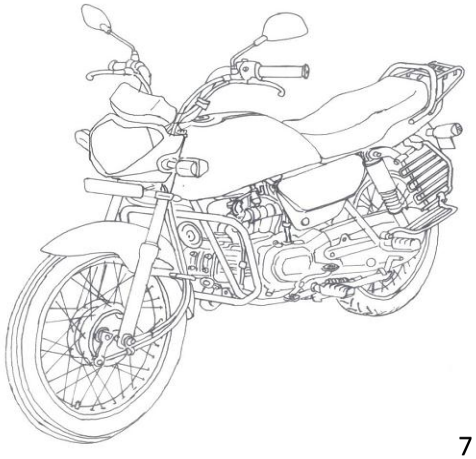
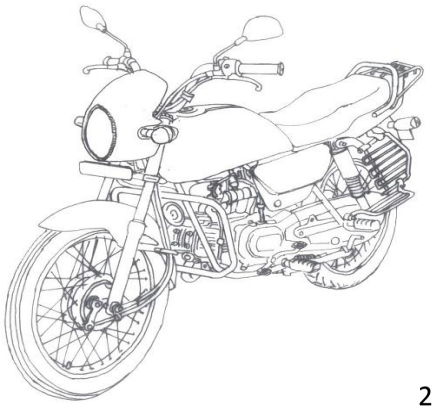
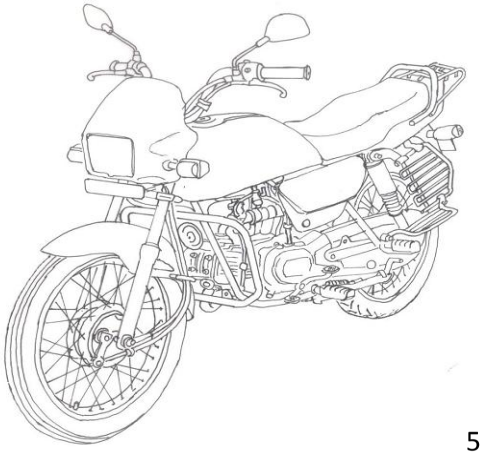
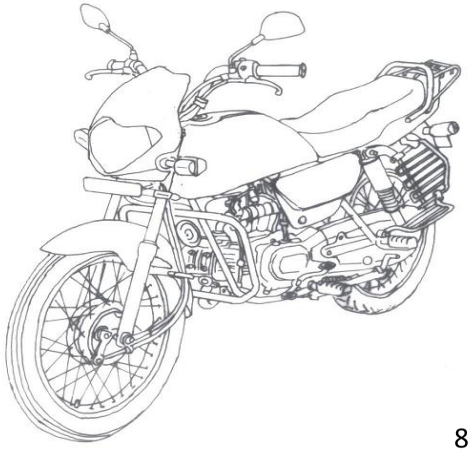
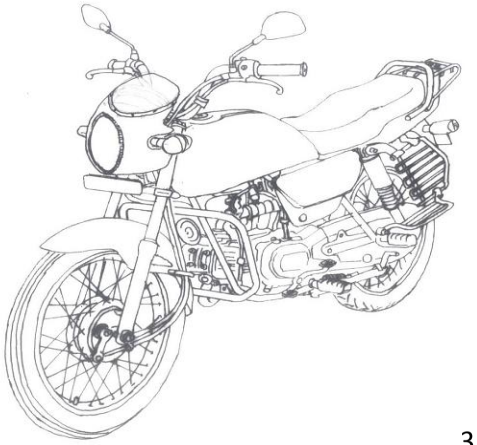
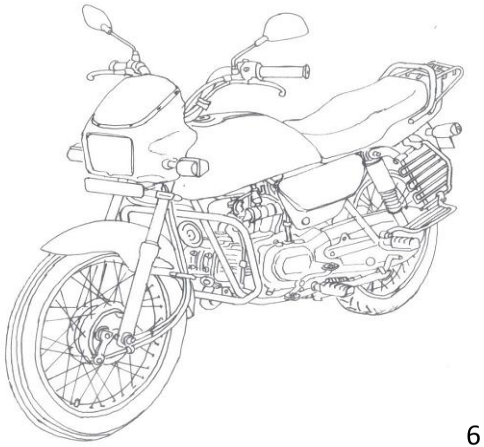
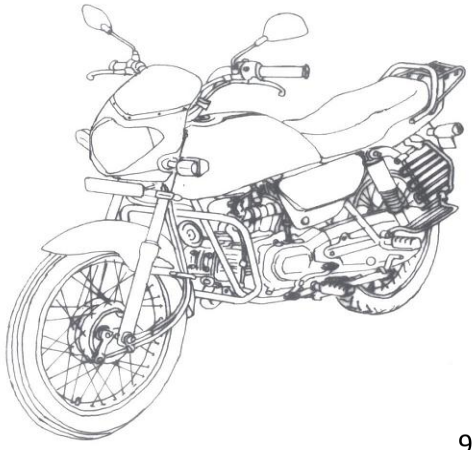
			Upper Case		Lower Case	
			Straight	Inclined	Straight	Inclined
Text	Old English	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
Roman-Old Style	Caslon	Large	ABCD	ABCD	abcd	abcd
		Small	ABCD	ABCD	abcd	abcd
	Palatino	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
	Perpetua	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
	Garamond	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
Roman-Transitional	Baskerville	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
Roman-Modern	Bodony	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
Square Serif	Rockwell	Large	ABCD	ABCD	Abcd	Abcd
		Small	ABCD	ABCD	Abcd	Abcd
Sans Serif	Helvetica	Large	ABCD	ABCD	abcd	abcd
		Small	ABCD	ABCD	abcd	abcd
	Futura	Large	ABCD	ABCD	abcd	abcd
		Small	ABCD	ABCD	abcd	abcd

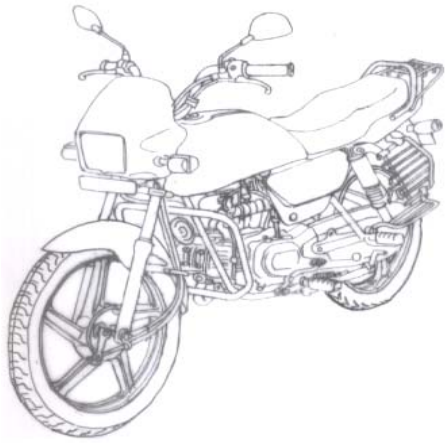
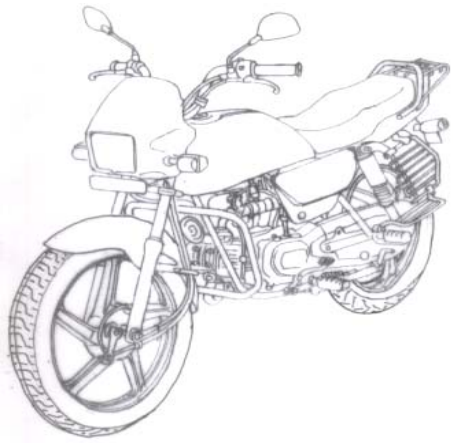
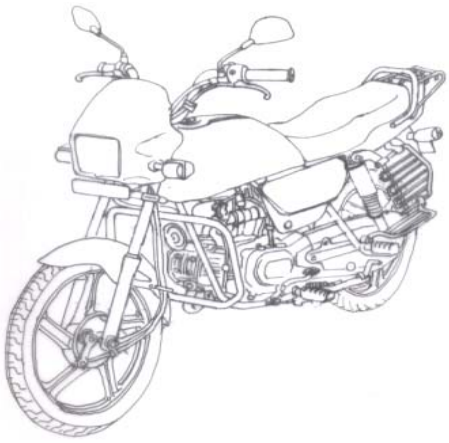
Fancy	Ornamental	Ringlet	Large	ABCD	*ABCD*	abcd	*abcd*
			Small	ABCD	*ABCD*	abcd	*abcd*
		Arnold	Large	ABCD	ABCD	abcd	abcd
			Small	ABCD	ABCD	abcd	abcd
		Gallia	Large	ABCD	*ABCD*	abcd	*abcd*
			Small	ABCD	*ABCD*	abcd	*abcd*
	Novelty	Friz Quadrata	Large	ABCD	*ABCD*	abcd	*abcd*
			Small	ABCD	*ABCD*	abcd	*abcd*
Hand	Script	Palace	Large	ABCD	ABCD	Abcd	Abcd
			Small	ABCD	ABCD	Abcd	Abcd
		Free Style	Large	ABCD	*ABCD*	Abcd	*Abcd*
			Small	ABCD	*ABCD*	Abcd	*Abcd*
		Commercial	Large	ABCD	*ABCD*	abcd	abcd
			Small	ABCD	*ABCD*	abcd	abcd
	Cursive	Murray Hill	Large	ABCD	ABCD	ABCD	ABCD
			Small	ABCD	*ABCD*	abcd	abcd
		Legend	Large	ABCD	ABCD	ABCD	ABCD
			Small	ABCD	*ABCD*	abcd	abcd
		Zapf Chancery	Large	ABCD	*ABCD*	abcd	abcd
			Small	ABCD	*ABCD*	abcd	abcd

Appendix-14.a: Types of Motorcycles

			A Cruiser	B Sports	C Standard
1	**Lean**	Naked			
2		Ornamental			
3	**Bulky**	Naked			
4		Ornamental			

Appendix-14.b: Fr facia

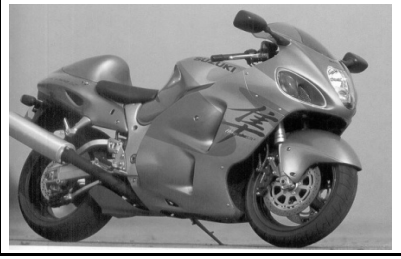
	ROUND HEAD LIGHT(1)	RECTANGULAR HEAD LIGHT(2)	TRAPIZOIDAL HEAD LIGHT(3)
NO VISOR(1)	 1	 4	 7
WITH SIMPLE	 2	 5	 8
WITH WINDSHIELD VISOR(3)	 3	 6	 9

		A	B
		SPOKE	CAST
BIG WHE	NAF		
	WID		
SMALL WHEEL	NAF		
	WID		

Appendix-15.b: Data for Unity and Dynamism Survey (sheet-2)

A

Unity

Dynamism	Level 1	Level 2	Level 3
Level 1	1a 	2a 	3a 
Level 2	4a 	5a 	6a 
Level 3	7a 	8a 	9a 

Appendix-15.b: Data for Unity and Dynamism Survey (sheet-2)

A

Unity

Dynamism

	Level 1	Level 2	Level 3
Level 1	1a 	2a 	3a 
Level 2	S: 0.43 | G: 4a: 0.37 | D: 1.02 | 1: 2.30 	S: 2.25 | G: 5a: 1.59 | D: 1.73 | 1: 0.99 	S: 0.19 | G: 1.10 | D: 1.07 | 1: 1.41 6a 
Level 3	S: 2.02 | G: 7a: 0.77 | D: 0.37 | 1: 0.15 	S: 0.99 | G: 8a: 2.10 | D: 2.37 | 1: 0.99 	S: 0.15 | G: 0.42 | D: 2.14 | 1: 0.99 9a 

Appendix-15.a: Data for Unity and Dynamism Survey (sheet-1)

Unity

Dynamism	Level 1	Level 2	Level 3
Level 1	1b 	2b 	3b 
Level 2	4b 	5b 	6b 
Level 3	7b 	8b 	9b 

Appendix-15.c: Data for Unity and Dynamism Survey (sheet-3)

Unity

	Level 1	Level 2	Level 3
Level 1			
Level 2		5c 	
Level 3			S | G | D | 1 0.71 | 1.73 | 2.61 | 2.23 9c 

Appendix-16.a: Survey Sheet for Overall Weightage, and Graphics and Visor Survey

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Weightage

Sheet	Character	Intensity
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		
17		
18		
19		
20		
21		
22		
23		
24		

Sheet	Character	Intensity
25		
26		
27		
28		
29		
30		
31		
32		
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36		
37		
38		
39		
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41		
42		
43		
44		
45		
46		
47		
48		

Graphics

Sheet	Character	Intensity
11		
15		
21		
22		
25		
27		
28		
31		
34		
37		
38		
41		
43		
44		
46		
47		
48		
51		
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57		
62		
63		
65		
66		
67		
71		
73		
81		
82		

Sheet	Character	Intensity
83		
84		
85		
87		
88		
91		
94		
95		
97		
99		
101		
102		
103		
104		
107		
108		
112		
113		
114		
118		
119		
121		
122		
123		
124		
125		
127		
141		
143		
163		

Visors

Sheet	Character	Intensity
11		
12		
13		
14		
15		
16		
21		
22		
23		
24		
25		
26		
31		
32		
33		
34		
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63		
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65		
66		

Sheet	Character	Intensity
71		
72		
73		
74		
75		
76		
81		
82		
83		
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92		
93		
94		
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126		

Appendix-16.b: Weightage(colour, texture) and score (texture)

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Sheet	Character	Intensity
1		
2		
3		
4		
5		
6		
7		
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11		
12		
13		
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16		
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19		
20		

Sheet	Character	Intensity
21		
22		
23		
24		
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Appendix-16.c: Survey Sheet for Form, Context Weightage and Unity and Dynamism

---

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Form Weightage

Sheet	Character	Intensity
1		
2		
3		
4		
5		
6		
7		
8		
9		
10		
11		
12		
13		
14		
15		
16		

Context weightage

Sheet	Character	Intensity
11		
12		
13		
14		
21		
22		
23		
24		

Unity and dynamism

Sheet	Character	Intensity
1a		
2a		
3a		
4a		
5a		
6a		
7a		
8a		
9a		
1b		
2b		
3b		
4b		
5b		
6b		
7b		
8b		
9b		
1c		
2c		
3c		
4c		
5c		
6c		
7c		
8c		
9c		

Appendix-16.d: Survey sheet for Weightage (typographics and Graphics)

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Sheet	Character	Intensity
1		
2		
3		
4		

Sheet	Character	Intensity
5		
6		
7		
8		

Appendix -16.e: Survey sheet for scores (Fuel tank form, colour 1, 2)

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Fuel Tank

Sheet	Character	Intensity
SA1		
SB1		
SB2		
SB3		
SB4		
SB5		
SC1		
SC2		
SC3		
SC4		
SC5		
SD1		
SD2		
SD3		
SD4		
SD5		
SE1		
SE2		
SE3		
SE4		
SE5		
SF1		
SF2		
SF3		
SF4		
SF5		
SG1		
SG2		
SG3		
SG4		
SG5		
SH1		
SH2		
SH3		
SH4		
SH5		
SI1		
SI2		
SI3		
SI4		
SI5		
SJ1		
SJ2		
SJ3		
SJ4		
SJ5		
SK1		
SK2		
SK3		
SK4		
SK5		
SL1		
SL2		
SL3		
SL4		
SL5		
SM1		
SM2		
SM3		
SM4		
SM5		
SN1		
SN2		
SN3		
SN4		
SN5		
SO1		
SO2		
SO3		
SO4		
SO5		
SP1		
SP2		
SP3		
SP4		
SP5		
SQ1		
SQ2		
SQ3		
SQ4		
SQ5		
SR1		
SR2		
SR3		

Fuel Tank

Sheet	Character	Intensity
SR4		
SR5		
SS1		
SS2		
SS3		
SS4		
SS5		
MA1		
MB1		
MB2		
MB3		
MB4		
MB5		
MC1		
MC2		
MC3		
MC4		
MC5		
MD1		
MD2		
MD3		
MD4		
MD5		
ME1		
ME2		
ME3		
ME4		
ME5		
MF1		
MF2		
MF3		
MF4		
MF5		
MG1		
MG2		
MG3		
MG4		
MG5		
MH1		
MH2		
MH3		
MH4		
MH5		
MI1		
MI2		
MI3		
MI4		
MI5		
MJ1		
MJ2		
MJ3		
MJ4		
MJ5		
MK1		
MK2		
MK3		
MK4		
MK5		
ML1		
ML2		
ML3		
ML4		
ML5		
MM1		
MM2		
MM3		
MM4		
MM5		
MN1		
MN2		
MN3		
MN4		
MN5		
MO1		
MO2		
MO3		
MO4		
MO5		
MP1		
MP2		
MP3		
MP4		
MP5		
MQ1		

Fuel Tank

Sheet	Character	Intensity
MQ2		
MQ3		
MQ4		
MQ5		
MR1		
MR2		
MR3		
MR4		
MR5		
MS1		
MS2		
MS3		
MS4		
MS5		
LA1		
LB1		
LB2		
LB3		
LB4		
LB5		
LC1		
LC2		
LC3		
LC4		
LC5		
LD1		
LD2		
LD3		
LD4		
LD5		
LE1		
LE2		
LE3		
LE4		
LE5		
LF1		
LF2		
LF3		
LF4		
LF5		
LG1		
LG2		
LG3		
LG4		
LG5		
LH1		
LH2		
LH3		
LH4		
LH5		
LI1		
LI2		
LI3		
LI4		
LI5		
LJ1		
LJ2		
LJ3		
LJ4		
LJ5		
LK1		
LK2		
LK3		
LK4		
LK5		
LL1		
LL2		
LL3		
LL4		
LL5		
LM1		
LM2		
LM3		
LM4		
LM5		
LN1		
LN2		
LN3		
LN4		
LN5		
LO1		
LO2		
LO3		
LO4		

Fuel Tank

Sheet	Character	Intensity
LO5		
LP1		
LP2		
LP3		
LP4		
LP5		
LQ1		
LQ2		
LQ3		
LQ4		
LQ5		
LR1		
LR2		
LR3		
LR4		
LR5		
LS1		
LS2		
LS3		
LS4		
LS5		

Colour

Sheet	Character	Intensity
1		
2		
3		
4		
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14		
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60		
61		

Colour

Sheet	Character	Intensity
62		
63		
64		
65		
66		
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70		
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74		
75		
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96		
97		
98		
99		
100		

Colour

Sheet	Character	Intensity
146		
147		
148		
149		
150		
151		
152		
153		
154		
155		
156		
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158		
159		
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224		
225		
226		
227		
228		
229		

Colour

Sheet	Character	Intensity
230		
231		
232		
233		
234		
235		

Colour 2

Sheet	Character	Intensity
1		
2		
3		
4		
5		
6		
7		
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13		
14		
15		
16		
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75		
76		

Colour 2

Sheet	Character	Intensity
77		
78		
79		
80		
81		
82		
83		
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89		
90		
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96		
97		
98		
99		
100		

Appendix-16.f: Survey for score (colour 3)

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Color 3		
Sheet	Character	Intensity
1		
2		
3		

Appendix-16.g: Survey sheet for score (seat, side cover, types, front facia, tyre and wheels

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Seat

Sheet	Character	Intensity
1A		
1B		
1C		
1D		
1E		
2A		
2B		
2C		
2D		
2E		
3A		
3B		
3C		
3D		
3E		
4A		
4B		
4C		
4D		
4E		
4F		
5A		
5B		
5C		

Seat

Sheet	Character	Intensity
5D		
5E		
5F		
6A		
6B		
6C		
6D		
6E		
6F		
7A		
7B		
7C		
7D		
7E		
7F		

Fr. Facia

Sheet	Character	Intensity
1		
2		
3		
4		
5		
6		
7		
8		
9		

Motorcycle types

Sheet	Character	Intensity
A_1		
A_2		
A_3		
A_4		
B_1		
B_2		
B_3		
B_4		
C_1		
C_2		
C_3		
C_4		

Tyres and wheels

Sheet	Character	Intensity
A_1		
A_2		
A_3		
A_4		
B_1		
B_2		
B_3		
B_4		

Side Cover

Sheet	Character	Intensity
1A		
1B		
1C		
1D		
1E		
1F		
1G		
2A		
2B		
2C		
2D		
2E		
2F		
2G		
2H		
2I		
2J		
3A		
3B		
3C		
3D		
3E		
3F		
3G		
3H		
3I		
3J		
4A		
4B		
4C		

Side Cover

Sheet	Character	Intensity
4D		
4E		
4F		
4G		
4H		
4I		
4J		
5A		
5B		
5C		
5D		
5E		
5F		
5G		
5H		
5I		
5J		
6A		
6B		
6C		
6D		
6E		
6F		
6G		
6H		
6I		
6J		
7A		
7B		
7C		
7D		
7E		
7F		
7G		
7H		
7I		
7J		

Appendix-16.h: Survey sheet for Score (typography)

Name:

Character

S: **S**ober, quiet

G:Glamorous, beautiful

D: Dynamic

I:Intimidating, dominating

Intensity

1: Low

2: Medium

3:High

Sheet	Character	Intensity
$A_1$1		
$A_1$2		
$A_1$3		
$A_1$4		
$A_2$1		
$A_2$2		
$A_2$3		
$A_2$4		
$B_1$1		
$B_1$2		
$B_1$3		
$B_1$4		
$B_2$1		
$B_2$2		
$B_2$3		
$B_2$4		
$C_1$1		
$C_1$2		
$C_1$3		
$C_1$4		
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Sheet	Character	Intensity
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Sheet	Character	Intensity
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Sheet	Character	Intensity
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Sheet	Character	Intensity
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Appendix 17: Respondents for Survey

S No	Name	Apprx Age	Profession	Rural/Urban	Gender
1	Anil Gauba	44	Salaried	Urban	**Male**
2	Amit Saroch	35	Salaried	Urban	**Male**
3	Ajay Kumar Sood	28	Salaried	Urban	**Male**
4	Yogesh sabharwal	33	Salaried	Urban	**Male**
5	Varun Sachdev	25	Student	Urban	**Male**
6	Manu Vashisht	25	Student	Urban	**Male**
7	Deepak Manchanda	46	Salaried	Urban	**Male**
8	Jitender Mohil	24	Salaried	Urban	**Male**
9	Akhilesh	25	Salaried	Urban	**Male**
10	Manish sharma	25	Salaried	Urban	**Male**
11	Parteek Gautam	24	Student	Urban	**Male**
12	T J Rajendaran	39	Salaried	Urban	**Male**
13	Jairaj	24	Salaried	Urban	**Male**
14	Anuj sharma	39	Salaried	Urban	**Male**
15	Pankaj	32	Salaried	Urban	**Male**
16	Amit Rana	35	Salaried	Urban	**Male**
17	Rakesh Ghuge.	29	Salaried	Urban	**Male**
18	Soni Gautam	38	Salaried	Urban	**Male**
19	Parvesh	31	Salaried	Urban	**Male**
20	RAJESH JAITLY	49	Salaried	Urban	**Male**
21	ANIL KUMAR CHAWLA	50	Salaried	Urban	**Male**
22	SAMEER REKHI	38	Salaried	Urban	**Male**
23	DEVENDRA BHASKAR HAKIM	29	Salaried	Urban	**Male**
24	ASHISH MAHADEV CHOPADE	32	Salaried	Urban	**Male**
25	ATUL ABROL	30	Salaried	Urban	**Male**
26	ANSHUL ARORA	28	Salaried	Urban	**Male**
27	AMIT MAHAJAN	28	Salaried	Urban	**Male**
28	ASHWANI RAINA	28	Business	Urban	**Male**
29	VICHITER KUMAR	36	Business	Urban	**Male**
30	SACHIN AHUJA	35	Business	Urban	**Male**
31	DEEPAK CHANDRA	46	Business	Urban	**Male**
32	ASHWINI KUMAR AGGARWAL	42	Business	Urban	**Male**
33	SURENDER KUMAR	40	Business	Urban	**Male**
34	NAVEEN BHAT	35	Business	Urban	**Male**
35	VISHAN SINGH SHEKHAWAT	32	Salaried	Urban	**Male**
36	VIKAS TANEJA	30	Salaried	Urban	**Male**
37	K PRAKASH RAO	30	Salaried	Urban	**Male**
38	MR. L. ARUNACHALAM	53	Salaried	Urban	**Male**
39	MR. UNNIKRISHNAN K.G	47	Salaried	Urban	**Male**
40	MR. SUSHIL CHANDRA	49	Salaried	Urban	**Male**
41	MR. ASHOK KATARIA	50	Business	Urban	**Male**
42	MR. AJAY GUPTA	40	Business	Urban	**Male**
43	MR. B.K. GUPTA	47	Business	Urban	**Male**
44	MR. KENDRAJ DHASMANA	44	Salaried	Urban	**Male**
45	MR. G. S. KALSI	52	Salaried	Urban	**Male**
46	MR. SHIV SANJAY GUJRAL	36	Salaried	Urban	**Male**
47	MR. D.N. ANJANEYA PRASAD	39	Salaried	Urban	**Male**
48	MR. N. GURUMURTHY	41	Salaried	Urban	**Male**
49	MR. RAJEEV SHARMA	40	Salaried	Urban	**Male**
50	MR. SHIVA KUMAR V.R	36	Salaried	Urban	**Male**
51	MR. SUSHEEL SINHA	43	Salaried	Urban	**Male**
52	MR. O.K. RAINA	52	Salaried	Urban	**Male**
53	MR. SANJAY GUPTA	44	Salaried	Urban	**Male**
54	MR. SURINDER SINGH CHADHA	41	Salaried	Urban	**Male**
55	MR. RAMA SUBBU	37	Salaried	Urban	**Male**
56	MR. VIRENDRA SINGH	51	Salaried	Urban	**Male**
57	MR. K.K. THOMAS	55	Salaried	Urban	**Male**
58	MR. JITENDRA JHA	45	Salaried	Urban	**Male**
59	MR. NITISH TALWAR	38	Salaried	Urban	**Male**
60	MR. SULABH SHARMA	35	Salaried	Urban	**Male**
61	MR. B.K. PANDIT	42	Salaried	Urban	**Male**
62	MR. SANJEEV TANDON	41	Business	Urban	**Male**
63	MR. SHAILENDRA KUMAR PANDEY	37	Business	Urban	**Male**
64	MR. SHIWALIK GHOSH	35	Business	Urban	**Male**

65	MR. SHIRISH SHARMA	36	Business	Rural	**Male**
66	MR. RAHUL BHATNAGAR	37	Business	Urban	**Male**
67	MR. SANJAY GILOTRA	37	Business	Urban	**Male**
68	MR. SHAILENDRA MUTHU	40	Salaried	Urban	**Male**
69	MR. U.K. BISHNOI	49	Business	Rural	**Male**
70	MR. RAKESH SETHI	39	Salaried	Urban	**Male**
71	MR. SURJEET KUMAR	41	Salaried	Urban	**Male**
72	MR. HARISH KUMAR	37	Salaried	Urban	**Male**
73	MR. ANUJ SOOD	39	Salaried	Urban	**Male**
74	MR. RAHUL KUMAR JAIN	36	Self-employed	Urban	**Male**
75	MR. TARUN OJHA	30	Self-employed	Urban	**Male**
76	MR. GHANSHYAM PRASAD	35	Self-employed	Rural	**Male**
77	MR. MANPREET S. GROVER	36	Self-employed	Urban	**Male**
78	MR. ABHINAV VIDYARTHI	34	Salaried	Urban	**Male**
79	MR. RAGHAV PANDYA	32	Salaried	Urban	**Male**
80	MR. AJAY KUMAR SINGH	23	Student	Rural	**Male**
81	MR. KAMAL KISHORE KACHOLYA	32	Salaried	Urban	**Male**
82	MR. VENKAIAH BATHULA	33	Salaried	Urban	**Male**
83	MR. VISHWAS MORGHARE	22	Student	Urban	**Male**
84	MR. HARSH AGARWAL	32	Salaried	Urban	**Male**
85	MR. SORABH MITTAL	23	Student	Urban	**Male**
86	MR. DHEERAJ KUMAR SHARMA	21	Student	Urban	**Male**
87	MR. A.C. POPLI	56	Farmer	Rural	**Male**
88	MR. RAJESH SHUKLA	42	Farmer	Rural	**Male**
89	MR. MANISH KESWANI	37	Farmer	Rural	**Male**
90	MR. ABHINAV RAI	33	Farmer	Rural	**Male**
91	MR. P.P. GUPTA	38	Business	Urban	**Male**
92	MR. ANURAG DUREJA	33	Business	Urban	**Male**
93	MR. SHARAD MEHTA	34	Business	Urban	**Male**
94	MR. BHARAT VIMAL KACHROO	32	Business	Urban	**Male**
95	MR. PRASHANT KU MAR VAISH	33	Business	Urban	**Male**
96	MR. SATYA NARAYAN JANGRA	37	Business	Urban	**Male**
97	MR. RAJESH SUBRAMANI	24	Business	Urban	**Male**
98	MR. R. KANNAN	29	Business	Urban	**Male**
99	MR. VIJAY SINGH	32		Urban	**Male**
100	MR. PRAKASH VERMA	23	Student	Urban	**Male**
101	MS. PUSHPINDER KAUR	31	Business	Urban	**Female**
102	MR. TEJINDER SINGH	48	Business	Urban	**Male**
103	MR. J.K. KAKKAR	48	Business	Urban	**Male**
104	MR. VISHAL THAKUR	29	Business	Urban	**Male**
105	MS. BHAVNA MANN	28	Business	Urban	**Female**
106	MR. AMIT RAWAL	28	Business	Urban	**Male**
107	MR. SUMIT BANSAL	31	Salaried	Urban	**Male**
108	MR. ASHISH MATHUR	33	Business	Urban	**Male**
109	MR. SUNIL SEHGAL	31	Salaried	Urban	**Male**
110	MR. S.K. KAUSHIK	46	Business	Rural	**Male**
111	MR. SUMIT KATARIA	29	Salaried	Rural	**Male**
112	MR. SANTU KUMAR SAHA	29	Business	Urban	**Male**
113	MR. PUNEET MIGLANI	29	Business	Urban	**Male**
114	MR. MOHIT GUPTA	29	Business	Rural	**Male**

115	MR. SANDEEP SRIVASTAVA	29	Salaried	Rural	**Male**
116	MR. RAVI KUMAR KHATRI	30	Salaried	Rural	**Male**
117	MR. KUMAR GIRISH RANJAN	27	Salaried	Urban	**Male**
118	MS. MALA SINGH	27	Salaried	Urban	**Female**
119	MR. SURENDER KUMAR VERMA	30	Salaried	Urban	**Male**
120	MR. PULKIT	26	Salaried	Rural	**Male**
121	MR. ADITYA POLISETTY	26	Salaried	Urban	**Male**
122	MR. ASHISH JAIN	27	Salaried	Urban	**Male**
123	MR. ANIRUDDH SUKHWAL	27	Salaried	Rural	**Male**
124	MR. VIRENDRA SINGH SHAKTAWAT	26	Salaried	Urban	**Male**
125	MR. RAHUL GARG	26	Salaried	Urban	**Male**
126	MR. DEEPAK SINGH	29	Salaried	Urban	**Male**
127	MR. U.K. SHARMA	46	Business	Rural	**Male**
128	MR. V.K. VERMA	44	Business	Rural	**Male**
129	MR. PRASHANT KUMAR	30	Business	Rural	**Male**
130	MS. ZULEKHA	27	Salaried	Urban	**Female**
131	MR. SUMEET DUTTA	26	Salaried	Urban	**Male**
132	MR. VENKATESH BANGARA	26	Salaried	Urban	**Male**
133	MR. K KAMALANATHAN	26	Salaried	Urban	**Male**
134	MR. ASHISH JAIN	26	Salaried	Urban	**Male**
135	MR. RANDEEP SINGH BHANOT	27	Salaried	Rural	**Male**
136	MR. NEERAJ KUMAR	26	Salaried	Urban	**Male**
137	MR. A BASKAR	25	Student	Urban	**Male**
138	MR. LEELADHAR RAJPUT	25	Student	Urban	**Male**
139	MR. KALYAN MANOHAR BHAVARAJU	23	Student	Urban	**Male**
140	MR. SRIKRISHNA KODURI	23	Student	Urban	**Male**
141	MR. BANGALORE LINGARAJ YASHWANTH	25	Student	Urban	**Male**
142	MR. POUL PARSHURAM VENKETRAO	25	Student	Urban	**Male**
143	MR. ANKIT KUMAR SHARMA	24	Student	Rural	**Male**
144	MS. ANNAPURNA ADDAGARLA	26	Salaried	Urban	**Female**
145	MR. ANKIT GUPTA	30	Salaried	Urban	**Male**
146	MR. SHANKARLINGAM	26	Salaried	Urban	**Male**
147	MR. S. MUTHU KUMAR	25	Student	Urban	**Male**
148	MR. RAJ KUMAR	37	Salaried	Rural	**Male**
149	MR. SUGAN CHAND	47	Salaried	Rural	**Male**
150	MR. BHUPINDER SINGH	21	Salaried	Rural	**Male**
151	MR. ASHISH MAKHIJA	25	Student	Urban	**Male**
152	MR. SOURAV GUPTA	24	Student	Urban	**Male**
153	MR. SUDHIR KUMAR	24	Student	Rural	**Male**
154	MR. NIKUNJ SHARMA	23	Student	Rural	**Male**
155	MR. SUNILRANA	23	Student	Rural	**Male**
156	MR. SATYAM MISHRA	25	Student	Rural	**Male**
157	MR. PRADIP KUMAR	24	Student	Urban	**Male**
158	MR. RAJAT KAPOOR	23	Student	Urban	**Male**
159	MR. PIYUSH MANI SHARMA	24	Student	Urban	**Male**
160	MR. ARCHISMAN ROY	23	Student	Urban	**Male**
161	MR. MAYANK KAKRAN	23	Student	Urban	**Male**
162	MR. AVINASH KUMAR	20	Student	Urban	**Male**
163	MR. MOHIT JAIN	24	Student	Urban	**Male**
164	MR. KAUSHIK PADHY	23	Student	Urban	**Male**
165	MR. VIVEK CHAHAL	25	Student	Rural	**Male**
166	MS. RADHIKA SELGAONKAR	23	Student	Urban	**Female**
167	MR. SOURABH CHOUDHARY	25	Salaried	Rural	**Male**
168	MR. SURESH KAPOOR	46	Salaried	Urban	**Male**
169	MR. J.K. VASHISHT	53	Salaried	Rural	**Male**

170	MR. BHAGWAN SVARUP	43	Salaried	Rural	**Male**
171	MR. BIRENDER SHARMA	48	Salaried	Rural	**Male**
172	MR. PAWAN SHARMA	47	Salaried	Rural	**Male**
173	MR. RAM PRAKASH	48	Salaried	Rural	**Male**
174	MR. N.P. KHURANA	52	Salaried	Urban	**Male**
175	MR. RAM SINGH	44	Salaried	Urban	**Male**
176	MR. VIKRAM SINGH	43	Salaried	Rural	**Male**
177	MR. ASHOK KUMAR TANWAR	41	Salaried	Urban	**Male**
178	MR. WAZIR CHAND	52	Salaried	Rural	**Male**
179	MR. SANJAY YADAV	19	Student	Rural	**Male**
180	MR. R.K. ARORA	44	Salaried	Urban	**Male**
181	MR. DHARMVIR BURA	36	Salaried	Rural	**Male**
182	MR. AJIT SINGH	39	Salaried	Rural	**Male**
183	MR. KARAN SINGH	48	Salaried	Rural	**Male**
184	MR. LOKINDER SHARMA	55	Salaried	Rural	**Male**
185	MR. MAWASI RAM	43	Salaried	Rural	**Male**
186	MR. NARENDER YADAV	41	Salaried	Rural	**Male**
187	MR. SANJAY KUMAR	41	Salaried	Rural	**Male**
188	MR. PAWAN KUMAR	33	Salaried	Rural	**Male**
189	MR. BRAHAM DEV	43	Salaried	Rural	**Male**
190	MR. GAURAV KASHYAP	22	Student	Urban	**Male**
191	MR. D. DAYANANDA REDDY	32	Salaried	Urban	**Male**
192	MR. VIRENDER SINGH (ST-2)	42	Salaried	Rural	**Male**
193	MR. A. SANDEEP FRANCIS (ST-2)	24	Student	Urban	**Male**
194	MR. ANIL UNIYAL (ST-2)	30	Salaried	Urban	**Male**
195	MS. NUPUR GUPTA (ST-2)	25	Salaried	Urban	**Female**
196	MR. HARI OM (ST-2)	24	Salaried	Rural	**Male**
197	MR. GAGAN KUMAR (ST-2)	23	Student	Rural	**Male**
198	MR. SHRIKANT NATTHUJI HATAGALE (ST-2)	22	Business	Urban	**Male**
199	MR. LEO PAUL (ST-2)	32	Business	Urban	**Male**
200	MR. TEJPAL SHARMA (ST-2)	25	Student	Rural	**Male**
201	MR. VIJAY SINGH SAINI	23	Student	Urban	**Male**
202	MR. CHAZHOOR THOMAS PAUL	24	Student	Urban	**Male**
203	MR. PANCHAM KATYAL	24	Student	Urban	**Male**
204	MR. TARUN ARORA	22	Student	Urban	**Male**
205	MR. ANUJ KUJUR	23	Student	Urban	**Male**
206	MR. OM PRAKASH	38	Farmer	Rural	**Male**
207	MR. NARESH KUMAR	38	Farmer	Rural	**Male**
208	MR. TULSI RAM	38	Farmer	Rural	**Male**
209	MR. NARESH KUMAR DHULL	37	Farmer	Urban	**Male**
210	MR. HEMANT	35	Farmer	Urban	**Male**
211	MR. VIKAS ROBERT	21	Farmer	Urban	**Male**
212	MR. PETER ELO	24	Student	Urban	**Male**
213	MR. DOMINIC	23	Student	Urban	**Male**
214	MR. ASHOK KUMAR	23	Student	Rural	**Male**
215	MR. SHANI S NATH	22	Student	Rural	**Male**
216	MR. JOHN A MENDONZA	23	Student	Urban	**Male**
217	MR. UMAKANT	40	Business	Rural	**Male**
218	MR. BIRENDER YADAV	39	Business	Rural	**Male**
219	MR. YASH PAL	35	Business	Rural	**Male**

220	MR. ASHOK KUMAR KUSHWAHA	47	Business	Rural	**Male**
221	MR. SURESH KUMAR	34	Business	Rural	**Male**
222	MR. RUBESH SINGH	31	Business	Rural	**Male**
223	MR. ATTAR SINGH	32	Business	Rural	**Male**
224	MR. DINESH KUMAR	33	Business	Rural	**Male**
225	MR. RAJESH KASHYAP	30	Business	Rural	**Male**
226	MR. BHAGWAT SVAROOP SONI (ST-1)	41	Farmer	Rural	**Male**
227	MR. MAHINDER SINGH	45	Farmer	Rural	**Male**
228	MR. GURBACHAN SINGH	47	Farmer	Rural	**Male**
229	MR. JITENDRA SINGH	42	Farmer	Rural	**Male**
230	MR. HARISH SHUKLA	49	Farmer	Rural	**Male**
231	MR. NARESH SHARMA	49	Farmer	Rural	**Male**
232	MR. JAGBIR SINGH	44	Farmer	Rural	**Male**
233	MR. SAJJAN SINGH	42	Farmer	Rural	**Male**
234	MR. CHANDER BOSE	43	Farmer	Rural	**Male**
235	MR. LALESH KUMAR	47	Farmer	Rural	**Male**
236	MR. RAM NARESH	44	Farmer	Rural	**Male**
237	MR. INDRA BHAN	41	Farmer	Rural	**Male**
238	MR. ALOK NATH MANDAL	47	Farmer	Rural	**Male**

Chapter 5: Result Analysis

Introduction

Though the overall conclusion of the study can be drawn only after comparing with actual observations, the results of the surveys themselves tell many stories. In this chapter, we have tried to interpret the results to find the way various design factors influence the emotions individually.

5.1 Analysis

After conducting the survey, results were compiled and following results were observed

Context:

Types: The survey results are compiled in appendix-23.a and appendix-23.b. The summary of the result shows the top two types for each emotion.

Table -5.1, Survey Result Trends for Motorcycle Types

Character	Rank	Sheet No	Score	Detail
Sober	1	C_1	3.00	Standard, naked, lean
	2	C_2	1.11	Standard, ornamental, lean
Glamourous	1	C_2	2.50	Standard, ornamental, lean
	2	A_3	1.39	Cruiser, bulky, naked
Dynamic	1	B_2	2.87	Sports, lean, ornamental
	2	B_1	2.41	Sports, lean, naked
Intimidating	1	B_4	2.59	Sports, bulky, ornamental
	2	C_4	2.54	Standard, bulky, ornamental

We observe here that standard lean motorcycles are predominantly sober but ornamentation adds glamour to the bikes. Next to them in glamour is cruiser with bulky and naked variety. Sports bikes evoke visual dynamism in lean category, while bulky ones are predominantly intimidating.

Front Facia: Front facia is front area of a motorcycle, which includes the visor and the head light. The survey results are compiled in appendix-24.a and appendix-24.b. The summary of the result shows the top two types for each emotion.

Table -5.2, Survey Result Trends for Fr Facia

Character	Rank	Sheet No	Score	Detail
Sober	1	1	3.00	No visor, round head light
	2	2	2.65	Simple visor, round head light
Glamourous	1	8	1.93	Simple visor, trapezoidal head light
	2	9	1.86	Windscreen visor, trapezoidal head light
Dynamic	1	9	1.25	Windscreen visor, trapezoidal head light
	2	7	1.18	No visor, trapezoidal head light
Intimidating	1	9	0.30	Windscreen visor, trapezoidal head light
	2	7	0.19	No visor, trapezoidal head light

Interesting observation here is that windscreen visor with trapezoidal head light has dominant characters like glamour, dynamism and intimidation (though intimidation score is very low), whereas trapezoidal head light without visor has both dynamism and intimidation (again intimidation is low).

Tires and wheels: The survey results are compiled in appendix-25.a and appendix-25.b. The summary of the result shows the top two types for each emotion.

Table -5.3, Survey Result Trends for Tires and Wheels

Character	Rank	Sheet No	Score	Detail
Sober	1	A_1	3.00	Narrow tyre, big wheel spoke
	2	A_3	2.75	Narrow tyre, small wheel spoke
Glamourous	1	B_2	1.90	Wide tyre, big wheel cast
	2	B_3	1.62	Narrow tyre, small wheel cast
Dynamic	1	B_4	1.70	Wide tyre, small wheel cast
	2	B_2	0.93	Wide tyre, big wheel cast
Intimidating	1	B_4	0.36	Wide tyre, small wheel cast
	2	B_2	0.24	Wide tyre, big wheel cast

This study shows that spoke wheels with narrow tire have a sober character, whereas cast wheels have glamorous and dynamic character. As the low scores for intimidation show, tires do not contribute to an intimidating character.

Color: The survey results are compiled in appendix-26.a, appendix-25.b and appendix-26.c. The summary shows the most dominant colors and color combinations for each emotion.

Table -5.4, Survey Result Trends for Color

Character	Rank	Sheet No	Score	Detail
Sober	1	b1	3.00	Light blue high chroma
	2	b1/b3	2.82	Deep blue low chroma on light blue high chroma background
	3	b3	2.82	Deep blue low chroma on light blue high chroma background
	4	y3/r3	2.82	Deep red low chroma on a deep yellow low chroma background
Glamourous	1	gy/r2	3.00	Medium red medium chroma on a gray background
	2	gy/g3	2.58	Deep green low chroma on a gray background
	3	b3.g2	2.36	Deep blue low chroma in combination with medium green medium chroma
Dynamic	1	gy.b3	2.07	Deep blue low chroma and gray combination
	2	bl/g2	1.96	Medium green medium chroma on a black background
	3	bl.r3	1.96	Deep red low chroma and black combination
Intimidating	1	y2/g1	2.64	Light green on medium yellow background
	2	y2/g2	2.36	Medium green medium yellow background
	3	r3/r2	1.91	Medium red on deep red background

The survey shows that blue is the color signifying sober character, where as green and red on gray background signify glamour. Dynamism is portrayed most by deep blue combination with gray whereas black in combination with green or red also signifies dynamism. Green on yellow background or medium red on deep red background also show intimidating character.

Texture:

The results are compiled in appendix-6.This survey provides a good insight into the role of texture in the overall effect of surface appearance. The following figures plot the intensity of each emotion for all combinations of color and texture.

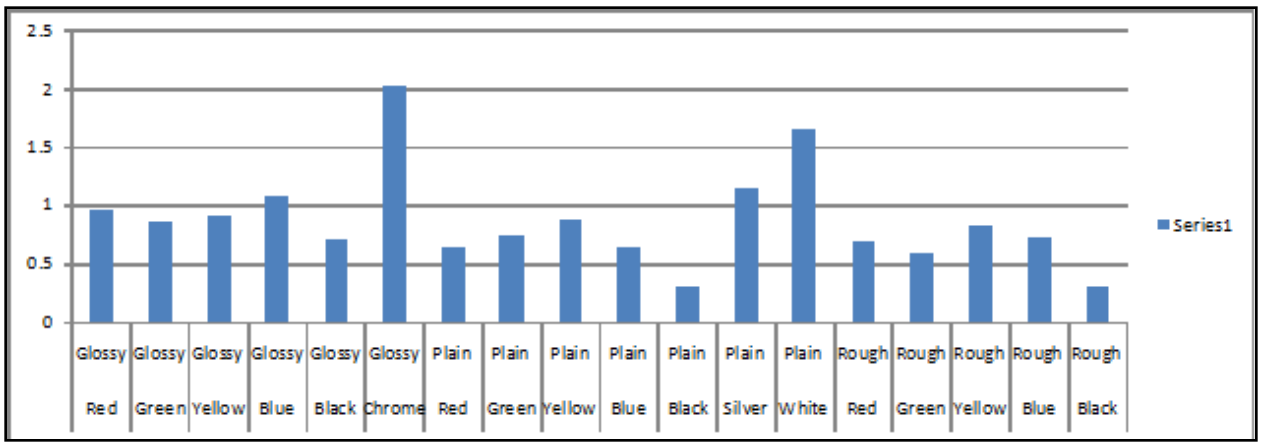

Fig-5.1, Survey Result Trends for Texture (S)

This result shows that by and large for sober emotion, intensity is highest with glossy surface and highest with chrome color. General trend is almost same for plain and rough except for white where plain surface is more sober.

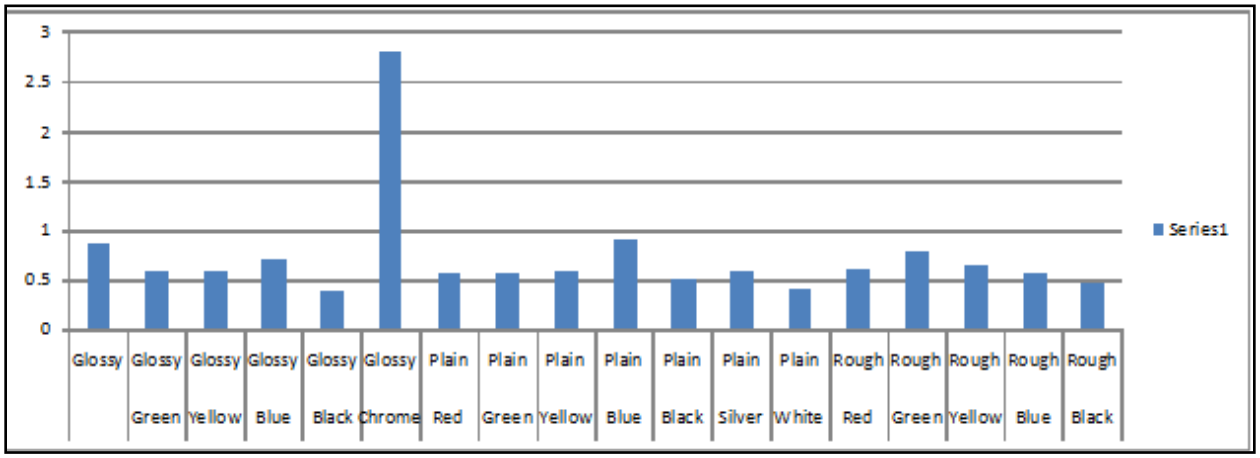

Fig-5.2, Survey Result Trends for Texture (G)

Here it is clear that by and large, all types of surface generate almost same glamour except glossy chrome.

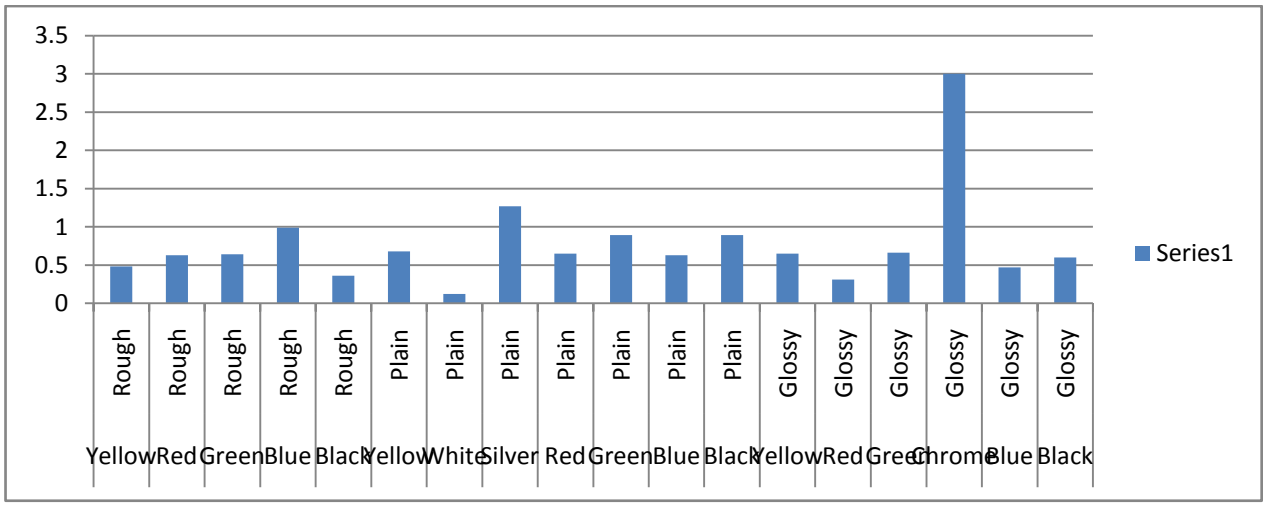

Fig-5.3, Survey Result Trends for Texture (D)

Chrome color in glossy and silver in plain is more dynamic.

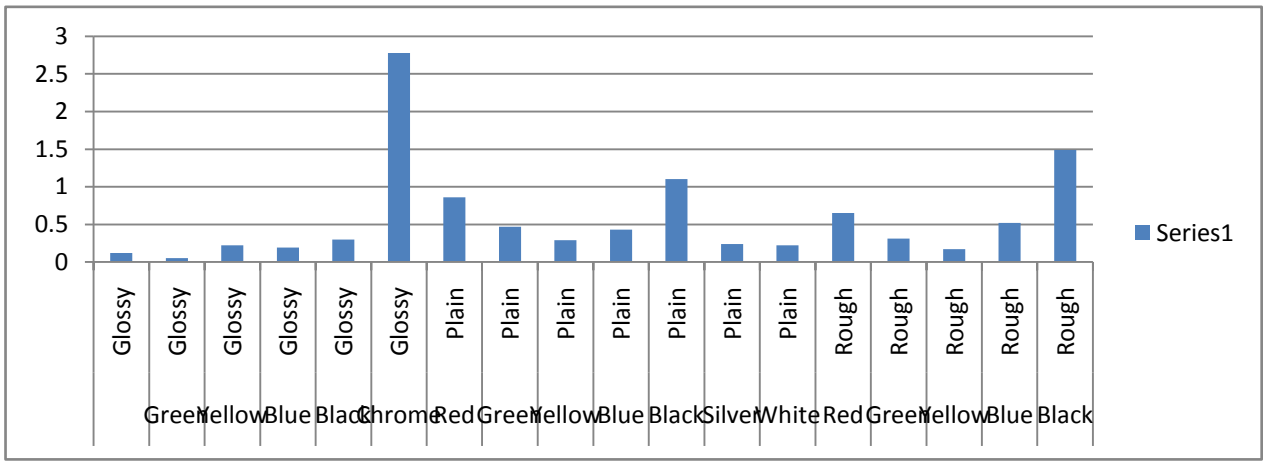

Fig-5.4, Survey Result Trends for Texture (I)

Chrome in glossy and black in rough and plain is more intimidating.

Table -5.5, Survey Result Trends for Texture (Mean)

The above charts and tables clearly indicate that by and lage chrome plating generates the highest intensity for all kinds of emotions. If we exclude chrome plating, glossy surface generate best results for sober and dynamic characters, plain for glamour and rough for intimidation.

Form:

Fuel tank: The results are compiled in appendix-27. The result summary identifies the dominant forms for each emotion.

Table -5.6, Survey Result Trends for Fuel Tank Form

Character	Rank	Sheet No	Score	Detail
Sober	1	MB1	3.00	Medium fillet, flat top, flat mild convex fast side
	2	MB4	2.42	Medium fillet, high convex fast top, flat mild convex fast side
	3	MF3	2.36	Medium fillet, mild convex slow top, (mild+mild) convex fast side
	4	MC5	2.31	Medium fillet, high convex fast top, flat mild convex slow side
	5	MK1	2.26	Medium fillet, Flat top, (high +high) convex slow side
	6	LC2	2.26	Large fillet, mild convex fast top, flat mild convex slow side
Glamourous	1	MQ5	2.73	Medium fillet, high convex fast top, high convex mild concave slow side
	2	LP4	2.57	Large fillet, high convex fast top, high convex mild concave fast side
	3	LP5	2.42	Large fillet, high convex slow top, high convex mild concave fast side
	4	LJ4	2.36	Large fillet, high convex fast top, (high+high) convex fast side
Dynamic	1	MM2	2.26	Medium fillet, mild convex fast top, mild convex high concave slow side
	2	MO5	2.26	Medium fillet, high convex fast top, mild convex mild concave slow side
	3	SN3	2.21	Sharp fillet, mild convex slow top, mild convex mild concave fast side
	4	MS3	2.10	Medium fillet, mild convex slow top, high convex high concave slow side
Intimidating	1	SI4	1.63	Sharp fillet, high convex fast top, (mild+high) convex slow side
	2	MJ2	1.26	Medium fillet, mild convex fast top, (high+high) convex fast side
	3	SG5	1.21	Sharp fillet, high convex fast top, (mild+mild) convex slow side

Side Cover: Results are compiled in appendix-28.a and appendix-28.b. The summary below identifies the dominant forms for each emotion.

Table -5.7, Survey Result Trends for Side Cover Form

Character	Rank	Sheet No	Score	Detail
Sober	1	1B	3.00	Large fillet triangular profile with flat surface.
	2	1A	2.65	Sharp fillet triangular profile with flat surface.
	3	1G	2.65	Sharp fillet recto-curvilinear profile with flat surface.
Glamourous	1	1D	1.86	Large fillet polygon(++) profile with flat surface.
	2	3D	1.81	Large fillet polygon(++) profile with flat/flat angle surface.
	3	1F	1.57	Large fillet polygon(+-) profile with flat surface.
Dynamic	1	4E	2.26	Sharp fillet polygon(+-) profile with flat/flat step surface.
	2	6A	2.11	Sharp fillet triangularprofile with flat convex surface.
	3	6C	2.06	Sharp fillet polygon (++)profile with flat convex surface.
Intimidating	1			none
Sober and glamourous		2c	S:1.91	Sharp fillet polygon (++)profile with convex surface.
			G:1.61	
		2J	S:1.47	Large fillet recto-curvilinear (+-)profile with convex surface.
			G:1.47	
		4J	S:2.01	Large fillet recto-curvilinear (+-)profile with flat/flat step surface.
			G:1.57	
Glamourous and dynamic		3D	G:1.81	Large fillet polygon (++)profile with flat/flat angle surface.
			D:1.32	
		3E	G:1.52	Sharp fillet polygon (+-)profile with flat/flat angle surface.
			D:1.62	
		7B	G:1.91	Large fillet triangular profile with convex-concave surface.
			D:1.57	
Dynamic and intimidating		6E	D:1.57	Sharp fillet polygon(+-) profile with flat-convex surface.
			I:1.23	

Some general trends available from this survey are as follows:

a. In general flat surfaces either with triangular or recto-curvilinear profile generates a sober character.
b. Large filleted polygons either with flat surfaces or flat/flat angles generate glamour.
c. Sharp fillet polygons or triangles either with flat/flat angle surfaces or flat-convex surfaces.
d. Element of intimidation generated by any form of side cover very low compared to other characters. In some cases it can be a supplementary character as discussed in point 'g'.
e. Convex surfaces either with polygon or recto-curvilinear profile generate a combination of sober and glamorous characters.
f. Flat/flat angle surfaces or convex-concave surfaces with triangular or polygonal profile generate a combination of glamorous and dynamic characters.
g. Sharp fillet polygons with flat-convex surfaces generate a dynamic character supplemented by an element of intimidation.

Seat: Results are compiled in appendix-29.a and appendix-29.b. The summary below identifies the dominant forms for each emotion.

Table -5.8, Survey Result Trends for Seat Form

Character	Rank	Sheet No	Score	Detail
Sober	1	1C	3.00	Inclined top and flat bottom
	2	1B	2.66	Flat top with ends curved and flat bottom
	3	7B	2.62	Flat-inclined top withends curved anf flat bottom
Glamourous	1	6F	1.46	Flat-deep curve top with stepped bottom
	2	6E	1.33	Flat-shallow curve top with stepped bottom
	3	5A	1.33	Stepped top and inclined bottom
Dynamic	1	5F	1.58	Flat-deep curve top with inclined bottom
	2	6A	1.54	Stepped top and stepped bottom
	3	5A	1.41	Stepped top and inclined bottom
Intimidating				None
Glamorous and dynamic		4F	G:1.33	Flat-deep curve top with flat bottom
			D:1.33	
		5A	G:1.33	Stepped top and inclined bottom
			D:1.41	

General trends observed in this survey are as follows:

a. Flat or inclined top with flat bottom generates a sober character.
b. Seats with dual surface top (either flat and curved top or stepped top) and stepped and bottom generates glamorous or dynamic characters or both.

Visor: Results are compiled in appendix-30.a, appendix-28.b and appendix-30.c. The summary below identifies the dominant forms for each emotion.

Table -5.9, Survey Result Trends for Visor Form

Character	Rank	Sheet No	Score	Detail
Sober	1	34	3.00	Small fillet trapezoidal H/L with convex contour and flat concave surface
	2	36	3.00	Small fillet trapezoidal H/L with concave contour and flat concave surface
	3	33	2.94	Small fillet rectangular H/L with convex contour and flat concave surface
Glamourous	1	83	1.80	Large fillet rectangular H/L with convex contour and convex surface
	2	53	1.80	Small fillet rectangular H/L with convex contour and convex concave surface
	3	23	1.76	Small fillet rectangular H/L with convex contour and convex surface
Dynamic	1	116	1.80	Large fillet trapezoidal H/L with concave contour and convex concave surface
	2	65	1.66	Small fillet rectangular H/L with concave contour and convex convex surface
	3	62	1.61	Small fillet trapezoidal H/L with flat contour and convex convex surface
	4	63	1.57	Small fillet rectangular H/L with convex contour and convex convex surface
	5	64	1.52	Small fillet trapezoidal H/L with convex contour and convex convex surface
Intimidating	1	122	1.57	Large fillet trapezoidal H/L with flat contour and convex convex surface
	2	61	1.33	Small fillet rectangular H/L with flat contour and convex convex surface
	3	126	1.23	Large fillet trapezoidal H/L with concave contour and convex convex surface

General trends from the above observation indicate:

a. Flat concave surfaces with small fillets generate sober character.
b. Rectangular head lights with convex contours with convex or convex-concave surfaces generate glamorous character.
c. Convex-convex surfaces with small fillets generate dynamic characters.
d. Convex-convex surfaces with flat on concave contours generate intimidating character.

Typography:

Effect of case

X axis shows the number of style, inclination and size combination.

Y axis shows the intensity of emotion.

a. Sober

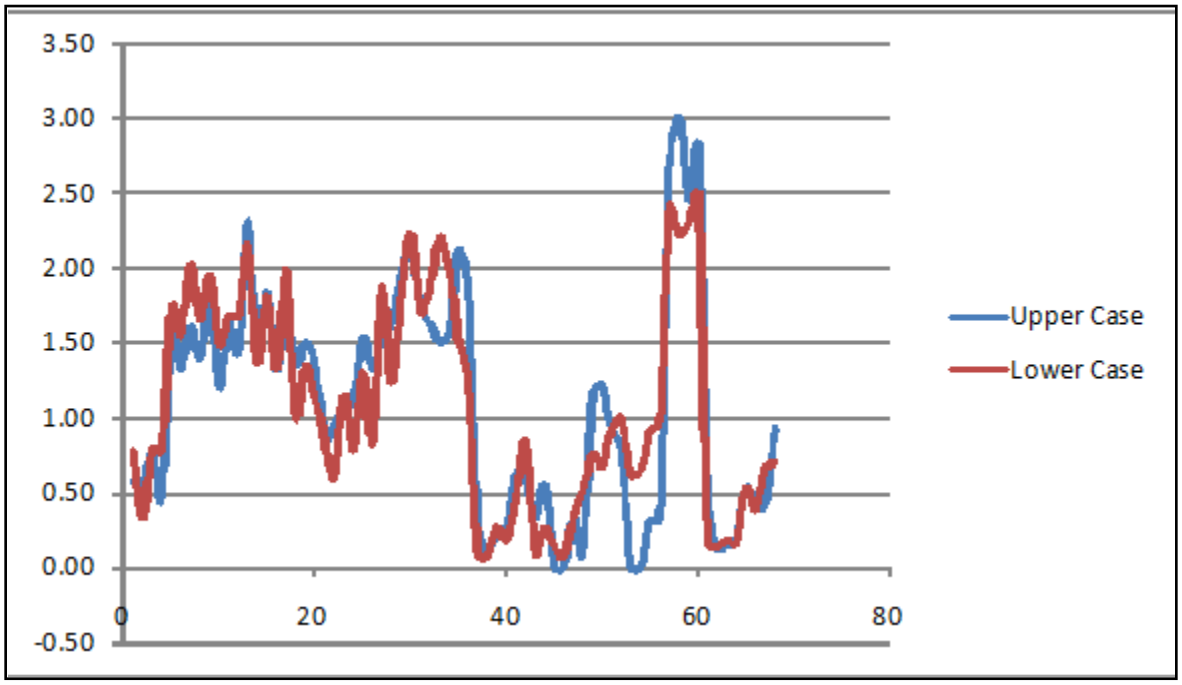

Fig-5.5, Effect of Case on Emotion 'Sober'

b. Glamorous

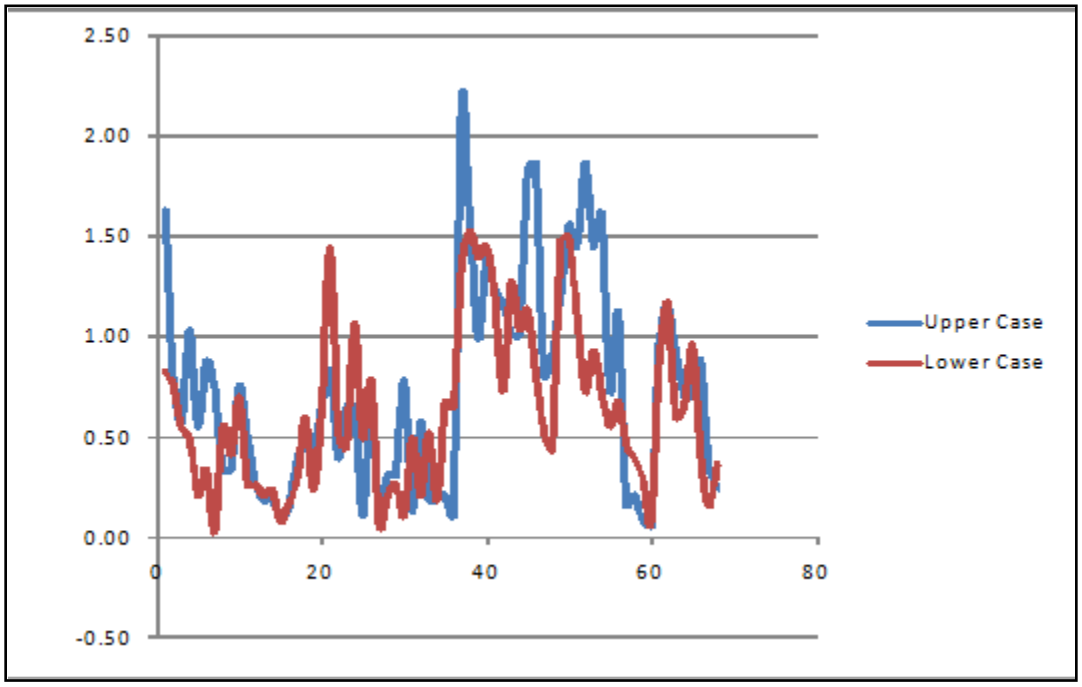

Fig-5.6. Effect of Case on Emotion 'Glamorous'

c. Dynamic

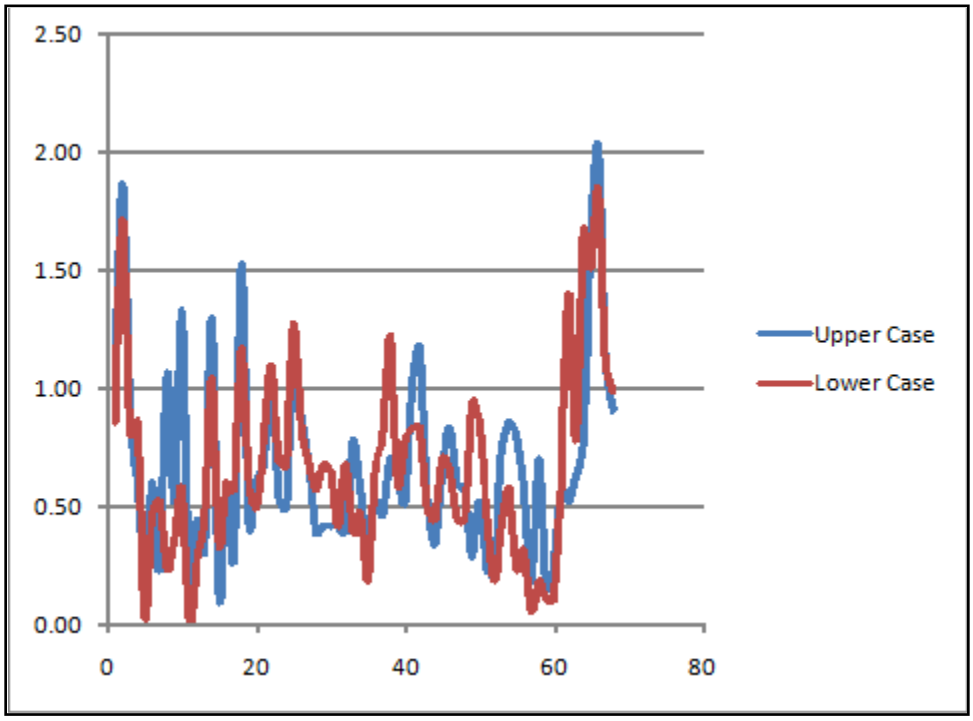

Fig-5.7, Effect of Case on emotion 'Dynamic'

d. Intimidating

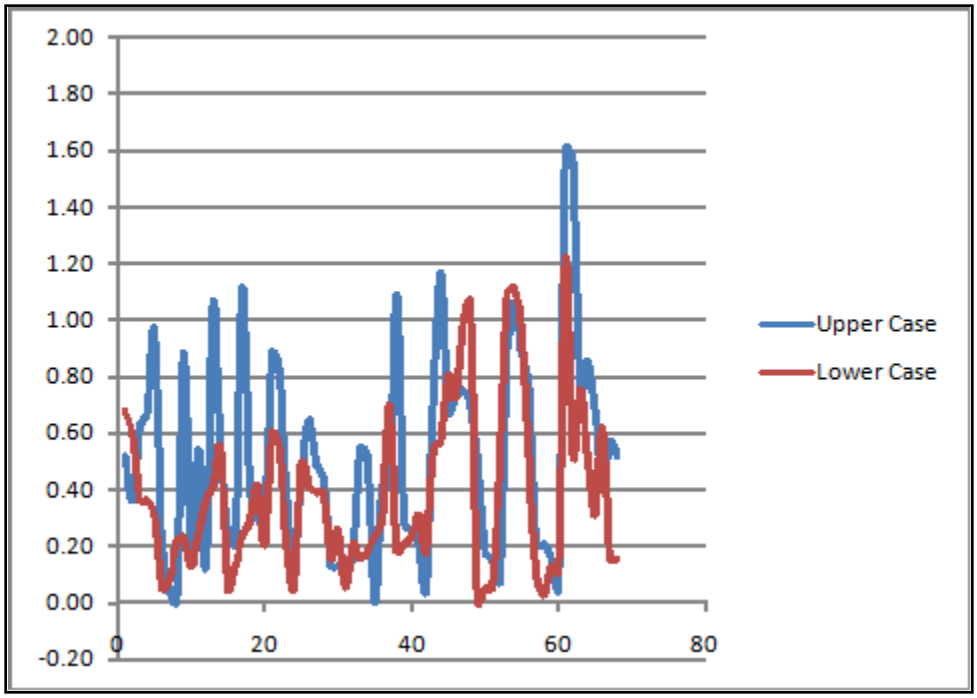

Fig-5.8, Effect of Case on Emotion 'Intimidation'

e. Mean and max scores

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Table-5.10, Effect of Case on Emotion ('Mean' and 'Max' Values)

Mean		
	Upper	Lower
S	1.09	1.09
G	0.74	0.63
D	0.67	0.66
I	0.51	0.38

Max		
	Upper	Lower
S	3.00	2.49
G	2.18	1.83
D	2.02	1.84
I	1.61	1.22

The charts and table clearly indicate the upper case gives a better result for almost all emotions (in case of dynamic, they are almost equal), whereas for some individual styles, the lower case can give better results. Finally, for highest results, the upper case is definitely better.

Effect of size

X axis shows the number of style, inclination and case combination.

Y axis shows the intensity of emotion

a. Sober

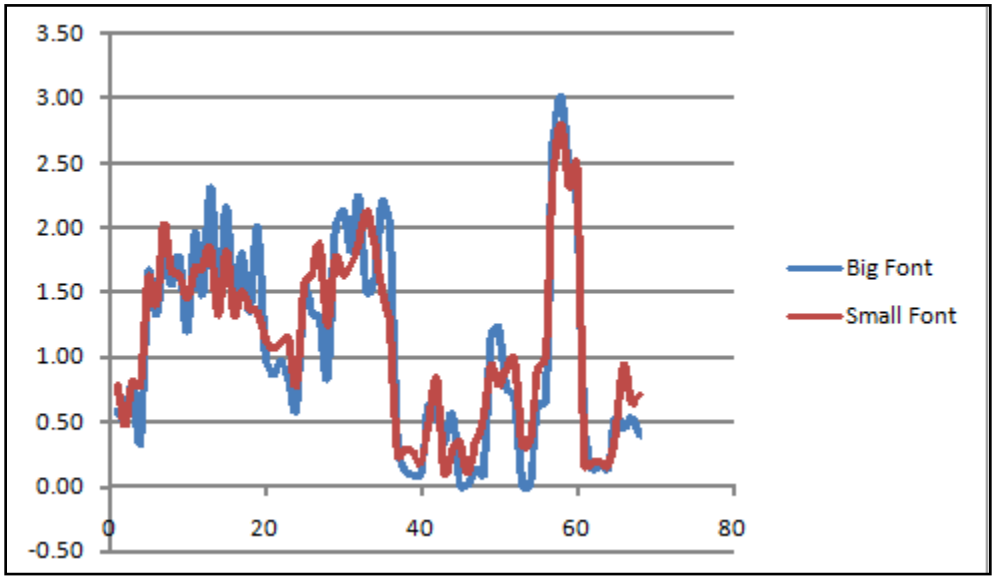
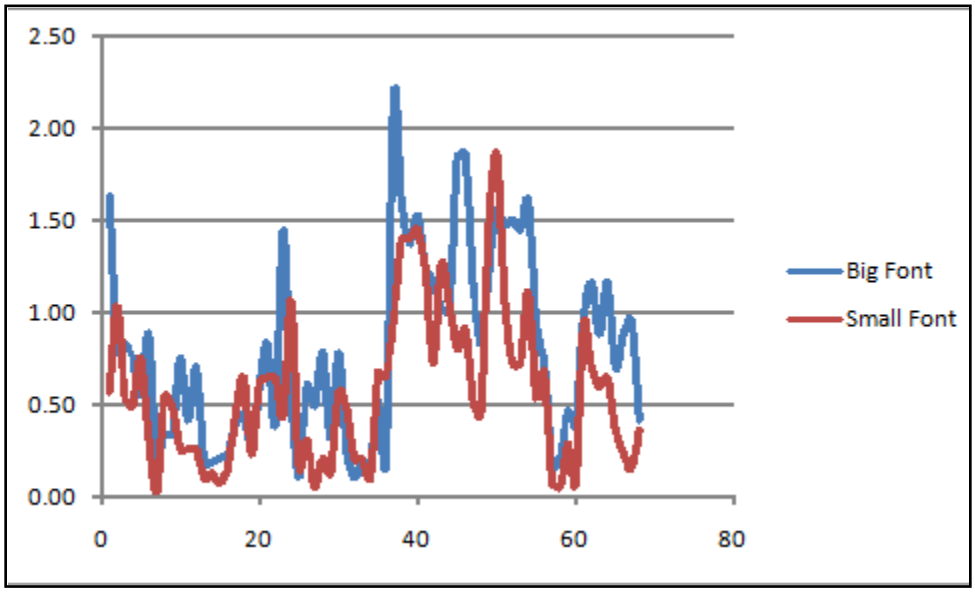


Fig-5.9, Effect of Typography Size on Emotion 'Sober'

b. Glamorous



Fi Fig-5.10, Effect of Typography Size on Emotion 'Glamorous'

c. Dynamic

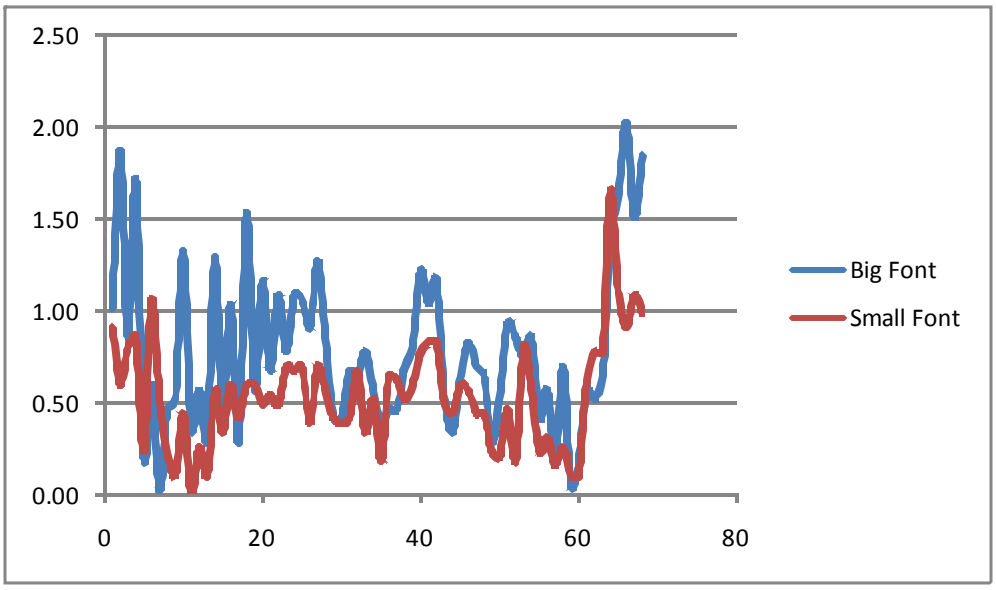


Fig-5.11, Effect of Typography Size on Emotion 'Dynamic'

d. Intimidating

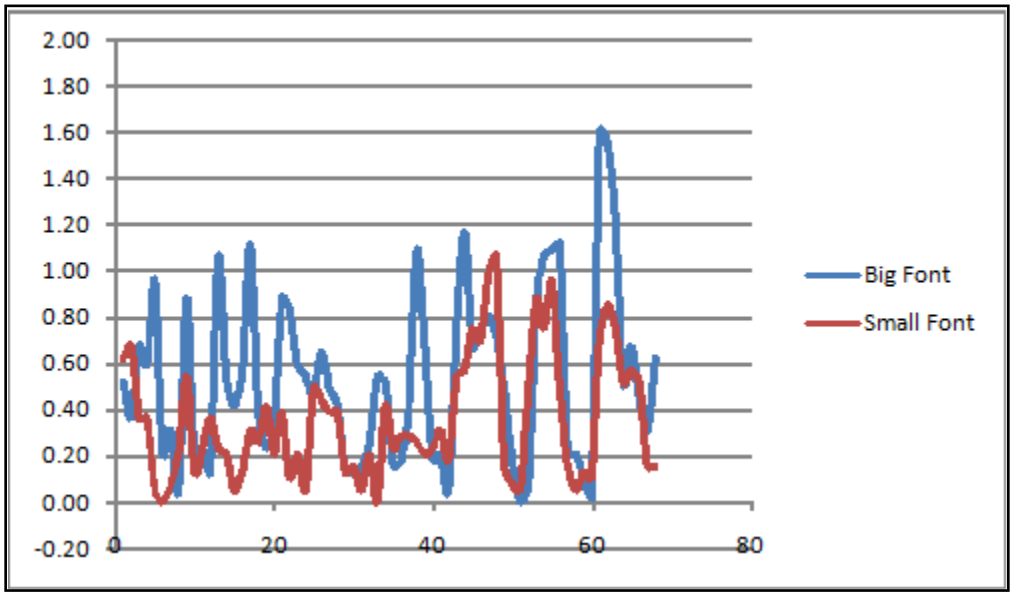


Fig-5.12, Effect of Typography Size on Emotion 'Intimidation'

e. Mean and max scores

Table-5.11, Effect of Size on Emotion ('Mean' and 'Max' Values

Mean		
	Big Font	Small Font
S	1.07	1.11
G	0.79	0.58
D	0.79	0.54
I	0.54	0.35

Max		
	Big Font	Small Font
S	3.00	2.80
G	2.18	1.86
D	2.02	1.66
I	1.61	1.06

The charts and table clearly indicate the bigger size gives a better result for all emotions except sober, whereas for some individual styles, the smaller size can give better results. Finally, for highest results, the big size is definitely better.

Effect of inclination:

X axis shows the number of style, size and case combination.

Y axis shows the intensity of emotion

a. Sober

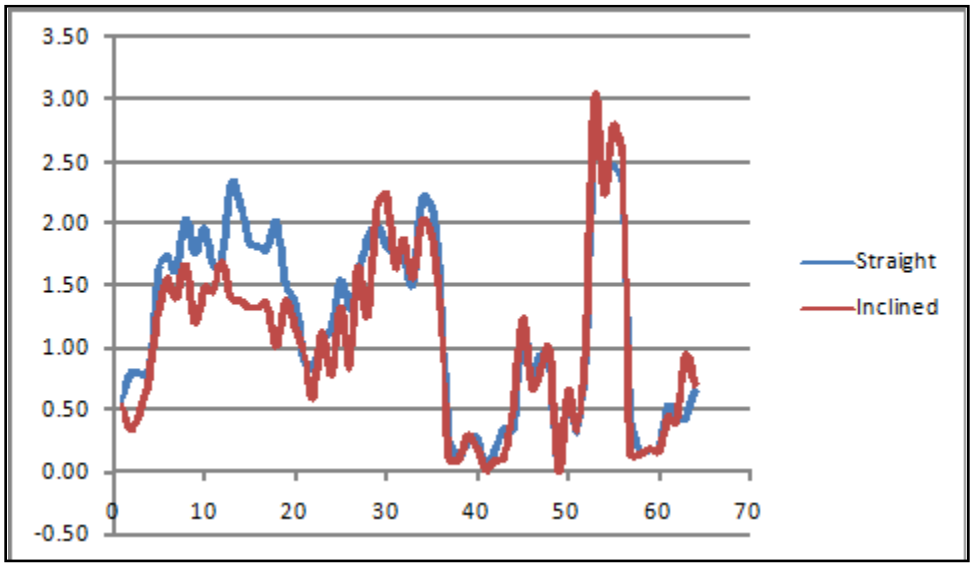


Fig-5.13, Effect of Inclination on Emotion 'Sober'

b. Glamorous

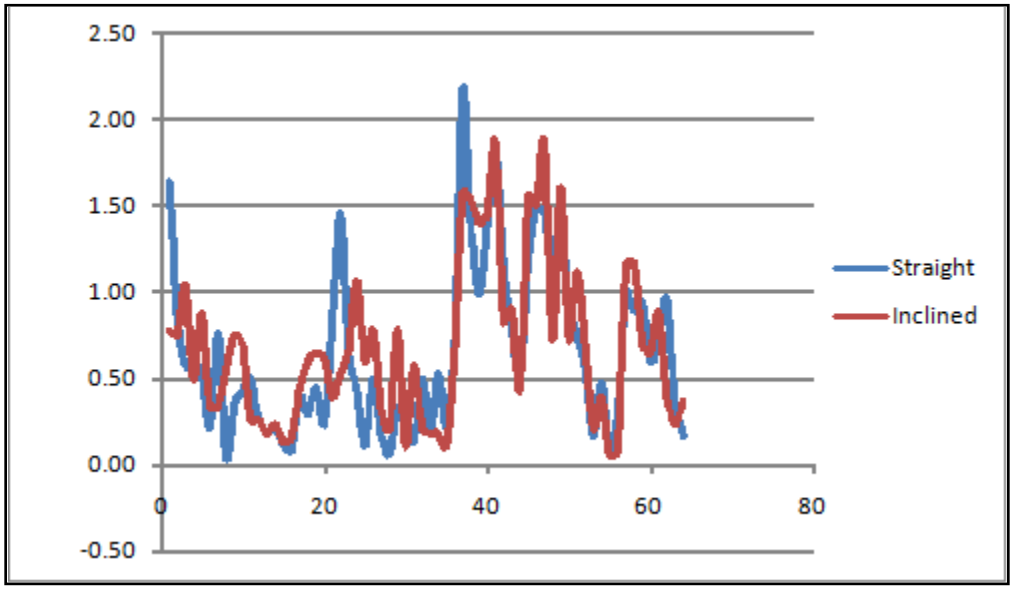


Fig-5.14, Effect of Inclination on Emotion 'Glamorous'

c. Dynamic

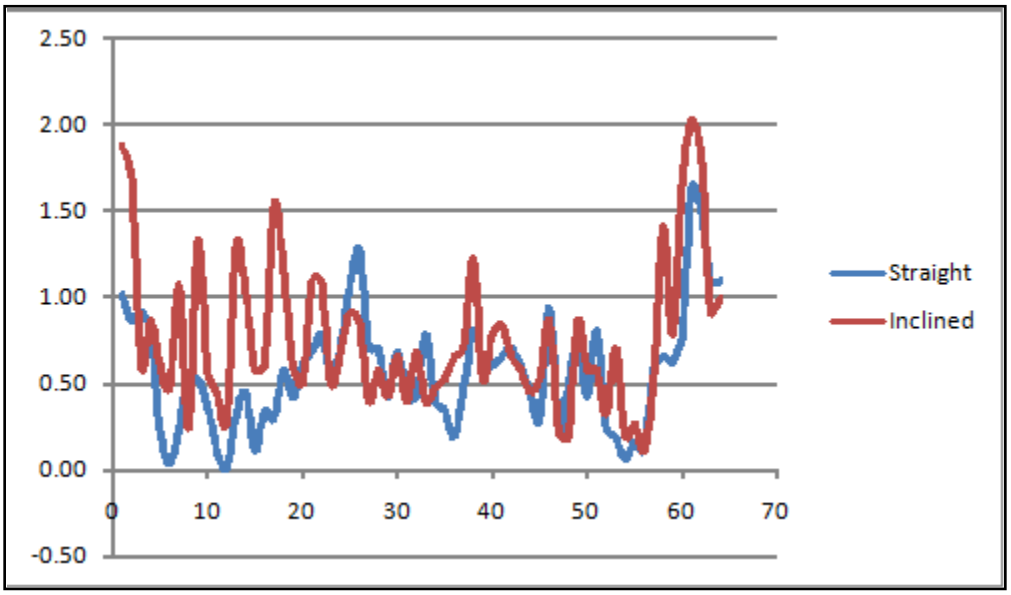


Fig-5.15, Effect of Inclination on Emotion 'Dynamic'

d. Intimidating

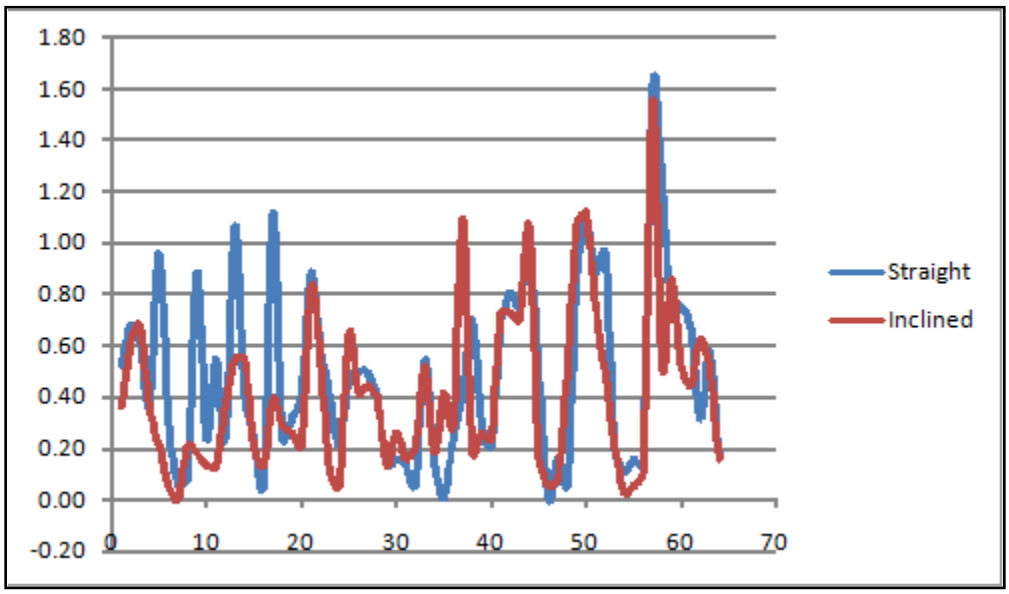


Fig-5.16, Effect of inclination on emotion 'Intimidation'

Max and mean scores

Table-5.12, Effect of Inclination on Emotion ('Mean' and 'Max' Values

Mean		
	Straight	Inclination
S	1.09	1.06
G	0.64	0.68
D	0.56	0.76
I	0.48	0.41

Max		
	Straight	Inclination
S	2.46	3.00
G	2.18	1.86
D	1.63	2.02
I	1.61	1.55

The charts and table clearly indicate the straight font gives a better result for sober and intimidating character, and inclined font gives better results for glamour and dynamic characters whereas for some individual styles, the lower case can give better results. Finally, for highest results, the inclined font is better for sober and dynamic characters and straight for glamorous and intimidating.

Graphics: The results are compiled in appendix-32. The summary below lists the dominant graphic styles for each emotion.

Table -5.13, Survey Result Trends for Graphics

Character	Rank	Sheet No	Score	Detail
Sober	1	123	3.00	Integral with logo, horizontal, recto-curvilinear, diverging
	2	51	2.72	chrome metallic flowing logo with stripe, straight
	3	101	2.45	Horizontal rectilinear logo with stripe
Glamourous	1	37	1.90	Flowing logo in stripe, aligned and bright in color
	2	87	1.70	Logo with stripe and capital fonts, aligned and bright in color
	3	97	1.70	Random rectilinear grids
Dynamic	1	27	1.53	Only logo in separated metallic fonts, aligned and bright in color
	2	46	1.53	Gold colored separated fonts, aligned
	3	127	1.53	Logo with stripe in capital fontsaligned and bright in color
Intimidating	1	118	1.22	Spiral stripes in random curvilinear shapes
	2	103	1.16	Stripe with horizontal recto-curvilinear logo
Glamourous and dynamic		27	G:1.46	Only logo in separated metallic fonts, aligned and bright in color
			D:1.53	
		46	G:1.46	Gold colored separated fonts, aligned
			D:1.53	
Dynamic and intimidating		102	G:1.33	Horizontal curvilinear straight stripes
			I:1.29	

Unity and dynamism: Results are compiled in appendix-33.a to appendix-33.d. The basic trends are seen in the table below and the graphs.

Table -5.14, Survey Result Trends for Unity and Dynamism

Character	Rank	Sheet No	Score	Detail
Sober	1	2	2.80	Unity :2 Dynamism :1
	2	1	2.11	Unity :1 Dynamism :1
Glamourous	1	6	2.64	Unity :3 Dynamism :2
	2	8	1.81	Unity :2 Dynamism :3
Dynamic	1	8	2.45	Unity :2 Dynamism :3
	2	6	2.40	Unity :3 Dynamism :2
Intimidating	1	9	1.88	Unity :3 Dynamism :3
	2	4	1.39	Unity :1 Dynamism :2

The following figures (Fig 5.17 to Fig-5.20) plot the variation of dynamism with unity for each emotion S, G, D and I.

X axis represents unity score Y axis represents intensity of emotion

Sober

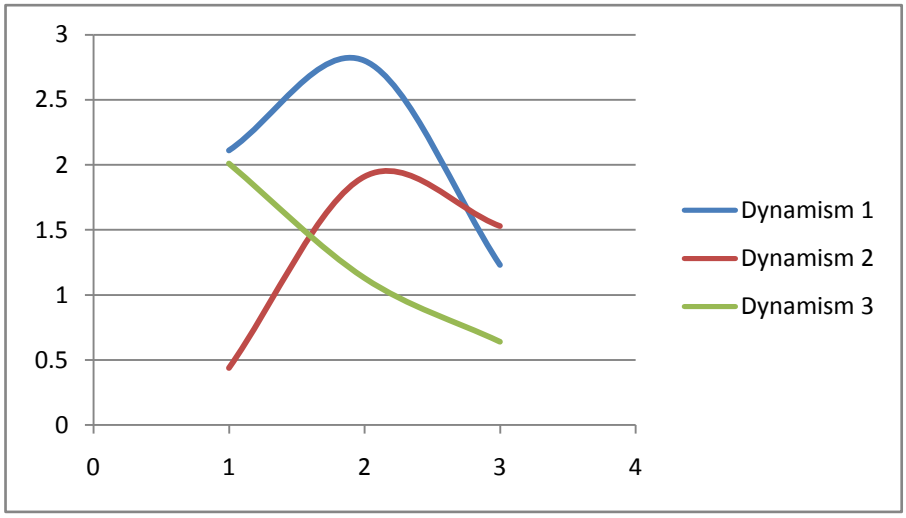


Fig -5.17, Effect of Unity and Dynamism on 'Sober' Quotient

We observe a very clear trend that though sobriety is highest for dynamism level 1, it is highest at unity level 2. When unity level increases to 3, sobriety turns into glamour, which is illustrated in the diagram for glamour.

Glamorous

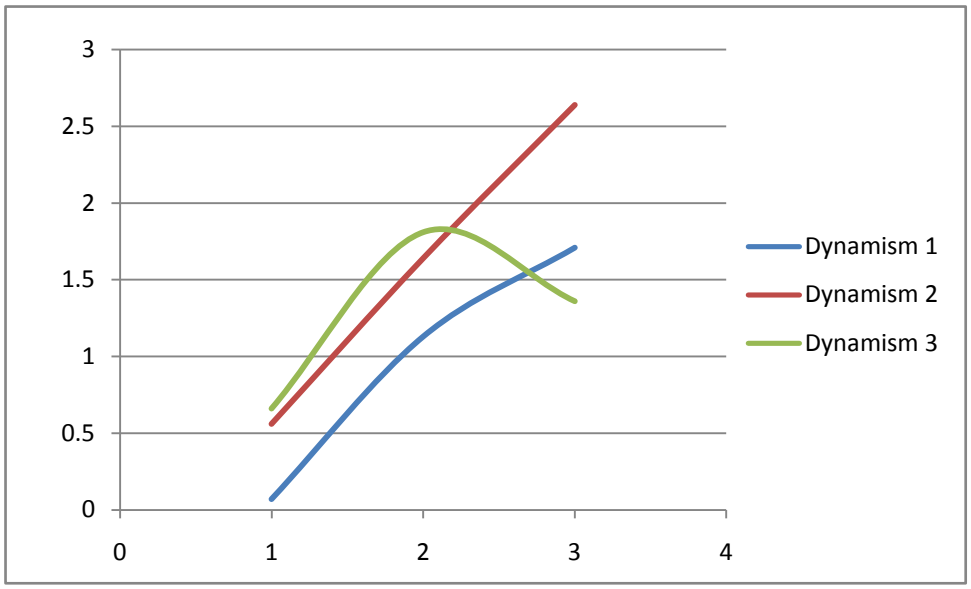


Fig -5.18, Effect of Unity and Dynamism on 'Glamour' Quotient

For high dynamism levels, glamour factor is highest at unity level 2, whereas for high medium, it increases steadily with unity. If we increase the dynamism level to 3, we see an improvement in dynamism and intimidation factor as illustrated in next diagrams. Overall, at low unity it is low and generally improves with unity except at very high dynamism.

Dynamic

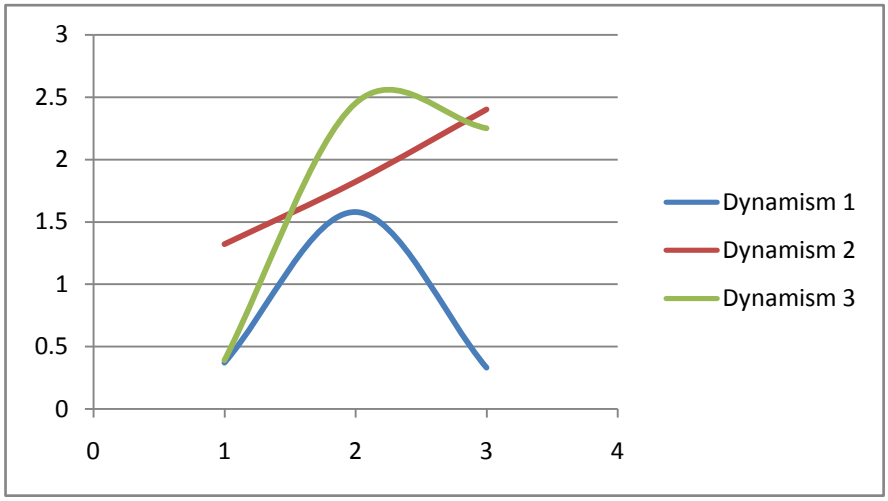


Fig -5.19, Effect of Unity and Dynamism on 'Dynamism' Quotient

Here we observe highest level of dynamism at dynamism level 3, where it slightly declines at very high unity, whereas for dynamism level 2, it increases steadily with unity.

Intimidating

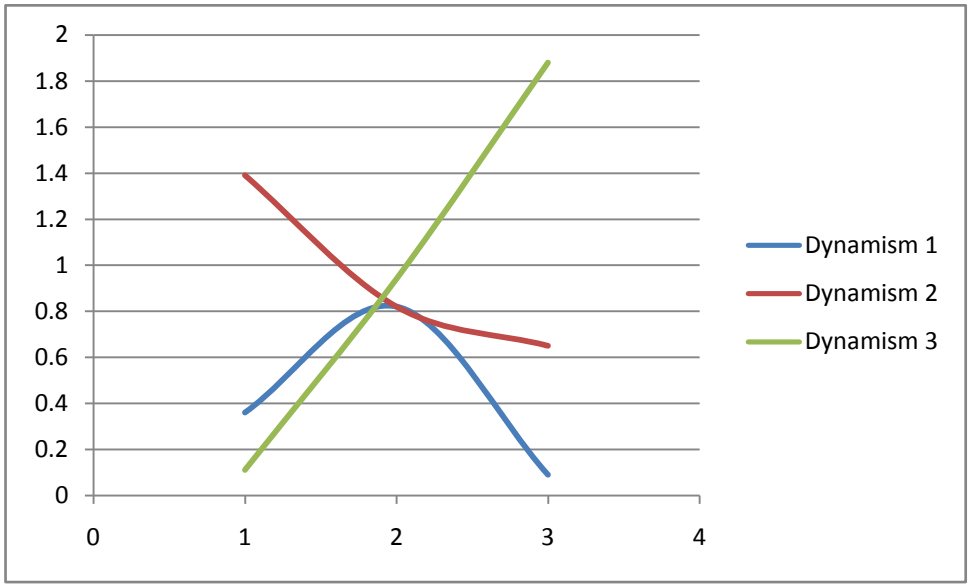


Fig -5.20, Effect of Unity and Dynamism on 'Intimidation' Quotient

Here we observe that highest level of intimidation is achieved at high dynamism, where the intensity is almost directly proportional to the unity level. At low dynamism level, it improves from low to medium whereas at medium dynamism, it reduces with density.

General trends observed in this survey are:

a. Lower levels of unity and dynamism generate sober character.
b. Very high degree of unity with low dynamism generates glamorous character.
c. As we increase dynamism level with medium level of unity design moves towards higher dynamic character.
d. As we increase dynamism with high level of unity, design moves towards higher intimidating character.
e. The most interesting interplay of emotions is observed when we see intimidation and glamour are almost opposite to each other where dynamism and glamour are supplementing each other. Similarly intimidation and dynamism are lowest at low dynamism where sobriety is highest, whereas sobriety and glamour supplement each other.

5.2 Conclusions and Summary

Having separately analyzed the results for each factor and sub- factor, we can relate to the conclusions of chapter 3 for each of the factor and sub factor. The weightages and general trends observed have been tabulated in the following tables:

Table -5.15, Conclusion (Weightages for Factors and Sub-factors)

Factor	Weightage	Sub-factor	Weightage
Context	0.25	Type	0.54
		Fr-facia	0.23
		Tires and wheels	0.23
Color	0.12	Body color	0.5
		Surface texture	0.5
Form	0.18	Fuel tank	0.31
		Seat	0.34
		Visor	0.31
		Side cover	0.04
Unity and Dynamism	0.3		
Graphics	0.15	Graphics	0.25
		Typography	0.75

With the help of these weightages and the equations 3.7 to 3.11, which has also been translated into a table in chapter 4 as Table 4.11, we can calculate the overall intensity of all four emotions for any motorcycle

Table -5.15, Conclusion (Trends for Factors and Sub-factors)

Design Factor	Sub-factor	Trend
Context	Motorcycle Type	The combination of motorcycle class, its bulk and nakedness generates the desired emotional intensity.
	Fr-facia	The combination of visor and head-light can alter the emotional impact only to certain extent. For example, intimidation cannot be created by any combination and the amount of dynamism best generated by any combination is less than the glamour generated by the same combination
	Tires and wheels	Here also the combination of size, width and type can alter the emotional impact only to a certain extent.
Color	Body color	The combination of hue, value and chroma can be used effectively to create and vary emotional impact.
	Surface texture	Texture affects intensity of dominant emotion generated by other factors.
Form	Fuel Tank	The combination of space (positive/negative), fillet and surface (convexity or concavity) generates the desired emotional impact.
	Side cover	Combination of shape, fillet and surface (convexity or concavity) generates the desired emotional impact.
	Seat	Combination of inclination, top surface and edge shape generates the desired emotional impact.
	Visor	Combination of head-light shape, fillets and surface and contour convexity generates the desired emotional impact.
Graphics	Typography	Intensity of each emotion generated depends on case, type, size and inclination of typography
	Graphics	Intensity of each emotion generated depends on logo integration, inclination, type, size and location of graphics
Unity and dynamism		Intensity of each emotion generated depends on combination of unity and dynamism levels.

Appendix-18.a: Survey results for Overall Weightage

		Green				Red				Green with changed graphics			
		Low dynamism		High Dynamism		High Dynamism		Low dynamism		Low dynamism		High Dynamism	
		Low unity	High Unity	Low unity	High Unity	Low unity	High Unity	Low unity	High Unity	Low unity	High Unity	Low unity	High Unity
Cruiser	Geometric	CGGL1 1	CGGL2 2	CGGH1 3	CGGH2 4	CGRH1 5	CGRH2 6	CGRL1 7	CGRL2 8	CGGL1 9	CGGL2 10	CGGH1 11	CGGH2 12
		S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I
n		105 30 50 45	20 60 90 65	85 50 50 45	0 30 40 65 100	95 65 40 35	25 55 75 80	90 40 35 65	30 80 50 75	105 5 65 60	40 45 75 70	105 35 40 60	75 45 40 75
Σx		190 45 85 105	35 140 195 175	175 105 105 100	0 60 90 165 235	185 135 80 65	45 120 170 190	210 75 75 155	60 195 110 195	185 5 115 140	95 100 155 160	195 50 90 125	125 90 75 195
	Organic	COGL1 13	COGL2 14	COGH1 15	COGH2 16	CORH1 17	CORH2 18	CORL1 19	CORL2 20	COGL1 21	COGL2 22	COGH1 23	COGH2 24
		S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I
n		50 80 60 45	20 45 85 80	35 50 60 100	0 25 70 40 95	30 55 55 85	15 65 70 85	65 70 70 35	55 60 80 40	95 50 45 45	45 65 65 65	40 55 60 80	45 55 45 85
Σx		85 145 150 75	45 75 175 175	50 75 100 220	0 55 160 80 225	55 125 100 165	35 165 140 195	140 115 155 70	110 135 165 80	170 105 90 90	90 140 125 125	85 110 105 150	75 100 90 205
Sports	Geometric	SGGL1 25	SGGL2 26	SGGH1 27	SGGH2 28	SGRH1 29	SGRH2 30	SGRL1 31	SGRL2 32	SGGL1 33	SGGL2 34	SGGH1 35	SGGH2 36
		S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I
		5 55 145 30	20 55 60 60	20 40 120 65	0 25 45 95 60	35 25 80 90	15 55 95 70	25 50 105 60	20 50 95 70	30 80 75 50	20 60 100 60	35 70 80 55	10 55 105 55
		5 130 370 90	20 35 115 245 135	50 75 285 140	0 50 100 230 125	75 60 205 210	15 120 205 160	50 110 270 150	30 110 225 165	60 180 185 115	35 140 230 125	80 160 170 110	20 115 230 115
	Organic	SOGL1 37	SOGL2 38	SOGH1 39	SOGH2 40	SORH1 41	SORH2 42	SORL1 43	SORL2 44	SOGL1 45	SOGL2 46	SOGH1 47	SOGH2 48
		S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I
		25 60 80 65	25 55 100 55	20 45 120 60	0 65 80 55 30	30 65 90 50	65 55 85 30	30 55 100 50	30 60 110 35	40 60 90 50	45 45 95 50	35 45 110 45	100 65 55 15
		40 145 185 115	35 140 210 135	35 120 295 120	0 155 185 110 50	60 155 160 130	65 155 120 175 60	55 115 200 105	60 135 240 90	40 135 180 115	70 90 185 120	80 95 250 85	195 150 135 25

Appendix-18.b: Weightage,Color

Green			Red			Diff	Absolute	Absolute
Sheet	Character	Sum	Sheet	Character	Sum			Difference
3	S	175	5	S	185	-10	2	10
	G	105		G	135	-30	6	30
	D	105		D	80	25	5	25
	I	100		I	65	35	7	35
4	S	60	6	S	45	15	3	15
	G	90		G	120	-30	6	30
	D	165		D	170	-5	1	5
	I	235		I	190	45	9	45
1	S	190	7	S	210	-20	4	20
	G	45		G	75	-30	6	30
	D	85		D	75	10	2	10
	I	105		I	155	-50	10	50
2	S	35	8	S	60	-25	5	25
	G	140		G	195	-55	11	55
	D	195		D	110	85	17	85
	I	175		I	195	-20	4	20
15	S	50	17	S	55	-5	1	5
	G	75		G	125	-50	10	50
	D	100		D	100	0	0	0
	I	220		I	165	55	11	55
16	S	55	18	S	35	20	4	20
	G	160		G	165	-5	1	5
	D	80		D	140	-60	12	60
	I	225		I	195	30	6	30
13	S	85	19	S	140	-55	11	55
	G	145		G	115	30	6	30
	D	150		D	155	-5	1	5
	I	175		I	70	105	21	105
14	S	45	20	S	110	-65	13	65
	G	75		G	135	-60	12	60
	D	175		D	165	10	2	10
	I	175		I	80	95	19	95
27	S	50	29	S	75	-25	5	25
	G	75		G	60	15	3	15
	D	285		D	205	80	16	80
	I	140		I	210	-70	14	70
28	S	50	30	S	15	35	7	35
	G	100		G	120	-20	4	20
	D	230		D	205	25	5	25
	I	125		I	160	-35	7	35
25	S	5	31	S	50	-45	9	45
	G	130		G	110	20	4	20
	D	370		D	270	100	20	100
	I	90		I	150	-60	12	60
26	S	35	32	S	30	5	1	5
	G	115		G	110	5	1	5
	D	245		D	225	20	4	20
	I	135		I	165	-30	6	30
39	S	35	41	S	60	-25	5	25
	G	120		G	155	-35	7	35
	D	295		D	160	135	27	135
	I	120		I	130	-10	2	10
40	S	155	42	S	155	0	0	0
	G	185		G	120	65	13	65
	D	110		D	175	-65	13	65
	I	50		I	60	-10	2	10
37	S	40	43	S	55	-15	3	15
	G	145		G	115	30	6	30
	D	185		D	200	-15	3	15
	I	115		I	105	10	2	10
38	S	35	44	S	60	-25	5	25
	G	140		G	135	5	1	5
	D	210		D	240	-30	6	30
	I	135		I	90	45	9	45
							450	2250

Appendix-18.c: Weightage,Graphics

Graphic 1			Graphic 2			Diff	Absolute
No	Resp	Score	No	Resp	Score		
1	S	190	9	S	185	5	5
	G	45		G	5	40	40
	D	85		D	115	-30	30
	I	105		I	140	-35	35
2	S	35	10	S	95	-60	60
	G	140		G	100	40	40
	D	195		D	155	40	40
	I	175		I	160	15	15
3	S	175	11	S	195	-20	20
	G	105		G	50	55	55
	D	105		D	90	15	15
	I	100		I	125	-25	25
4	S	60	12	S	125	-65	65
	G	90		G	90	0	0
	D	165		D	75	90	90
	I	235		I	195	40	40
13	S	85	21	S	170	-85	85
	G	145		G	105	40	40
	D	150		D	90	60	60
	I	175		I	90	85	85
14	S	45	22	S	90	-45	45
	G	75		G	90	-15	15
	D	175		D	125	50	50
	I	175		I	125	50	50
15	S	50	23	S	85	-35	35
	G	75		G	110	-35	35
	D	100		D	105	-5	5
	I	220		I	150	70	70
16	S	55	24	S	75	-20	20
	G	160		G	100	60	60
	D	80		D	90	-10	10
	I	225		I	205	20	20
25	S	5	33	S	60	-55	55
	G	130		G	180	-50	50
	D	370		D	185	185	185
	I	90		I	115	-25	25
26	S	35	34	S	35	0	0
	G	115		G	140	-25	25
	D	245		D	230	15	15
	I	135		I	125	10	10
27	S	50	35	S	80	-30	30
	G	75		G	160	-85	85
	D	285		D	170	115	115
	I	140		I	110	30	30
28	S	50	36	S	20	30	30
	G	100		G	115	-15	15
	D	230		D	230	0	0
	I	125		I	115	10	10
37	S	40	45	S	40	0	0
	G	145		G	135	10	10
	D	185		D	180	5	5
	I	115		I	115	0	0
38	S	35	46	S	70	-35	35
	G	140		G	90	50	50
	D	210		D	185	25	25
	I	135		I	120	15	15
39	S	35	47	S	80	-45	45
	G	120		G	95	25	25
	D	295		D	250	45	45
	I	120		I	85	35	35
40	S	155	48	S	195	-40	40
	G	185		G	150	35	35
	D	110		D	135	-25	25
	I	50		I	25	25	25
		0					2355

Appendix-18.d: Weightage,Context

Cruiser			Sports					Absolute
No	Resp	Score	No	Resp	Score			
1	S	190	25	S	5	185	1	185
	G	45		G	130	-85	-1	85
	D	85		D	370	-285	-1	285
	I	105		I	90	15	1	15
2	S	35	26	S	35	0	1	0
	G	140		G	115	25	1	25
	D	195		D	245	-50	-1	50
	I	175		I	135	40	1	40
3	S	175	27	S	50	125	1	125
	G	105		G	75	30	1	30
	D	105		D	285	-180	1	-180
	I	100		I	140	-40	-1	40
4	S	60	28	S	50	10	1	10
	G	90		G	100	-10	-1	10
	D	165		D	230	-65	-1	65
	I	235		I	125	110	1	110
5	S	185	29	S	75	110	1	110
	G	135		G	60	75	1	75
	D	80		D	205	-125	-1	125
	I	65		I	210	-145	-1	145
6	S	45	30	S	15	30	1	30
	G	120		G	120	0	1	0
	D	170		D	205	-35	-1	35
	I	190		I	160	30	1	30
7	S	210	31	S	50	160	1	160
	G	75		G	110	-35	-1	35
	D	75		D	270	-195	-1	195
	I	155		I	150	5	1	5
8	S	60	32	S	30	30	1	30
	G	195		G	110	85	1	85
	D	110		D	225	-115	-1	115
	I	195		I	165	30	1	30
13	S	85	37	S	40	45	1	45
	G	145		G	145	0	1	0
	D	150		D	185	-35	-1	35
	I	175		I	115	60	1	60
14	S	45	38	S	35	10	1	10
	G	75		G	140	-65	-1	65
	D	175		D	210	-35	-1	35
	I	175		I	135	40	1	40
15	S	50	39	S	35	15	1	15
	G	75		G	120	-45	-1	45
	D	100		D	295	-195	-1	195
	I	220		I	120	100	1	100
16	S	55	40	S	155	-100	-1	100
	G	160		G	185	-25	-1	25
	D	80		D	110	-30	-1	30
	I	225		I	50	175	1	175
17	S	55	41	S	60	-5	-1	5
	G	125		G	155	-30	-1	30
	D	100		D	160	-60	-1	60
	I	165		I	130	35	1	35
18	S	35	42	S	155	-120	-1	120
	G	165		G	120	45	1	45
	D	140		D	175	-35	-1	35
	I	195		I	60	135	1	135
19	S	140	43	S	55	85	1	85
	G	115		G	115	0	1	0
	D	155		D	200	-45	-1	45
	I	70		I	105	-35	-1	35
20	S	110	44	S	60	50	1	50
	G	135		G	135	0	1	0
	D	165		D	240	-75	-1	75
	I	80		I	90	-10	-1	10
								3840

Appendix-18.e: Weightage,Form

Geometric			Organic			Diff	Sign	Absolute
No	Resp	Score	No	Resp	Score			
1	S	190	13	S	85	105	1	105
	G	45		G	145	-100	-1	100
	D	85		D	150	-65	-1	65
	I	105		I	175	-70	-1	70
2	S	35	14	S	45	-10	-1	10
	G	140		G	75	65	1	65
	D	195		D	175	20	1	20
	I	175		I	175	0	0	0
3	S	175	15	S	50	125	1	125
	G	105		G	75	30	1	30
	D	105		D	100	5	1	5
	I	100		I	220	-120	-1	120
4	S	60	16	S	55	5	1	5
	G	90		G	160	-70	-1	70
	D	165		D	80	85	1	85
	I	235		I	225	10	1	10
5	S	185	17	S	55	130	1	130
	G	135		G	125	10	1	10
	D	80		D	100	-20	-1	20
	I	65		I	165	-100	-1	100
6	S	45	18	S	35	10	1	10
	G	120		G	165	-45	-1	45
	D	170		D	140	30	1	30
	I	190		I	195	-5	-1	5
7	S	210	19	S	140	70	1	70
	G	75		G	115	-40	-1	40
	D	75		D	155	-80	-1	80
	I	155		I	70	85	1	85
8	S	60	20	S	110	-50	-1	50
	G	195		G	135	60	1	60
	D	110		D	165	-55	-1	55
	I	195		I	80	115	1	115
25	S	5	37	S	40	-35	-1	35
	G	130		G	145	-15	-1	15
	D	370		D	185	185	1	185
	I	90		I	115	-25	-1	25
26	S	35	38	S	35	0	0	0
	G	115		G	140	-25	-1	25
	D	245		D	210	35	1	35
	I	135		I	135	0	0	0
27	S	50	39	S	35	15	1	15
	G	75		G	120	-45	-1	45
	D	285		D	295	-10	-1	10
	I	140		I	120	20	1	20
28	S	50	40	S	155	-105	-1	105
	G	100		G	185	-85	-1	85
	D	230		D	110	120	1	120
	I	125		I	50	75	1	75
29	S	75	41	S	60	15	1	15
	G	60		G	155	-95	-1	95
	D	205		D	160	45	1	45
	I	210		I	130	80	1	80
30	S	15	42	S	155	-140	-1	140
	G	120		G	120	0	0	0
	D	205		D	175	30	1	30
	I	160		I	60	100	1	100
31	S	50	43	S	55	-5	-1	5
	G	110		G	115	-5	-1	5
	D	270		D	200	70	1	70
	I	150		I	105	45	1	45
32	S	30	44	S	60	-30	-1	30
	G	110		G	135	-25	-1	25
	D	225		D	240	-15	-1	15
	I	165		I	90	75	1	75
								3360

Appendix-18.f: Weightage,Unity

Geometric			Organic					Absolute
No	Resp	Score	No	Resp	Score			
1	S	190	2	S	35	155	1	155
	G	45		G	140	-95	-1	95
	D	85		D	195	-110	-1	110
	I	105		I	175	-70	-1	70
3	S	175	4	S	60	115	1	115
	G	105		G	90	15	1	15
	D	105		D	165	-60	-1	60
	I	100		I	235	-135	-1	135
5	S	185	6	S	45	140	1	140
	G	135		G	120	15	1	15
	D	80		D	170	-90	-1	90
	I	65		I	190	-125	-1	125
7	S	210	8	S	60	150	1	150
	G	75		G	195	-120	-1	120
	D	75		D	110	-35	-1	35
	I	155		I	195	-40	-1	40
13	S	85	14	S	45	40	1	40
	G	145		G	75	70	1	70
	D	150		D	175	-25	-1	25
	I	175		I	175	0	0	0
15	S	50	16	S	55	-5	-1	5
	G	75		G	160	-85	-1	85
	D	100		D	80	20	1	20
	I	220		I	225	-5	-1	5
17	S	55	18	S	35	20	1	20
	G	125		G	165	-40	-1	40
	D	100		D	140	-40	-1	40
	I	165		I	195	-30	-1	30
19	S	140	20	S	110	30	1	30
	G	115		G	135	-20	-1	20
	D	155		D	165	-10	-1	10
	I	70		I	80	-10	-1	10
25	S	5	26	S	35	-30	-1	30
	G	130		G	115	15	1	15
	D	370		D	245	125	1	125
	I	90		I	135	-45	-1	45
27	S	50	28	S	50	0	0	0
	G	75		G	100	-25	-1	25
	D	285		D	230	55	1	55
	I	140		I	125	15	1	15
29	S	75	30	S	15	60	1	60
	G	60		G	120	-60	-1	60
	D	205		D	205	0	0	0
	I	210		I	160	50	1	50
31	S	50	32	S	30	20	1	20
	G	110		G	110	0	0	0
	D	270		D	225	45	1	45
	I	150		I	165	-15	-1	15
37	S	40	38	S	35	5	1	5
	G	145		G	140	5	1	5
	D	185		D	210	-25	-1	25
	I	115		I	135	-20	-1	20
39	S	35	40	S	155	-120	-1	120
	G	120		G	185	-65	-1	65
	D	295		D	110	185	1	185
	I	120		I	50	70	1	70
41	S	60	42	S	155	-95	-1	95
	G	155		G	120	35	1	35
	D	160		D	175	-15	-1	15
	I	130		I	60	70	1	70
43	S	55	44	S	60	-5	-1	5
	G	115		G	135	-20	-1	20
	D	200		D	240	-40	-1	40
	I	105		I	90	15	1	15
							0	0
								3270

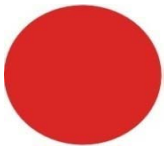
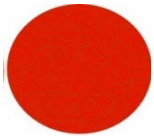
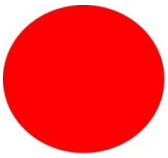
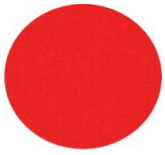
Appendix-18.g: Weightage,Dynamism

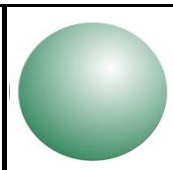
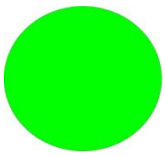
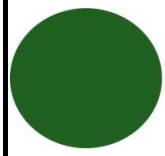
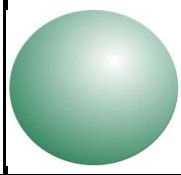
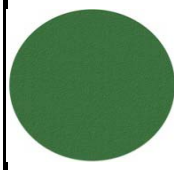
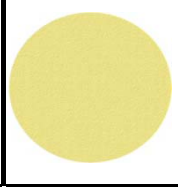
Low Dynamism			High Dynamism			Diff		Absolute
No	Resp	Score	No	Resp	Score			
1	S	190	3	S	175	15	1	15
	G	45		G	105	-60	-1	60
	D	85		D	105	-20	-1	20
	I	105		I	100	5	1	5
2	S	35	4	S	60	-25	-1	25
	G	140		G	90	50	1	50
	D	195		D	165	30	1	30
	I	175		I	235	-60	-1	60
7	S	210	5	S	185	25	1	25
	G	75		G	135	-60	-1	60
	D	75		D	80	-5	-1	5
	I	155		I	65	90	1	90
8	S	60	6	S	45	15	1	15
	G	195		G	120	75	1	75
	D	110		D	170	-60	-1	60
	I	195		I	190	5	1	5
13	S	85	15	S	50	35	1	35
	G	145		G	75	70	1	70
	D	150		D	100	50	1	50
	I	175		I	220	-45	-1	45
14	S	45	16	S	55	-10	-1	10
	G	75		G	160	-85	-1	85
	D	175		D	80	95	1	95
	I	175		I	225	-50	-1	50
19	S	140	17	S	55	85	1	85
	G	115		G	125	-10	-1	10
	D	155		D	100	55	1	55
	I	70		I	165	-95	-1	95
20	S	110	18	S	35	75	1	75
	G	135		G	165	-30	-1	30
	D	165		D	140	25	1	25
	I	80		I	195	-115	-1	115
25	S	5	27	S	50	-45	-1	45
	G	130		G	75	55	1	55
	D	370		D	285	85	1	85
	I	90		I	140	-50	-1	50
26	S	35	28	S	50	-15	-1	15
	G	115		G	100	15	1	15
	D	245		D	230	15	1	15
	I	135		I	125	10	1	10
31	S	50	29	S	75	-25	-1	25
	G	110		G	60	50	1	50
	D	270		D	205	65	1	65
	I	150		I	210	-60	-1	60
32	S	30	30	S	15	15	1	15
	G	110		G	120	-10	-1	10
	D	225		D	205	20	1	20
	I	165		I	160	5	1	5
37	S	40	39	S	35	5	1	5
	G	145		G	120	25	1	25
	D	185		D	295	-110	-1	110
	I	115		I	120	-5	-1	5
38	S	35	40	S	155	-120	-1	120
	G	140		G	185	-45	-1	45
	D	210		D	110	100	1	100
	I	135		I	50	85	1	85
43	S	55	41	S	60	-5	-1	5
	G	115		G	155	-40	-1	40
	D	200		D	160	40	1	40
	I	105		I	130	-25	-1	25
44	S	60	42	S	155	-95	-1	95
	G	135		G	120	15	1	15
	D	240		D	175	65	1	65
	I	90		I	60	30	1	30
								2880

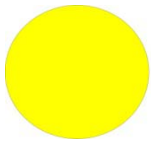
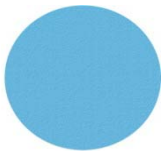
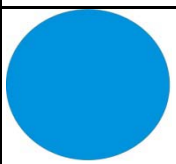
Appendix-18.h: Weightage Calculation

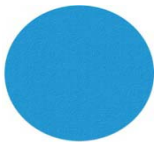
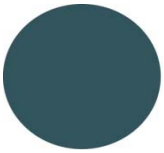
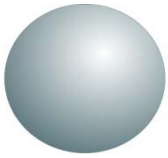
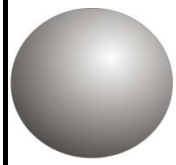
				Weightage	Round off
a	Colour	450	2250	12.2850123	12
b	Graphics	471	2355	12.8583129	13
c	Context	840	4200	22.9320229	23
d	Form	672	3360	18.3456183	18
e	Unity	654	3270	17.8542179	18
f	Dynamism	576	2880	15.7248157	16
		3663	18315		

Appendix-19.a: Weightage and scores for colour and texture

		Hue	Value	Chroma	Texture		x'=∑x/220	X=x'/2.29*3
1		Red	Medium	Low	Plain	S	0.55	0.71
						G	0.59	0.77
						D	0.39	0.51
						I	0.50	0.66
2		Red	Medium	Low	Glossy	S	0.84	1.10
						G	0.70	0.92
						D	0.07	0.09
						I	0.07	0.09
3		Red	Medium	Low	Rough	S	0.64	0.83
						G	0.39	0.51
						D	0.25	0.33
						I	0.61	0.80
4		Red	Medium	High	Plain	S	0.34	0.45
						G	0.36	0.48
						D	0.84	1.10
						I	0.68	0.89
5		Red	Medium	High	Glossy	S	0.45	0.60
						G	1.14	1.49
						D	0.36	0.48
						I	0.00	0.00
6		Red	Medium	High	Rough	S	0.27	0.36
						G	0.50	0.66
						D	1.07	1.40
						I	0.34	0.45
7		Red	Low	Low	Plain	S	0.59	0.77
						G	0.34	0.45
						D	0.25	0.33
						I	0.80	1.04
8		Red	Low	Low	Glossy	S	0.89	1.16
						G	0.16	0.21
						D	0.27	0.36
						I	0.20	0.27
9		Red	Low	Low	Rough	S	0.68	0.89
						G	0.50	0.66
						D	0.11	0.15
						I	0.52	0.68
10		Green	Medium	Low	Plain	S	0.41	0.54
						G	0.64	0.83
						D	0.52	0.68
						I	0.23	0.30

11		Green	Medium	Low	Glossy	S	0.66	0.86
						G	0.34	0.45
						D	0.55	0.71
						I	0.05	0.06
12		Green	Medium	Low	Rough	S	0.64	0.83
						G	0.45	0.60
						D	0.43	0.57
						I	0.14	0.18
13		Green	Medium	High	Plain	S	0.23	0.30
						G	0.34	0.45
						D	1.00	1.31
						I	0.66	0.86
14		Green	Medium	High	Glossy	S	0.80	1.04
						G	0.39	0.51
						D	0.55	0.71
						I	0.00	0.00
15		Green	Medium	High	Rough	S	0.25	0.33
						G	0.82	1.07
						D	0.66	0.86
						I	0.23	0.30
16		Green	Low	Low	Plain	S	1.05	1.37
						G	0.32	0.42
						D	0.52	0.68
						I	0.18	0.24
17		Green	Low	Low	Glossy	S	0.50	0.66
						G	0.59	0.77
						D	0.41	0.54
						I	0.07	0.09
18		Green	Low	Low	Rough	S	0.43	0.57
						G	0.55	0.71
						D	0.36	0.48
						I	0.34	0.45
19		Yellow	Medium	Low	Plain	S	0.66	0.86
						G	0.27	0.36
						D	0.59	0.77
						I	0.14	0.18
20		Yellow	Medium	Low	Glossy	S	0.86	1.13
						G	0.16	0.21
						D	0.66	0.86
						I	0.05	0.06
21		Yellow	Medium	Low	Rough	S	0.77	1.01
						G	0.50	0.66
						D	0.25	0.33
						I	0.00	0.00

22		Yellow	Medium	High	Plain	S	0.77	1.01
						G	0.59	0.77
						D	0.66	0.86
						I	0.18	0.24
23		Yellow	Medium	High	Glossy	S	0.45	0.60
						G	0.86	1.13
						D	0.66	0.86
						I	0.09	0.12
24		Yellow	Medium	High	Rough	S	0.32	0.42
						G	0.86	1.13
						D	0.41	0.54
						I	0.16	0.21
25		Yellow	Low	Low	Plain	S	0.59	0.77
						G	0.50	0.66
						D	0.32	0.42
						I	0.34	0.45
26		Yellow	Low	Low	Glossy	S	0.80	1.04
						G	0.32	0.42
						D	0.16	0.21
						I	0.36	0.48
27		Yellow	Low	Low	Rough	S	0.82	1.07
						G	0.16	0.21
						D	0.43	0.57
						I	0.23	0.30
28		Blue	Medium	Low	Plain	S	0.20	0.27
						G	1.05	1.37
						D	0.50	0.66
						I	0.25	0.33
29		Blue	Medium	Low	Glossy	S	0.82	1.07
						G	0.52	0.68
						D	0.32	0.42
						I	0.14	0.18
30		Blue	Medium	Low	Rough	S	0.43	0.57
						G	0.59	0.77
						D	0.84	1.10
						I	0.23	0.30
31		Blue	Medium	High	Plain	S	0.70	0.92
						G	0.70	0.92
						D	0.66	0.86
						I	0.16	0.21
32		Blue	Medium	High	Glossy	S	0.70	0.92
						G	0.75	0.98
						D	0.55	0.71
						I	0.09	0.12

33		Blue	Medium	High	Rough	S	0.77	1.01
						G	0.32	0.42
						D	0.80	1.04
						I	0.25	0.33
34		Blue	Low	Low	Plain	S	0.52	0.68
						G	0.32	0.42
						D	0.27	0.36
						I	0.57	0.74
35		Blue	Low	Low	Glossy	S	0.95	1.25
						G	0.39	0.51
						D	0.20	0.27
						I	0.20	0.27
36		Blue	Low	Low	Rough	S	0.45	0.60
						G	0.36	0.48
						D	0.64	0.83
						I	0.70	0.92
37		Black			Plain	S	0.23	0.30
						G	0.39	0.51
						D	0.68	0.89
						I	0.84	1.10
38		Black			Glossy	S	0.55	0.71
						G	0.30	0.39
						D	0.45	0.60
						I	0.23	0.30
39		Black			Rough	S	0.23	0.30
						G	0.34	0.45
						D	0.27	0.36
						I	1.14	1.49
40		Chrome				S	1.54	2.02
						G	2.14	2.80
						D	2.29	3.00
						I	2.12	2.78
41		Silver				S	0.88	1.15
						G	0.45	0.59
						D	0.97	1.27
						I	0.18	0.24
42		White				S	1.26	1.65
						G	0.31	0.41
						D	0.09	0.12
						I	0.17	0.22

Appendix-19.b: Weightage Calculation for Colour and Texture

															δS			δG			δD			δI			∑δ	Weightage=∑δ/∑∑δ
			Plain				Glossy				Rough				$δS_1$	$δS_2$	$δS_3$	$δG_1$	$δG_2$	$δG_3$	$δD_1$	$δD_2$	$δD_3$	$δI_1$	$δI_2$	$δI_3$		
	Hue	Value-chroma	S	G	D	I	S	G	D	I	S	G	D	I														
Colour Change Aggregate	Red	Med-low	0.71	0.77	0.51	0.66	1.1	0.92	0.09	0.09	0.83	0.51	0.33	0.8	0.39	0.27	0.12	0.15	0.41	0.26	0.42	0.24	0.18	0.57	0.71	0.14	35.35	52.71398747
		Med-high	0.45	0.48	1.1	0.89	0.6	1.49	0.48	0	0.36	0.66	1.4	0.45	0.15	0.24	0.09	1.01	0.83	0.18	0.62	0.92	0.3	0.89	0.45	0.44		
		Low-low	0.77	0.45	0.33	1.04	1.16	0.21	0.36	1.27	0.89	0.66	1.15	0.68	0.39	0.27	0.12	0.24	0.45	0.21	0.03	0.79	0.82	0.23	0.59	0.36		
	Green	Med-low	0.54	0.83	0.68	0.3	0.86	0.45	0.71	0.06	0.83	0.6	0.57	0.18	0.32	0.03	0.29	0.38	0.15	0.23	0.03	0.14	0.11	0.24	0.12	0.12		
		Med-high	0.3	0.45	1.31	0.86	1.04	0.51	0.71	0	0.33	1.07	0.86	0.3	0.74	0.71	0.03	0.06	0.56	0.62	0.6	0.15	0.45	0.86	0.3	0.56		
		Low-low	1.37	0.42	0.68	0.24	0.66	0.77	0.54	0.09	0.57	0.71	0.45	0.43	0.71	0.09	0.8	0.35	0.06	0.29	0.14	0.09	0.23	0.15	0.34	0.19		
	Yellow	Med-low	0.86	0.36	0.77	0.18	1.13	0.21	0.86	0.06	1.01	0.66	0.33	0	0.27	0.12	0.15	0.15	0.45	0.3	0.09	0.53	0.44	0.12	0.06	0.18		
		Med-high	1.01	0.77	0.86	0.24	0.6	1.13	0.86	0.12	0.42	1.13	0.54	0.21	0.41	0.18	0.59	0.36	0	0.36	0	0.32	0.32	0.12	0.09	0.03		
		Low-low	0.77	0.66	0.42	0.45	1.04	0.42	0.21	0.48	1.07	0.21	0.57	0.3	0.27	0.03	0.3	0.24	0.21	0.45	0.21	0.36	0.15	0.03	0.18	0.15		
															3.65	1.94	2.49	2.94	3.12	2.9	2.14	3.54	3	3.21	2.84	2.17		
															δS			δG			δD			δI				
			Red				Green				Yellow				$δS_1$	$δS_2$	$δS_3$	$δG_1$	$δG_2$	$δG_3$	$δD_1$	$δD_2$	$δD_3$	$δI_1$	$δI_2$	$δI_3$		
			S	G	D	I	S	G	D	I	S	G	D	I														
Texture Change Aggregate	Plain	Med-low	0.71	0.77	0.51	0.66	0.54	0.83	0.68	0.3	0.86	0.36	0.77	0.18	0.17	0.32	0.15	0.06	0.47	0.41	0.17	0.09	0.09	0.36	0.12	0.48	31.71	47.28601253
		Med-high	0.45	0.48	1.1	0.89	0.3	0.45	1.31	0.86	1.01	0.77	0.86	0.24	0.15	0.71	0.56	0.03	0.32	0.29	0.21	0.45	0.45	0.03	0.62	0.65		
		Low-low	0.77	0.45	0.33	1.04	1.37	0.42	0.68	0.24	0.77	0.66	0.42	0.45	0.6	0.6	0	0.03	0.24	0.21	0.35	0.26	0.26	0.8	0.21	0.59		
	Glossy	Med-low	1.1	0.92	0.09	0.09	0.86	0.45	0.71	0.06	1.13	0.21	0.86	0.06	0.24	0.27	0.03	0.47	0.24	0.71	0.62	0.15	0.15	0.03	0	0.03		
		Med-high	0.6	1.49	0.48	0	1.04	0.51	0.71	0	0.6	1.13	0.86	0.12	0.44	0.44	0	0.98	0.62	0.36	0.23	0.15	0.15	0	0.12	0.12		
		Low-low	1.16	0.21	0.36	1.27	0.66	0.77	0.54	0.09	1.04	0.42	0.21	0.48	0.5	0.38	0.12	0.56	0.35	0.21	0.18	0.33	0.33	1.18	0.39	0.79		
	Rough	Med-low	0.83	0.51	0.33	0.8	0.83	0.6	0.57	0.18	1.01	0.66	0.33	0	0	0.18	0.18	0.09	0.06	0.15	0.24	0.24	0.24	0.62	0.18	0.8		
		Med-high	0.36	0.66	1.4	0.45	0.33	1.07	0.86	0.3	0.42	1.13	0.54	0.21	0.03	0.09	0.06	0.41	0.06	0.47	0.54	0.32	0.32	0.15	0.09	0.24		
		Low-low	0.89	0.66	1.15	0.68	0.57	0.71	0.45	0.43	1.07	0.21	0.57	0.3	0.32	0.5	0.18	0.05	0.5	0.45	0.7	0.12	0.12	0.25	0.13	0.38		
															2.45	3.49	1.28	2.68	2.86	3.26	3.24	2.11	2.11	3.42	1.86	4.08		

Appendix-20: Weightage results and calculation for form

		AVERAGE
1	S	1.49
	G	0.18
	D	0.01
	I	0.03
2	S	1.27
	G	0.23
	D	0.14
	I	0.05
3	S	1.30
	G	0.18
	D	0.24
	I	0.12
4	S	1.07
	G	0.24
	D	0.36
	I	0.01
5	S	1.26
	G	0.13
	D	0.12
	I	0.16
6	S	1.07
	G	0.24
	D	0.32
	I	0.10
7	S	1.24
	G	0.19
	D	0.19
	I	0.02
8	S	1.08
	G	0.37
	D	0.10
	I	0.20
9	S	1.19
	G	0.13
	D	0.12
	I	0.16
10	S	0.91
	G	0.44
	D	0.39
	I	0.02
11	S	1.26
	G	0.17
	D	0.32
	I	0.01
12	S	1.22
	G	0.36
	D	0.24
	I	0.10
13	S	1.42
	G	0.21
	D	0.19
	I	0.08
14	S	1.09
	G	0.20
	D	0.39
	I	0.06

Fue Tank

Sheet		Score (a)	Sheet		Score (b)	a-b	abs
1	S	1.49	3	S	1.20	0.29	0.29
	G	0.18		G	0.34	-0.16	0.16
	D	0.01		D	0.04	-0.03	0.03
	I	0.03		I	0.12	-0.09	0.09
2	S	1.27	4	S	1.15	0.12	0.12
	G	0.23		G	0.14	0.09	0.09
	D	0.14		D	0.36	-0.22	0.22
	I	0.05		I	0.01	0.04	0.04
3	S	1.30	7	S	1.24	0.06	0.06
	G	0.18		G	0.19	-0.01	0.01
	D	0.24		D	0.37	-0.13	0.13
	I	0.12		I	0.11	0.02	0.02
4	S	1.07	8	S	1.08	-0.01	0.01
	G	0.24		G	0.37	-0.13	0.13
	D	0.36		D	0.10	0.22	0.22
	I	0.01		I	0.20	-0.19	0.19
5	S	1.26	11	S	1.19	-0.07	0.07
	G	0.13		G	0.17	-0.04	0.04
	D	0.12		D	0.32	-0.20	0.20
	I	0.16		I	0.01	0.15	0.15
6	S	1.07	12	S	1.22	-0.31	0.31
	G	0.24		G	0.36	0.08	0.08
	D	0.32		D	0.24	0.15	0.15
	I	0.10		I	0.02	-0.08	0.08
7	S	1.24	15	S	1.06	0.36	0.36
	G	0.19		G	0.21	-0.12	0.12
	D	0.19		D	0.41	-0.22	0.22
	I	0.08		I	0.06	0.02	0.02
8	S	1.08	16	S	0.95	0.13	0.13
	G	0.37		G	0.64	-0.27	0.27
	D	0.10		D	0.37	-0.27	0.27
	I	0.20		I	0.00	0.20	0.20
9	S	1.19					4.36
	G	0.13					
	D	0.12					
	I	0.16					
10	S	0.91					
	G	0.44					
	D	0.39					
	I	0.02					
11	S	1.26					
	G	0.17					
	D	0.32					
	I	0.01					
12	S	1.22					
	G	0.36					
	D	0.24					
	I	0.10					
13	S	1.42					
	G	0.21					
	D	0.19					
	I	0.08					
14	S	1.09					
	G	0.20					
	D	0.39					
	I	0.06					

Side Cover

Sheet		Score (a)	Sheet		Score (b)	a-b	abs
1	S	1.49	5	S	1.30	-0.02	0.02
	G	0.18		G	0.18	0.01	0.01
	D	0.01		D	0.24	0.00	0.00
	I	0.03		I	0.13	0.00	0.00
2	S	1.27	6	S	1.07	-0.03	0.03
	G	0.23		G	0.24	0.01	0.01
	D	0.14		D	0.32	0.00	0.00
	I	0.05		I	0.01	0.00	0.00
3	S	1.30	7	S	1.24	-0.02	0.02
	G	0.18		G	0.19	0.00	0.00
	D	0.24		D	0.37	0.00	0.00
	I	0.12		I	0.02	0.00	0.00
4	S	1.15	8	S	1.08	-0.04	0.04
	G	0.14		G	0.37	0.00	0.00
	D	0.36		D	0.10	0.01	0.01
	I	0.01		I	0.20	0.00	0.00
5	S	1.19	13	S	1.42	-0.07	0.07
	G	0.13		G	0.21	0.00	0.00
	D	0.12		D	0.19	0.01	0.01
	I	0.16		I	0.08	0.00	0.00
6	S	0.91	14	S	1.09	-0.07	0.07
	G	0.44		G	0.20	0.01	0.01
	D	0.39		D	0.39	0.00	0.00
	I	0.02		I	0.06	0.01	0.01
7	S	1.26	15	S	1.06	-0.08	0.08
	G	0.17		G	0.33	0.00	0.00
	D	0.32		D	0.41	0.02	0.02
	I	0.01		I	0.06	0.00	0.00
8	S	1.08	16	S	0.95	0.13	0.13
	G	0.37		G	0.64	-0.01	0.01
	D	0.10		D	0.37	0.00	0.00
	I	0.20		I	0.00	0.01	0.01
9	S	1.19					0.49
	G	0.13					
	D	0.12					
	I	0.16					
10	S	0.91					
	G	0.44					
	D	0.39					
	I	0.02					
11	S	1.26					
	G	0.17					
	D	0.32					
	I	0.01					
12	S	1.22					
	G	0.36					
	D	0.24					
	I	0.10					
13	S	1.42					
	G	0.21					
	D	0.19					
	I	0.08					
14	S	1.09					
	G	0.20					
	D	0.39					
	I	0.06					

Seat

Sheet		Score (a)	Sheet		Score (b)	a-b	abs
1	S	1.49	5	S	1.27	0.22	0.22
	G	0.18		G	0.23	-0.05	0.05
	D	0.01		D	0.01	0.00	0.00
	I	0.03		I	0.05	-0.02	0.02
2	S	1.20	6	S	1.15	0.05	0.05
	G	0.34		G	0.14	0.20	0.20
	D	0.04		D	0.36	-0.32	0.32
	I	0.01		I	0.01	0.11	0.11
3	S	1.24	7	S	1.07	0.23	0.23
	G	0.19		G	0.24	-0.06	0.06
	D	0.37		D	0.32	-0.08	0.08
	I	0.11		I	0.01	0.12	0.12
4	S	1.08	8	S	1.08	0.16	0.16
	G	0.37		G	0.37	-0.18	0.18
	D	0.10		D	0.10	-0.27	0.27
	I	0.20		I	0.20	-0.18	0.18
5	S	1.26	13	S	0.91	0.28	0.28
	G	0.13		G	0.44	-0.31	0.31
	D	0.12		D	0.39	-0.27	0.27
	I	0.16		I	0.02	0.14	0.14
6	S	1.07	12	S	1.22	0.04	0.04
	G	0.24		G	0.36	-0.19	0.19
	D	0.32		D	0.24	0.08	0.08
	I	0.10		I	0.02	-0.09	0.09
7	S	1.24	14	S	1.09	0.33	0.33
	G	0.19		G	0.20	0.01	0.01
	D	0.19		D	0.39	-0.20	0.20
	I	0.08		I	0.06	0.02	0.02
8	S	1.08	15	S	0.95	0.11	0.11
	G	0.37		G	0.64	-0.31	0.31
	D	0.10		D	0.37	0.04	0.04
	I	0.20		I	0.00	0.06	0.06
9	S	1.19					4.73
	G	0.13					
	D	0.12					
	I	0.16					
10	S	0.91					
	G	0.44					
	D	0.39					
	I	0.02					
11	S	1.26					
	G	0.17					
	D	0.32					
	I	0.01					
12	S	1.22					
	G	0.36					
	D	0.24					
	I	0.10					
13	S	1.42					
	G	0.21					
	D	0.19					
	I	0.08					
14	S	1.09					
	G	0.20					
	D	0.39					
	I	0.06					

Visor

Sheet		Score (a)	Sheet		Score (b)	a-b	abs
1	S	1.49	9	S	1.19	0.30	0.30
	G	0.18		G	0.13	0.05	0.05
	D	0.01		D	0.12	-0.11	0.11
	I	0.02		I	0.16	-0.14	0.14
2	S	1.27	10	S	0.91	0.36	0.36
	G	0.23		G	0.44	-0.21	0.21
	D	0.13		D	0.39	-0.26	0.26
	I	0.05		I	0.02	0.03	0.03
3	S	1.20	11	S	1.26	-0.06	0.06
	G	0.34		G	0.17	0.17	0.17
	D	0.04		D	0.32	-0.28	0.28
	I	0.12		I	0.01	0.11	0.11
4	S	1.15	12	S	1.22	-0.07	0.07
	G	0.14		G	0.36	-0.22	0.22
	D	0.36		D	0.24	-0.12	0.12
	I	0.01		I	0.10	-0.09	0.09
5	S	1.30	13	S	1.42	-0.12	0.12
	G	0.18		G	0.21	-0.03	0.03
	D	0.24		D	0.19	0.05	0.05
	I	0.13		I	0.08	0.05	0.05
6	S	1.07	14	S	1.09	-0.02	0.02
	G	0.24		G	0.20	0.04	0.04
	D	0.32		D	0.39	-0.07	0.07
	I	0.10		I	0.06	-0.05	0.05
7	S	1.24	15	S	1.06	0.18	0.18
	G	0.19		G	0.33	-0.14	0.14
	D	0.19		D	0.41	-0.04	0.04
	I	0.08		I	0.06	-0.04	0.04
8	S	1.08	16	S	0.95	0.13	0.13
	G	0.37		G	0.64	-0.27	0.27
	D	0.10		D	0.37	-0.27	0.27
	I	0.20		I	0.00	0.20	0.20
9	S	1.19					4.27
	G	0.13					
	D	0.12					
	I	0.16					
10	S	0.91					
	G	0.44					
	D	0.39					
	I	0.02					
11	S	1.26					
	G	0.17					
	D	0.32					
	I	0.01					
12	S	1.22					
	G	0.36					
	D	0.24					
	I	0.10					
13	S	1.42					
	G	0.21					
	D	0.19					
	I	0.08					
14	S	1.09					
	G	0.20					
	D	0.39					
	I	0.06					

	Σδ S.	Σδ	Σδ	Σδ diffrential
Σδf. tank	cover	Seat	visor	
4.36	0.49	4.73	4.27	13.85

Weightage fuel tank	31.48	31
Weightage slide cover	3.54	4
Weightage seat	34.15	34
Weightage visor	30.83	31

15	S	1.06
	G	0.33
	D	0.41
	I	0.06
16	S	0.95
	G	0.64
	D	0.37
	I	0

Appendix-21: Weightage results and calulation for Context

		AVERAGE
11	S	1.52
	G	0.27
	D	0.02
	I	0.02
12	S	0.98
	G	0.40
	D	0.15
	I	0.02
13	S	0.30
	G	0.65
	D	0.84
	I	0.36
14	S	0.18
	G	1.00
	D	0.41
	I	0.25
21	S	1.30
	G	0.40
	D	0.24
	I	0.12
22	S	1.15
	G	0.18
	D	0.20
	I	0.10
23	S	0.41
	G	1.03
	D	0.32
	I	0.25
24	S	0.48
	G	0.44
	D	0.74
	I	0.21

Visor

Sheet		a	Sheet		b	a-b	abs
11	S	1.52	21	S	1.30	0.22	0.22
	G	0.27		G	0.40	-0.12	0.12
	D	0.02		D	0.24	-0.22	0.22
	I	0.02		I	0.12	-0.09	0.09
12	S	0.98	22	S	1.15	-0.17	0.17
	G	0.40		G	0.18	0.22	0.22
	D	0.15		D	0.20	-0.05	0.05
	I	0.02		I	0.10	-0.08	0.08
13	S	0.30	23	S	0.41	-0.11	0.11
	G	0.65		G	1.03	-0.39	0.39
	D	0.84		D	0.32	0.53	0.53
	I	0.36		I	0.25	0.11	0.11
14	S	0.18	24	S	0.48	-0.31	0.31
	G	1.00		G	0.44	0.56	0.56
	D	0.41		D	0.74	-0.33	0.33
	I	0.25		I	0.21	0.04	0.04
							3.55

Motorcycle type

Sheet		a	Sheet		b	a-b	abs
11	S	1.52	13	S	0.30	1.22	1.22
	G	0.27		G	0.65	-0.38	0.38
	D	0.02		D	0.84	-0.82	0.82
	I	0.02		I	0.36	-0.34	0.34
12	S	0.98	14	S	0.18	0.80	0.80
	G	0.40		G	1.00	-0.60	0.60
	D	0.15		D	0.41	-0.26	0.26
	I	0.02		I	0.25	-0.23	0.23
21	S	1.30	23	S	0.41	0.88	0.88
	G	0.40		G	1.03	-0.64	0.64
	D	0.24		D	0.32	-0.07	0.07
	I	0.12		I	0.25	-0.13	0.13
22	S	1.15	24	S	0.48	0.66	0.66
	G	0.18		G	0.44	-0.26	0.26
	D	0.20		D	0.74	-0.54	0.54
	I	0.10		I	0.21	-0.11	0.11
							7.94

Wheels

Sheet		a	Sheet		b	a-b	abs
11	S	1.52	12	S	0.98	0.54	0.54
	G	0.27		G	0.40	-0.13	0.13
	D	0.02		D	0.15	-0.13	0.13
	I	0.02		I	0.02	0.00	0.00
13	S	0.30	14	S	0.18	0.13	0.13
	G	0.65		G	1.00	-0.35	0.35
	D	0.84		D	0.41	0.43	0.43
	I	0.36		I	0.25	0.11	0.11
21	S	1.30	22	S	1.15	0.15	0.15
	G	0.40		G	0.18	0.21	0.21
	D	0.24		D	0.20	0.04	0.04
	I	0.12		I	0.10	0.01	0.01
23	S	0.41	24	S	0.48	-0.07	0.07
	G	1.03		G	0.44	0.60	0.60
	D	0.32		D	0.74	-0.42	0.42
	I	0.25		I	0.21	0.04	0.04
							3.36

∑∑ differential= ∑δVisor +∑δ Type+∑δ Wheels = 4.36+0.49+4.73= 14.85

Weightage $_{visor}$

.=3.55/14.85= 23.9 %

Weightage $_{type}$

.=7.94/14.85=53.5 %

Weightage $_{wheels}$

.=3.36/14.85= 22.6 %

Appendix-22: Weightage results and calculation for typography and graphics

		X=x/1.27*3
1	S	2.36
	G	0.59
	D	1.18
	I	0.43
2	S	0.81
	G	1.02
	D	1.50
	I	1.29
3	S	0.70
	G	2.47
	D	0.59
	I	0.27
4	S	0.64
	G	1.66
	D	1.13
	I	0.97
5	S	1.13
	G	1.61
	D	1.13
	I	0.48
6	S	0.27
	G	0.81
	D	3.01
	I	1.34
7	S	0.54
	G	2.25
	D	1.07
	I	0.81
8	S	0.11
	G	1.61
	D	1.93
	I	1.29

Impact of Typography change

δS'	δG'	δD'	δI'	
1.89	1.88	0.59	0.16	
0.17	0.64	0.37	0.32	
0.59	0.64	0.06	1.33	
0.16	0.8	1.07	0.05	
2.81	3.96	2.09	1.86	10.72

Weightage of typography	75.75972
Weightage of graphics	24.24028

Impact of Graphic change

δS'	δG'	δD'	δI'	
1.23	1.02	0.05	0.05	
0.54	0.21	1.5	0.05	
0.07	0.22	0.48	1.54	
0.53	0.05	0.8	0.32	
2.37	1.5	2.83	1.96	3.43

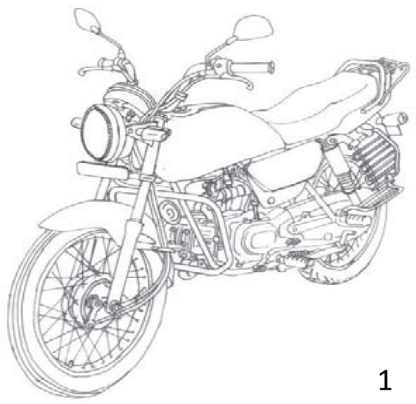
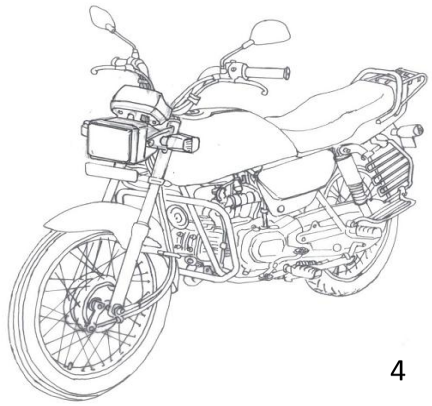
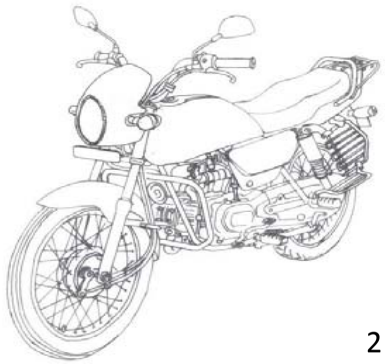
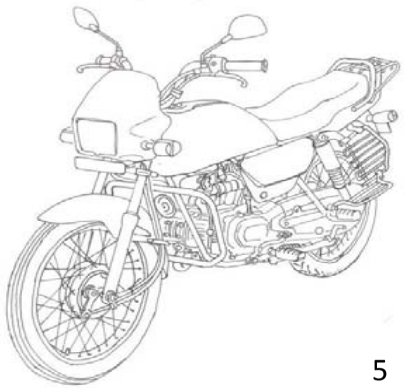
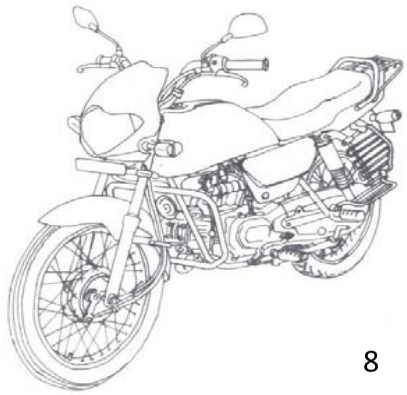
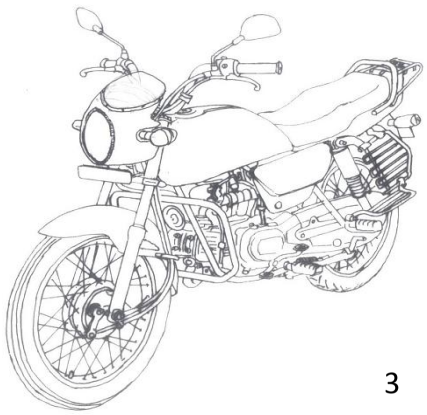
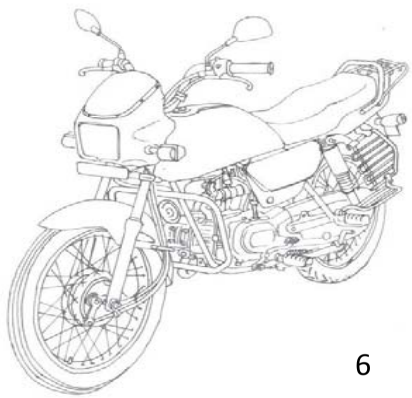
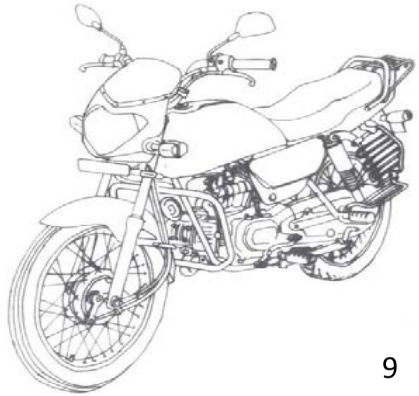
Appendix-23.a: Survey Result for Motorcycle Types

		A				B				C			
		Cruiser				**Sports**				**Standard**			
1	Lear	S	G	D	1	S	G	D	I	S	G	D	I
		0.46	0.60	1.94	1.16	0.09	0.74	2.41	1.25	3.00	0.09	0.14	0.23
													
		Naked											
2		S	G	D	I	S	G	D	I	S	G	D	I
		0.32	0.51	1.67	1.90	0.14	0.74	2.87	1.39	1.11	2.50	0.14	0.09
													
		Orna											
3	Bulk	S	G	D	I	S	G	D	I	S	G	D	I
		0.19	0.88	2.27	1.43	0.00	0.79	2.22	1.20	0.19	0.60	2.31	1.02
													
		Naked											
4		S	G	D	I	S	G	D	I	S	G	D	I
		0.46	0.60	1.94	1.16	0.23	0.88	1.67	2.59	0.28	0.32	1.90	1.54
													
		Ornamental											

Appendix 23.b: SGDI calculation for types

	S		G		D		I	
Sheet	Survey Score	Weighted score	Survey Score	Weighted score	Survey Score	Weighted score	Survey Score	Weighted score
A_1	0.22	**0.46**	0.28	**0.60**	0.91	**1.94**	0.54	**1.16**
A_2	0.15	**0.32**	0.24	**0.51**	0.78	**1.67**	0.89	**1.90**
A_3	0.07	**0.14**	0.65	**1.39**	0.74	**1.57**	0.74	**1.57**
A_4	0.09	**0.19**	0.41	**0.88**	1.07	**2.27**	0.67	**1.43**
B_1	0.04	**0.09**	0.35	**0.74**	1.13	**2.41**	0.59	**1.25**
B_2	0.07	**0.14**	0.35	**0.74**	1.35	**2.87**	0.65	**1.39**
B_3	0.00	**0.00**	0.37	**0.79**	1.04	**2.22**	0.57	**1.20**
B_4	0.11	**0.23**	0.41	**0.88**	0.78	**1.67**	1.22	**2.59**
C_1	1.41	**3.01**	0.04	**0.09**	0.07	**0.14**	0.11	**0.23**
C_2	0.52	**1.11**	1.17	**2.50**	0.07	**0.14**	0.04	**0.09**
C_3	0.09	**0.19**	0.28	**0.60**	1.09	**2.31**	0.48	**1.02**
C_4	0.13	**0.28**	0.15	**0.32**	0.89	**1.90**	1.20	**2.54**

Appendix-24.a: Survey Results for Front Facia

	ROUND HEAD LIGHT(1)	RECTANGULAR HEAD LIGHT(2)	TRAPIZOIDAL HEAD LIGHT(3)
NO VISOR(1)	S: 3, G: 0, D: 0.08, I: 0.11  1	S: 2.46, G: 0.23, D: 0.11, I: 0.08  4	S: 0.61, G: 1.1, D: 1.18, I: 0.19  7
WITH SIMPLE	S: 2.65, G: 0.38, D: 0.27, I: 0.11  2	S: 2.28, G: 1.25, D: 0.27, I: 0  5	S: 0.04, G: 1.93, D: 1.14, I: 0.11  8
WITH WINDSHIELD VISOR(3)	S: 1.82, G: 0.64, D: 0.27, I: 0.11  3	S: 1.71, G: 1.44, D: 0.3, I: 0  6	S: 0.27, G: 1.86, D: 1.25, I: 0.3  9

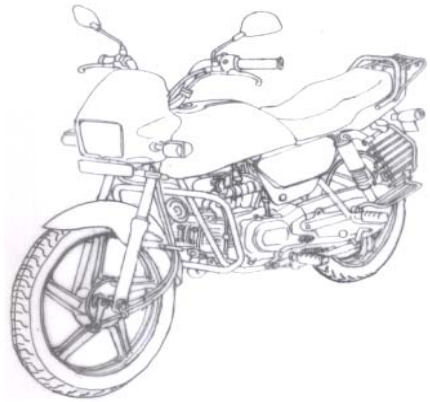
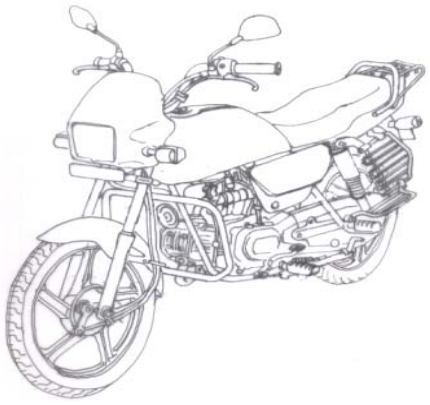
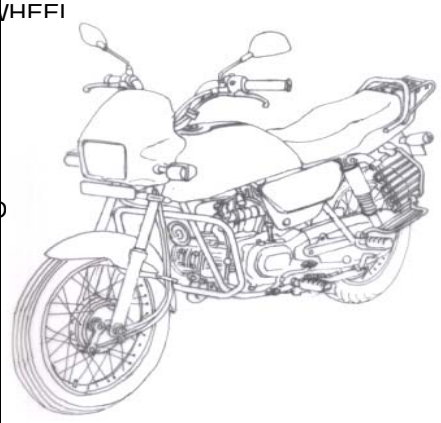
Appendix-24.b: SGDI Calculation for Fr Facia

	S		G		D		I	
	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
Sheet	x	X	x	X	x	X	x	X
1	1.72	**3.00**	0.00	**0.00**	0.04	**0.08**	0.07	**0.11**
2	1.52	**2.65**	0.22	**0.38**	0.15	**0.27**	0.07	**0.11**
3	1.04	**1.82**	0.37	**0.64**	0.15	**0.27**	0.07	**0.11**
4	1.41	**2.46**	0.13	**0.23**	0.07	**0.11**	0.04	**0.08**
5	1.30	**2.28**	0.72	**1.25**	0.15	**0.27**	0.00	**0.00**
6	0.98	**1.71**	0.83	**1.44**	0.17	**0.30**	0.00	**0.00**
7	0.35	**0.61**	0.63	**1.10**	0.67	**1.18**	0.11	**0.19**
8	0.02	**0.04**	1.11	**1.93**	0.65	**1.14**	0.07	**0.11**
9	0.15	**0.27**	1.07	**1.86**	0.72	**1.25**	0.17	**0.30**

Appendix-25.a: SGDI Calculation for tyre and wheels

	S		G		D		1	
	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
Sheet	x	X	x	X	x	X	x	X
A_1	1.61	3.00	0.04	0.08	0.02	0.04	0.07	0.12
A_2	1.37	2.55	0.22	0.41	0.11	0.20	0.11	0.20
A_3	1.48	2.75	0.11	0.20	0.04	0.08	0.04	0.08
A_4	1.26	2.35	0.43	0.81	0.09	0.16	0.09	0.16
B_1	0.43	0.81	0.85	1.58	0.46	0.85	0.07	0.12
B_2	0.17	0.32	1.02	1.90	0.50	0.93	0.13	0.24
B_3	0.35	0.65	0.87	1.62	0.39	0.73	0.07	0.12
B_4	0.26	0.49	0.61	1.13	0.91	1.70	0.20	0.36

Appendix-25.b: Survey Results for Wheels and Tyres

			A					B				
			SPOKE					CAST				
			S	G	D	I		S	G	D	I	
1		NAF	3.00	0.08	0.04	0.12		0.81	1.58	0.85	0.12	
2	BIG WHEI	WIDI	2.55	0.41	0.20	0.20		0.32	1.90	0.93	0.24	
3		NAF	2.75	0.20	0.08	0.08		0.65	1.62	0.73	0.12	
4	SMALL WHEEI	WID	2.35	0.81	0.16	0.16		0.49	1.13	1.70	0.36	

Appendix-26.a: SGDI Scores for Colour

		S		G		D		I	
		Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
		x	X	x	X	x	X	x	X
1	b3/b1	1.18	**2.36**	0.05	**0.09**	0.36	**0.73**	0.09	**0.18**
2	b3/b2	1.14	**2.27**	0.50	**1.00**	0.27	**0.55**	0.09	**0.18**
3	b2/b3	1.32	**2.64**	0.14	**0.27**	0.45	**0.91**	0.27	**0.55**
4	b2/b1	0.95	**1.91**	0.36	**0.73**	0.36	**0.73**	0.09	**0.18**
5	b1/b3	1.41	**2.82**	0.14	**0.27**	0.00	**0.00**	0.41	**0.82**
6	b1/b2	1.09	**2.18**	0.23	**0.45**	0.18	**0.36**	0.18	**0.36**
7	b2.b3	1.36	**2.73**	0.36	**0.73**	0.41	**0.82**	0.00	**0.00**
8	b1.b2	0.59	**1.18**	0.55	**1.09**	0.45	**0.91**	0.05	**0.09**
9	b1.b3	0.77	**1.55**	0.55	**1.09**	0.41	**0.82**	0.18	**0.36**
10	b3	1.41	**2.82**	0.09	**0.18**	0.27	**0.55**	0.23	**0.45**
11	b2	1.18	**2.36**	0.41	**0.82**	0.18	**0.36**	0.14	**0.27**
12	b1	1.50	**3.00**	0.27	**0.55**	0.14	**0.27**	0.00	**0.00**
13	b3/g3	0.77	**1.55**	0.18	**0.36**	0.18	**0.36**	0.59	**1.18**
14	b2/g3	0.86	**1.73**	0.27	**0.55**	0.32	**0.64**	0.41	**0.82**
15	b3/g2	0.68	**1.36**	0.82	**1.64**	0.09	**0.18**	0.36	**0.73**
16	b2/g2	0.41	**0.82**	0.68	**1.36**	0.36	**0.73**	0.18	**0.36**
17	b3/g1	0.91	**1.82**	0.55	**1.09**	0.18	**0.36**	0.32	**0.64**
18	b2/g1	0.59	**1.18**	0.77	**1.55**	0.32	**0.64**	0.05	**0.09**
19	b1/g1	0.73	**1.45**	0.55	**1.09**	0.09	**0.18**	0.27	**0.55**
20	b1/g2	0.55	**1.09**	0.68	**1.36**	0.09	**0.18**	0.14	**0.27**
21	b1/g3	0.64	**1.27**	0.41	**0.82**	0.18	**0.36**	0.14	**0.27**
22	b2.g1	0.27	**0.55**	0.59	**1.18**	0.36	**0.73**	0.32	**0.64**
23	b2.g2	0.23	**0.45**	0.77	**1.55**	0.32	**0.64**	0.32	**0.64**
24	b2.g3	0.27	**0.55**	0.64	**1.27**	0.45	**0.91**	0.32	**0.64**
25	b3.g1	0.18	**0.36**	0.64	**1.27**	0.50	**1.00**	0.36	**0.73**
26	b3.g2	0.14	**0.27**	1.18	**2.36**	0.45	**0.91**	0.45	**0.91**
27	b3.g3	0.27	**0.55**	0.50	**1.00**	0.59	**1.18**	0.36	**0.73**
28	b1.g1	0.86	**1.73**	0.41	**0.82**	0.32	**0.64**	0.27	**0.55**
29	b1.g2	0.68	**1.36**	0.36	**0.73**	0.36	**0.73**	0.32	**0.64**

30	b1.g3	0.45	**0.91**	0.32	**0.64**	0.41	**0.82**	0.41	**0.82**
31	g1/b1	0.55	**1.09**	0.45	**0.91**	0.23	**0.45**	0.41	**0.82**
32	g1/b2	0.86	**1.73**	0.41	**0.82**	0.18	**0.36**	0.36	**0.73**
33	g1/b3	0.86	**1.73**	0.86	**1.73**	0.09	**0.18**	0.00	**0.00**
34	g2/b1	0.73	**1.45**	0.45	**0.91**	0.59	**1.18**	0.27	**0.55**
35	g2/b2	0.91	**1.82**	0.36	**0.73**	0.32	**0.64**	0.36	**0.73**
36	g2/b3	0.95	**1.91**	0.23	**0.45**	0.41	**0.82**	0.41	**0.82**
37	g3/b1	0.68	**1.36**	0.45	**0.91**	0.55	**1.09**	0.23	**0.45**
38	g3/b2	0.59	**1.18**	0.55	**1.09**	0.32	**0.64**	0.41	**0.82**
39	g3/b3	1.00	**2.00**	0.64	**1.27**	0.36	**0.73**	0.36	**0.73**
40	g1/g3	0.41	**0.82**	0.95	**1.91**	0.14	**0.27**	0.14	**0.27**
41	g1/g2	0.82	**1.64**	0.36	**0.73**	0.36	**0.73**	0.27	**0.55**
42	g2/g1	0.86	**1.73**	0.64	**1.27**	0.05	**0.09**	0.14	**0.27**
43	g2/g3	0.77	**1.55**	0.64	**1.27**	0.09	**0.18**	0.41	**0.82**
44	g3/g1	0.73	**1.45**	0.18	**0.36**	0.55	**1.09**	0.36	**0.73**
45	g3/g2	0.41	**0.82**	0.41	**0.82**	0.27	**0.55**	0.50	**1.00**
46	g1.g2	0.86	**1.73**	0.64	**1.27**	0.18	**0.36**	0.32	**0.64**
47	g2.g3	0.18	**0.36**	1.00	**2.00**	0.09	**0.18**	0.23	**0.45**
48	g3.g1	0.27	**0.55**	1.05	**2.09**	0.36	**0.73**	0.09	**0.18**
49	g1	0.95	**1.91**	0.91	**1.82**	0.00	**0.00**	0.14	**0.27**
50	g2	0.77	**1.55**	0.64	**1.27**	0.18	**0.36**	0.18	**0.36**
51	g3	0.59	**1.18**	0.50	**1.00**	0.50	**1.00**	0.14	**0.27**
52	b1/w	0.68	**1.36**	0.59	**1.18**	0.27	**0.55**	0.05	**0.09**
53	b2/w	0.86	**1.73**	0.82	**1.64**	0.14	**0.27**	0.09	**0.18**
54	b1.w	1.05	**2.09**	0.77	**1.55**	0.09	**0.18**	0.05	**0.09**
55	b2.w	0.36	**0.73**	0.91	**1.82**	0.32	**0.64**	0.09	**0.18**
56	g3/w	0.59	**1.18**	0.73	**1.45**	0.18	**0.36**	0.27	**0.55**
57	g2/w	0.50	**1.00**	0.45	**0.91**	0.32	**0.64**	0.36	**0.73**
58	g1/w	0.91	**1.82**	0.41	**0.82**	0.09	**0.18**	0.41	**0.82**
59	g3.w	0.23	**0.45**	0.55	**1.09**	0.27	**0.55**	0.32	**0.64**
60	g2.w	0.36	**0.73**	0.50	**1.00**	0.41	**0.82**	0.27	**0.55**
61	g1.w	0.45	**0.91**	0.82	**1.64**	0.36	**0.73**	0.18	**0.36**

62	g3/r1	0.50	**1.00**	0.64	**1.27**	0.32	**0.64**	0.41	**0.82**
63	g2/r1	0.05	**0.09**	0.82	**1.64**	0.45	**0.91**	0.59	**1.18**
64	g1/r1	0.14	**0.27**	0.73	**1.45**	0.36	**0.73**	0.45	**0.91**
65	g3/r2	0.05	**0.09**	0.50	**1.00**	0.64	**1.27**	0.45	**0.91**
66	g2/r2	0.05	**0.09**	0.64	**1.27**	0.32	**0.64**	0.68	**1.36**
67	g1/r2	0.45	**0.91**	0.73	**1.45**	0.55	**1.09**	0.32	**0.64**
68	g3/r3	0.32	**0.64**	0.77	**1.55**	0.50	**1.00**	0.27	**0.55**
69	g2/r3	0.73	**1.45**	0.50	**1.00**	0.41	**0.82**	0.32	**0.64**
70	g1/r3	0.50	**1.00**	0.55	**1.09**	0.32	**0.64**	0.32	**0.64**
71	g3.r1	0.41	**0.82**	0.32	**0.64**	0.55	**1.09**	0.36	**0.73**
72	g3.r2	0.41	**0.82**	0.45	**0.91**	0.73	**1.45**	0.27	**0.55**
73	g3.r3	0.68	**1.36**	0.27	**0.55**	0.68	**1.36**	0.14	**0.27**
74	g2.r1	0.73	**1.45**	0.59	**1.18**	0.59	**1.18**	0.41	**0.82**
75	g2.r2	0.05	**0.09**	1.00	**2.00**	0.68	**1.36**	0.36	**0.73**
76	g2.r3	0.18	**0.36**	0.73	**1.45**	0.77	**1.55**	0.36	**0.73**
77	g1.r1	0.50	**1.00**	0.36	**0.73**	0.32	**0.64**	0.36	**0.73**
78	g1.r2	0.05	**0.09**	0.82	**1.64**	0.50	**1.00**	0.27	**0.55**
79	g1.r3	0.18	**0.36**	0.45	**0.91**	0.64	**1.27**	0.27	**0.55**
80	r3/g1	0.18	**0.36**	0.32	**0.64**	0.68	**1.36**	0.68	**1.36**
81	r3/g2	0.27	**0.55**	0.50	**1.00**	0.55	**1.09**	0.59	**1.18**
82	r3/g3	0.32	**0.64**	0.23	**0.45**	0.68	**1.36**	0.73	**1.45**
83	r2/g1	0.05	**0.09**	0.59	**1.18**	0.59	**1.18**	0.59	**1.18**
84	r2/g2	0.27	**0.55**	0.23	**0.45**	0.73	**1.45**	0.73	**1.45**
85	r2/g3	0.18	**0.36**	0.55	**1.09**	0.55	**1.09**	0.82	**1.64**
86	r1/g1	0.36	**0.73**	0.50	**1.00**	0.50	**1.00**	0.23	**0.45**
87	r1/g2	0.41	**0.82**	0.45	**0.91**	0.45	**0.91**	0.45	**0.91**
88	r1/g3	0.27	**0.55**	0.55	**1.09**	0.59	**1.18**	0.27	**0.55**
89	b1/r1	0.82	**1.64**	0.50	**1.00**	0.55	**1.09**	0.50	**1.00**
90	b1/r2	0.32	**0.64**	0.95	**1.91**	0.23	**0.45**	0.41	**0.82**
91	b1/r3	0.68	**1.36**	1.05	**2.09**	0.09	**0.18**	0.32	**0.64**
92	b2/r1	0.45	**0.91**	0.59	**1.18**	0.23	**0.45**	0.32	**0.64**
93	b2/r2	0.14	**0.27**	0.73	**1.45**	0.27	**0.55**	0.23	**0.45**

94	b2/r3	0.18	**0.36**	1.00	**2.00**	0.50	**1.00**	0.14	**0.27**
95	b3/r1	0.45	**0.91**	0.14	**0.27**	0.55	**1.09**	0.27	**0.55**
96	b3/r2	0.27	**0.55**	0.23	**0.45**	0.64	**1.27**	0.45	**0.91**
97	b3/r3	0.27	**0.55**	0.36	**0.73**	0.64	**1.27**	0.41	**0.82**
98	b1.r1	0.32	**0.64**	0.50	**1.00**	0.41	**0.82**	0.23	**0.45**
99	b1.r2	0.41	**0.82**	0.45	**0.91**	0.50	**1.00**	0.41	**0.82**
100	b1.r3	0.27	**0.55**	0.32	**0.64**	0.55	**1.09**	0.32	**0.64**
101	b2.r1	0.18	**0.36**	0.64	**1.27**	0.64	**1.27**	0.18	**0.36**
102	b2.r2	0.59	**1.18**	0.50	**1.00**	0.50	**1.00**	0.50	**1.00**
103	b2.r3	0.14	**0.27**	0.50	**1.00**	0.91	**1.82**	0.32	**0.64**
104	b3.r1	0.45	**0.91**	0.45	**0.91**	0.82	**1.64**	0.14	**0.27**
105	b3.r2	0.32	**0.64**	0.64	**1.27**	0.77	**1.55**	0.50	**1.00**
106	b3.r3	0.23	**0.45**	0.55	**1.09**	0.82	**1.64**	0.41	**0.82**
107	r1/b1	0.59	**1.18**	0.59	**1.18**	0.55	**1.09**	0.18	**0.36**
108	r1/b2	0.59	**1.18**	0.50	**1.00**	0.59	**1.18**	0.14	**0.27**
109	r1/b3	0.68	**1.36**	0.64	**1.27**	0.41	**0.82**	0.32	**0.64**
110	r2/b1	0.45	**0.91**	0.59	**1.18**	0.27	**0.55**	0.41	**0.82**
111	r2/b2	0.32	**0.64**	0.50	**1.00**	0.27	**0.55**	0.68	**1.36**
112	r2/b3	0.27	**0.55**	0.36	**0.73**	0.55	**1.09**	0.64	**1.27**
113	r3/b1	0.23	**0.45**	0.50	**1.00**	0.45	**0.91**	0.59	**1.18**
114	r3/b2	0.36	**0.73**	0.36	**0.73**	0.55	**1.09**	0.64	**1.27**
115	r3/b3	0.36	**0.73**	0.45	**0.91**	0.50	**1.00**	0.86	**1.73**
116	r3/r1	0.32	**0.64**	0.36	**0.73**	0.41	**0.82**	0.77	**1.55**
117	r3/r2	0.27	**0.55**	0.18	**0.36**	0.45	**0.91**	0.95	**1.91**
118	r3/w	0.23	**0.45**	0.41	**0.82**	0.32	**0.64**	0.77	**1.55**
119	r2/r1	0.27	**0.55**	0.59	**1.18**	0.45	**0.91**	0.50	**1.00**
120	r2/r3	0.36	**0.73**	0.64	**1.27**	0.18	**0.36**	0.45	**0.91**
121	r2/w	0.14	**0.27**	0.77	**1.55**	0.45	**0.91**	0.41	**0.82**
122	r1/r3	0.14	**0.27**	0.68	**1.36**	0.82	**1.64**	0.27	**0.55**
123	r1/r2	0.27	**0.55**	0.23	**0.45**	0.82	**1.64**	0.27	**0.55**
124	r1/w	0.68	**1.36**	0.55	**1.09**	0.55	**1.09**	0.18	**0.36**
125	r1.r2	0.32	**0.64**	1.05	**2.09**	0.32	**0.64**	0.18	**0.36**

126	r2.r3	0.18	**0.36**	0.91	**1.82**	0.91	**1.82**	0.14	**0.27**
127	r3.r1	0.27	**0.55**	0.50	**1.00**	0.73	**1.45**	0.23	**0.45**
128	r1.w	0.32	**0.64**	1.00	**2.00**	0.36	**0.73**	0.27	**0.55**
129	r2.w	0.82	**1.64**	0.32	**0.64**	0.36	**0.73**	0.14	**0.27**
130	r3.w	0.36	**0.73**	0.55	**1.09**	0.82	**1.64**	0.09	**0.18**
131	r1	0.64	**1.27**	0.73	**1.45**	0.27	**0.55**	0.00	**0.00**
132	r2	0.91	**1.82**	0.68	**1.36**	0.55	**1.09**	0.05	**0.09**
133	r3	0.50	**1.00**	0.68	**1.36**	0.55	**1.09**	0.00	**0.00**
134	b1/y1	1.36	**2.73**	0.18	**0.36**	0.23	**0.45**	0.05	**0.09**
135	b1/y2	1.23	**2.45**	0.45	**0.91**	0.14	**0.27**	0.00	**0.00**
136	b1/y3	0.86	**1.73**	0.45	**0.91**	0.32	**0.64**	0.27	**0.55**
137	b2/y1	1.09	**2.18**	0.64	**1.27**	0.23	**0.45**	0.05	**0.09**
138	b2/y2	0.50	**1.00**	0.68	**1.36**	0.27	**0.55**	0.14	**0.27**
139	b2/y3	0.45	**0.91**	1.05	**2.09**	0.23	**0.45**	0.14	**0.27**
140	b3/y1	0.55	**1.09**	0.77	**1.55**	0.32	**0.64**	0.14	**0.27**
141	b3/y2	0.27	**0.55**	0.82	**1.64**	0.59	**1.18**	0.18	**0.36**
142	b3/y3	0.09	**0.18**	1.00	**2.00**	0.50	**1.00**	0.23	**0.45**
143	b1.y1	0.50	**1.00**	0.64	**1.27**	0.36	**0.73**	0.09	**0.18**
144	b1.y2	0.86	**1.73**	0.59	**1.18**	0.18	**0.36**	0.14	**0.27**
145	b1.y3	0.45	**0.91**	0.68	**1.36**	0.55	**1.09**	0.14	**0.27**
146	b2.y1	0.18	**0.36**	0.59	**1.18**	0.23	**0.45**	0.41	**0.82**
147	b2.y2	0.36	**0.73**	0.77	**1.55**	0.27	**0.55**	0.64	**1.27**
148	b2.y3	0.14	**0.27**	0.77	**1.55**	0.32	**0.64**	0.45	**0.91**
149	b3.y1	0.45	**0.91**	0.59	**1.18**	0.50	**1.00**	0.32	**0.64**
150	b3.y2	0.32	**0.64**	0.86	**1.73**	0.68	**1.36**	0.32	**0.64**
151	b3.y3	0.27	**0.55**	0.64	**1.27**	0.64	**1.27**	0.23	**0.45**
152	y1/b1	0.95	**1.91**	0.41	**0.82**	0.32	**0.64**	0.14	**0.27**
153	y1/b2	1.00	**2.00**	0.45	**0.91**	0.45	**0.91**	0.18	**0.36**
154	y1/b3	0.77	**1.55**	0.50	**1.00**	0.50	**1.00**	0.14	**0.27**
155	y2/b1	0.59	**1.18**	0.59	**1.18**	0.41	**0.82**	0.23	**0.45**
156	y2/b2	0.23	**0.45**	0.77	**1.55**	0.45	**0.91**	0.27	**0.55**
157	y2/b3	0.32	**0.64**	0.64	**1.27**	0.45	**0.91**	0.32	**0.64**

158	y3/b1	0.55	**1.09**	0.73	**1.45**	0.45	**0.91**	0.23	**0.45**
159	y3/b2	0.64	**1.27**	0.64	**1.27**	0.18	**0.36**	0.23	**0.45**
160	y3/b3	0.41	**0.82**	0.77	**1.55**	0.18	**0.36**	0.32	**0.64**
161	y1/w	1.00	**2.00**	0.50	**1.00**	0.09	**0.18**	0.09	**0.18**
162	y2/w	0.77	**1.55**	0.68	**1.36**	0.09	**0.18**	0.32	**0.64**
163	y3/w	0.91	**1.82**	0.36	**0.73**	0.05	**0.09**	0.32	**0.64**
164	b1.w	0.59	**1.18**	0.36	**0.73**	0.36	**0.73**	0.55	**1.09**
165	y2.w	0.55	**1.09**	0.91	**1.82**	0.14	**0.27**	0.32	**0.64**
166	y3.w	0.50	**1.00**	0.55	**1.09**	0.23	**0.45**	0.41	**0.82**
167	y1/y2	0.64	**1.27**	0.64	**1.27**	0.23	**0.45**	0.41	**0.82**
168	y1/y3	0.73	**1.45**	0.73	**1.45**	0.18	**0.36**	0.36	**0.73**
169	y2/y1	0.73	**1.45**	0.36	**0.73**	0.32	**0.64**	0.36	**0.73**
170	y2/y3	0.36	**0.73**	0.45	**0.91**	0.41	**0.82**	0.41	**0.82**
171	y3/y1	0.36	**0.73**	0.64	**1.27**	0.23	**0.45**	0.41	**0.82**
172	y3/y2	0.50	**1.00**	0.59	**1.18**	0.45	**0.91**	0.41	**0.82**
173	y1.y2	0.68	**1.36**	0.36	**0.73**	0.55	**1.09**	0.18	**0.36**
174	y2.y3	0.73	**1.45**	0.18	**0.36**	0.77	**1.55**	0.18	**0.36**
175	y3.y1	0.14	**0.27**	0.68	**1.36**	0.64	**1.27**	0.14	**0.27**
176	g1/y1	0.36	**0.73**	0.68	**1.36**	0.09	**0.18**	0.32	**0.64**
177	g1/y2	0.27	**0.55**	1.05	**2.09**	0.09	**0.18**	0.18	**0.36**
178	g1/y3	0.32	**0.64**	0.73	**1.45**	0.50	**1.00**	0.23	**0.45**
179	g2/y1	0.23	**0.45**	1.00	**2.00**	0.45	**0.91**	0.23	**0.45**
180	g2/y2	0.41	**0.82**	0.86	**1.73**	0.27	**0.55**	0.32	**0.64**
181	g2/y3	0.64	**1.27**	1.18	**2.36**	0.23	**0.45**	0.32	**0.64**
182	g3/y1	0.09	**0.18**	0.64	**1.27**	0.41	**0.82**	0.27	**0.55**
183	g3/y2	0.09	**0.18**	0.82	**1.64**	0.68	**1.36**	0.18	**0.36**
184	g3/y3	0.14	**0.27**	0.86	**1.73**	0.41	**0.82**	0.32	**0.64**
185	g1.y2	0.27	**0.55**	0.73	**1.45**	0.27	**0.55**	0.23	**0.45**
186	g1.y1	0.50	**1.00**	1.05	**2.09**	0.23	**0.45**	0.05	**0.09**
187	g1.y3	0.82	**1.64**	0.68	**1.36**	0.36	**0.73**	0.00	**0.00**
188	g2.y1	0.45	**0.91**	1.23	**2.45**	0.23	**0.45**	0.18	**0.36**
189	g2.y2	0.41	**0.82**	0.55	**1.09**	0.82	**1.64**	0.14	**0.27**

190	g2.y3	0.18	**0.36**	0.59	**1.18**	0.50	**1.00**	0.45	**0.91**
191	g3.y1	0.14	**0.27**	1.00	**2.00**	0.64	**1.27**	0.18	**0.36**
192	g3.y2	0.32	**0.64**	0.77	**1.55**	0.55	**1.09**	0.41	**0.82**
193	g3.y3	0.64	**1.27**	0.23	**0.45**	0.59	**1.18**	0.32	**0.64**
194	y1/g1	0.64	**1.27**	0.36	**0.73**	0.32	**0.64**	0.45	**0.91**
195	y1/g2	0.64	**1.27**	0.59	**1.18**	0.27	**0.55**	0.50	**1.00**
196	y1/g3	0.59	**1.18**	0.50	**1.00**	0.14	**0.27**	0.64	**1.27**
197	y2/g1	0.45	**0.91**	0.18	**0.36**	0.36	**0.73**	1.32	**2.64**
198	y2/g2	0.14	**0.27**	0.32	**0.64**	0.50	**1.00**	1.18	**2.36**
199	y2/g3	0.14	**0.27**	0.32	**0.64**	0.59	**1.18**	0.73	**1.45**
200	y3/g1	0.23	**0.45**	0.50	**1.00**	0.59	**1.18**	0.36	**0.73**
201	y3/g2	0.45	**0.91**	0.55	**1.09**	0.45	**0.91**	0.50	**1.00**
202	y3/g3	0.41	**0.82**	0.59	**1.18**	0.55	**1.09**	0.41	**0.82**
203	r1/y1	0.14	**0.27**	0.86	**1.73**	0.27	**0.55**	0.64	**1.27**
204	r1/y2	0.32	**0.64**	0.59	**1.18**	0.32	**0.64**	0.41	**0.82**
205	r1/y3	0.27	**0.55**	0.64	**1.27**	0.50	**1.00**	0.41	**0.82**
206	r2/y1	0.41	**0.82**	0.86	**1.73**	0.36	**0.73**	0.55	**1.09**
207	r2/y2	0.32	**0.64**	0.59	**1.18**	0.50	**1.00**	0.55	**1.09**
208	r2/y3	0.55	**1.09**	0.68	**1.36**	0.36	**0.73**	0.50	**1.00**
209	r3/y1	0.09	**0.18**	0.91	**1.82**	0.14	**0.27**	0.68	**1.36**
210	r3/y2	0.18	**0.36**	0.86	**1.73**	0.23	**0.45**	0.64	**1.27**
211	r3/y3	0.18	**0.36**	1.05	**2.09**	0.50	**1.00**	0.50	**1.00**
212	r1.y1	0.41	**0.82**	0.45	**0.91**	0.59	**1.18**	0.32	**0.64**
213	r1.y2	0.55	**1.09**	0.95	**1.91**	0.82	**1.64**	0.18	**0.36**
214	r1.y3	0.45	**0.91**	1.05	**2.09**	0.45	**0.91**	0.27	**0.55**
215	r2.y1	0.45	**0.91**	0.59	**1.18**	0.64	**1.27**	0.32	**0.64**
216	r2.y2	0.23	**0.45**	0.82	**1.64**	0.73	**1.45**	0.45	**0.91**
217	r2.y3	0.27	**0.55**	0.45	**0.91**	0.82	**1.64**	0.32	**0.64**
218	r3.y1	0.14	**0.27**	0.55	**1.09**	0.91	**1.82**	0.23	**0.45**
219	r3.y2	0.23	**0.45**	0.55	**1.09**	0.77	**1.55**	0.27	**0.55**
220	r3.y3	0.09	**0.18**	0.86	**1.73**	0.68	**1.36**	0.14	**0.27**
221	y1/r1	0.50	**1.00**	0.73	**1.45**	0.41	**0.82**	0.27	**0.55**

222	y1/r2	0.45	**0.91**	0.91	**1.82**	0.36	**0.73**	0.05	**0.09**
223	y1/r3	0.50	**1.00**	0.86	**1.73**	0.32	**0.64**	0.27	**0.55**
224	y2/r1	0.59	**1.18**	0.50	**1.00**	0.23	**0.45**	0.32	**0.64**
225	y2/r2	0.23	**0.45**	0.45	**0.91**	0.77	**1.55**	0.36	**0.73**
226	y2/r3	0.27	**0.55**	0.45	**0.91**	0.50	**1.00**	0.64	**1.27**
227	y3/r1	0.86	**1.73**	0.23	**0.45**	0.18	**0.36**	0.41	**0.82**
228	y3/r2	0.59	**1.18**	0.36	**0.73**	0.50	**1.00**	0.14	**0.27**
229	y3/r3	0.55	**1.09**	1.00	**2.00**	0.14	**0.27**	0.36	**0.73**
230	y1	1.41	**2.82**	0.23	**0.45**	0.09	**0.18**	0.23	**0.45**
231	y2	1.09	**2.18**	0.64	**1.27**	0.18	**0.36**	0.05	**0.09**
232	y3	1.27	**2.55**	0.27	**0.55**	0.32	**0.64**	0.00	**0.00**

Appendix-26.b: SGDI Scores forColour 2

		S		G		D		I	
		Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
		x	X	x	X	x	X	x	X
b3/w	1	0.71	**1.76**	0.33	**0.83**	0.29	**0.72**	0.00	**0.00**
b3/bl	2	0.67	**1.65**	0.13	**0.31**	0.38	**0.93**	0.46	**1.14**
b3/gy	3	0.92	**2.27**	0.25	**0.62**	0.46	**1.14**	0.42	**1.03**
b2/bl	4	0.58	**1.45**	0.46	**1.14**	0.33	**0.83**	0.46	**1.14**
b2/gy	5	0.83	**2.07**	0.38	**0.93**	0.38	**0.93**	0.50	**1.24**
b1/bl	6	0.58	**1.45**	0.50	**1.24**	0.13	**0.31**	0.38	**0.93**
b1/gy	7	0.88	**2.17**	0.50	**1.24**	0.25	**0.62**	0.25	**0.62**
g3/bl	8	0.42	**1.03**	0.50	**1.24**	0.67	**1.65**	0.38	**0.93**
g3/gy	9	0.75	**1.86**	0.25	**0.62**	0.42	**1.03**	0.38	**0.93**
g2/bl	10	0.38	**0.93**	0.50	**1.24**	0.33	**0.83**	0.54	**1.34**
g2/gy	11	0.42	**1.03**	0.33	**0.83**	0.67	**1.65**	0.42	**1.03**
g1/bl	12	0.58	**1.45**	0.33	**0.83**	0.46	**1.14**	0.33	**0.83**
g1/gy	13	0.63	**1.55**	0.75	**1.86**	0.25	**0.62**	0.21	**0.52**
bl/w	14	0.42	**1.03**	0.42	**1.03**	0.63	**1.55**	0.50	**1.24**
bl/gy	15	0.29	**0.72**	0.50	**1.24**	0.38	**0.93**	0.58	**1.45**
r3/bl	16	0.21	**0.52**	0.46	**1.14**	0.63	**1.55**	0.42	**1.03**
r3/gy	17	0.46	**1.14**	0.58	**1.45**	0.63	**1.55**	0.13	**0.31**
r2/bl	18	0.25	**0.62**	0.58	**1.45**	0.58	**1.45**	0.38	**0.93**
r2/gy	19	0.21	**0.52**	0.79	**1.96**	0.58	**1.45**	0.29	**0.72**
r1/bl	20	0.46	**1.14**	0.67	**1.65**	0.29	**0.72**	0.21	**0.52**
r1/gy	21	0.88	**2.17**	0.71	**1.76**	0.38	**0.93**	0.00	**0.00**
y3/bl	22	0.63	**1.55**	0.54	**1.34**	0.21	**0.52**	0.25	**0.62**
y3/gy	23	0.38	**0.93**	0.67	**1.65**	0.42	**1.03**	0.29	**0.72**
y2/bl	24	0.29	**0.72**	0.79	**1.96**	0.54	**1.34**	0.29	**0.72**
y2/gy	25	0.38	**0.93**	0.46	**1.14**	0.63	**1.55**	0.33	**0.83**
y1/bl	26	0.42	**1.03**	0.58	**1.45**	0.58	**1.45**	0.25	**0.62**
gy/bl	27	0.38	**0.93**	0.75	**1.86**	0.25	**0.62**	0.29	**0.72**
w/bl	28	0.83	**2.07**	0.13	**0.31**	0.25	**0.62**	0.46	**1.14**
gy/w	29	0.92	**2.27**	0.38	**0.93**	0.33	**0.83**	0.17	**0.41**
w/bl	30	0.67	**1.65**	0.33	**0.83**	0.50	**1.24**	0.46	**1.14**
y1/gy	31	0.46	**1.14**	0.29	**0.72**	0.46	**1.14**	0.29	**0.72**
w/b3	32	0.71	**1.76**	0.38	**0.93**	0.42	**1.03**	0.08	**0.21**
w/b2	33	0.63	**1.55**	0.63	**1.55**	0.42	**1.03**	0.25	**0.62**
w/b1	34	0.75	**1.86**	0.29	**0.72**	0.67	**1.65**	0.08	**0.21**
w/g3	35	0.54	**1.34**	0.29	**0.72**	0.67	**1.65**	0.29	**0.72**
w/g2	36	0.50	**1.24**	0.58	**1.45**	0.58	**1.45**	0.25	**0.62**
w/g1	37	0.63	**1.55**	0.46	**1.14**	0.54	**1.34**	0.33	**0.83**
w/r3	38	0.46	**1.14**	0.96	**2.38**	0.21	**0.52**	0.13	**0.31**
w/r2	39	0.42	**1.03**	0.71	**1.76**	0.33	**0.83**	0.21	**0.52**
w/r1	40	0.38	**0.93**	0.54	**1.34**	0.33	**0.83**	0.29	**0.72**
w/y3	41	0.67	**1.65**	0.38	**0.93**	0.38	**0.93**	0.33	**0.83**
w/y2	42	0.58	**1.45**	0.42	**1.03**	0.17	**0.41**	0.58	**1.45**
w/y1	43	0.96	**2.38**	0.42	**1.03**	0.04	**0.10**	0.29	**0.72**
bl/b3	44	0.63	**1.55**	0.42	**1.03**	0.29	**0.72**	0.46	**1.14**
bl/b2	45	0.58	**1.45**	0.38	**0.93**	0.42	**1.03**	0.54	**1.34**
bl/b1	46	0.38	**0.93**	0.50	**1.24**	0.38	**0.93**	0.50	**1.24**
bl/g3	47	0.21	**0.52**	0.67	**1.65**	0.42	**1.03**	0.63	**1.55**
bl/g2	48	0.21	**0.52**	0.67	**1.65**	0.79	**1.96**	0.46	**1.14**
bl/g1	49	0.46	**1.14**	0.50	**1.24**	0.38	**0.93**	0.50	**1.24**
bl/r3	50	0.50	**1.24**	0.42	**1.03**	0.25	**0.62**	0.71	**1.76**
bl/r2	51	0.46	**1.14**	0.88	**2.17**	0.29	**0.72**	0.50	**1.24**
bl/r1	52	0.29	**0.72**	0.71	**1.76**	0.33	**0.83**	0.46	**1.14**
bl/y3	53	0.29	**0.72**	0.46	**1.14**	0.54	**1.34**	0.38	**0.93**
bl/y2	54	0.25	**0.62**	0.63	**1.55**	0.50	**1.24**	0.50	**1.24**
bl/y1	55	0.42	**1.03**	0.38	**0.93**	0.50	**1.24**	0.46	**1.14**

gy/b3	56	0.79	**1.96**	0.67	**1.65**	0.08	**0.21**	0.17	**0.41**
gy/b2	57	0.58	**1.45**	0.71	**1.76**	0.29	**0.72**	0.13	**0.31**
gy/b1	58	0.46	**1.14**	0.63	**1.55**	0.21	**0.52**	0.25	**0.62**
gy/g3	59	0.25	**0.62**	1.04	**2.58**	0.17	**0.41**	0.25	**0.62**
gy/g2	60	0.38	**0.93**	0.33	**0.83**	0.38	**0.93**	0.46	**1.14**
gy/g1	61	0.83	**2.07**	0.58	**1.45**	0.33	**0.83**	0.13	**0.31**
gy/r3	62	0.67	**1.65**	0.50	**1.24**	0.50	**1.24**	0.29	**0.72**
gy/r2	63	0.17	**0.41**	1.21	**3.00**	0.13	**0.31**	0.29	**0.72**
gy/r1	64	0.46	**1.14**	0.75	**1.86**	0.25	**0.62**	0.17	**0.41**
gy/y3	65	0.54	**1.34**	0.46	**1.14**	0.29	**0.72**	0.46	**1.14**
gy/y2	66	0.29	**0.72**	0.38	**0.93**	0.46	**1.14**	0.33	**0.83**
gy/g1	67	0.71	**1.76**	0.29	**0.72**	0.38	**0.93**	0.17	**0.41**
bl.b3	68	0.13	**0.31**	0.75	**1.86**	0.58	**1.45**	0.29	**0.72**
bl.b2	69	0.13	**0.31**	0.42	**1.03**	0.58	**1.45**	0.58	**1.45**
bl.b1	70	0.13	**0.31**	0.83	**2.07**	0.58	**1.45**	0.46	**1.14**
bl.g3	71	0.00	**0.00**	0.88	**2.17**	0.63	**1.55**	0.38	**0.93**
bl.g2	72	0.08	**0.21**	0.50	**1.24**	0.50	**1.24**	0.67	**1.65**
bl.g1	73	0.29	**0.72**	0.54	**1.34**	0.58	**1.45**	0.50	**1.24**
bl.r3	74	0.21	**0.52**	0.25	**0.62**	0.79	**1.96**	0.75	**1.86**
bl.r2	75	0.04	**0.10**	0.50	**1.24**	0.58	**1.45**	0.75	**1.86**
bl.r1	76	0.04	**0.10**	0.71	**1.76**	0.75	**1.86**	0.50	**1.24**
bl.y3	77	0.25	**0.62**	0.46	**1.14**	0.75	**1.86**	0.29	**0.72**
bl.y1	78	0.29	**0.72**	0.42	**1.03**	0.42	**1.03**	0.33	**0.83**
bl.y2	79	0.08	**0.21**	0.63	**1.55**	0.79	**1.96**	0.29	**0.72**
bl.w	80	0.21	**0.52**	0.63	**1.55**	0.58	**1.45**	0.50	**1.24**
bl.gy	81	0.21	**0.52**	0.63	**1.55**	0.50	**1.24**	0.50	**1.24**
gy.b3	82	0.46	**1.14**	0.46	**1.14**	0.83	**2.07**	0.29	**0.72**
gy.b2	83	0.21	**0.52**	0.25	**0.62**	0.63	**1.55**	0.38	**0.93**
gy.b1	84	0.46	**1.14**	0.63	**1.55**	0.38	**0.93**	0.21	**0.52**
gy.g3	85	0.17	**0.41**	0.58	**1.45**	0.50	**1.24**	0.29	**0.72**
gy.g2	86	0.33	**0.83**	0.50	**1.24**	0.58	**1.45**	0.38	**0.93**
gy.g1	87	0.46	**1.14**	0.75	**1.86**	0.50	**1.24**	0.13	**0.31**
gy.r3	88	0.46	**1.14**	0.46	**1.14**	0.63	**1.55**	0.00	**0.00**
gy.r2	89	0.54	**1.34**	0.67	**1.65**	0.58	**1.45**	0.04	**0.10**
gy.g1	90	0.42	**1.03**	0.79	**1.96**	0.42	**1.03**	0.25	**0.62**
gy.y3	91	0.29	**0.72**	0.75	**1.86**	0.29	**0.72**	0.25	**0.62**
gy.y2	92	0.33	**0.83**	0.71	**1.76**	0.46	**1.14**	0.38	**0.93**
gy.y1	93	0.46	**1.14**	0.79	**1.96**	0.38	**0.93**	0.21	**0.52**
gy.w	94	0.38	**0.93**	0.67	**1.65**	0.33	**0.83**	0.25	**0.62**
	95	0.00	**0.00**	0.25	**0.62**	0.21	**0.52**	0.00	**0.00**
	96	0.21	**0.52**	0.13	**0.31**	0.04	**0.10**	0.00	**0.00**
	97	0.00	**0.00**	0.13	**0.31**	0.08	**0.21**	0.00	**0.00**
	98	0.00	**0.00**	0.08	**0.21**	0.13	**0.31**	0.00	**0.00**
	99	0.08	**0.21**	0.00	**0.00**	0.17	**0.41**	0.00	**0.00**
	100	0.00	**0.00**	0.13	**0.31**	0.08	**0.21**	0.13	**0.31**

Appendix-26.c: SGDI Scores for Colour 3

		S		G		D		I	
	Sheet	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
		x	X	x	X	x	X	x	X
w	1	1.26	**2.99**	0.31	**0.75**	0.09	**0.20**	0.17	**0.41**
bl	2	0.00	**0.00**	0.56	**1.33**	0.94	**2.24**	1.03	**2.45**
gy	3	0.88	**2.09**	0.45	**1.08**	0.97	**2.31**	0.18	**0.43**

Appendix-27: SGDI calculation for Fuel Tank

	S		G		D		1	
	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
	x	X	x	X	x	X	x	X
SA1	1.09	**1.89**	0.24	**0.42**	0.03	**0.05**	0.00	**0.00**
SB1	0.94	**1.63**	0.36	**0.63**	0.06	**0.11**	0.06	**0.11**
SB2	0.88	**1.52**	0.18	**0.32**	0.06	**0.11**	0.06	**0.11**
SB3	0.76	**1.31**	0.24	**0.42**	0.27	**0.47**	0.18	**0.32**
SB4	1.00	**1.73**	0.33	**0.58**	0.15	**0.26**	0.00	**0.00**
SB5	0.91	**1.58**	0.42	**0.74**	0.45	**0.79**	0.03	**0.05**
SC1	0.88	**1.52**	0.15	**0.26**	0.09	**0.16**	0.45	**0.79**
SC2	0.91	**1.58**	0.45	**0.79**	0.12	**0.21**	0.03	**0.05**
SC3	0.42	**0.74**	1.00	**1.73**	0.27	**0.47**	0.12	**0.21**
SC4	1.30	**2.26**	0.18	**0.32**	0.09	**0.16**	0.09	**0.16**
SC5	0.97	**1.68**	0.00	**0.00**	0.73	**1.26**	0.06	**0.11**
SD1	0.79	**1.37**	0.03	**0.05**	0.52	**0.89**	0.15	**0.26**
SD2	1.39	**2.42**	0.06	**0.11**	0.15	**0.26**	0.27	**0.47**
SD3	0.88	**1.52**	0.00	**0.00**	0.09	**0.16**	0.09	**0.16**
SD4	0.61	**1.05**	0.21	**0.37**	0.70	**1.21**	0.09	**0.16**
SD5	0.21	**0.37**	0.12	**0.21**	0.33	**0.58**	0.30	**0.53**
SE1	0.85	**1.47**	0.09	**0.16**	0.15	**0.26**	0.18	**0.32**
SE2	1.00	**1.73**	0.12	**0.21**	0.33	**0.58**	0.09	**0.16**
SE3	0.45	**0.79**	0.09	**0.16**	0.82	**1.42**	0.24	**0.42**
SE4	0.91	**1.58**	0.00	**0.00**	0.33	**0.58**	0.09	**0.16**
SE5	0.33	**0.58**	0.00	**0.00**	0.18	**0.32**	0.00	**0.00**
SF1	0.15	**0.26**	0.06	**0.11**	0.73	**1.26**	0.18	**0.32**
SF2	0.42	**0.74**	0.42	**0.74**	0.55	**0.95**	0.18	**0.32**
SF3	0.55	**0.95**	0.39	**0.68**	0.61	**1.05**	0.18	**0.32**
SF4	0.58	**1.00**	0.39	**0.68**	0.58	**1.00**	0.24	**0.42**
SF5	0.27	**0.47**	0.36	**0.63**	0.48	**0.84**	0.15	**0.26**
SG1	0.70	**1.21**	0.12	**0.21**	0.79	**1.37**	0.00	**0.00**
SG2	0.52	**0.89**	0.36	**0.63**	0.76	**1.31**	0.00	**0.00**
SG3	0.64	**1.10**	0.73	**1.26**	0.55	**0.95**	0.00	**0.00**
SG4	0.21	**0.37**	0.58	**1.00**	0.88	**1.52**	0.12	**0.21**
SG5	0.12	**0.21**	0.64	**1.10**	0.45	**0.79**	0.70	**1.21**
SH1	0.09	**0.16**	0.33	**0.58**	0.76	**1.31**	0.03	**0.05**
SH2	0.67	**1.16**	0.70	**1.21**	0.24	**0.42**	0.30	**0.53**
SH3	0.24	**0.42**	0.70	**1.21**	0.64	**1.10**	0.27	**0.47**
SH4	1.03	**1.79**	0.48	**0.84**	0.21	**0.37**	0.15	**0.26**
SH5	0.18	**0.32**	0.76	**1.31**	0.67	**1.16**	0.21	**0.37**
SI1	0.61	**1.05**	0.39	**0.68**	0.58	**1.00**	0.00	**0.00**
SI2	0.42	**0.74**	0.91	**1.58**	0.15	**0.26**	0.30	**0.53**
SI3	0.12	**0.21**	0.39	**0.68**	0.76	**1.31**	0.33	**0.58**
SI4	0.18	**0.32**	0.48	**0.84**	0.03	**0.05**	0.94	**1.63**
SI5	0.33	**0.58**	0.33	**0.58**	0.88	**1.52**	0.30	**0.53**
SJ1	0.70	**1.21**	0.39	**0.68**	0.24	**0.42**	0.15	**0.26**
SJ2	0.24	**0.42**	0.67	**1.16**	0.64	**1.10**	0.18	**0.32**
SJ3	0.48	**0.84**	1.15	**2.00**	0.18	**0.32**	0.06	**0.11**

SJ4	1.18	**2.05**	0.03	**0.05**	0.15	**0.26**	0.09	**0.16**
SJ5	0.52	**0.89**	0.73	**1.26**	0.15	**0.26**	0.03	**0.05**
SK1	0.67	**1.16**	0.70	**1.21**	0.18	**0.32**	0.03	**0.05**
SK2	0.30	**0.53**	0.45	**0.79**	0.27	**0.47**	0.48	**0.84**
SK3	0.33	**0.58**	1.21	**2.10**	0.30	**0.53**	0.09	**0.16**
SK4	0.91	**1.58**	0.48	**0.84**	0.18	**0.32**	0.06	**0.11**
SK5	0.82	**1.42**	0.21	**0.37**	0.36	**0.63**	0.15	**0.26**
SL1	1.27	**2.21**	0.33	**0.58**	0.21	**0.37**	0.27	**0.47**
SL2	0.06	**0.11**	0.27	**0.47**	0.33	**0.58**	0.82	**1.42**
SL3	0.09	**0.16**	0.70	**1.21**	0.24	**0.42**	0.48	**0.84**
SL4	0.70	**1.21**	0.48	**0.84**	0.21	**0.37**	0.09	**0.16**
SL5	0.33	**0.58**	0.45	**0.79**	1.00	**1.73**	0.09	**0.16**
SM1	0.06	**0.11**	0.79	**1.37**	0.21	**0.37**	0.45	**0.79**
SM2	0.15	**0.26**	1.12	**1.94**	0.42	**0.74**	0.27	**0.47**
SM3	0.52	**0.89**	0.76	**1.31**	0.52	**0.89**	0.27	**0.47**
SM4	0.73	**1.26**	0.64	**1.10**	0.48	**0.84**	0.15	**0.26**
SM5	0.67	**1.16**	0.55	**0.95**	0.45	**0.79**	0.24	**0.42**
SN1	0.30	**0.53**	0.33	**0.58**	0.85	**1.47**	0.30	**0.53**
SN2	1.03	**1.79**	0.15	**0.26**	0.55	**0.95**	0.12	**0.21**
SN3	0.45	**0.79**	0.18	**0.32**	1.27	**2.21**	0.09	**0.16**
SN4	0.30	**0.53**	0.48	**0.84**	0.48	**0.84**	0.21	**0.37**
SN5	0.82	**1.42**	0.33	**0.58**	0.30	**0.53**	0.21	**0.37**
SO1	0.33	**0.58**	0.94	**1.63**	0.58	**1.00**	0.27	**0.47**
SO2	0.52	**0.89**	0.91	**1.58**	0.15	**0.26**	0.12	**0.21**
SO3	0.48	**0.84**	0.55	**0.95**	0.24	**0.42**	0.21	**0.37**
SO4	0.76	**1.31**	0.36	**0.63**	0.21	**0.37**	0.21	**0.37**
SO5	0.52	**0.89**	1.00	**1.73**	0.18	**0.32**	0.00	**0.00**
SP1	0.12	**0.21**	1.12	**1.94**	0.24	**0.42**	0.18	**0.32**
SP2	0.18	**0.32**	0.91	**1.58**	0.18	**0.32**	0.73	**1.26**
SP3	0.30	**0.53**	0.94	**1.63**	0.24	**0.42**	0.18	**0.32**
SP4	0.30	**0.53**	0.61	**1.05**	0.58	**1.00**	0.24	**0.42**
SP5	0.88	**1.52**	0.76	**1.31**	0.21	**0.37**	0.21	**0.37**
SQ1	0.94	**1.63**	0.55	**0.95**	0.15	**0.26**	0.21	**0.37**
SQ2	0.24	**0.42**	0.52	**0.89**	0.09	**0.16**	0.67	**1.16**
SQ3	0.15	**0.26**	1.15	**2.00**	0.24	**0.42**	0.15	**0.26**
SQ4	0.64	**1.10**	0.76	**1.31**	0.12	**0.21**	0.27	**0.47**
SQ5	0.15	**0.26**	0.73	**1.26**	0.82	**1.42**	0.15	**0.26**
SR1	0.18	**0.32**	0.27	**0.47**	0.33	**0.58**	1.03	**1.79**
SR2	0.12	**0.21**	0.73	**1.26**	0.33	**0.58**	0.42	**0.74**
SR3	0.85	**1.47**	0.30	**0.53**	0.30	**0.53**	0.21	**0.37**
SR4	0.76	**1.31**	0.55	**0.95**	0.33	**0.58**	0.12	**0.21**
SR5	1.03	**1.79**	0.27	**0.47**	0.45	**0.79**	0.24	**0.42**
SS1	0.70	**1.21**	0.27	**0.47**	0.73	**1.26**	0.09	**0.16**
SS2	0.64	**1.10**	0.42	**0.74**	0.39	**0.68**	0.12	**0.21**
SS3	0.61	**1.05**	0.94	**1.63**	0.39	**0.68**	0.06	**0.11**
SS4	0.64	**1.10**	0.55	**0.95**	0.45	**0.79**	0.00	**0.00**
SS5	0.70	**1.21**	1.06	**1.84**	0.33	**0.58**	0.06	**0.11**
MA1	0.45	**0.79**	0.39	**0.68**	0.06	**0.11**	0.03	**0.05**
MB1	1.73	**3.00**	0.15	**0.26**	0.00	**0.00**	0.09	**0.16**
MB2	0.58	**1.00**	0.21	**0.37**	0.61	**1.05**	0.12	**0.21**
MB3	0.88	**1.52**	0.24	**0.42**	0.58	**1.00**	0.09	**0.16**
MB4	1.39	**2.42**	0.09	**0.16**	0.00	**0.00**	0.03	**0.05**

MB5	1.30	**2.26**	0.48	**0.84**	0.09	**0.16**	0.03	**0.05**
MC1	0.91	**1.58**	0.58	**1.00**	0.09	**0.16**	0.06	**0.11**
MC2	0.24	**0.42**	0.33	**0.58**	0.09	**0.16**	0.06	**0.11**
MC3	0.85	**1.47**	0.36	**0.63**	0.36	**0.63**	0.00	**0.00**
MC4	1.03	**1.79**	0.06	**0.11**	0.70	**1.21**	0.12	**0.21**
MC5	1.33	**2.31**	0.06	**0.11**	0.00	**0.00**	0.15	**0.26**
MD1	0.85	**1.47**	0.21	**0.37**	0.55	**0.95**	0.09	**0.16**
MD2	0.82	**1.42**	0.18	**0.32**	0.85	**1.47**	0.09	**0.16**
MD3	1.09	**1.89**	0.15	**0.26**	0.27	**0.47**	0.06	**0.11**
MD4	1.12	**1.94**	0.30	**0.53**	0.18	**0.32**	0.18	**0.32**
MD5	0.70	**1.21**	0.18	**0.32**	0.48	**0.84**	0.15	**0.26**
ME1	1.00	**1.73**	0.21	**0.37**	0.64	**1.10**	0.15	**0.26**
ME2	1.06	**1.84**	0.55	**0.95**	0.09	**0.16**	0.15	**0.26**
ME3	1.15	**2.00**	0.27	**0.47**	0.15	**0.26**	0.15	**0.26**
ME4	0.82	**1.42**	0.70	**1.21**	0.21	**0.37**	0.12	**0.21**
ME5	1.12	**1.94**	0.21	**0.37**	0.27	**0.47**	0.15	**0.26**
MF1	1.18	**2.05**	0.39	**0.68**	0.15	**0.26**	0.03	**0.05**
MF2	0.82	**1.42**	0.48	**0.84**	0.30	**0.53**	0.12	**0.21**
MF3	1.33	**2.31**	0.03	**0.05**	0.42	**0.74**	0.15	**0.26**
MF4	0.79	**1.37**	0.61	**1.05**	0.64	**1.10**	0.09	**0.16**
MF5	0.30	**0.53**	0.48	**0.84**	0.48	**0.84**	0.06	**0.11**
MG1	1.12	**1.94**	0.09	**0.16**	0.18	**0.32**	0.12	**0.21**
MG2	0.97	**1.68**	0.21	**0.37**	0.70	**1.21**	0.06	**0.11**
MG3	1.09	**1.89**	0.21	**0.37**	0.79	**1.37**	0.12	**0.21**
MG4	0.73	**1.26**	0.30	**0.53**	0.79	**1.37**	0.09	**0.16**
MG5	0.91	**1.58**	0.36	**0.63**	0.21	**0.37**	0.06	**0.11**
MH1	0.67	**1.16**	0.12	**0.21**	0.58	**1.00**	0.21	**0.37**
MH2	0.61	**1.05**	0.24	**0.42**	0.33	**0.58**	0.79	**1.37**
MH3	0.91	**1.58**	0.12	**0.21**	0.36	**0.63**	0.12	**0.21**
MH4	0.79	**1.37**	0.21	**0.37**	0.33	**0.58**	0.06	**0.11**
MH5	0.73	**1.26**	0.33	**0.58**	0.61	**1.05**	0.09	**0.16**
MI1	0.91	**1.58**	0.18	**0.32**	0.24	**0.42**	0.27	**0.47**
MI2	0.61	**1.05**	0.27	**0.47**	0.48	**0.84**	0.15	**0.26**
MI3	0.36	**0.63**	0.52	**0.89**	0.33	**0.58**	0.15	**0.26**
MI4	0.61	**1.05**	0.21	**0.37**	0.33	**0.58**	0.30	**0.53**
MI5	0.64	**1.10**	0.55	**0.95**	0.24	**0.42**	0.03	**0.05**
MJ1	0.82	**1.42**	0.70	**1.21**	0.24	**0.42**	0.00	**0.00**
MJ2	0.58	**1.00**	0.36	**0.63**	0.15	**0.26**	0.73	**1.26**
MJ3	0.33	**0.58**	0.61	**1.05**	0.30	**0.53**	0.09	**0.16**
MJ4	0.88	**1.52**	0.33	**0.58**	0.27	**0.47**	0.00	**0.00**
MJ5	0.94	**1.63**	0.52	**0.89**	0.09	**0.16**	0.00	**0.00**
MK1	1.30	**2.26**	0.39	**0.68**	0.15	**0.26**	0.00	**0.00**
MK2	0.70	**1.21**	0.67	**1.16**	0.21	**0.37**	0.12	**0.21**
MK3	0.70	**1.21**	0.39	**0.68**	0.21	**0.37**	0.33	**0.58**
MK4	1.12	**1.94**	0.27	**0.47**	0.09	**0.16**	0.12	**0.21**
MK5	0.45	**0.79**	0.82	**1.42**	0.27	**0.47**	0.09	**0.16**
ML1	0.12	**0.21**	0.67	**1.16**	0.24	**0.42**	0.39	**0.68**
ML2	0.42	**0.74**	0.58	**1.00**	0.09	**0.16**	0.33	**0.58**
ML3	0.15	**0.26**	0.33	**0.58**	0.64	**1.10**	0.42	**0.74**
ML4	0.58	**1.00**	0.15	**0.26**	0.67	**1.16**	0.33	**0.58**
ML5	0.48	**0.84**	0.15	**0.26**	0.42	**0.74**	0.45	**0.79**
MM1	0.03	**0.05**	0.45	**0.79**	0.82	**1.42**	0.24	**0.42**

MM2	0.09	**0.16**	0.30	**0.53**	1.30	**2.26**	0.42	**0.74**
MM3	0.12	**0.21**	0.58	**1.00**	0.64	**1.10**	0.24	**0.42**
MM4	0.55	**0.95**	0.36	**0.63**	0.36	**0.63**	0.33	**0.58**
MM5	0.18	**0.32**	0.45	**0.79**	1.00	**1.73**	0.33	**0.58**
MN1	0.48	**0.84**	0.39	**0.68**	0.58	**1.00**	0.18	**0.32**
MN2	0.09	**0.16**	0.30	**0.53**	0.58	**1.00**	0.67	**1.16**
MN3	0.18	**0.32**	0.61	**1.05**	0.61	**1.05**	0.18	**0.32**
MN4	0.45	**0.79**	0.33	**0.58**	0.45	**0.79**	0.21	**0.37**
MN5	0.27	**0.47**	0.70	**1.21**	0.76	**1.31**	0.09	**0.16**
MO1	1.03	**1.79**	0.48	**0.84**	0.36	**0.63**	0.03	**0.05**
MO2	0.36	**0.63**	0.39	**0.68**	0.52	**0.89**	0.06	**0.11**
MO3	0.45	**0.79**	0.39	**0.68**	0.97	**1.68**	0.06	**0.11**
MO4	0.82	**1.42**	0.27	**0.47**	0.39	**0.68**	0.15	**0.26**
MO5	0.24	**0.42**	0.24	**0.42**	1.30	**2.26**	0.09	**0.16**
MP1	0.55	**0.95**	0.15	**0.26**	0.88	**1.52**	0.12	**0.21**
MP2	0.39	**0.68**	0.33	**0.58**	0.91	**1.58**	0.06	**0.11**
MP3	0.70	**1.21**	0.67	**1.16**	0.42	**0.74**	0.09	**0.16**
MP4	0.12	**0.21**	0.58	**1.00**	1.27	**2.21**	0.09	**0.16**
MP5	0.21	**0.37**	0.61	**1.05**	0.88	**1.52**	0.03	**0.05**
MQ1	0.48	**0.84**	0.33	**0.58**	0.36	**0.63**	0.45	**0.79**
MQ2	0.88	**1.52**	0.67	**1.16**	0.33	**0.58**	0.00	**0.00**
MQ3	0.55	**0.95**	1.06	**1.84**	0.12	**0.21**	0.00	**0.00**
MQ4	0.94	**1.63**	0.82	**1.42**	0.24	**0.42**	0.00	**0.00**
MQ5	0.18	**0.32**	1.58	**2.73**	0.21	**0.37**	0.03	**0.05**
MR1	0.12	**0.21**	1.00	**1.73**	0.33	**0.58**	0.15	**0.26**
MR2	0.42	**0.74**	0.58	**1.00**	0.36	**0.63**	0.18	**0.32**
MR3	0.27	**0.47**	1.18	**2.05**	0.33	**0.58**	0.09	**0.16**
MR4	0.70	**1.21**	0.85	**1.47**	0.21	**0.37**	0.21	**0.37**
MR5	0.70	**1.21**	0.52	**0.89**	0.36	**0.63**	0.06	**0.11**
MS1	0.52	**0.89**	0.42	**0.74**	0.42	**0.74**	0.18	**0.32**
MS2	0.45	**0.79**	0.55	**0.95**	0.76	**1.31**	0.00	**0.00**
MS3	0.30	**0.53**	0.30	**0.53**	1.21	**2.10**	0.24	**0.42**
MS4	0.73	**1.26**	0.45	**0.79**	0.33	**0.58**	0.15	**0.26**
MS5	0.42	**0.74**	0.61	**1.05**	0.64	**1.10**	0.06	**0.11**
LA1	0.61	**1.05**	0.33	**0.58**	0.39	**0.68**	0.00	**0.00**
LB1	0.76	**1.31**	0.39	**0.68**	0.18	**0.32**	0.00	**0.00**
LB2	1.12	**1.94**	0.36	**0.63**	0.15	**0.26**	0.00	**0.00**
LB3	0.76	**1.31**	0.94	**1.63**	0.24	**0.42**	0.00	**0.00**
LB4	1.00	**1.73**	0.48	**0.84**	0.12	**0.21**	0.06	**0.11**
LB5	0.64	**1.10**	1.06	**1.84**	0.09	**0.16**	0.06	**0.11**
LC1	0.73	**1.26**	0.67	**1.16**	0.21	**0.37**	0.03	**0.05**
LC2	1.30	**2.26**	0.24	**0.42**	0.18	**0.32**	0.06	**0.11**
LC3	0.76	**1.31**	0.18	**0.32**	0.70	**1.21**	0.06	**0.11**
LC4	0.64	**1.10**	0.45	**0.79**	0.55	**0.95**	0.06	**0.11**
LC5	0.85	**1.47**	0.33	**0.58**	0.18	**0.32**	0.03	**0.05**
LD1	0.73	**1.26**	0.27	**0.47**	0.91	**1.58**	0.03	**0.05**
LD2	0.61	**1.05**	0.36	**0.63**	0.52	**0.89**	0.03	**0.05**
LD3	0.67	**1.16**	0.27	**0.47**	0.64	**1.10**	0.06	**0.11**
LD4	1.00	**1.73**	0.91	**1.58**	0.15	**0.26**	0.03	**0.05**
LD5	0.94	**1.63**	0.61	**1.05**	0.12	**0.21**	0.03	**0.05**
LE1	0.70	**1.21**	0.82	**1.42**	0.24	**0.42**	0.03	**0.05**
LE2	0.39	**0.68**	0.85	**1.47**	0.24	**0.42**	0.15	**0.26**

LE3	0.97	**1.68**	0.33	**0.58**	0.18	**0.32**	0.09	**0.16**
LE4	0.42	**0.74**	0.36	**0.63**	1.03	**1.79**	0.03	**0.05**
LE5	0.64	**1.10**	0.36	**0.63**	0.70	**1.21**	0.12	**0.21**
LF1	0.85	**1.47**	0.36	**0.63**	0.36	**0.63**	0.12	**0.21**
LF2	0.88	**1.52**	0.55	**0.95**	0.18	**0.32**	0.00	**0.00**
LF3	0.39	**0.68**	0.45	**0.79**	0.76	**1.31**	0.06	**0.11**
LF4	0.55	**0.95**	0.36	**0.63**	0.88	**1.52**	0.00	**0.00**
LF5	1.03	**1.79**	0.52	**0.89**	0.45	**0.79**	0.00	**0.00**
LG1	0.61	**1.05**	0.33	**0.58**	0.42	**0.74**	0.06	**0.11**
LG2	0.42	**0.74**	0.45	**0.79**	0.42	**0.74**	0.12	**0.21**
LG3	0.30	**0.53**	0.48	**0.84**	0.88	**1.52**	0.15	**0.26**
LG4	0.73	**1.26**	0.42	**0.74**	0.39	**0.68**	0.21	**0.37**
LG5	0.33	**0.58**	0.52	**0.89**	0.45	**0.79**	0.09	**0.16**
LH1	0.30	**0.53**	0.27	**0.47**	0.36	**0.63**	0.24	**0.42**
LH2	1.00	**1.73**	0.21	**0.37**	0.39	**0.68**	0.06	**0.11**
LH3	0.76	**1.31**	0.30	**0.53**	0.61	**1.05**	0.06	**0.11**
LH4	0.64	**1.10**	0.88	**1.52**	0.06	**0.11**	0.12	**0.21**
LH5	1.15	**2.00**	0.12	**0.21**	0.24	**0.42**	0.00	**0.00**
LI1	0.48	**0.84**	0.48	**0.84**	0.12	**0.21**	0.06	**0.11**
LI2	0.76	**1.31**	0.55	**0.95**	0.24	**0.42**	0.00	**0.00**
LI3	0.52	**0.89**	0.39	**0.68**	0.18	**0.32**	0.30	**0.53**
LI4	0.88	**1.52**	0.64	**1.10**	0.03	**0.05**	0.06	**0.11**
LI5	0.48	**0.84**	0.73	**1.26**	0.33	**0.58**	0.00	**0.00**
LJ1	0.76	**1.31**	0.33	**0.58**	0.27	**0.47**	0.06	**0.11**
LJ2	0.52	**0.89**	0.42	**0.74**	0.91	**1.58**	0.09	**0.16**
LJ3	0.73	**1.26**	0.27	**0.47**	0.36	**0.63**	0.21	**0.37**
LJ4	1.36	**2.36**	0.21	**0.37**	0.27	**0.47**	0.00	**0.00**
LJ5	0.76	**1.31**	0.27	**0.47**	0.85	**1.47**	0.00	**0.00**
LK1	0.79	**1.37**	0.15	**0.26**	0.33	**0.58**	0.06	**0.11**
LK2	0.64	**1.10**	0.36	**0.63**	0.39	**0.68**	0.00	**0.00**
LK3	0.97	**1.68**	0.39	**0.68**	0.09	**0.16**	0.00	**0.00**
LK4	1.21	**2.10**	0.27	**0.47**	0.15	**0.26**	0.00	**0.00**
LK5	1.21	**2.10**	0.18	**0.32**	0.21	**0.37**	0.06	**0.11**
LL1	0.30	**0.53**	0.36	**0.63**	0.45	**0.79**	0.21	**0.37**
LL2	0.70	**1.21**	0.52	**0.89**	0.18	**0.32**	0.24	**0.42**
LL3	0.21	**0.37**	0.39	**0.68**	0.67	**1.16**	0.27	**0.47**
LL4	0.45	**0.79**	0.82	**1.42**	0.39	**0.68**	0.24	**0.42**
LL5	0.61	**1.05**	0.42	**0.74**	0.09	**0.16**	0.27	**0.47**
LM1	0.33	**0.58**	0.64	**1.10**	0.06	**0.11**	0.48	**0.84**
LM2	0.12	**0.21**	0.76	**1.31**	0.18	**0.32**	0.24	**0.42**
LM3	0.91	**1.58**	0.76	**1.31**	0.09	**0.16**	0.00	**0.00**
LM4	0.15	**0.26**	0.79	**1.37**	0.61	**1.05**	0.09	**0.16**
LM5	0.24	**0.42**	0.30	**0.53**	0.30	**0.53**	0.70	**1.21**
LN1	0.45	**0.79**	0.82	**1.42**	0.18	**0.32**	0.12	**0.21**
LN2	0.82	**1.42**	0.42	**0.74**	0.30	**0.53**	0.15	**0.26**
LN3	0.21	**0.37**	0.70	**1.21**	0.12	**0.21**	0.27	**0.47**
LN4	0.06	**0.11**	0.82	**1.42**	0.24	**0.42**	0.39	**0.68**
LN5	0.91	**1.58**	0.67	**1.16**	0.15	**0.26**	0.27	**0.47**
LO1	0.70	**1.21**	0.24	**0.42**	0.36	**0.63**	0.03	**0.05**
LO2	0.45	**0.79**	0.15	**0.26**	0.97	**1.68**	0.12	**0.21**
LO3	1.12	**1.94**	0.45	**0.79**	0.36	**0.63**	0.15	**0.26**
LO4	0.52	**0.89**	0.06	**0.11**	0.64	**1.10**	0.12	**0.21**

LO5	0.79	**1.37**	0.24	**0.42**	0.30	**0.53**	0.18	**0.32**
LP1	0.55	**0.95**	0.33	**0.58**	0.48	**0.84**	0.21	**0.37**
LP2	0.30	**0.53**	0.33	**0.58**	1.12	**1.94**	0.18	**0.32**
LP3	0.85	**1.47**	0.45	**0.79**	0.27	**0.47**	0.03	**0.05**
LP4	0.15	**0.26**	1.48	**2.57**	0.27	**0.47**	0.06	**0.11**
LP5	0.15	**0.26**	1.39	**2.42**	0.15	**0.26**	0.06	**0.11**
LQ1	1.33	**2.31**	0.12	**0.21**	0.24	**0.42**	0.09	**0.16**
LQ2	0.76	**1.31**	0.27	**0.47**	0.61	**1.05**	0.12	**0.21**
LQ3	0.30	**0.53**	0.61	**1.05**	0.91	**1.58**	0.09	**0.16**
LQ4	0.61	**1.05**	0.61	**1.05**	0.21	**0.37**	0.06	**0.11**
LQ5	0.21	**0.37**	0.70	**1.21**	0.61	**1.05**	0.12	**0.21**
LR1	0.36	**0.63**	0.55	**0.95**	0.64	**1.10**	0.18	**0.32**
LR2	0.61	**1.05**	0.21	**0.37**	0.76	**1.31**	0.15	**0.26**
LR3	0.76	**1.31**	0.21	**0.37**	0.18	**0.32**	0.18	**0.32**
LR4	0.18	**0.32**	0.48	**0.84**	0.88	**1.52**	0.15	**0.26**
LR5	0.36	**0.63**	0.42	**0.74**	0.30	**0.53**	0.27	**0.47**
LS1	0.88	**1.52**	0.39	**0.68**	0.27	**0.47**	0.27	**0.47**
LS2	0.42	**0.74**	0.79	**1.37**	0.58	**1.00**	0.24	**0.42**
LS3	0.73	**1.26**	0.06	**0.11**	0.30	**0.53**	0.24	**0.42**
LS4	1.27	**2.21**	0.18	**0.32**	0.18	**0.32**	0.52	**0.89**
LS5	1.00	**1.73**	0.30	**0.53**	0.33	**0.58**	0.30	**0.53**

	A	B	C	D	E	F	G	H	I	J
SIDE COVER	**Triangular**		**Polygon +/+**		**Polygon +/-**		**Recto-curvilinear +/+**		**Recto-curvilinear +/-**	
	sharp fillet	**large fillet**	**sharp fillet**	**large fillet**	**sharp fillet**	**large fillet**	**sharp fillet**	**large fillet**	**sharp fillet**	**large fillet**
	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I	S G D I
1 **Flat**	2.65 0.00 0.49 0.05	3.00 0.39 0.39 0.25	2.11 0.74 0.64 0.15	1.47 1.86 0.88 0.15	1.52 1.18 1.18 0.29	1.32 1.57 1.03 0.20	2.65 1.03 0.34 0.15	0.09 0.74 2.41 1.25	0.09 0.74 2.41 1.25	0.09 0.74 2.41 1.25
2 **Convex**	2.01 1.08 0.49 0.20	2.35 1.08 0.78 0.20	1.91 1.67 0.49 0.29	1.32 1.47 0.74 0.34	1.32 1.13 1.32 0.25	1.72 1.08 1.13 0.54	1.96 0.74 0.69 0.29	1.96 0.98 0.69 0.44	1.77 1.23 0.74 0.25	1.47 1.47 0.78 0.15
3 **Flat / Flat-angle**	1.03 1.13 1.23 0.39	1.18 1.42 1.08 0.54	1.27 1.27 0.83 0.29	0.64 1.81 1.32 0.25	0.59 1.52 1.62 0.49	0.78 1.37 1.08 0.64	1.08 1.08 1.27 0.69	1.27 1.47 1.03 0.49	1.57 1.13 0.69 0.44	1.42 1.27 0.69 0.29
4 **Flat / Flat-step**	1.27 0.93 0.83 0.39	0.93 1.47 0.83 0.39	0.64 1.37 1.37 0.44	0.93 0.93 1.86 0.59	0.59 0.83 2.26 0.83	0.74 0.78 1.86 1.08	1.47 0.59 0.93 0.69	1.47 1.27 0.83 0.54	1.52 1.27 0.98 0.34	2.01 1.57 0.54 0.44
5 **Flat concave**	0.74 1.23 1.62 0.59	0.44 1.27 2.35 0.49	0.64 1.57 1.37 0.39	0.59 1.37 1.81 0.83	0.54 0.88 1.72 0.98	0.44 1.03 1.62 0.78	1.18 1.32 0.88 0.15	1.08 1.81 0.93 0.20	1.47 1.62 0.64 0.25	1.42 1.52 0.93 0.25
6 **Flat convex**	0.74 0.74 2.11 0.25	0.88 1.13 1.47 0.69	0.78 0.54 2.06 0.78	0.54 0.88 2.06 0.69	0.44 1.03 1.57 1.23	0.20 1.27 1.81 0.88	0.83 0.88 1.91 0.44	1.67 1.13 0.88 0.64	1.08 1.37 0.64 0.74	0.69 1.77 0.69 0.64
7 **Convex-concave**	0.54 1.18 1.32 0.25	0.54 1.91 1.57 0.15	0.93 1.52 1.42 0.25	1.08 1.91 0.74 0.44	0.69 1.13 1.62 0.64	0.78 1.42 1.57 0.69	0.98 1.23 1.13 0.49	1.18 1.57 0.83 0.39	1.13 1.86 0.59 0.44	1.08 1.42 0.64 0.39

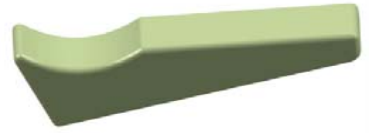
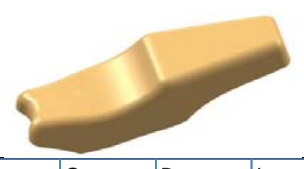
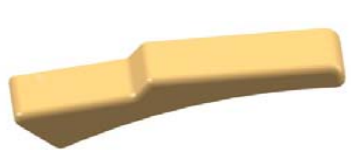
Appendix-28.b: SGDI Calculation for Side cover

	S		G		D		1	
	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
Sheet	x	X	x	X	x	X	x	X
1A	1.17	**2.65**	0.00	**0.00**	0.22	**0.49**	0.02	**0.05**
1B	1.33	**2.99**	0.17	**0.39**	0.17	**0.39**	0.11	**0.25**
1C	0.93	**2.11**	0.33	**0.74**	0.28	**0.64**	0.07	**0.15**
1D	0.65	**1.47**	0.83	**1.86**	0.39	**0.88**	0.07	**0.15**
1E	0.67	**1.52**	0.52	**1.18**	0.52	**1.18**	0.13	**0.29**
1F	0.59	**1.32**	0.70	**1.57**	0.46	**1.03**	0.09	**0.20**
1G	1.17	**2.65**	0.46	**1.03**	0.15	**0.34**	0.07	**0.15**
2A	0.89	**2.01**	0.48	**1.08**	0.22	**0.49**	0.09	**0.20**
2B	1.04	**2.35**	0.48	**1.08**	0.35	**0.78**	0.09	**0.20**
2C	0.85	**1.91**	0.74	**1.67**	0.22	**0.49**	0.13	**0.29**
2D	0.59	**1.32**	0.65	**1.47**	0.33	**0.74**	0.15	**0.34**
2E	0.59	**1.32**	0.50	**1.13**	0.59	**1.32**	0.11	**0.25**
2F	0.76	**1.72**	0.48	**1.08**	0.50	**1.13**	0.24	**0.54**
2G	0.87	**1.96**	0.33	**0.74**	0.30	**0.69**	0.13	**0.29**
2H	0.87	**1.96**	0.43	**0.98**	0.30	**0.69**	0.20	**0.44**
2I	0.78	**1.77**	0.54	**1.23**	0.33	**0.74**	0.11	**0.25**
2J	0.65	**1.47**	0.65	**1.47**	0.35	**0.78**	0.07	**0.15**
3A	0.46	**1.03**	0.50	**1.13**	0.54	**1.23**	0.17	**0.39**
3B	0.52	**1.18**	0.63	**1.42**	0.48	**1.08**	0.24	**0.54**
3C	0.57	**1.27**	0.57	**1.27**	0.37	**0.83**	0.13	**0.29**
3D	0.28	**0.64**	0.80	**1.81**	0.59	**1.32**	0.11	**0.25**
3E	0.26	**0.59**	0.67	**1.52**	0.72	**1.62**	0.22	**0.49**
3F	0.35	**0.78**	0.61	**1.37**	0.48	**1.08**	0.28	**0.64**
3G	0.48	**1.08**	0.48	**1.08**	0.57	**1.27**	0.30	**0.69**
3H	0.57	**1.27**	0.65	**1.47**	0.46	**1.03**	0.22	**0.49**
3I	0.70	**1.57**	0.50	**1.13**	0.30	**0.69**	0.20	**0.44**
3J	0.63	**1.42**	0.57	**1.27**	0.30	**0.69**	0.13	**0.29**
4A	0.57	**1.27**	0.41	**0.93**	0.37	**0.83**	0.17	**0.39**
4B	0.41	**0.93**	0.65	**1.47**	0.37	**0.83**	0.17	**0.39**
4C	0.28	**0.64**	0.61	**1.37**	0.61	**1.37**	0.20	**0.44**
4D	0.41	**0.93**	0.41	**0.93**	0.83	**1.86**	0.26	**0.59**
4E	0.26	**0.59**	0.37	**0.83**	1.00	**2.26**	0.37	**0.83**
4F	0.33	**0.74**	0.35	**0.78**	0.83	**1.86**	0.48	**1.08**
4G	0.65	**1.47**	0.26	**0.59**	0.41	**0.93**	0.30	**0.69**
4H	0.65	**1.47**	0.57	**1.27**	0.37	**0.83**	0.24	**0.54**
4I	0.67	**1.52**	0.57	**1.27**	0.43	**0.98**	0.15	**0.34**
4J	0.89	**2.01**	0.70	**1.57**	0.24	**0.54**	0.20	**0.44**
5A	0.33	**0.74**	0.54	**1.23**	0.72	**1.62**	0.26	**0.59**
5B	0.20	**0.44**	0.57	**1.27**	1.04	**2.35**	0.22	**0.49**
5C	0.28	**0.64**	0.70	**1.57**	0.61	**1.37**	0.17	**0.39**
5D	0.26	**0.59**	0.61	**1.37**	0.80	**1.81**	0.37	**0.83**
5E	0.24	**0.54**	0.39	**0.88**	0.76	**1.72**	0.43	**0.98**
5F	0.20	**0.44**	0.46	**1.03**	0.72	**1.62**	0.35	**0.78**

5G	0.52	**1.18**	0.59	**1.32**	0.39	**0.88**	0.07	**0.15**
5H	0.48	**1.08**	0.80	**1.81**	0.41	**0.93**	0.09	**0.20**
5I	0.65	**1.47**	0.72	**1.62**	0.28	**0.64**	0.11	**0.25**
5J	0.63	**1.42**	0.67	**1.52**	0.41	**0.93**	0.11	**0.25**
6A	0.33	**0.74**	0.33	**0.74**	0.93	**2.11**	0.11	**0.25**
6B	0.39	**0.88**	0.50	**1.13**	0.65	**1.47**	0.30	**0.69**
6C	0.35	**0.78**	0.24	**0.54**	0.91	**2.06**	0.35	**0.78**
6D	0.24	**0.54**	0.39	**0.88**	0.91	**2.06**	0.30	**0.69**
6E	0.20	**0.44**	0.46	**1.03**	0.70	**1.57**	0.54	**1.23**
6F	0.09	**0.20**	0.57	**1.27**	0.80	**1.81**	0.39	**0.88**
6G	0.37	**0.83**	0.39	**0.88**	0.85	**1.91**	0.20	**0.44**
6H	0.74	**1.67**	0.50	**1.13**	0.39	**0.88**	0.28	**0.64**
6I	0.48	**1.08**	0.61	**1.37**	0.28	**0.64**	0.33	**0.74**
6J	0.30	**0.69**	0.78	**1.77**	0.30	**0.69**	0.28	**0.64**
7A	0.24	**0.54**	0.52	**1.18**	0.59	**1.32**	0.11	**0.25**
7B	0.24	**0.54**	0.85	**1.91**	0.70	**1.57**	0.07	**0.15**
7C	0.41	**0.93**	0.67	**1.52**	0.63	**1.42**	0.11	**0.25**
7D	0.48	**1.08**	0.85	**1.91**	0.33	**0.74**	0.20	**0.44**
7E	0.30	**0.69**	0.50	**1.13**	0.72	**1.62**	0.28	**0.64**
7F	0.35	**0.78**	0.63	**1.42**	0.70	**1.57**	0.30	**0.69**
7G	0.43	**0.98**	0.54	**1.23**	0.50	**1.13**	0.22	**0.49**
7H	0.52	**1.18**	0.70	**1.57**	0.37	**0.83**	0.17	**0.39**
7I	0.50	**1.13**	0.83	**1.86**	0.26	**0.59**	0.20	**0.44**
7J	0.48	**1.08**	0.63	**1.42**	0.28	**0.64**	0.17	**0.39**

Appendix-29.a: Survey results (weighted) for seat

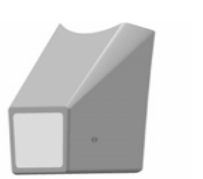
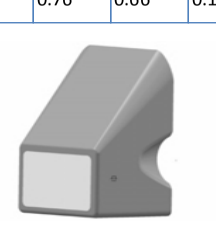
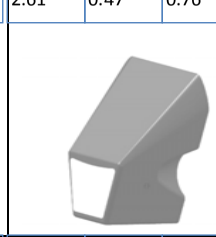
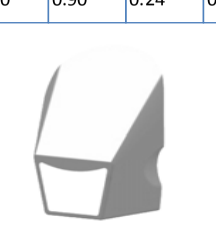
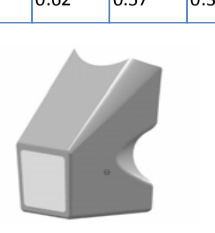
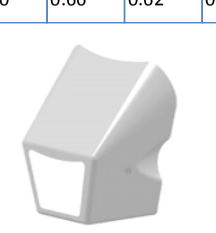
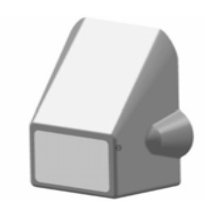
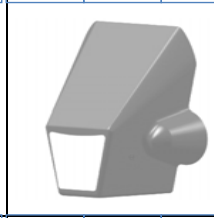
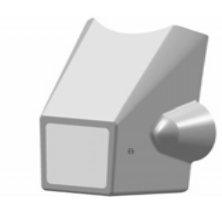
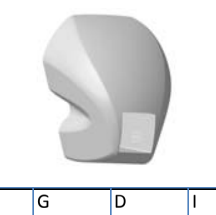
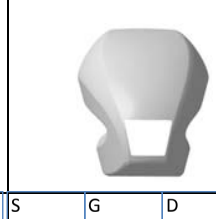
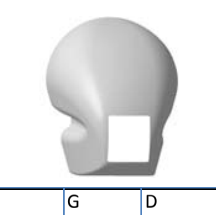
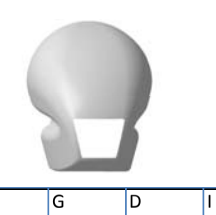
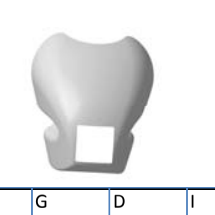
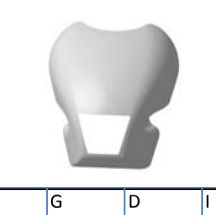
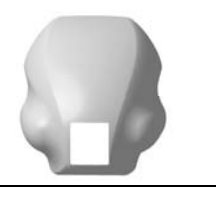
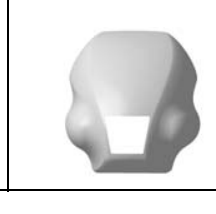
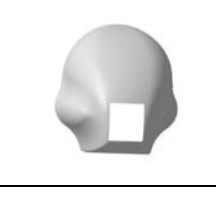
		A				B				C				D				E				F
	Rectangular	Flat				Flat with Ends Curved				Inclined				Inclined with ends Curved				Fast Curve				
1	Bottom Flat	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	
		2.08	0.08	0.00	0.12	2.66	0.12	0.25	0.04	3.00	0.21	0.12	0.04	1.58	1.12	0.29	0.04	1.21	1.29	0.46	0.12	
																						
2	Top & Bottom Inclined	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	
		1.79	0.62	0.50	0.04	1.87	1.00	0.42	0.00	2.37	0.33	0.37	0.04	1.95	0.67	0.58	0.04	1.04	1.25	1.00	0.17	
																						
3	Top Flat & Bottom Stepped	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	
		1.75	0.54	0.62	0.21	2.12	0.87	0.62	0.08	2.00	0.71	0.71	0.17	2.08	1.00	0.33	0.17	1.00	1.16	0.87	0.33	
																						

	Polygonal	Stepped				Inclined Flat				Inclined Curve - SHALLOW				Inclined Curve - DEEP				Flat Curve - SHALLOW				Flat Curve - DEEP			
4	Flat Bottom	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		1.95	0.21	0.42	0.42	2.04	0.83	0.42	0.12	1.87	0.87	0.58	0.17	0.96	1.33	0.96	0.00	1.08	1.54	0.91	0.08	0.75	1.33	1.33	0.37
																									
5	Inclined Bottom	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		0.58	1.33	1.41	0.33	1.50	1.12	0.33	0.29	1.66	1.21	0.46	0.00	1.04	0.87	1.16	0.21	1.12	0.96	1.25	0.21	0.37	1.25	1.58	1.29
																									
6	Stepped Bottom	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		1.00	1.08	1.54	0.29	1.46	0.75	0.29	0.42	1.83	0.83	0.46	0.33	1.41	0.85	0.71	0.50	1.25	1.33	0.46	0.37	0.87	1.46	1.12	0.17
																									
7	Curved Bottom	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		1.25	0.67	0.62	0.08	2.62	0.71	0.62	0.12	2.16	0.54	0.58	0.00	1.12	1.04	0.87	0.04	1.33	0.75	1.25	0.21	0.91	1.21	1.25	42
																									

Appendix-29.b: SGDI Calculation for Seat

	S		G		D		I		
Sheet	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	
1A	1.14	**2.08**	0.05	**0.08**	0.00	**0.00**	0.07	**0.12**	
1B	1.45	**2.66**	0.07	**0.12**	0.14	**0.25**	0.02	**0.04**	
1C	1.64	**2.99**	0.11	**0.21**	0.07	**0.12**	0.02	**0.04**	
1D	0.86	**1.58**	0.61	**1.12**	0.16	**0.29**	0.02	**0.04**	
1E	0.66	**1.21**	0.70	**1.29**	0.25	**0.46**	0.07	**0.12**	
2A	0.98	**1.79**	0.34	**0.62**	0.27	**0.50**	0.02	**0.04**	
2B	1.02	**1.87**	0.55	**1.00**	0.23	**0.42**	0.00	**0.00**	
2C	1.30	**2.37**	0.18	**0.33**	0.20	**0.37**	0.02	**0.04**	
2D	1.07	**1.95**	0.36	**0.67**	0.32	**0.58**	0.02	**0.04**	
2E	0.57	**1.04**	0.68	**1.25**	0.55	**1.00**	0.09	**0.17**	
3A	0.95	**1.75**	0.30	**0.54**	0.34	**0.62**	0.11	**0.21**	
3B	1.16	**2.12**	0.48	**0.87**	0.34	**0.62**	0.05	**0.08**	
3C	1.09	**2.00**	0.39	**0.71**	0.39	**0.71**	0.09	**0.17**	
3D	1.14	**2.08**	0.55	**1.00**	0.18	**0.33**	0.09	**0.17**	
3E	0.55	**1.00**	0.64	**1.16**	0.48	**0.87**	0.18	**0.33**	
4A	1.07	**1.95**	0.11	**0.21**	0.23	**0.42**	0.23	**0.42**	
4B	1.11	**2.04**	0.45	**0.83**	0.23	**0.42**	0.07	**0.12**	
4C	1.02	**1.87**	0.48	**0.87**	0.32	**0.58**	0.09	**0.17**	
4D	0.52	**0.96**	0.73	**1.33**	0.52	**0.96**	0.00	**0.00**	
4E	0.59	**1.08**	0.84	**1.54**	0.50	**0.91**	0.05	**0.08**	
4F	0.41	**0.75**	0.73	**1.33**	0.73	**1.33**	0.20	**0.37**	
5A	0.32	**0.58**	0.73	**1.33**	0.77	**1.41**	0.18	**0.33**	
5B	0.82	**1.50**	0.61	**1.12**	0.18	**0.33**	0.16	**0.29**	
5C	0.91	**1.66**	0.66	**1.21**	0.25	**0.46**	0.00	**0.00**	
5D	0.57	**1.04**	0.48	**0.87**	0.64	**1.16**	0.11	**0.21**	
5E	0.61	**1.12**	0.52	**0.96**	0.68	**1.25**	0.11	**0.21**	
5F	0.20	**0.37**	0.68	**1.25**	0.86	**1.58**	0.16	**0.29**	
6A	0.55	**1.00**	0.59	**1.08**	0.84	**1.54**	0.16	**0.29**	
6B	0.80	**1.46**	0.41	**0.75**	0.16	**0.29**	0.23	**0.42**	
6C	1.00	**1.83**	0.45	**0.83**	0.25	**0.46**	0.18	**0.33**	
6D	0.77	**1.41**	0.48	**0.87**	0.39	**0.71**	0.27	**0.50**	
6E	0.68	**1.25**	0.73	**1.33**	0.25	**0.46**	0.20	**0.37**	
6F	0.48	**0.87**	0.80	**1.46**	0.61	**1.12**	0.09	**0.17**	
7A	0.68	**1.25**	0.36	**0.67**	0.34	**0.62**	0.05	**0.08**	
7B	1.43	**2.62**	0.39	**0.71**	0.34	**0.62**	0.07	**0.12**	
7C	1.18	**2.16**	0.30	**0.54**	0.32	**0.58**	0.00	**0.00**	
7D	0.61	**1.12**	0.57	**1.04**	0.48	**0.87**	0.02	**0.04**	
7E	0.73	**1.33**	0.41	**0.75**	0.68	**1.25**	0.11	**0.21**	
7F	0.50	**0.91**	0.66	**1.21**	0.68	**1.25**	0.23	**0.42**	

Appendix-30.a: Survey results(weighted) for Visor (Small fillet)

		1				2				3				4				5				6			
	VISOR	**FLAT CONTOUR**								**CONVEX CONTOUR**								**CONCAVE CONTOUR**							
	(small fillet)	RECTNGULAR H/L				TRAPEZOIDAL H/L				RECTNGULAR H/L				TRAPEZOIDAL H/L				RECTNGULAR H/L				TRAPEZOIDAL H/L			
		S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
1	FLAT	2.66	0.19	0.33	0.19	2.51	0.33	0.81	0.00	2.66	0.57	0.81	0.05	2.23	1.00	0.57	0.09	2.56	1.00	0.33	0.19	2.18	0.95	0.62	0.14
																									
2	CONVEX	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		1.47	1.66	1.28	0.19	1.66	.23	1.47	0.43	0.81	1.76	1.52	0.57	1.19	1.47	1.04	0.52	1.42	0.95	1.42	0.66	1.04	1.66	1.42	0.52
																									
3	FLAT CONCAVE	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		2.89	0.76	0.66	0.14	2.61	0.47	0.76	0.28	2.94	0.52	0.33	0.19	3.00	0.90	0.24	0.43	2.42	0.62	0.57	0.33	3.00	0.66	0.62	0.00
																									
4	FLAT CONVEX	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		1.90	0.57	0.85	0.28	2.28	0.76	0.57	0.33	1.85	0.38	1.09	0.28	2.00	0.66	0.90	0.47	2.09	0.95	0.47	0.38	1.57	1.19	0.76	0.71
																									
5	CONVEX CONCAE	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		0.71	1.47	1.28	1.09	1.00	1.71	1.09	1.09	0.85	1.80	0.76	1.00	0.76	1.47	1.04	0.81	0.52	1.71	1.14	1.28	0.47	1.66	1.28	1.09
																									
6	CONVEX CONVEX	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
		0.52	1.28	1.28	1.33	0.57	1.33	1.61	1.33	1.14	1.04	1.57	0.76	0.81	1.28	1.52	52	0.47	1.57	1.66	0.76	1.00	1.28	1.23	1.00
																									

Appendix 30.b: Survey results (weighted) for visor (large fillet)

		1				2				3				4				5				6			
	VISOR (small fillet)	**FLAT CONTOUR**								**CONVEX CONTOUR**								**CONCAVE CONTOUR**							
		RECTNGULAR H/L				TRAPEZOIDAL H/L				RECTNGULAR H/L				TRAPEZOIDAL H/L				RECTNGULAR H/L				TRAPEZOIDAL H/L			
		S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
7	FLAT	2.89	0.43	0.28	0.24	2.75	0.57	0.57	0.19	2.32	0.52	0.76	0.24	2.42	1.00	0.76	0.19	2.37	0.28	0.43	0.52	1.99	0.95	0.71	0.14
																									
8	CONVEX	1.80	1.52	0.66	0.19	1.23	1.57	0.76	0.43	1.71	1.80	0.95	0.19	1.66	1.71	0.62	0.24	1.71	1.04	1.09	0.33	1.57	1.09	1.33	0.33
																									
9	FLAT CONCAVE	1.38	1.23	1.19	0.28	2.04	0.90	0.76	0.28	2.09	0.90	0.76	0.57	2.09	1.00	0.71	0.62	2.28	0.47	0.95	0.47	1.52	0.85	1.14	0.28
																									
10	FLAT CONVEX	2.18	0.81	0.43	0.47	2.04	0.85	0.85	0.62	1.94	0.85	0.85	0.43	1.47	1.42	0.90	0.52	1.61	1.14	0.90	0.57	1.71	1.23	0.76	0.43
																									
11	CONVEX CONCAE	1.19	1.42	1.28	0.43	1.04	1.09	1.47	0.47	1.04	1.19	1.00	0.90	1.04	1.28	1.04	0.76	0.66	1.52	1.23	0.90	0.43	1.42	1.80	1.00
																									
12	CONVEX CONVEX	0.90	0.81	1.28	1.23	1.04	0.76	1.14	1.57	0.47	1.47	1.47	0.90	0.85	1.47	0.90	0.90	1.38	0.95	0.90	1.04	0.90	1.14	1.14	1.23
																									

Appendix-30.c: SGDI Calculation for Visor

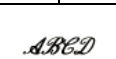
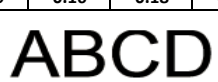
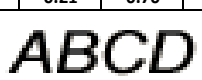
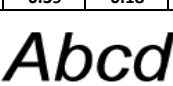
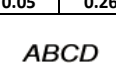
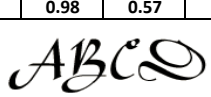
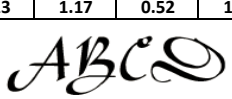
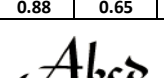
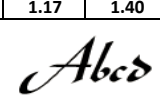
	s		G		D		I	
	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
Sheet	x	X	x	X	x	X	x	X
11	1.10	**2.66**	0.08	**0.19**	0.14	**0.33**	0.08	**0.19**
12	1.04	**2.51**	0.14	**0.33**	0.33	**0.81**	0.00	**0.00**
13	1.06	**2.56**	0.24	**0.57**	0.33	**0.81**	0.02	**0.05**
14	0.92	**2.23**	0.41	**1.00**	0.24	**0.57**	0.04	**0.09**
15	1.06	**2.56**	0.41	**1.00**	0.14	**0.33**	0.08	**0.19**
16	0.90	**2.18**	0.39	**0.95**	0.25	**0.62**	0.06	**0.14**
21	0.61	**1.47**	0.69	**1.66**	0.53	**1.28**	0.08	**0.19**
22	0.69	**1.66**	0.51	**1.23**	0.61	**1.47**	0.18	**0.43**
23	0.33	**0.81**	0.73	**1.76**	0.63	**1.52**	0.24	**0.57**
24	0.49	**1.19**	0.61	**1.47**	0.43	**1.04**	0.22	**0.52**
25	0.59	**1.42**	0.39	**0.95**	0.59	**1.42**	0.27	**0.66**
26	0.43	**1.04**	0.69	**1.66**	0.59	**1.42**	0.22	**0.52**
31	1.20	**2.89**	0.31	**0.76**	0.27	**0.66**	0.06	**0.14**
32	1.08	**2.61**	0.20	**0.47**	0.31	**0.76**	0.12	**0.28**
33	1.22	**2.94**	0.22	**0.52**	0.14	**0.33**	0.08	**0.19**
34	1.24	**2.99**	0.37	**0.90**	0.10	**0.24**	0.18	**0.43**
35	1.00	**2.42**	0.25	**0.62**	0.24	**0.57**	0.14	**0.33**
36	1.24	**2.99**	0.27	**0.66**	0.25	**0.62**	0.00	**0.00**
41	0.78	**1.90**	0.24	**0.57**	0.35	**0.85**	0.12	**0.28**
42	0.94	**2.28**	0.31	**0.76**	0.24	**0.57**	0.14	**0.33**
43	0.76	**1.85**	0.16	**0.38**	0.45	**1.09**	0.12	**0.28**
44	0.82	**1.99**	0.27	**0.66**	0.37	**0.90**	0.20	**0.47**
45	0.86	**2.09**	0.39	**0.95**	0.20	**0.47**	0.16	**0.38**
46	0.65	**1.57**	0.49	**1.19**	0.31	**0.76**	0.29	**0.71**
51	0.29	**0.71**	0.61	**1.47**	0.53	**1.28**	0.45	**1.09**
52	0.41	**1.00**	0.71	**1.71**	0.45	**1.09**	0.45	**1.09**
53	0.35	**0.85**	0.75	**1.80**	0.31	**0.76**	0.41	**1.00**
54	0.31	**0.76**	0.61	**1.47**	0.43	**1.04**	0.33	**0.81**
55	0.22	**0.52**	0.71	**1.71**	0.47	**1.14**	0.53	**1.28**
56	0.20	**0.47**	0.69	**1.66**	0.53	**1.28**	0.45	**1.09**
61	0.22	**0.52**	0.53	**1.28**	0.53	**1.28**	0.55	**1.33**
62	0.24	**0.57**	0.55	**1.33**	0.67	**1.61**	0.55	**1.33**
63	0.47	**1.14**	0.43	**1.04**	0.65	**1.57**	0.31	**0.76**
64	0.33	**0.81**	0.53	**1.28**	0.63	**1.52**	0.22	**0.52**
65	0.20	**0.47**	0.65	**1.57**	0.69	**1.66**	0.31	**0.76**
66	0.41	**1.00**	0.53	**1.28**	0.51	**1.23**	0.41	**1.00**
71	1.20	**2.89**	0.18	**0.43**	0.12	**0.28**	0.10	**0.24**
72	1.14	**2.75**	0.24	**0.57**	0.24	**0.57**	0.08	**0.19**
73	0.96	**2.32**	0.22	**0.52**	0.31	**0.76**	0.10	**0.24**
74	1.00	**2.42**	0.41	**1.00**	0.31	**0.76**	0.08	**0.19**
75	0.98	**2.37**	0.12	**0.28**	0.18	**0.43**	0.22	**0.52**
76	0.82	**1.99**	0.39	**0.95**	0.29	**0.71**	0.06	**0.14**
81	0.75	**1.80**	0.63	**1.52**	0.27	**0.66**	0.08	**0.19**
82	0.51	**1.23**	0.65	**1.57**	0.31	**0.76**	0.18	**0.43**
83	0.71	**1.71**	0.75	**1.80**	0.39	**0.95**	0.08	**0.19**
84	0.69	**1.66**	0.71	**1.71**	0.25	**0.62**	0.10	**0.24**
85	0.71	**1.71**	0.43	**1.04**	0.45	**1.09**	0.14	**0.33**

86	0.65	**1.57**	0.45	**1.09**	0.55	**1.33**	0.14	**0.33**
91	0.57	**1.38**	0.51	**1.23**	0.49	**1.19**	0.12	**0.28**
92	0.84	**2.04**	0.37	**0.90**	0.31	**0.76**	0.12	**0.28**
93	0.86	**2.09**	0.37	**0.90**	0.31	**0.76**	0.24	**0.57**
94	0.86	**2.09**	0.41	**1.00**	0.29	**0.71**	0.25	**0.62**
95	0.94	**2.28**	0.20	**0.47**	0.39	**0.95**	0.20	**0.47**
96	0.63	**1.52**	0.35	**0.85**	0.47	**1.14**	0.12	**0.28**
101	0.90	**2.18**	0.33	**0.81**	0.18	**0.43**	0.20	**0.47**
102	0.84	**2.04**	0.35	**0.85**	0.35	**0.85**	0.25	**0.62**
103	0.80	**1.94**	0.35	**0.85**	0.35	**0.85**	0.18	**0.43**
104	0.61	**1.47**	0.59	**1.42**	0.37	**0.90**	0.22	**0.52**
105	0.67	**1.61**	0.47	**1.14**	0.47	**1.14**	0.24	**0.57**
106	0.71	**1.71**	0.51	**1.23**	0.31	**0.76**	0.18	**0.43**
111	0.49	**1.19**	0.59	**1.42**	0.53	**1.28**	0.18	**0.43**
112	0.43	**1.04**	0.45	**1.09**	0.61	**1.47**	0.20	**0.47**
113	0.43	**1.04**	0.49	**1.19**	0.41	**1.00**	0.37	**0.90**
114	0.43	**1.04**	0.53	**1.28**	0.43	**1.04**	0.31	**0.76**
115	0.27	**0.66**	0.63	**1.52**	0.51	**1.23**	0.37	**0.90**
116	0.18	**0.43**	0.59	**1.42**	0.75	**1.80**	0.41	**1.00**
121	0.37	**0.90**	0.33	**0.81**	0.53	**1.28**	0.51	**1.23**
122	0.43	**1.04**	0.31	**0.76**	0.47	**1.14**	0.65	**1.57**
123	0.20	**0.47**	0.61	**1.47**	0.61	**1.47**	0.37	**0.90**
124	0.35	**0.85**	0.61	**1.47**	0.37	**0.90**	0.37	**0.90**
125	0.57	**1.38**	0.39	**0.95**	0.37	**0.90**	0.43	**1.04**
126	0.37	**0.90**	0.47	**1.14**	0.47	**1.14**	0.51	**1.23**

Appendix-31.a: Survey results (weighted) for Typography

	1				2				3				4			
A_1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.57	**1.63**	**1.01**	**0.52**	**0.52**	**0.78**	**1.86**	**0.36**	**0.78**	**0.83**	**0.85**	**0.67**	**0.34**	**1.75**	**1.71**	**0.60**
	ABCD				ABCD				Abcd				Abcd			
A_2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.78	**0.57**	**0.91**	**0.62**	**0.47**	**1.04**	**0.60**	**0.67**	**0.80**	**0.54**	**0.80**	**0.36**	**0.78**	**0.49**	**0.85**	**0.36**
	ABCD				ABCD				Abcd				Abcd			
B1	S	G	D	I	S	G	D	I								
	0.26	**1.74**	**1.24**	**0.08**	**0.52**	**2.07**	**0.96**	**0.00**								
	ABCD				ABCD											
B2	S	G	D	I	S	G	D	I								
	1.06	**1.19**	**0.49**	**0.13**	**1.09**	**0.98**	**0.83**	**0.05**								
	ABCD				ABCD											
C1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.63	**0.54**	**0.21**	**0.96**	**1.32**	**0.88**	**0.60**	**0.21**	**1.74**	**0.21**	**0.03**	**0.31**	**1.55**	**0.34**	**0.47**	**0.05**
	ABCD				ABCD				Abcd				Abcd			
C2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.61	**0.75**	**0.23**	**0.05**	**1.40**	**0.34**	**1.06**	**0.00**	**2.02**	**0.03**	**0.52**	**0.08**	**1.66**	**0.54**	**0.23**	**0.21**
	ABCD				ABCD				Abcd				Abcd			
D1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.76	**0.34**	**0.52**	**0.88**	**1.19**	**0.75**	**1.32**	**0.18**	**1.94**	**0.41**	**0.36**	**0.23**	**1.48**	**0.70**	**0.57**	**0.13**
	ABCD				ABCD				Abcd				Abcd			
D2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.63	**0.49**	**0.10**	**0.54**	**1.45**	**0.26**	**0.44**	**0.13**	**1.68**	**0.26**	**0.00**	**0.23**	**1.68**	**0.26**	**0.26**	**0.36**
	ABCD				ABCD				Abcd				Abcd			
E1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	2.30	**0.18**	**0.31**	**1.06**	**1.40**	**0.18**	**1.29**	**0.54**	**2.15**	**0.21**	**0.44**	**0.41**	**1.37**	**0.23**	**1.04**	**0.54**
	ABCD				ABCD				Abcd				Abcd			
E2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.84	**0.10**	**0.10**	**0.23**	**1.32**	**0.13**	**0.57**	**0.21**	**1.81**	**0.08**	**0.34**	**0.05**	**1.31**	**0.16**	**0.60**	**0.13**
	ABCD				ABCD				Abcd				Abcd			
F1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.79	**0.39**	**0.28**	**1.11**	**1.35**	**0.44**	**1.53**	**0.39**	**1.99**	**0.28**	**0.57**	**0.23**	**1.01**	**0.60**	**1.17**	**0.28**
	ABCD				ABCD				Abcd				Abcd			
F2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.50	**0.40**	**0.41**	**1.31**	**1.37**	**0.65**	**1.60**	**0.26**	**1.35**	**0.23**	**0.60**	**0.41**	**1.14**	**0.62**	**0.49**	**0.21**
	ABCD				ABCD				Abcd				Abcd			

G1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.85	0.83	0.67	0.88	0.96	0.39	1.09	0.83	0.83	1.45	0.78	0.60	0.60	0.52	1.09	0.54
	ABCD				ABCD				Abcd				Abcd			
G2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.06	0.65	0.54	0.39	1.11	0.65	0.49	0.10	1.14	0.44	0.70	0.21	0.78	1.06	0.67	0.05
	ABCD				ABCD				Abcd				Abcd			
H1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.53	0.10	1.06	0.47	1.32	0.60	0.91	0.65	1.29	0.49	1.27	0.49	0.83	0.78	0.85	0.41
	ABCD				ABCD				Abcd				Abcd			
H2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.55	0.16	0.70	0.49	1.63	0.31	0.39	0.44	1.86	0.05	0.70	0.39	1.24	0.21	0.59	0.39
	ABCD				ABCD				Abcd				Abcd			
I1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.97	0.31	0.41	0.13	2.12	0.78	0.41	0.13	1.81	0.26	0.67	0.16	2.23	0.10	0.65	0.26
	ABCD				ABCD				abcd				Abcd			
I2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.76	0.13	0.41	0.13	1.63	0.57	0.39	0.16	1.71	0.49	0.41	0.05	1.86	0.21	0.67	0.21
	ABCD				ABCD				abcd				Abcd			
J1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.50	0.18	0.78	0.54	1.55	0.18	0.57	0.52	2.20	0.52	0.39	0.16	2.02	0.18	0.47	0.18
	ABCD				ABCD				abcd				Abcd			
J2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	2.12	0.21	0.34	0.00	1.89	0.10	0.52	0.41	1.50	0.67	0.18	0.23	1.24	0.65	0.65	0.28
	ABCD				ABCD				abcd				Abcd			
K1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.28	2.18	0.47	0.41	0.10	1.58	0.70	1.09	0.08	1.37	0.80	0.70	0.08	1.53	1.22	0.18
	ABCD				ABCD				abcd				Abcd			
K2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.23	0.98	0.62	0.28	0.28	1.40	0.52	0.26	0.26	1.40	0.60	0.21	0.18	1.45	0.78	0.23
	ABCD				ABCD				abcd				Abcd			
L1	S	G	D	I	S	G	D	I								
	0.62	1.24	1.04	0.21	0.57	1.17	1.17	0.05								
	ABCD				ABCD											
L2	S	G	D	I	S	G	D	I								
	0.47	1.22	0.83	0.31	0.83	0.73	0.83	0.18								
	ABCD				ABCD											

M1	S	G	D	I	S	G	D	I								
	0.34	1.01	1.52	0.75	0.54	1.01	0.34	1.17								
																
M2	S	G	D	I	S	G	D	I								
	0.10	1.27	0.49	0.54	0.26	1.04	0.44	0.57								
																
N1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.00	1.84	0.65	0.67	0.00	1.86	0.83	0.73	0.13	1.14	0.70	0.80	0.08	0.83	0.65	0.73
																
N2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.34	0.80	0.60	0.75	0.10	0.91	0.57	0.70	0.34	0.52	0.44	0.98	0.52	0.44	0.44	1.06
																
O1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	1.17	1.19	0.28	0.49	1.22	1.55	0.52	0.18	0.75	1.48	0.93	0.00	0.67	1.50	0.85	0.05
																
O2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.93	1.45	1.23	0.16	0.78	1.86	0.21	0.08	0.91	1.09	0.47	0.05	0.98	0.73	0.18	0.49
																
P1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.00	1.45	0.75	0.85	0.00	1.61	0.85	1.06	0.62	0.93	0.41	1.09	0.65	0.73	0.57	1.11
																
P2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.31	0.73	0.80	0.88	0.34	1.11	0.57	0.75	0.91	0.54	0.23	0.96	0.98	0.67	0.31	0.49
																
Q1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	2.69	0.16	0.18	0.21	3.00	0.21	0.70	0.21	2.41	0.47	0.05	0.10	2.23	0.39	0.18	0.03
																
Q2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	2.46	0.08	0.16	0.16	2.80	0.05	0.26	0.05	0.44	0.98	0.57	1.61	2.49	0.08	0.10	0.10
																
R1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.44	0.98	0.57	1.61	0.13	1.17	0.52	1.55	0.16	0.88	0.65	1.22	0.13	1.17	1.40	0.52
																
R2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.16	0.93	0.62	0.73	0.18	0.70	0.78	0.85	0.18	0.60	0.78	0.85	0.16	0.65	1.66	0.52
S1	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.52	0.70	1.63	0.70	0.44	0.88	2.02	0.44	0.52	0.96	1.50	0.31	0.39	0.41	1.84	0.62
S2	S	G	D	I	S	G	D	I	S	G	D	I	S	G	D	I
	0.41	0.36	1.09	0.57	0.93	0.23	0.91	0.52	0.65	0.16	1.09	0.16	0.70	0.36	0.98	0.16

Appendix-31.b: Typography result

Sheet	Emotion	Survey Score	Weighted score
$A_1$1	S	0.34	0.57
	G	0.98	1.63
	D	0.61	1.01
	I	0.31	0.52
$A_1$2	S	0.31	0.52
	G	0.47	0.78
	D	1.13	1.86
	I	0.22	0.36
$A_1$3	S	0.47	0.78
	G	0.50	0.83
	D	0.52	0.85
	I	0.41	0.67
$A_1$4	S	0.20	0.34
	G	0.45	0.75
	D	1.03	1.71
	I	0.36	0.60
$A_2$1	S	0.47	0.78
	G	0.34	0.57
	D	0.55	0.91
	I	0.38	0.62
$A_2$2	S	0.28	0.47
	G	0.63	1.04
	D	0.36	0.60
	I	0.41	0.67
$A_2$3	S	0.48	0.80
	G	0.33	0.54
	D	0.48	0.80
	I	0.22	0.36
$A_2$4	S	0.47	0.78
	G	0.30	0.49
	D	0.52	0.85
	I	0.22	0.36
$B_1$1	S	0.16	0.26
	G	1.05	1.74
	D	0.75	1.24
	I	0.05	0.08
$B_1$2	S	0.31	0.52
	G	1.25	2.07
	D	0.58	0.96
	I	0.00	0.00
$B_2$1	S	0.64	1.06
	G	0.72	1.19
	D	0.30	0.49
	I	0.08	0.13
$B_2$2	S	0.66	1.09
	G	0.59	0.98
	D	0.50	0.83
	I	0.03	0.05

$C_1$1	S	0.98	1.63
	G	0.33	0.54
	D	0.13	0.21
	I	0.58	0.96
$C_1$2	S	0.80	1.32
	G	0.53	0.88
	D	0.36	0.60
	I	0.13	0.21
$C_1$3	S	1.05	1.74
	G	0.13	0.21
	D	0.02	0.03
	I	0.19	0.31
$C_1$4	S	0.94	1.55
	G	0.20	0.34
	D	0.28	0.47
	I	0.03	0.05
$C_2$1	S	0.97	1.61
	G	0.45	0.75
	D	0.14	0.23
	I	0.03	0.05
$C_2$2	S	0.84	1.40
	G	0.20	0.34
	D	0.64	1.06
	I	0.00	0.00
$C_2$3	S	1.22	2.02
	G	0.02	0.03
	D	0.31	0.52
	I	0.05	0.08
$C_2$4	S	1.00	1.66
	G	0.33	0.54
	D	0.14	0.23
	I	0.13	0.21
$D_1$1	S	1.06	1.76
	G	0.20	0.34
	D	0.31	0.52
	I	0.53	0.88
$D_1$2	S	0.72	1.19
	G	0.45	0.75
	D	0.80	1.32
	I	0.11	0.18
$D_1$3	S	1.17	1.94
	G	0.25	0.41
	D	0.22	0.36
	I	0.14	0.23
$D_1$4	S	0.89	1.48
	G	0.42	0.70
	D	0.34	0.57
	I	0.08	0.13
$D_2$1	S	0.98	1.63
	G	0.30	0.49
	D	0.06	0.10
	I	0.33	0.54
$D_2$2	S	0.88	1.45
	G	0.16	0.26

$D_2$2	D	0.27	0.44
	I	0.08	0.13
$D_2$3	S	1.02	1.68
	G	0.16	0.26
	D	0.00	0.00
	I	0.14	0.23
$D_2$4	S	1.02	1.68
	G	0.16	0.26
	D	0.16	0.26
	I	0.22	0.36
$E_1$1	S	1.39	2.30
	G	0.11	0.18
	D	0.19	0.31
	I	0.64	1.06
$E_1$2	S	0.84	1.40
	G	0.11	0.18
	D	0.78	1.29
	I	0.33	0.54
$E_1$3	S	1.30	2.15
	G	0.13	0.21
	D	0.27	0.44
	I	0.25	0.41
$E_1$4	S	0.83	1.37
	G	0.14	0.23
	D	0.63	1.04
	I	0.33	0.54
$E_2$1	S	1.11	1.84
	G	0.06	0.10
	D	0.06	0.10
	I	0.14	0.23
$E_2$2	S	0.80	1.32
	G	0.08	0.13
	D	0.34	0.57
	I	0.13	0.21
$E_2$3	S	1.09	1.81
	G	0.05	0.08
	D	0.20	0.34
	I	0.03	0.05
$E_2$4	S	0.80	1.32
	G	0.09	0.16
	D	0.36	0.60
	I	0.08	0.13
$F_1$1	S	1.08	1.79
	G	0.23	0.39
	D	0.17	0.28
	I	0.67	1.11
$F_1$2	S	0.81	1.35
	G	0.27	0.44
	D	0.92	1.53
	I	0.23	0.39
$F_1$3	S	1.20	1.99
	G	0.17	0.28
	D	0.34	0.57
	I	0.14	0.23

$F_1$4	**S**	0.61	1.01
	G	0.36	0.60
	D	0.70	1.17
	I	0.17	0.28
$F_2$1	**S**	0.91	1.50
	G	0.27	0.44
	D	0.25	0.41
	I	0.19	0.31
$F_2$2	**S**	0.83	1.37
	G	0.39	0.65
	D	0.36	0.60
	I	0.16	0.26
$F_2$3	**S**	0.81	1.35
	G	0.14	0.23
	D	0.36	0.60
	I	0.25	0.41
$F_2$4	**S**	0.69	1.14
	G	0.38	0.62
	D	0.30	0.49
	I	0.13	0.21
$G_1$1	**S**	0.52	0.85
	G	0.50	0.83
	D	0.41	0.67
	I	0.53	0.88
$G_1$2	**S**	0.58	0.96
	G	0.23	0.39
	D	0.66	1.09
	I	0.50	0.83
$G_1$3	**S**	0.50	0.83
	G	0.88	1.45
	D	0.47	0.78
	I	0.36	0.60
$G_1$4	**S**	0.36	0.60
	G	0.31	0.52
	D	0.66	1.09
	I	0.33	0.54
$G_2$1	**S**	0.64	1.06
	G	0.39	0.65
	D	0.33	0.54
	I	0.23	0.39
$G_2$2	**S**	0.67	1.11
	G	0.39	0.65
	D	0.30	0.49
	I	0.06	0.10
$G_2$3	**S**	0.69	1.14
	G	0.27	0.44
	D	0.42	0.70
	I	0.13	0.21
$G_2$4	**S**	0.47	0.78
	G	0.64	1.06
	D	0.41	0.67
	I	0.03	0.05
H 1	**S**	0.92	1.53
	G	0.06	0.10

$H_1$1	D	0.64	1.06
	I	0.28	0.47
$H_1$2	S	0.80	1.32
	G	0.36	0.60
	D	0.55	0.91
	I	0.39	0.65
$H_1$3	S	0.78	1.29
	G	0.30	0.49
	D	0.77	1.27
	I	0.30	0.49
$H_1$4	S	0.50	0.83
	G	0.47	0.78
	D	0.52	0.85
	I	0.25	0.41
$H_2$1	S	0.94	1.55
	G	0.09	0.16
	D	0.42	0.70
	I	0.30	0.49
$H_2$2	S	0.98	1.63
	G	0.19	0.31
	D	0.23	0.39
	I	0.27	0.44
$H_2$3	S	1.13	1.86
	G	0.03	0.05
	D	0.42	0.70
	I	0.23	0.39
$H_2$4	S	0.75	1.24
	G	0.13	0.21
	D	0.34	0.57
	I	0.23	0.39
$I_1$1	S	1.19	1.97
	G	0.19	0.31
	D	0.25	0.41
	I	0.08	0.13
$I_1$2	S	1.28	2.12
	G	0.47	0.78
	D	0.25	0.41
	I	0.08	0.13
$I_1$3	S	1.09	1.81
	G	0.16	0.26
	D	0.41	0.67
	I	0.09	0.16
$I_1$4	S	1.34	2.23
	G	0.06	0.10
	D	0.39	0.65
	I	0.16	0.26
$I_2$1	S	1.06	1.76
	G	0.08	0.13
	D	0.25	0.41
	I	0.08	0.13
$I_2$2	S	0.98	1.63
	G	0.34	0.57
	D	0.23	0.39
	I	0.09	0.16

$I_2$3	S	1.03	1.71
	G	0.30	0.49
	D	0.25	0.41
	I	0.03	0.05
$I_2$4	S	1.13	1.86
	G	0.13	0.21
	D	0.41	0.67
	I	0.13	0.21
$J_1$1	S	0.91	1.50
	G	0.11	0.18
	D	0.47	0.78
	I	0.33	0.54
$J_1$2	S	0.94	1.55
	G	0.11	0.18
	D	0.34	0.57
	I	0.31	0.52
$J_1$3	S	1.33	2.20
	G	0.31	0.52
	D	0.23	0.39
	I	0.09	0.16
$J_1$4	S	1.22	2.02
	G	0.11	0.18
	D	0.28	0.47
	I	0.11	0.18
$J_2$1	S	1.28	2.12
	G	0.13	0.21
	D	0.20	0.34
	I	0.00	0.00
$J_2$2	S	1.14	1.89
	G	0.06	0.10
	D	0.31	0.52
	I	0.25	0.41
$J_2$3	S	0.91	1.50
	G	0.41	0.67
	D	0.11	0.18
	I	0.14	0.23
$J_2$4	S	0.75	1.24
	G	0.39	0.65
	D	0.39	0.65
	I	0.17	0.28
$K_1$1	S	0.17	0.28
	G	1.31	2.18
	D	0.28	0.47
	I	0.25	0.41
$K_1$2	S	0.06	0.10
	G	0.95	1.58
	D	0.42	0.70
	I	0.66	1.09
$K_1$3	S	0.05	0.08
	G	0.83	1.37
	D	0.48	0.80
	I	0.42	0.70
$K_1$4	S	0.05	0.08
	G	0.92	1.53

$K_1$4	D	0.73	1.22
	I	0.11	0.18
$K_2$1	S	0.14	0.23
	G	0.59	0.98
	D	0.38	0.62
	I	0.17	0.28
$K_2$2	S	0.17	0.28
	G	0.84	1.40
	D	0.31	0.52
	I	0.16	0.26
$K_2$3	S	0.16	0.26
	G	0.84	1.40
	D	0.36	0.60
	I	0.13	0.21
$K_2$4	S	0.11	0.18
	G	0.88	1.45
	D	0.47	0.78
	I	0.14	0.23
$L_1$1	S	0.38	0.62
	G	0.75	1.24
	D	0.63	1.04
	I	0.13	0.21
$L_1$2	S	0.34	0.57
	G	0.70	1.17
	D	0.70	1.17
	I	0.03	0.05
$L_2$1	S	0.28	0.47
	G	0.73	1.22
	D	0.50	0.83
	I	0.19	0.31
$L_2$2	S	0.50	0.83
	G	0.44	0.73
	D	0.50	0.83
	I	0.11	0.18
$M_1$1	S	0.20	0.34
	G	0.61	1.01
	D	0.31	0.52
	I	0.45	0.75
$M_1$2	S	0.33	0.54
	G	0.61	1.01
	D	0.20	0.34
	I	0.70	1.17
$M_2$1	S	0.06	0.10
	G	0.77	1.27
	D	0.30	0.49
	I	0.33	0.54
$M_2$2	S	0.16	0.26
	G	0.63	1.04
	D	0.27	0.44
	I	0.34	0.57
$N_1$1	S	0.00	0.00
	G	1.11	1.84
	D	0.39	0.65
	I	0.41	0.67

$N_1$2	S	0.00	0.00
	G	1.13	1.86
	D	0.50	0.83
	I	0.44	0.73
$N_1$3	S	0.08	0.13
	G	0.69	1.14
	D	0.42	0.70
	I	0.48	0.80
$N_1$4	S	0.05	0.08
	G	0.50	0.83
	D	0.39	0.65
	I	0.44	0.73
$N_2$1	S	0.20	0.34
	G	0.48	0.80
	D	0.36	0.60
	I	0.45	0.75
$N_2$2	S	0.06	0.10
	G	0.55	0.91
	D	0.34	0.57
	I	0.42	0.70
$N_2$3	S	0.20	0.34
	G	0.31	0.52
	D	0.27	0.44
	I	0.59	0.98
$N_2$4	S	0.31	0.52
	G	0.27	0.44
	D	0.27	0.44
	I	0.64	1.06
$O_1$1	S	0.70	1.17
	G	0.72	1.19
	D	0.17	0.28
	I	0.30	0.49
$O_1$2	S	0.73	1.22
	G	0.94	1.55
	D	0.31	0.52
	I	0.11	0.18
$O_1$3	S	0.45	0.75
	G	0.89	1.48
	D	0.56	0.93
	I	0.00	0.00
$O_1$4	S	0.41	0.67
	G	0.91	1.50
	D	0.52	0.85
	I	0.03	0.05
$O_2$1	S	0.56	0.93
	G	0.88	1.45
	D	0.14	0.23
	I	0.09	0.16
$O_2$2	S	0.47	0.78
	G	1.13	1.86
	D	0.13	0.21
	I	0.05	0.08
$O_2$3	S	0.55	0.91
	G	0.66	1.09

$O_2$3	D	0.28	0.47
	I	0.03	0.05
$O_2$4	S	0.59	0.98
	G	0.44	0.73
	D	0.11	0.18
	I	0.30	0.49
$P_1$1	S	0.00	0.00
	G	0.88	1.45
	D	0.45	0.75
	I	0.52	0.85
$P_1$2	S	0.00	0.00
	G	0.97	1.61
	D	0.52	0.85
	I	0.64	1.06
$P_1$3	S	0.38	0.62
	G	0.56	0.93
	D	0.25	0.41
	I	0.66	1.09
$P_1$4	S	0.39	0.65
	G	0.44	0.73
	D	0.34	0.57
	I	0.67	1.11
$P_2$1	S	0.19	0.31
	G	0.44	0.73
	D	0.48	0.80
	I	0.53	0.88
$P_2$2	S	0.20	0.34
	G	0.67	1.11
	D	0.34	0.57
	I	0.45	0.75
$P_2$3	S	0.55	0.91
	G	0.33	0.54
	D	0.14	0.23
	I	0.58	0.96
$P_2$4	S	0.59	0.98
	G	0.41	0.67
	D	0.19	0.31
	I	0.30	0.49
$Q_1$1	S	1.63	2.69
	G	0.09	0.16
	D	0.11	0.18
	I	0.13	0.21
$Q_1$2	S	1.81	3.00
	G	0.13	0.21
	D	0.42	0.70
	I	0.13	0.21
$Q_1$3	S	1.45	2.41
	G	0.28	0.47
	D	0.03	0.05
	I	0.06	0.10
$Q_1$4	S	1.34	2.23
	G	0.23	0.39
	D	0.11	0.18
	I	0.02	0.03

$Q_2$1	S	1.48	2.46
	G	0.05	0.08
	D	0.09	0.16
	I	0.09	0.16
$Q_2$2	S	1.69	2.80
	G	0.03	0.05
	D	0.16	0.26
	I	0.03	0.05
$Q_2$3	S	1.39	2.30
	G	0.17	0.28
	D	0.06	0.10
	I	0.08	0.13
$Q_2$4	S	1.50	2.49
	G	0.05	0.08
	D	0.06	0.10
	I	0.06	0.10
$R_1$1	S	0.27	0.44
	G	0.59	0.98
	D	0.34	0.57
	I	0.97	1.61
$R_1$2	S	0.08	0.13
	G	0.70	1.17
	D	0.31	0.52
	I	0.94	1.55
$R_1$3	S	0.09	0.16
	G	0.53	0.88
	D	0.39	0.65
	I	0.73	1.22
$R_1$4	S	0.08	0.13
	G	0.70	1.17
	D	0.84	1.40
	I	0.31	0.52
$R_2$1	S	0.09	0.16
	G	0.56	0.93
	D	0.38	0.62
	I	0.44	0.73
$R_2$2	S	0.11	0.18
	G	0.42	0.70
	D	0.47	0.78
	I	0.52	0.85
$R_2$3	S	0.11	0.18
	G	0.36	0.60
	D	0.47	0.78
	I	0.45	0.75
$R_2$4	S	0.09	0.16
	G	0.39	0.65
	D	1.00	1.66
	I	0.31	0.52
$S_1$1	S	0.31	0.52
	G	0.42	0.70
	D	0.98	1.63
	I	0.41	0.67
$S_1$2	S	0.27	0.44
	G	0.53	0.88

S_12	D	1.22	2.02
	I	0.27	0.44
S_13	S	0.31	0.52
	G	0.58	0.96
	D	0.91	1.50
	I	0.19	0.31
S_14	S	0.23	0.39
	G	0.25	0.41
	D	1.11	1.84
	I	0.38	0.62
S_21	S	0.25	0.41
	G	0.22	0.36
	D	0.66	1.09
	I	0.34	0.57
S_22	S	0.56	0.93
	G	0.14	0.23
	D	0.55	0.91
	I	0.31	0.52
S_23	S	0.39	0.65
	G	0.09	0.16
	D	0.66	1.09
	I	0.09	0.16
S_24	S	0.42	0.70
	G	0.22	0.36
	D	0.59	0.98
	I	0.09	0.16

Appendix-32: SGDI Scores for Graphics

	S		G		D		I	
	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score	Survey Score	Weighted Score
	x	X	x	X	x	X	x	X
11	0.39	**0.68**	0.65	**1.12**	0.61	**1.05**	0.10	**0.17**
15	0.53	**0.92**	0.39	**0.68**	0.69	**1.19**	0.25	**0.44**
21	0.53	**0.92**	0.57	**0.99**	0.35	**0.61**	0.47	**0.82**
22	0.78	**1.36**	0.47	**0.82**	0.31	**0.54**	0.25	**0.44**
25	1.00	**1.73**	0.39	**0.68**	0.31	**0.54**	0.16	**0.27**
27	0.22	**0.37**	0.84	**1.46**	0.88	**1.53**	0.25	**0.44**
28	0.76	**1.33**	0.53	**0.92**	0.31	**0.54**	0.33	**0.58**
31	0.57	**0.99**	0.37	**0.65**	0.47	**0.82**	0.47	**0.82**
34	0.69	**1.19**	0.69	**1.19**	0.27	**0.48**	0.18	**0.31**
37	0.51	**0.88**	1.10	**1.90**	0.25	**0.44**	0.18	**0.31**
38	0.94	**1.63**	0.22	**0.37**	0.41	**0.71**	0.24	**0.41**
41	0.80	**1.39**	0.37	**0.65**	0.37	**0.65**	0.35	**0.61**
43	0.78	**1.36**	0.29	**0.51**	0.67	**1.16**	0.25	**0.44**
44	0.41	**0.71**	0.57	**0.99**	0.55	**0.95**	0.25	**0.44**
46	0.25	**0.44**	0.78	**1.36**	0.88	**1.53**	0.27	**0.48**
47	0.33	**0.58**	0.67	**1.16**	0.43	**0.75**	0.80	**1.39**
48	1.04	**1.80**	0.33	**0.58**	0.37	**0.65**	0.12	**0.20**
51	1.57	**2.72**	0.29	**0.51**	0.24	**0.41**	0.04	**0.07**
54	0.75	**1.29**	0.71	**1.22**	0.37	**0.65**	0.08	**0.14**
55	0.41	**0.71**	0.73	**1.26**	0.41	**0.71**	0.61	**1.05**
57	0.90	**1.56**	0.69	**1.19**	0.18	**0.31**	0.20	**0.34**
62	0.67	**1.16**	0.43	**0.75**	0.43	**0.75**	0.18	**0.31**
63	1.06	**1.84**	0.20	**0.34**	0.22	**0.37**	0.18	**0.31**
65	0.67	**1.16**	0.61	**1.05**	0.59	**1.02**	0.12	**0.20**
66	0.82	**1.43**	0.43	**0.75**	0.39	**0.68**	0.14	**0.24**
67	1.18	**2.04**	0.33	**0.58**	0.18	**0.31**	0.18	**0.31**
71	0.59	**1.02**	0.96	**1.67**	0.18	**0.31**	0.14	**0.24**
73	1.25	**2.18**	0.47	**0.82**	0.04	**0.07**	0.16	**0.27**
81	1.35	**2.35**	0.24	**0.41**	0.12	**0.20**	0.16	**0.27**
82	0.96	**1.67**	0.37	**0.65**	0.22	**0.37**	0.14	**0.24**
83	0.63	**1.09**	0.33	**0.58**	0.41	**0.71**	0.43	**0.75**
84	1.24	**2.14**	0.37	**0.65**	0.14	**0.24**	0.10	**0.17**
85	0.73	**1.26**	0.49	**0.85**	0.47	**0.82**	0.14	**0.24**
87	0.31	**0.54**	0.98	**1.70**	0.45	**0.78**	0.20	**0.34**
88	0.35	**0.61**	0.53	**0.92**	0.65	**1.12**	0.51	**0.88**
91	0.96	**1.67**	0.39	**0.68**	0.20	**0.34**	0.10	**0.17**
94	0.29	**0.51**	0.33	**0.58**	0.73	**1.26**	0.25	**0.44**
95	0.41	**0.71**	0.35	**0.61**	0.76	**1.33**	0.37	**0.65**
97	0.43	**0.75**	0.98	**1.70**	0.33	**0.58**	0.06	**0.10**
99	0.53	**0.92**	0.67	**1.16**	0.39	**0.68**	0.16	**0.27**
101	1.41	**2.45**	0.41	**0.71**	0.14	**0.24**	0.02	**0.03**

102	0.25	**0.44**	0.76	**1.33**	0.47	**0.82**	0.75	**1.29**
103	0.24	**0.41**	0.47	**0.82**	0.63	**1.09**	0.67	**1.16**
104	1.06	**1.84**	0.25	**0.44**	0.20	**0.34**	0.10	**0.17**
107	1.37	**2.38**	0.45	**0.78**	0.10	**0.17**	0.04	**0.07**
108	0.94	**1.63**	0.35	**0.61**	0.20	**0.34**	0.20	**0.34**
112	1.06	**1.84**	0.63	**1.09**	0.25	**0.44**	0.02	**0.03**
113	0.65	**1.12**	0.78	**1.36**	0.22	**0.37**	0.12	**0.20**
114	0.29	**0.51**	0.53	**0.92**	0.53	**0.92**	0.22	**0.37**
118	0.33	**0.58**	0.18	**0.31**	0.63	**1.09**	0.71	**1.22**
119	0.41	**0.71**	0.94	**1.63**	0.29	**0.51**	0.16	**0.27**
121	0.84	**1.46**	0.24	**0.41**	0.45	**0.78**	0.14	**0.24**
122	1.37	**2.38**	0.27	**0.48**	0.22	**0.37**	0.14	**0.24**
123	1.73	**2.99**	0.35	**0.61**	0.10	**0.17**	0.04	**0.07**
124	1.20	**2.07**	0.39	**0.68**	0.24	**0.41**	0.08	**0.14**
125	0.94	**1.63**	0.35	**0.61**	0.16	**0.27**	0.20	**0.34**
127	0.29	**0.51**	0.51	**0.88**	0.88	**1.53**	0.35	**0.61**
141	0.86	**1.50**	0.53	**0.92**	0.31	**0.54**	0.14	**0.24**
143	0.33	**0.58**	0.90	**1.56**	0.55	**0.95**	0.18	**0.31**
163	0.47	**0.82**	1.10	**1.90**	0.37	**0.65**	0.10	**0.17**

Appendix-33.a: Survey Result, Unity and Dynamism (sheet-1)

A

Unity

Dynamism

	Level 1	Level 2	Level 3
Level 1	S 1.73 G 0.00 D 0.45 1 0.40 — 1a 	S 2.59 G 1.16 D 1.65 1 0.79 — 2a 	S 0.57 G 1.93 D 0.45 1 0.17 — 3a 
Level 2	S 0.43 G 0.37 D 1.02 1 2.30 — 4a 	S 2.25 G 1.59 D 1.73 1 0.99 — 5a 	S 0.19 G 1.10 D 1.07 1 1.41 — 6a 
Level 3	S 2.02 G 0.77 D 0.37 1 0.15 — 7a 	S 0.99 G 2.10 D 2.37 1 0.99 — 8a 	S 0.24 G 0.74 D 1.26 2.08 — 9a 

Appendix-33.b: Survey Result, Unity and Dynamism (sheet-2)

B

Unity

Dynamism

	Level 1	Level 2	Level 3
Level 1	S | G 1b | D | 1 2.49 | 0.13 | 0.29 | 0.32	S | G 2b | D | 1 3.00 | 1.10 | 1.51 | 0.85	S | G | D | 1 (3b) 1.88 | 1.49 | 0.21 | 0.00
			
Level 2	S | G 4b | D | 1 0.45 | 0.74 | 1.62 | 0.47	S | G 5b | D | 1 1.08 | 1.96 | 2.54 | 0.99	S | G | D | 1 (6b) 1.62 | 2.58 | 1.41 | 0.49
			
Level 3	S | G 7b | D | 1 1.99 | 0.55 | 0.40 | 0.07	S | G 8b | D | 1 1.26 | 1.52 | 2.53 | 0.88	S | G | D | 1 (9b) 0.96 | 1.60 | 2.87 | 1.32
			

Appendix-33.c: Survey Result, Unity and Dynamism (sheet-3)

Unity

	Level 1	Level 2	Level 3
Level 1			
Level 2		S 2.40 | G 5c 1.37 | D 1.18 | 1 0.47 	
Level 3			S 0.71 | G 1.73 | D 2.61 | 1 2.23 9c 

Appendix-33.d: Survey Result, Compilation

Unity	Dynamism	Model	Sheet	S	G	D	I
1	1		1a	2.49	0.13	0.29	0.32
			1b	1.73	0.00	0.45	0.40
1	**1**	**Mean**		**2.11**	**0.07**	**0.37**	**0.36**
1	2		4a	0.43	0.37	1.02	2.30
			4b	0.45	0.74	1.62	0.47
1	**2**	**Mean**		**0.44**	**0.56**	**1.32**	**1.39**
1	3		7a	1.99	0.55	0.40	0.07
			7b	2.02	0.77	0.37	0.15
1	**3**	**Mean**		**2.01**	**0.66**	**0.39**	**0.11**
2	1	Splendor +	2a	3.00	1.10	1.51	0.85
		CD Delux	2b	2.59	1.16	1.65	0.79
2	**1**	**Mean**		**2.80**	**1.13**	**1.58**	**0.82**
2	2	Flame	5a	1.08	1.96	2.54	0.99
		Discover	5b	2.25	1.59	1.73	0.99
		Star City	5c	2.40	1.37	1.18	0.47
2	**2**	**Mean**		**1.91**	**1.64**	**1.82**	**0.82**
2	3	Pulser	8a	1.26	1.52	2.53	0.88
		Apache	8b	0.99	2.10	2.37	0.99
2	**3**	**Mean**		**1.13**	**1.10**	**2.45**	**1.75**
3	1		3a	1.88	1.49	0.21	0.00
3	1		3b	0.57	1.93	0.45	0.17
3	**1**	**Mean**		**1.23**	**1.71**	**0.33**	**0.09**
3	2	Passion pro	6a	1.62	2.58	1.41	0.49
		Glamour	6b	1.43	2.69	1.38	0.80
3	**2**	**Mean**		**1.53**	**2.64**	**1.40**	**0.65**
3	3	Hunk	9a	0.96	1.60	2.87	1.32
		CBZ	9b	0.71	1.73	2.61	2.23
		Hayabusa	9c	0.24	0.74	1.26	2.08
3	**3**	**Mean**		**0.64**	**1.05**	**2.25**	**2.08**

S

		Unity		
		1	2	3
Dynamism	1	2.11	2.8	0.17
	2	0.44	1.91	1.53
	3	2.01	1.13	0.64

G

		Unity		
		1	2	3
Dynamism	1	0.07	1.13	0.25
	2	0.56	1.64	2.64
	3	0.66	1.81	1.36

D

		Unity		
		1	2	3
Dynamism	1	0.37	1.58	1.11
	2	1.32	1.82	2.4
	3	0.39	2.45	2.25

I

		Unity		
		1	2	3
Dynamism	1	0.36	0.82	2.13
	2	1.39	0.82	0.65
	3	0.11	0.94	1.88

Chapter 6: Verification of Results

Introduction

Till now we have devised the methodology for quantifying and determining the emotions generated by the design of a motorcycle. We have also established the intensity of each emotion for each impacting combination and analyzed the general trends. But all this remains a hypothetical exercise unless we verify the validity of these observations. This can be done only by comparing the calculated values of the emotional quotients with actual observations. This whole exercise needs three major steps:

a. Data collection for actual emotions generated by actual bikes
b. Evaluation of the same bikes for calculating the emotion quotients
c. Comparing the two values and reiteration of weightages for correct matching

6.1 Data Collection (Actual):

This step is very important and complex because of the simplicity needed for this. Each step needs judicious mix of practicality, feasibility, accuracy and simplicity as a common observer cannot be expected to be very objective and quantitative about emotions and yet the results should reflect the correctness (or the absence of it) of our methodology. These steps for the data collection are:

a. Identification of vehicles
b. Collection of respondents' responses
c. Compilation of results

Step 1. Identification of vehicles

The most important pre-requisite for this step is that it should reflect the true composition of Indian motorcycle market. So all top selling bikes all manufacturers from popular segment have been chosen for this exercise. Niche bikes like Karizma from Hero were excluded as they cater to a very small segment and observations of all respondents will generate an anomaly.

Table -7.1, Motorcycles for Physical Survey

S.No	Motorcycle Name	Manufacturer	Year of make	Photograph
1	Hunk	Hero Honda	2010	
2	CBZ-Extreme	Hero Honda	2010	
3	Glamour	Hero Honda	2010	
4	Discover	Bajaj Auto	2010	
5	Apache	TVS	2010	
6	Pulser 150	Bajaj Auto	2010	
7	Star City	TVS	2010	
8	Flame	TVS	2010	
9	CD-Delux	Hero Honda	2010	
10	Splendor+	Hero Honda	2010	
11	Splendor-NXG	Hero Honda	2010	
12	Passion Plus	Hero Honda	2010	

Step 2. Physical survey

This survey was conducted on the same respondents and the questionnaire given to them as given in the table 7.2.Please note that the questionnaire has been kept very simple as the respondent cannot be expected to give relative rating for all emotions. Here

he is expected to identify the dominant emotion and its intensity, which is simple to do for any person.

Table -6.2, Questionnaire for Physical Survey

Name:

Character	Intensity
S: Sober, quiet	1: Low
G:Glamorous, beautiful	2: Medium
D: Dynamic	3:High
I:Intimidating, dominating	

S.No	Vehicle	character	Intensity
1	CD-DLX		
2	GLAMOUR		
3	PASSION		
4	SPLENDOR+		
5	HUNK		
6	SPLENDOR-NXG		
7	CBZ EXTREME		
8	DISCOVER		
9	PULSER 150		
10	TVS APACHE		
11	TVS FLAME		
12	TVS STAR CITY		

Step 3. Result compilation

Total no of respondents=235

For a particular motorcycle for a particular character,

No of respondents selecting that responding to that motorcycle=$\sum n$

Sum of scores for the character=$\sum x$

Score for the character x= $\sum x/\sum n$

Maximum score for any motorcycle for any character=x_{max}

$_{SGDI}$ score for a particular motorcycle for a particular emotion X=x/ x_{max}*3

See the compiled scores in Appendix-34.

6.2 Calculation of Emotion Quotients

Step 4. Motorcycle Evaluations

Before we fill the evaluation sheets for each motorcycle three activities need to be completed:

1. Calculation of dynamism for each bike. For this, the horizontal balance, vertical balance, ratio and visual dynamism for each bike was calculated and then the final dynamism score were calculated. (Refer appendix-35.a to 35.c)

2. Calculation of unity. (Refer appendix-36)

3. Calculation of SGDI scores for texture: For this each bike was divided into equal area grids and the areas for each zone with different color and texture was calculated and finally the weighted SGDI score was calculated as shown in the table below:

Table -6.3: Calculation Method for Texture Scores

	SGDI Score				A*Score			
Area	S	G	D	I	S	G	D	I
A_1	s_1	g_1	d_1	i_1	$A1s_1$	$A1g_1$	$A1d_1$	$A1i_1$
A_2	s_2	g_2	d_2	i_2	$A2s_2$	$A2g_2$	$A2d_2$	$A2i_2$
.----------								
A_n	s_n	g_n	d_n	i_n	A_ns_n	A_ng_n	A_nd_n	A_ni_n
Final Score					$\sum A_xs_x/\sum A$	$\sum A_xg_x/\sum A$	$\sum A_xS_x/\sum A$	$\sum A_xS_x/\sum A$

Texture scores are compiled in appendix-37.a and 37.b

See the evaluation scores in Appendix-38.a to 38.k.

6.3 Comparison and Iterations

Step 5. Comparison of survey and evaluation scores

Table 6.4, Comparison of Physical Survey and Evaluation Results

Motorcycle	Character	Evaluation score	Rated Score
CD-DLX	S	**2.75**	2.56
	G	**0.06**	1.43
	D	**0.27**	2.10
	I	**0.00**	1.27
GLAMOUR	S	**0.21**	1.49
	G	**2.66**	2.61
	D	**0.27**	1.76
	I	**0.00**	1.03
PASSION	S	**0.39**	1.63
	G	**2.18**	2.81
	D	**0.54**	1.90
	I	**0.00**	1.09
SPLENDOR+	S	**2.99**	3.00
	G	**0.09**	1.49
	D	**0.15**	1.99
	I	**0.09**	1.31
HUNK	S	**0.06**	0.95
	G	**0.21**	1.81
	D	**2.18**	2.77
	I	**1.12**	1.69
CBZ EXTREME	S	**0.00**	0.98
	G	**0.18**	1.78
	D	**2.06**	2.68
	I	**1.15**	2.15
DISCOVER	S	**0.85**	2.07
	G	**0.57**	1.88
	D	**0.97**	2.31
	I	**0.03**	1.43
PULSER 150	S	**0.15**	1.66
	G	**0.30**	1.96
	D	**1.85**	2.68
	I	**0.94**	1.34
TVS APACHE	S	**0.21**	1.75
	G	**0.27**	1.96
	D	**1.91**	2.50
	I	**0.54**	1.43
TVS FLAME	S	**0.48**	1.75
	G	**0.76**	1.91
	D	**1.06**	2.61
	I	**0.33**	1.39
TVS STAR CITY	S	**1.88**	2.22
	G	**0.21**	1.85
	D	**0.18**	1.80
	I	**0.00**	1.05

Important observations from this comparison are as follows:

i. The most dominant emotion exactly matched.
ii. The second most dominant matched in all cases except Hunk, Pulsar and Apache
iii. There was mismatch in scores, which is expected.

Since, the second dominant emotion was not matching in three cases, the scores for emotion factors need a slight tweaking. On closer examination two factors are observed:

1. The score for intimidation for cast wheels with big wider tire (B2) is too low (i.e. 0.24) in comparison to score for glamour, which lowers the intimidation factors for Hunk. As a result, Glamour becomes the second dominant emotion instead of intimidation. To correct this anomaly the scores for these two emotions needs to be adjusted.
2. The scores for glamour and intimidation for U2D3 and U3D3 are skewed in favor of glamour. This needs to be realistically adjusted.

With these observations, the following changes were made:

a. Wheels and tires

Table 6.5, Correction in SGDI values for Wheel and Tires

	S	G	D	I
Before	0.32	1.9	0.93	0.24
After	0.32	1.4	0.93	0.72

b. Unity and Dynamism

Table 6.6, Correction in SGDI values for Unity and Dynamism

		S	G	D	I
U2D3	Before	1.13	1.81	2.45	0.94
	After	1.13	1.1	2.45	1.75
U2D3	Before	0.64	1.36	2.25	1.88
	After	0.64	1.05	2.25	2.08

With these changes, the score charts for wheels and tires and Unity and dynamism are modified. With these modifications the motorcycle evaluation charts are also modified for Hunk, CBZ, Apache, Flame and Pulsar (appendix-39.a to 39.f) and the comparison chart between these rated scores and physical evaluation score are prepared afresh.

Table 6.7, Comparison of Physical Survey and Evaluation Results

Motorcycle	Physical Evaluation	Rated Score
CD-DLX	2.75	2.56
	0.06	1.43
	0.27	2.10
	0.00	1.27
GLAMOUR	0.21	1.49
	2.66	2.61
	0.27	1.76
	0.00	1.03
PASSION	0.39	1.63
	2.18	2.81
	0.54	1.90
	0.00	1.09
SPLENDOR+	2.99	3.00
	0.09	1.49
	0.15	1.99
	0.09	1.31
HUNK	0.06	0.95
	0.21	1.68
	2.18	2.93
	1.12	1.92
CBZ EXTREME	0.00	0.98
	0.18	1.65
	2.06	2.81
	1.15	2.37
DISCOVER	0.85	2.07
	0.57	1.88
	0.97	2.31
	0.03	1.43
PULSER 150	0.15	1.32
	0.30	1.72
	1.85	2.94
	0.94	1.74
TVS APACHE	0.21	1.41
	0.27	1.72
	1.91	2.77
	0.54	1.82
TVS FLAME	0.48	1.75
	0.76	1.91
	1.06	2.61
	0.33	1.39
TVS STAR CITY	1.88	2.22
	0.21	1.85
	0.18	1.80

Now, we can observe that the most dominant and second dominant emotions for all bikes are exactly matching. The second point to be observed is the relative identification of the bikes. Here, for each emotion, we identify three most dominant bikes and see whether they match for physical evaluation and rated scores. This can be seen in the following table.

Table 6.8, Comparison of Physical Survey and Evaluation Results (Relative Position in Market)

	Physical Evaluation	Rated Score
S	Splendor	Splendor
	CD Dlx	CD Dlx
	TVS Star City	TVS Star City
G	Glamour	Passion
	Passion	Glamour
	TVS Flame	Flame
D	Hunk	Hunk
	CBZ Extreme	CBZ Extreme
	Apache	Pulsar 151
I	CBZ Extreme	CBZ Extreme
	Hunk	Hunk
	Pulser	Apache

Here we observe that for emotions S and G, all three bikes are matching (except that the fact the order is reversed in case of G for the top two between Passion and Glamour). For D and I, top two bikes are exactly matching.

The next criterion for evaluating the results is the relative position of models for each emotion. We plot the curves for physical evaluation and rated scores for each emotion:

a. Sober

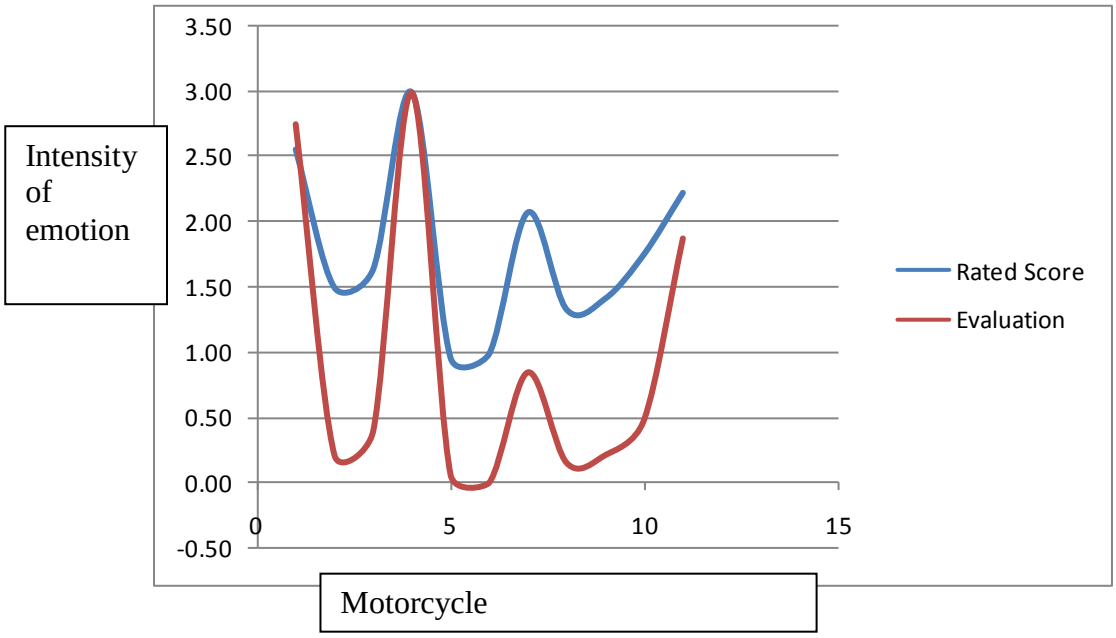


Fig-6.1, Comparison of Rated Score and Physical Evaluation Results for 'Sober' Quotient

b. Glamorous

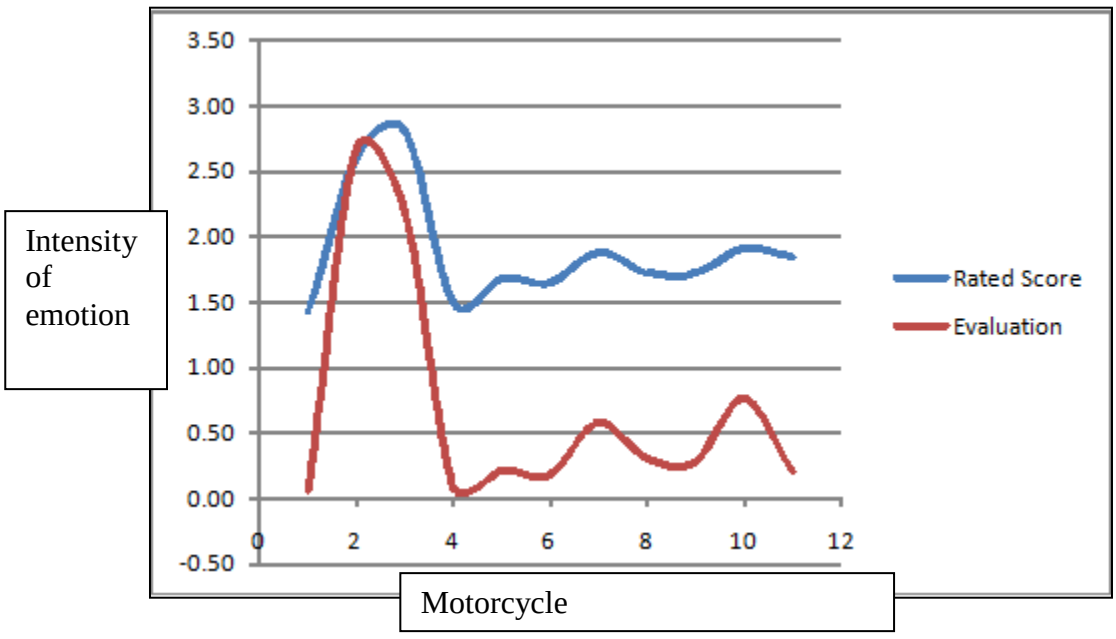


Fig-6.2, Comparison of Rated Score and Physical Evaluation Results for 'Glamour' Quotient

c. Dynamic

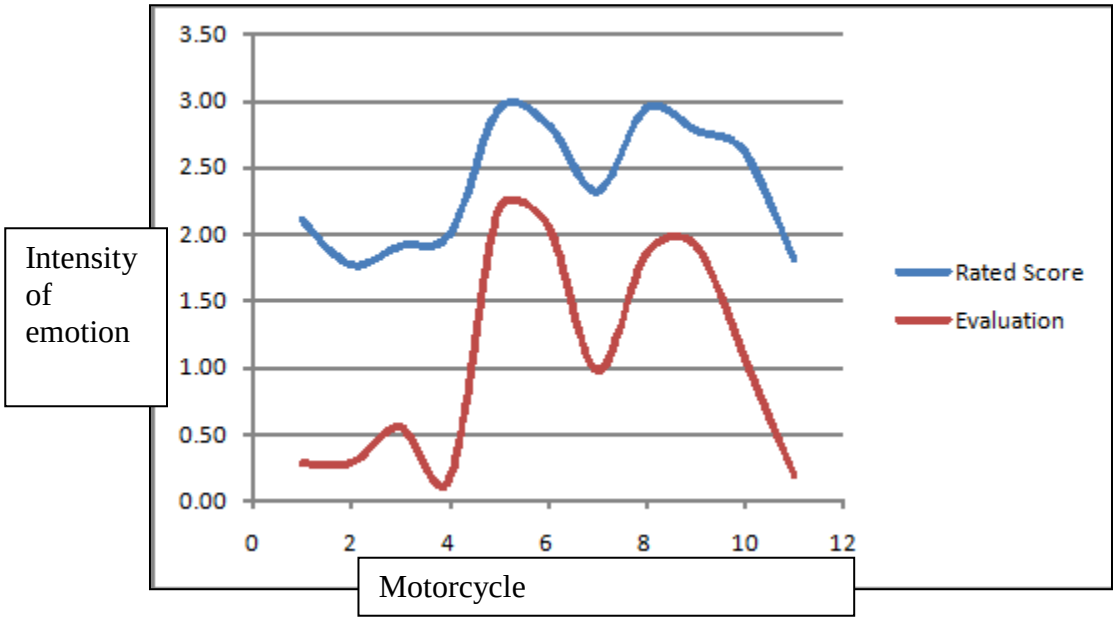


Fig-6.3, Comparison of Rated Score and Physical Evaluation Results for 'Dynamism' Quotient

d. Intimidating

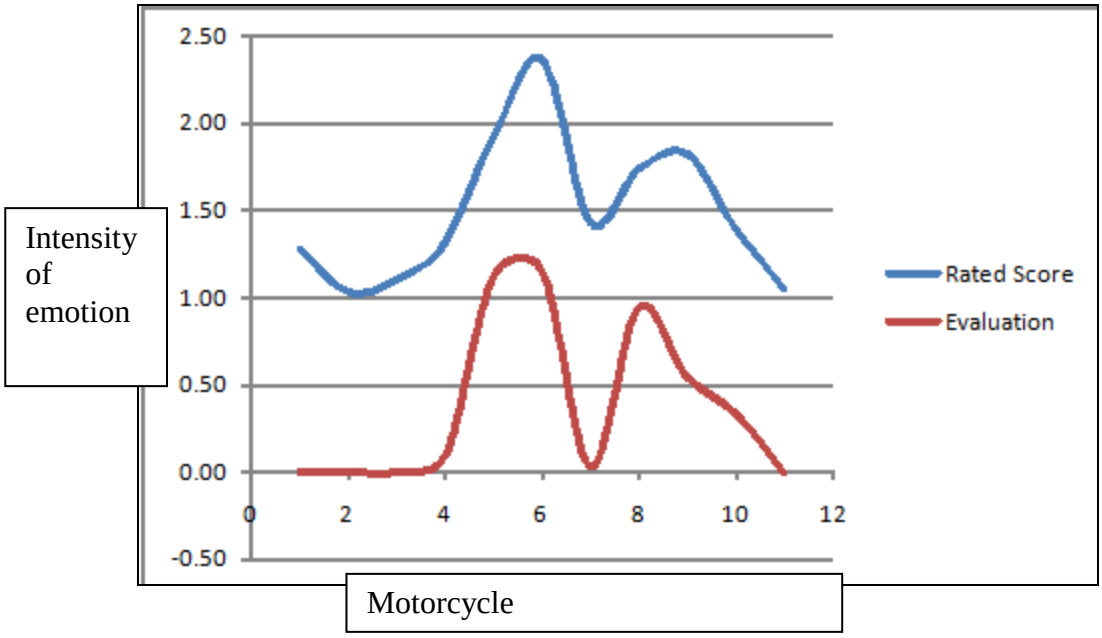


Fig-6.4, Comparison of Rated Score and Physical Evaluation Results for 'Intimidation' Quotient

Statistical Tools for Comparison: For comparison physical evaluation results and rated scores, calculating standard deviation is helpful as we observe that, though the curves are shifted, the variation pattern is similar. Standard deviation helps in understanding the similarity of pattern. It also helps in understanding the difference between physical evaluation and calculating the score.

Other tools like regression analysis and distribution curves do not help in reaching useful conclusions.

Table 6.9, Comparison of Rated Scores and Physical Evaluation Results (Standard Deviation)

	Evaluation	Rated Score
Sober	1.11	0.64
Glamorous	0.89	0.44
Dynamic	0.82	0.47
Intimidating	0.48	0.42

6.4. Conclusion and Summary

The most critical observation that we made during this verification was that the calculated score were quite close to the actual scores given by respondents, except for some. Still we made some iteration to our SGDI scores for factors wheels and tires and unity and dynamism.

After these iterations, we observe that the relative variation for each emotion is matching for physical evaluation and rated scores. The standard deviation for physical evaluation is slightly higher compared to the calculated ratings.

We will be discussing the conclusions in detail in next chapter.

Appendix-34: Evaluation survey result

Motorcycle	Character	∑x	n	x=∑x/n	Weighted Evaluation Survey score
CD-DLX	S	455	210	1.94	**2.75**
	G	10	5	0.04	**0.06**
	D	45	20	0.19	**0.27**
	I	0	0	0.00	**0.00**
GLAMOUR	S	35	20	0.15	**0.21**
	G	440	185	1.87	**2.66**
	D	45	25	0.19	**0.27**
	I	0	0	0.00	**0.00**
PASSION	S	65	30	0.28	**0.39**
	G	360	165	1.53	**2.18**
	D	90	40	0.38	**0.54**
	I	0	0	0.00	**0.00**
SPLENDOR+	S	495	215	2.11	**2.99**
	G	15	5	0.06	**0.09**
	D	25	10	0.11	**0.15**
	I	15	5	0.06	**0.09**
HUNK	S	10	5	0.04	**0.06**
	G	35	15	0.15	**0.21**
	D	360	135	1.53	**2.18**
	I	185	80	0.79	**1.12**
CBZ EXTREME	S	0	0	0.00	**0.00**
	G	30	15	0.13	**0.18**
	D	340	140	1.45	**2.06**
	I	190	75	0.81	**1.15**
DISCOVER	S	140	85	0.60	**0.85**
	G	95	65	0.40	**0.57**
	D	160	85	0.68	**0.97**
	I	5	5	0.02	**0.03**
PULSER 150	S	25	10	0.11	**0.15**
	G	50	20	0.21	**0.30**
	D	305	135	1.30	**1.85**
	I	155	70	0.66	**0.94**
TVS APACHE	S	35	25	0.15	**0.21**
	G	45	30	0.19	**0.27**
	D	315	140	1.34	**1.91**
	I	90	40	0.38	**0.54**
TVS FLAME	S	80	50	0.34	**0.48**
	G	125	60	0.53	**0.76**
	D	175	100	0.74	**1.06**
	I	55	25	0.23	**0.33**
TVS STAR CITY	S	310	200	1.32	**1.88**
	G	35	15	0.15	**0.21**
	D	30	20	0.13	**0.18**
	I	0	0	0.00	**0.00**

Appendix-35.a: Horizontal Imbalance

Model	Side	Details						n	r	w					W=w.n/r	Multi Facto	W.f	∑W.f	Imbalance
		Hue	Value	Chro	VC	Surf Texture	Space			a	b	c	d	w=(a+b-c)d					
Hunk	LHS	Red	2	4	0	Glossy	Flat	6	2	2.75	0.00	0.25	1.00	2.5	7.5	1.50	11.25	38.71	10.212986
		Red	2	4	0	Glossy	high + ve	6	4	2.75	0.00	0.25	1.50	3.75	5.625	1.00	5.63		
		Grey	2	1	0	Plain	Flat	3	0.5	1.75	0.00	0.50	1.00	1.25	7.5	1.00	7.50		
		Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.00	6.60		
		Black	1	4	2	Plain	Flat	0.5	5	2.75	0.50	0.50	1.00	2.75	0.275	1.00	0.28		
		Red	2	4	0	Glossy	Flat	2.5	8	2.75	0.00	0.25	1.00	2.5	0.78125	1.00	0.78		
		Red	2	4	4	Glossy	Flat	2.5	8	2.75	1.00	0.25	1.00	3.5	1.09375	1.00	1.09		
		Silver	4	2	2	Glossy	high + ve	1	3	1.50	0.50	0.25	1.50	2.625	0.875	1.00	0.88		
		Silver	4	2	2	Glossy	Flat	1	6.5	1.50	0.50	0.25	1.00	1.75	0.269231	1.00	0.27		
		Black	1	4	0	Glossy	Flat	2	6	2.75	0.00	0.25	1.00	2.5	0.833333	1.00	0.83		
		Black	1	4	2	Rough	Flat	7	8	2.75	0.50	0.00	1.00	3.25	2.84375	1.00	2.84		
		Grey	1	2	0	Rough	.-ve	3	8	1.75	0.00	0.00	0.75	1.3125	0.492188	1.00	0.49		
		White	4	4	0	Glossy	Flat	1	6.5	2.00	0.00	0.25	1.00	1.75	0.269231	1.00	0.27		
	RHS	Black	1	4	0	Rough	Flat	4	2	2.75	0.00	0.00	1.00	2.75	5.5	1.67	9.19	31.53	
		Black	1	4	0	Rough	Flat	8	5	2.75	0.00	0.00	1.00	2.75	4.4	1.00	4.40		
		Grey	2	1	0	Plain	Flat	4	1.5	1.75	0.00	0.50	1.00	1.25	3.333333	1.33	4.43		
		Red	2	4	3	Glossy	.+ve	4	4	2.75	0.75	0.25	1.25	4.0625	4.0625	1.00	4.06		
		White	4	4	4	Glossy	.+ve	7	4	2.00	1.00	0.25	1.25	3.4375	6.015625	1.00	6.02		
		Red	3	4	2	Glossy	.-ve	0.5	0.5	2.75	0.50	0.25	0.75	2.25	2.25	1.00	2.25		
		Grey	1	4	1	Rough	.+ve	1	6	2.75	0.25	0.00	1.25	3.75	0.625	1.00	0.63		
		Black	1	4	0	Plain	Flat	2	8	2.75	0.00	0.50	1.00	2.25	0.5625	1.00	0.56		
TVS Star	LHS	Red	2	3	0	Glossy	Flat	3.5	1	2.50	0.00	0.25	1.00	2.25	7.875	1.33	10.47	32.79	2.68563157
		Yellow	2	2	0	Glossy	Flat	4	2	1.25	0.00	0.25	1.00	1	2	1.67	3.34		
		White	2	2	0	Glossy	Flat	1	2	2.00	0.00	0.25	1.00	1.75	0.875	1.67	1.46		
		Black	1	4	0	Glossy	Flat	1	0.5	2.75	0.00	0.25	1.00	2.5	5	1.00	5.00		
		Silver	4	2	0	Rough	Flat	3	1	1.50	0.00	0.00	1.00	1.5	4.5	1.33	5.99		
		Silver	2	2	0	Rough	Flat	2	2.5	2.00	0.00	0.00	1.00	2	1.6	1.00	1.60		
		Red	3	3	0	Glossy	Flat	1.5	7	2.25	0.00	0.25	1.00	2	0.428571	1.00	0.43		
		White	2	2	1	Glossy	Flat	1	7	2.00	0.25	0.25	1.00	2	0.285714	1.00	0.29		
		Black	1	4	0	Transparent	Flat	1	7	2.75	0.00	0.75	1.00	2	0.285714	1.00	0.29		
		Red	3	3	0	Glossy	Flat	3	7	2.25	0.00	0.25	1.00	2	0.857143	1.00	0.86		
		Black	1	4	0	Glossy	Flat	5	8	2.75	0.00	0.25	1.00	2.5	1.5625	1.00	1.56		
		Silver	4	2	0	Rough	Flat	5	8	1.50	0.00	0.00	1.00	1.5	0.9375	1.00	0.94		
		Silver	2	2	0	Rough	Flat	2	7	2.00	0.00	0.00	1.00	2	0.571429	1.00	0.57		
	RHS	Black	1	4	0	Rough	Flat	5	2	2.75	0.00	0.00	1.00	2.75	6.875	1.67	11.48	31.07	
		Red	2	3	2	Glossy	Flat	2	1	2.50	0.50	0.25	1.00	2.75	5.5	1.00	5.50		
		Yellow	2	2	0	Glossy	Flat	2	1	1.25	0.00	0.25	1.00	1	2	1.33	2.66		
		White	2	2	0	Glossy	Flat	0.5	1.5	2.00	0.00	0.25	1.00	1.75	0.583333	1.00	0.58		
		Silver	4	2	0	Rough	Flat	8	4	1.50	0.00	0.00	1.00	1.5	3	1.67	5.01		
		Black	1	4	0	Rough	Flat	5	4.5	2.75	0.00	0.00	1.00	2.75	3.055556	1.00	3.06		
		Silver	4	2	0	Rough	Flat	2.5	4.5	1.50	0.00	0.00	1.00	1.5	0.833333	1.00	0.83		
		White	4	4	0	Glossy	Flat	2	5	2.00	0.00	0.25	1.00	1.75	0.7	1.00	0.70		
		Silver	4	4	0	Rough	Flat	1	7	2.00	0.00	0.00	1.00	2	0.285714	1.00	0.29		
		Black	1	4	0	Plain	Flat	3	7	2.75	0.00	0.50	1.00	2.25	0.964286	1.00	0.96		
	LHS	Black	1	4	0	Glossy	Flat	1.5	1	2.75	0.00	0.25	1.00	2.5	3.75	1.33	4.99	37.86	
		Red	3	4	3	Glossy	.+ve	2.5	3	2.50	0.75	0.25	1.25	3.75	3.125	1.00	3.13		
		Red	3	4	3	Glossy	.-ve	1.5	1	2.50	0.75	0.25	0.75	2.25	3.375	1.33	4.49		
		Red	2	4	3	Glossy	Flat	1	1	2.75	0.75	0.25	1.00	3.25	3.25	1.33	4.32		
		White	4	4	1	Glossy	.+ve	0.5	1	2.00	0.25	0.25	1.25	2.5	1.25	1.00	1.25		
		Yellow	3	3	0	Transparent	.+ve	1	4	1.25	0.00	0.75	1.25	0.625	0.15625	1.00	0.16		

TVS Flame		Black	1	4	0	Rough	Flat	7	2	2.75	0.00	0.00	1.00	2.75	9.625	1.00	9.63		
		White	4	4	1	Glossy	.+ve	2	3	2.00	0.25	0.25	1.25	2.5	1.666667	1.00	1.67		
		Red	3	4	0	Glossy	.+ve	2.5	6.5	2.50	0.00	0.25	1.25	2.8125	1.081731	1.00	1.08		-7.08325053
		Black	1	4	0	Glossy	Flat	2	4.5	2.75	0.00	0.25	1.00	2.5	1.111111	1.00	1.11		
		Black	1	4	0	Rough	Flat	8	6.5	2.75	0.00	0.00	1.00	2.75	3.384615	1.00	3.38		
		Black	1	4	0	Rough	Flat	5	6.5	2.75	0.00	0.00	1.00	2.75	2.115385	1.00	2.12		
	RHS	Black	1	4	0	Rough	Flat	7	3	2.75	0.00	0.00	1.00	2.75	6.416667	1.90	12.19		
		Black	1	4	0	Glossy	Flat	4	1.5	2.75	0.00	0.25	1.00	2.5	6.666667	1.50	10.00		
		Grey	1	3	0	Glossy	Flat	4.5	1.5	2.50	0.00	0.25	1.00	2.25	6.75	1.50	10.13	43.64	
		Black	1	4	0	Rough	Flat	11	5	2.75	0.00	0.00	1.00	2.75	6.05	1.00	6.05		
		Red	2	3	2	Glossy	Flat	3	4	2.50	0.50	0.25	1.00	2.75	2.0625	1.00	2.06		
		Black	1	4	0	Rough	Flat	7	6	2.75	0.00	0.00	1.00	2.75	3.208333	1.00	3.21		
Discover	LHS	Black	1	4	0	Glossy	.-ve	2	1	2.75	0.00	0.25	0.75	1.875	3.75	1.33	4.99		
		Red	2	3	2	Glossy	.-ve	3	2	2.50	0.50	0.25	0.75	2.0625	3.09375	1.50	4.64		
		White	3	3	3	Glossy	.+ve	1	2	2.00	0.75	0.25	1.25	3.125	1.5625	1.50	2.34		
		Grey	2	1	1	Rough	.-ve	5	2	1.75	0.25	0.00	0.75	1.5	3.75	1.50	5.63		
		Black	1	4	0	Plain	Flat	3	6	2.75	0.00	0.50	1.00	2.25	1.125	1.00	1.13		
		White	4	4	4	Plain	Flat	0.5	6	2.00	1.00	0.50	1.00	2.5	0.208333	1.00	0.21	25.19	
		White	3	3	3	Transparent	Flat	0.5	7	2.00	0.75	0.75	1.00	2	0.142857	1.00	0.14		
		Black	1	4	0	Glossy	Flat	7	7	2.75	0.00	0.25	1.00	2.5	2.5	1.00	2.50		
		Black	2	4	0	Rough	Flat	6	7.5	2.75	0.00	0.00	1.00	2.75	2.2	1.00	2.20		
		Grey	2	2	0	Rough	.-ve	5	7.5	2.00	0.00	0.00	0.75	1.5	1	1.00	1.00		-0.22017179
		White	4	3	4	Glossy	Flat	1	6	1.75	1.00	0.25	1.00	2.5	0.416667	1.00	0.42		
	RHS	Black	1	4	0	Rough	Flat	5	3	2.75	0.00	0.00	1.00	2.75	4.583333	1.90	8.71		
		Black	1	4	0	Rough	Flat	1	1	2.75	0.00	0.00	1.00	2.75	2.75	1.33	3.66		
		Red	2	3	2	Glossy	Flat	2	1.5	2.50	0.50	0.25	1.00	2.75	3.666667	1.50	5.50		
		White	3	3	3	Glossy	Flat	1	1	2.00	0.75	0.25	1.00	2.5	2.5	1.00	2.50	25.30	
		White	3	3	3	Glossy	Flat	1	5	2.00	0.75	0.25	1.00	2.5	0.5	1.00	0.50		
		White	4	3	4	Glossy	Flat	3	5.5	1.75	1.00	0.25	1.00	2.5	1.363636	1.00	1.36		
		Black	1	4	0	Plain	Flat	1	7	2.75	0.00	0.50	1.00	2.25	0.321429	1.00	0.32		
		Black	1	4	0	Rough	Flat	5	5	2.75	0.00	0.00	1.00	2.75	2.75	1.00	2.75		
Apache	LHS	Red	2	4	3	Glossy	.-ve	5	1.5	2.75	0.75	0.25	0.75	2.4375	8.125	1.50	12.19		
		Red	2	4	3	Glossy	high .+ve	5	3.5	2.75	0.75	0.25	1.50	4.875	6.964286	1.90	13.23		
		Black	1	4	0	Glossy	Flat	3	1	2.75	0.00	0.25	1.00	2.5	7.5	1.33	9.98		
		Grey	2	2	0	Rough	Flat	5	2	2.00	0.00	0.00	1.00	2	5	1.67	8.35		
		Grey	3	2	0	Rough	Flat	3	1.5	1.75	0.00	0.00	1.00	1.75	3.5	1.50	5.25		
		Red	2	4	1	Glossy	Flat	2	3	2.75	0.25	0.25	1.00	2.75	1.833333	1.00	1.83		
		Black	1	4	0	Transparent	Flat	2	6	2.75	0.00	0.75	1.00	2	0.666667	1.00	0.67	58.91	
		Red	2	4	3	Glossy	Flat	3	7	2.75	0.75	0.25	1.00	3.25	1.392857	1.00	1.39		
		White	3	3	1	Transparent	Flat	0.5	8	2.00	0.25	0.75	1.00	1.5	0.09375	1.00	0.09		
		Red	2	4	3	Glossy	Flat	3	8.5	2.75	0.75	0.25	1.00	3.25	1.147059	1.00	1.15		
		Black	1	4	0	Glossy	Flat	2.5	4	2.75	0.00	0.25	1.00	2.5	1.5625	1.00	1.56		
		Black	1	4	0	Rough	Flat	6	8.5	2.75	0.00	0.00	1.00	2.75	1.941176	1.00	1.94		17.8211585
		Grey	2	2	0	Rough	.-ve	6	8.5	2.00	0.00	0.00	0.75	1.5	1.058824	1.00	1.06		
		White	4	3	0	Glossy	Flat	1	7	1.75	0.00	0.25	1.00	1.5	0.214286	1.00	0.21		
	RHS	Black	1	4	0	Rough	Flat	4	2	2.75	0.00	0.00	1.00	2.75	5.5	1.67	9.19		
		Black	1	4	0	Glossy	Flat	4	1	2.75	0.00	0.25	1.00	2.5	10	1.33	13.30		
		Silver	4	2	4	Rough	Flat	5	5	1.50	1.00	0.00	1.00	2.5	2.5	1.00	2.50		
		Silver	4	2	0	Rough	Flat	2.5	1	1.50	0.00	0.00	1.00	1.5	3.75	1.33	4.99	41.09	
		White	4	4	0	Glossy	Flat	8	3	2.00	0.00	0.25	1.00	1.75	4.666667	1.00	4.67		
		Black	1	4	0	Rough	Flat	7	4	2.75	0.00	0.00	1.00	2.75	4.8125	1.00	4.81		
		Silver	3	2	0	Rough	Flat	3	4	1.75	0.00	0.00	1.00	1.75	1.3125	1.00	1.31		
		Black	1	4	0	Plain	Flat	1	7	2.75	0.00	0.50	1.00	2.25	0.321429	1.00	0.32		
		Black	1	4	0	Glossy	High+ve	8	2	2.75	0.00	0.25	1.50	3.75	15	1.67	25.05		
		White	4	4	4	Glossy	High+ve	1	2	2.00	1.00	0.25	1.50	4.125	2.0625	1.67	3.44		
		Silver	4	2	4	Rough	Flat	2.5	1	1.50	1.00	0.00	1.00	2.5	6.25	1.33	8.31		
		Silver	3	2	4	Rough	Flat	4	2	1.75	1.00	0.00	1.00	2.75	5.5	1.55	8.53		

Pulsar	LHS	Black	1	4	3	Plain	Flat	0.2	1.5	2.75	0.75	0.50	1.00	3	0.4	1.00	0.40	52.50	23.5905327
		Black	1	4	0	Plain	Flat	3	6	2.75	0.00	0.50	1.00	2.25	1.125	1.00	1.13		
		Black	1	4	0	Glossy	Flat	4	6.5	2.75	0.00	0.25	1.00	2.5	1.538462	1.00	1.54		
		Black	1	4	0	Rough	Flat	6	7	2.75	0.00	0.00	1.00	2.75	2.357143	1.00	2.36		
		Silver	3	2	0	Rough	Flat	3	7	1.75	0.00	0.00	1.00	1.75	0.75	1.00	0.75		
		Silver	2	2	0	Rough	Flat	1.5	7	2.00	0.00	0.00	1.00	2	0.428571	1.00	0.43		
		Black	1	4	0	Rough	.+ve	1	6	2.75	0.00	0.00	1.25	3.4375	0.572917	1.00	0.57		
	RHS	Black	1	4	0	Rough	Flat	6	3	2.75	0.00	0.00	1.00	2.75	5.5	1.90	10.45	32.46	
		Black	1	4	0	Glossy	Flat	11	4	2.75	0.00	0.25	1.00	2.5	6.875	1.90	13.06		
		Silver	4	2	4	Rough	Flat	0.5	7.5	1.50	1.00	0.00	1.00	2.5	0.166667	1.00	0.17		
		Silver	4	2	0	Rough	Flat	8.5	3	1.50	0.00	0.00	1.00	1.5	4.25	1.00	4.25		
		White	4	4	0	Glossy	Flat	5	6	2.00	0.00	0.25	1.00	1.75	1.458333	1.00	1.46		
		Black	1	4	0	Rough	Flat	4.5	6	2.75	0.00	0.00	1.00	2.75	2.0625	1.00	2.06		
		Silver	3	2	0	Rough	Flat	2.5	6	1.75	0.00	0.00	1.00	1.75	0.729167	1.00	0.73		
		Black	1	4	0	Plain	Flat	1	8	2.75	0.00	0.50	1.00	2.25	0.28125	1.00	0.28		
Splendor+	LHS	White	4	3	4	Glossy	Flat	0.5	0.5	1.75	1.00	0.25	1.00	2.5	2.5	1.00	2.50	41.23	-4.63739445
		Blue	3	3	3	Glossy	Flat	0.5	0.5	1.75	0.75	0.25	1.00	2.25	2.25	1.00	2.25		
		White	4	3	4	Glossy	Flat	3	2	1.75	1.00	0.25	1.00	2.5	3.75	1.50	5.63		
		Blue	3	3	3	Glossy	Flat	0.5	4	1.75	0.75	0.25	1.00	2.25	0.28125	1.90	0.53		
		Black	1	4	0	Glossy	Flat	4.5	0.8	2.75	0.00	0.25	1.00	2.5	15	1.00	15.00		
		Black	1	4	0	Glossy	Flat	3	3.5	2.75	0.00	0.25	1.00	2.5	2.142857	1.67	3.58		
		Black	1	4	0	Glossy	Flat	2	4.5	2.75	0.00	0.25	1.00	2.5	1.111111	1.00	1.11		
		Silver	2	1	0	Rough	Flat	9	2.5	1.75	0.00	0.00	1.00	1.75	6.3	1.00	6.30		
		Blue	4	3	3	Glossy	Flat	0.5	7	1.50	0.75	0.25	1.00	2	0.142857	1.00	0.14		
		Black	1	4	0	Glossy	Flat	13	9.5	2.75	0.00	0.25	1.00	2.5	3.421053	1.00	3.42		
		Silver	2	1	0	Rough	Flat	2	8.5	1.75	0.00	0.00	1.00	1.75	0.411765	1.00	0.41		
		Silver	3	1	0	Rough	Flat	2	8.5	1.50	0.00	0.00	1.00	1.5	0.352941	1.00	0.35		
	RHS	White	4	3	4	Glossy	Flat	1.5	0.8	1.75	1.00	0.25	1.00	2.5	5	1.00	5.00	45.24	
		White	4	3	4	Glossy	Flat	0.5	5	1.75	1.00	0.25	1.00	2.5	0.25	1.00	0.25		
		Black	1	4	0	Rough	Flat	6	3	2.75	0.00	0.00	1.00	2.75	5.5	1.90	10.45		
		Black	1	4	0	Glossy	Flat	1	0.5	2.75	0.00	0.25	1.00	2.5	5	1.00	5.00		
		Black	1	4	0	Glossy	.+ve	1	3	2.75	0.00	0.25	1.25	3.125	1.041667	1.00	1.04		
		Silver	2	1	0	Rough	Flat	9.5	2.5	1.75	0.00	0.00	1.00	1.75	6.65	1.90	12.64		
		Black	1	4	0	Rough	Flat	9	4	2.75	0.00	0.00	1.00	2.75	6.1875	1.00	6.19		
		White	4	3	4	Glossy	Flat	7	5.5	1.75	1.00	0.25	1.00	2.5	3.181818	1.00	3.18		
		Red	2	4	2	Transparent	Flat	0.5	6.5	2.75	0.50	0.75	1.00	2.5	0.192308	1.00	0.19		
		Black	1	4	0	Plain	Flat	2	7	2.75	0.00	0.50	1.00	2.25	0.642857	1.00	0.64		
		Silver	2	1	0	Rough	Flat	1.5	4	1.75	0.00	0.00	1.00	1.75	0.65625	1.00	0.66		
Splendor NXG	LHS	White	3	3	3	Glossy	.-ve	1	2	2.00	0.75	0.25	0.75	1.875	0.9375	1.33	1.25	31.88	-6.5365114
		White	4	4	4	Glossy	.+ve	1	4	2.00	1.00	0.25	1.25	3.4375	0.859375	1.33	1.14		
		Silver	2	2	2	Glossy	.+ve	1	4	2.00	0.50	0.25	1.25	2.8125	0.703125	1.33	0.94		
		Red	3	3	3	Glossy	.+ve	2	1	2.25	0.75	0.25	1.25	3.4375	6.875	1.50	10.31		
		White	4	4	4	Glossy	Flat	0.5	0.5	2.00	1.00	0.25	1.00	2.75	2.75	1.00	2.75		
		Red	3	3	3	Glossy	.-ve	1	3	2.25	0.75	0.25	0.75	2.0625	0.6875	1.00	0.69		
		Black	1	4	0	Glossy	Flat	1.5	1	2.75	0.00	0.25	1.00	2.5	3.75	1.33	4.99		
		Black	1	4	0	Glossy	Flat	2.5	4	2.75	0.00	0.25	1.00	2.5	1.5625	1.00	1.56		
		Black	1	4	0	Glossy	Flat	4	7	2.75	0.00	0.25	1.00	2.5	1.428571	1.00	1.43		
		White	3	3	3	Plain	Flat	0.5	7	2.00	0.75	0.50	1.00	2.25	0.160714	1.00	0.16		
		Red	2	3	2	Plain	Flat	0.5	7	2.50	0.50	0.50	1.00	2.5	0.178571	1.00	0.18		
		Black	1	4	0	Plain	Flat	6	3	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.50		
		Black	2	4	0	Plain	Flat	6	9	2.50	0.00	0.50	1.00	2	1.333333	1.00	1.33		
		Silver	2	1	0	Rough	.-ve	4.5	9	1.75	0.00	0.00	0.75	1.3125	0.65625	1.00	0.66		
	RHS	White	4	4	4	Glossy	.+ve	0.5	0.5	2.00	1.00	0.25	1.25	3.4375	3.4375	1.00	3.44	36.34	
		Red	2	2	2	Glossy	.+ve	0.5	1	2.25	0.50	0.25	1.25	3.125	1.5625	1.33	2.08		
		Black	1	4	0	Rough	Flat	6	3	2.75	0.00	0.00	1.00	2.75	5.5	1.90	10.45		
		Black	1	4	0	Plain	.-ve	4	3	2.75	0.00	0.50	0.75	1.6875	2.25	1.90	4.28		
		Grey	2	1	0	Rough	Flat	8	2.5	1.75	0.00	0.00	1.00	1.75	5.6	1.90	10.64		

	RHS	Black	2	4	0	Rough	Flat	4	6	2.50	0.00	0.00	1.00	2.5	1.666667	1.00	1.67	30.34	
		Silver	2	1	0	Rough	Flat	3	6	1.75	0.00	0.00	1.00	1.75	0.875	1.00	0.88		
		White	4	2	4	Glossy	Flat	3.5	4	1.75	1.00	0.25	1.00	2.5	2.1875	1.00	2.19		
		Red	2	4	2	Transparent	Flat	1	7	2.75	0.50	0.75	1.00	2.5	0.357143	1.00	0.36		
		Black	1	4	0	Plain	Flat	1	6	2.75	0.00	0.50	1.00	2.25	0.375	1.00	0.38		
Passion	LHS	Red	3	4	3	Glossy	Flat	2	2	2.50	0.75	0.25	1.00	3	3	1.50	4.50	47.01	1.72807488
		Red	2	4	2	Glossy	Flat	3	1	2.75	0.50	0.25	1.00	3	9	1.33	11.97		
		Black	1	4	4	Glossy	Flat	2	3	2.75	1.00	0.25	1.00	3.5	2.333333	1.90	4.43		
		Black	2	4	0	Glossy	Flat	10	2.5	2.50	0.00	0.25	1.00	2.25	9	1.90	17.10		
		Red	3	4	3	Glossy	Flat	0.5	7	2.50	0.75	0.25	1.00	3	0.214286	1.00	0.21		
		Black	1	4	0	Glossy	Flat	4	6	2.75	0.00	0.25	1.00	2.5	1.666667	1.00	1.67		
		Black	1	4	0	Rough	Flat	6	8	2.75	0.00	0.00	1.00	2.75	2.0625	1.00	2.06		
		Black	2	4	0	Rough	Flat	4	8	2.50	0.00	0.00	1.00	2.5	1.25	1.00	1.25		
		Grey	2	1	0	Plain	Flat	1	7.5	1.75	0.00	0.50	1.00	1.25	0.166667	1.00	0.17		
		Silver	4	3	3	Glossy	.+ve	1.5	5.5	1.75	0.75	0.25	1.25	2.8125	0.767045	1.00	0.77		
		White	4	4	0	Glossy	Flat	0.5	7	2.00	0.00	0.25	1.00	1.75	0.125	1.00	0.13		
		Black	1	4	0	Rough	Flat	0.5	0.5	2.75	0.00	0.00	1.00	2.75	2.75	1.00	2.75		
	RHS	Black	1	4	0	Rough	Flat	5.5	3	2.75	0.00	0.00	1.00	2.75	5.041667	1.90	9.58	45.41	
		Red	2	4	0	Glossy	Flat	2	0.5	2.75	0.00	0.25	1.00	2.5	10	1.00	10.00		
		Red	2	4	0	Glossy	Flat	6	3	2.75	0.00	0.25	1.00	2.5	5	1.90	9.50		
		Grey	2	1	0	Rough	Flat	4	1	1.75	0.00	0.00	1.00	1.75	7	1.33	9.31		
		Grey	2	1	0	Rough	Flat	3	3.5	1.75	0.00	0.00	1.00	1.75	1.5	1.00	1.50		
		White	4	2	4	Glossy	.-ve	2.5	4	1.50	1.00	0.25	0.75	1.6875	1.054688	1.00	1.05		
		Black	2	4	0	Rough	Flat	4	3.5	2.50	0.00	0.00	1.00	2.5	2.857143	1.00	2.86		
		Grey	2	1	0	Rough	.-ve	2	3.5	1.75	0.00	0.00	0.75	1.3125	0.75	1.00	0.75		
		Grey	1	1	1	Rough	.+ve	1	5.5	2.00	0.25	0.00	1.25	2.8125	0.511364	1.00	0.51		
		Black	1	4	0	Plain	Flat	1	6.5	2.75	0.00	0.50	1.00	2.25	0.346154	1.00	0.35		
CD Dlx	LHS	Red	3	3	3	Glossy	Flat	0.5	6	2.25	0.75	0.25	1.00	2.75	0.229167	1.00	0.23	29.70	3.08062658
		Red	3	3	3	Glossy	Flat	1	1	2.25	0.75	0.25	1.00	2.75	2.75	1.33	3.66		
		Red	4	4	1	Glossy	.+ve	4	4	2.25	0.25	0.25	1.25	2.8125	2.8125	1.90	5.34		
		Red	2	2	2	Glossy	Flat	1	2	2.25	0.50	0.25	1.00	2.5	1.25	1.67	2.09		
		Black	1	4	0	Glossy	Flat	2	1	2.75	0.00	0.25	1.00	2.5	5	1.33	6.65		
		Black	1	4	0	Plain	.-ve	3.5	1.5	2.75	0.00	0.50	0.75	1.6875	3.9375	1.67	6.58		
		Black	1	4	0	Plain	Flat	2	6	2.75	0.00	0.50	1.00	2.25	0.75	1.00	0.75		
		Black	1	4	0	Rough	Flat	9	8	2.75	0.00	0.00	1.00	2.75	3.09375	1.00	3.09		
		Silver	2	1	0	Rough	Flat	6	8	1.75	0.00	0.00	1.00	1.75	1.3125	1.00	1.31		
	RHS	Black	1	4	0	Rough	Flat	6	3	2.75	0.00	0.00	1.00	2.75	5.5	1.90	10.45	27.92	
		White	4	4	0	Glossy	.+ve	1	1	2.00	0.00	0.25	1.25	2.1875	2.1875	1.33	2.91		
		Silver	2	1	0	Rough	.+ve	1.5	6.5	1.75	0.00	0.00	1.25	2.1875	0.504808	1.00	0.50		
		White	4	4	0	Glossy	.+ve	3	5	2.00	0.00	0.25	1.25	2.1875	1.3125	1.00	1.31		
		Black	1	4	0	Rough	Flat	6.5	5	2.75	0.00	0.00	1.00	2.75	3.575	1.00	3.58		
		Silver	2	1	0	Plain	Flat	9	3	1.75	0.00	0.50	1.00	1.25	3.75	1.00	3.75		
		Red	2	2	2	Transparent	Flat	1	7.5	2.25	0.50	0.75	1.00	2	0.266667	1.00	0.27		
		Silver	2	1	0	Rough	.-ve	2.5	5	1.75	0.00	0.00	0.75	1.3125	0.65625	1.00	0.66		
		Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.50		
CBZ	LHS	Black	1	4	0	Plain	Flat	4	1	2.75	0.00	0.50	1.00	2.25	9	1.33	11.97	60.28	7.04610768
		White	4	3	4	Plain	.+ve	0.5	0.3	1.75	1.00	0.50	1.25	2.8125	5.625	1.00	5.63		
		Red	1	4	3	Plain	high.+ve	1	2	3.00	0.75	0.50	1.50	4.875	2.4375	1.00	2.44		
		Black	1	4	0	Glossy	high .+ve	5	2.5	2.75	0.00	0.25	1.50	3.75	7.5	1.90	14.25		
		Black	1	4	0	Plain	Flat	2.5	1	2.75	0.00	0.50	1.00	2.25	5.625	1.33	7.48		
		Grey	2	1	2	Rough	Flat	2	1	1.75	0.50	0.00	1.00	2.25	4.5	1.33	5.99		
		Grey	2	1	2	Rough	Flat	3	2	1.75	0.50	0.00	1.00	2.25	3.375	1.67	5.64		
		Black	1	4	0	Plain	Flat	4	5	2.75	0.00	0.50	1.00	2.25	1.8	1.00	1.80		
		White	4	4	4	Transparent	.+ve	1	6	2.00	1.00	0.75	1.25	2.8125	0.46875	1.00	0.47		
		Black	1	4	0	Glossy	Flat	4	5.5	2.75	0.00	0.25	1.00	2.5	1.818182	1.00	1.82		
		Grey	2	1	2	Rough	Flat	5	7	1.75	0.50	0.00	1.00	2.25	1.607143	1.00	1.61		
		Grey	2	1	2	Rough	.-ve	5	7	1.75	0.50	0.00	0.75	1.6875	1.205357	1.00	1.21		

	RHS	Black	1	4	0	Rough	Flat	13	3	2.75	0.00	0.00	1.00	2.75	11.91667	1.90	22.64	52.35	
		White	4	3	4	Plain	.-ve	0.5	0.3	1.75	1.00	0.50	0.75	1.6875	3.375	1.00	3.38		
		Grey	2	1	2	Rough	Flat	1	0.5	1.75	0.50	0.00	1.00	2.25	4.5	1.00	4.50		
		Silver	3	2	3	Rough	Flat	10	3.5	1.75	0.75	0.00	1.00	2.5	7.142857	1.90	13.57		
		Grey	1	1	1	Rough	Flat	3.5	3.5	2.00	0.25	0.00	1.00	2.25	2.25	1.90	4.28		
		Red	3	4	3	Plain	Flat	1	4.5	2.75	0.75	0.50	1.00	3	0.666667	1.00	0.67		
		Black	1	4	0	Rough	Flat	3.5	6	2.75	0.00	0.00	1.00	2.75	1.604167	1.00	1.60		
		Grey	2	1	2	Rough	.-ve	2	6	1.75	0.50	0.00	0.75	1.6875	0.5625	1.00	0.56		
		Red	3	4	3	Plain	.-ve	2	7	2.50	0.75	0.50	0.75	2.0625	0.589286	1.00	0.59		
		Black	1	4	0	Plain	Flat	2	8	2.75	0.00	0.50	1.00	2.25	0.5625	1.00	0.56		
Glamor	LHS	Black	1	4	1	Glossy	.-ve	3.5	1	2.75	0.25	0.25	0.75	2.0625	7.21875	1.33	9.60	43.94	4.79331051
		Black	1	4	1	Glossy	.+ve	1	1	2.75	0.25	0.25	1.25	3.4375	3.4375	1.33	4.57		
		Black	1	4	1	Glossy	Flat	3	3	2.75	0.25	0.25	1.00	2.75	2.75	1.67	4.59		
		Red	3	4	3	Glossy	Flat	3	1	2.50	0.75	0.25	1.00	3	9	1.33	11.97		
		Red	3	4	3	Glossy	Flat	1	3	2.50	0.75	0.25	1.00	3	1	1.67	1.67		
		Grey	1	1	1	Rough	Flat	2	1	2.00	0.25	0.00	1.00	2.25	4.5	1.33	5.99		
		Black	1	4	1	Glossy	Flat	3	6	2.75	0.25	0.25	1.00	2.75	1.375	1.00	1.38		
		Black	1	4	1	Rough	Flat	6	7	2.75	0.25	0.00	1.00	3	2.571429	1.00	2.57		
		Grey	1	4	1	Rough	.-ve	5	7	2.75	0.25	0.00	0.75	2.25	1.607143	1.00	1.61		
	RHS	Black	1	4	1	Rough	Flat	6	3.5	2.75	0.25	0.00	1.00	3	5.142857	1.90	9.77	39.92	
		Red	3	4	3	Glossy	Flat	7	4	2.50	0.75	0.25	1.00	3	5.25	1.90	9.98		
		Grey	1	4	1	Rough	.-ve	9	1.5	2.75	0.25	0.00	0.75	2.25	13.5	1.00	13.50		
		Black	1	4	1	Rough	Flat	5	5	2.75	0.25	0.00	1.00	3	3	1.00	3.00		
		Black	1	4	1	Plain	.+ve	4	5.5	2.75	0.25	0.50	1.25	3.125	2.272727	1.00	2.27		
		White	4	4	4	Glossy	.+ve	0.5	4	2.00	1.00	0.25	1.25	3.4375	0.429688	1.00	0.43		
		White	4	4	1	Plain	Flat	0.5	2.5	2.00	0.25	0.50	1.00	1.75	0.35	1.00	0.35		
		Black	1	4	1	Plain	Flat	2	8	2.75	0.25	0.50	1.00	2.5	0.625	1.00	0.63		

Appendix-35.b:Vertical Imbalance

S.No	Model	Side	Details						n	r	w						Multi Factor (f)	W.f	∑W.f	Imbalance
			Hue	Value	Chro	VC	Surf Texture	Space			a	b	c	d	w=(a+b-c)d	W=w.n/r				
1	Hunk	Lower	Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	76.01875	14.86923
2			Black	1	4	0	Plain	Flat	6	2.5	2.75	0.00	0.50	1.00	2.25	5.4	1.90	10.26		
3			Black	1	4	0	Glossy	Flat	2	2	2.75	0.00	0.25	1.00	2.5	2.5	1.00	2.5		
4			Red	3	4	0	Glossy	Flat	1	0.5	2.50	0.00	0.25	1.00	2.25	4.5	1.00	4.5		
5			Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		
6			Grey	1	1	0	Plain	Flat	6	1.5	2.00	0.00	0.50	1.00	1.5	6	1.50	9		
7			Silver	4	3	0	Glossy	.+ve	5.5	2.5	1.75	0.00	0.25	1.25	1.875	4.125	1.90	7.8375		
8			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
9			Black	1	4	0	Plain	Flat	3	2.5	2.75	0.00	0.50	1.00	2.25	2.7	1.00	2.7		
10			Red	3	4	0	Glossy	.+ve	0.5	1	2.50	0.00	0.25	1.25	2.8125	1.40625	1.00	1.40625		
11			Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25		
12			Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
13		Upper	Black	1	4	0	Rough	Flat	4.5	2.5	2.75	0.00	0.00	1.00	2.75	4.95	1.00	4.95	56.33827	
14			Red	3	4	0	Glossy	.-ve	5	1.5	2.50	0.00	0.25	0.75	1.6875	5.625	1.50	8.4375		
15			Red	3	4	0	Glossy	.+ve	7	2	2.50	0.00	0.25	1.25	2.8125	9.84375	1.00	9.84375		
16			Red	3	4	0	Glossy	.+ve	3	2	2.50	0.00	0.25	1.25	2.8125	4.21875	1.00	4.21875		
17			Grey	1	1	0	Plain	Flat	4	0.5	2.00	0.00	0.50	1.00	1.5	12	1.00	12		
18			Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
19			Red	3	4	0	Glossy	.+ve	2.5	3	2.50	0.00	0.25	1.25	2.8125	2.34375	1.00	2.34375		
20			Black	1	4	0	Transparent	.+ve	0.5	3	2.75	0.00	0.75	1.25	2.5	0.4166667	1.00	0.416667		
21			Silver	4	3	0	Glossy	Flat	1.5	1.5	1.75	0.00	0.25	1.00	1.5	1.5	1.00	1.5		
22			Black	1	4	0	Plain	Flat	2	3.5	2.75	0.00	0.50	1.00	2.25	1.2857143	1.00	1.285714		
23			Grey	2	2	0	Plain	Flat	2	3.5	2.00	0.00	0.50	1.00	1.5	0.8571429	1.00	0.857143		
24			Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		
25	TVS Star	Lower	Black	1	4	0	Rough	Flat	6.5	2.5	2.75	0.00	0.00	1.00	2.75	7.15	1.90	13.585	74.39125	6.759556
26			Silver	3	2	0	Plain	Flat	3	2.5	1.75	0.00	0.50	1.00	1.25	1.5	1.90	2.85		
27			Silver	2	2	0	Plain	Flat	1.5	1.5	2.00	0.00	0.50	1.00	1.5	1.5	1.00	1.5		
28			Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		
29			Red	2	3	1	Glossy	Flat	1	0.5	2.50	0.25	0.25	1.00	2.5	5	1.00	5		
30			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5		
31			Silver	3	2	0	Plain	Flat	12	1.5	1.75	0.00	0.50	1.00	1.25	10	1.00	10		
32			Black	1	4	0	Rough	Flat	6.5	2.5	2.75	0.00	0.00	1.00	2.75	7.15	1.90	13.585		
33			Silver	3	2	0	Plain	Flat	3	2.5	1.75	0.00	0.50	1.00	1.25	1.5	1.50	2.25		
34			Silver	4	3	0	Glossy	Flat	1.5	0.5	1.75	0.00	0.25	1.00	1.5	4.5	1.00	4.5		
35			Red	2	3	0	Glossy	Flat	2	0.5	2.50	0.00	0.25	1.00	2.25	9	1.00	9		
36			Black	1	4	0	Plain	Flat	3	2	2.75	0.00	0.50	1.00	2.25	3.375	1.67	5.63625		
37		Upper	Black	1	4	0	Rough	Flat	6.5	2	2.75	0.00	0.00	1.00	2.75	8.9375	1.00	8.9375		
38			Red	2	3	0	Glossy	.+ve	4.5	1.5	2.50	0.00	0.25	1.25	2.8125	8.4375	1.50	12.65625		
39			White	3	3	0	Glossy	.+ve	3	1.5	2.00	0.00	0.25	1.25	2.1875	4.375	1.50	6.5625		
40			Red	4	2	0	Glossy	.+ve	8	1.5	1.75	0.00	0.25	1.25	1.875	10	1.50	15		
41			White	4	4	2	Glossy	.+ve	0.5	2.5	2.00	0.50	0.25	1.25	2.8125	0.5625	1.00	0.5625		
42			White	3	3	1	Glossy	.+ve	1	0.5	2.00	0.25	0.25	1.25	2.5	5	1.00	5		

43			Black	1	4	0	Plain	.+ve	0.5	0.5	2.75	0.00	0.50	1.25	2.8125	2.8125	1.00	2.8125		
44		Upper	Silver	4	3	0	Glossy	Flat	1.5	1.5	1.75	0.00	0.25	1.00	1.5	1.5	1.50	2.25	64.97098	
45			Red	2	3	0	Glossy	.+ve	2	3	2.50	0.00	0.25	1.25	2.8125	1.875	1.00	1.875		
46			Red	4	2	0	Glossy	.+ve	0.5	3.5	1.75	0.00	0.25	1.25	1.875	0.2678571	1.00	0.267857		
47			White	3	3	0	Glossy	.+ve	1	4	2.00	0.00	0.25	1.25	2.1875	0.546875	1.00	0.546875		
48			Black	1	4	0	Transparent	Flat	1	5	2.75	0.00	0.75	1.00	2	0.4	1.00	0.4		
49			Silver	3	2	0	Glossy	Flat	1	2.5	1.75	0.00	0.25	1.00	1.5	0.6	1.00	0.6		
50			Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
51			Silver	2	2	0	Plain	Flat	1	0.5	2.00	0.00	0.50	1.00	1.5	3	1.00	3		
52			Black	1	4	0	Rough	Flat	5.5	2.5	2.75	0.00	0.00	1.00	2.75	6.05	1.90	11.495		
53			Black	1	4	0	Plain	Flat	5.5	2.5	2.75	0.00	0.50	1.00	2.25	4.95	1.90	9.405		
54			Black	1	4	0	Glossy	Flat	2	2	2.75	0.00	0.25	1.00	2.5	2.5	1.00	2.5		
55			Red	3	4	0	Glossy	Flat	0.5	1	2.50	0.00	0.25	1.00	2.25	1.125	1.00	1.125		
56			Silver	4	3	0	Glossy	Flat	0.5	1	1.75	0.00	0.25	1.00	1.5	0.75	1.00	0.75		
57			Grey	1	2	0	Plain	Flat	12	2.5	2.25	0.00	0.50	1.00	1.75	8.4	1.00	8.4		
58		Lower	Grey	2	2	0	Plain	Flat	4	1.5	2.00	0.00	0.50	1.00	1.5	4	1.50	6	66.98094	
59			Black	1	4	0	Plain	Flat	1	1	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25		
60			Grey	2	2	0	Plain	Flat	1	0.5	2.00	0.00	0.50	1.00	1.5	3	1.00	3		
61			Black	1	4	0	Rough	Flat	5.5	2.5	2.75	0.00	0.00	1.00	2.75	6.05	1.90	11.495		
62			Black	1	4	0	Plain	Flat	3	2.5	2.75	0.00	0.50	1.00	2.25	2.7	1.00	2.7		
63			Black	1	4	0	Plain	.+ve	1.5	1	2.75	0.00	0.50	1.25	2.8125	4.21875	1.33	5.610938		
64			Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25		
65			Black	1	4	0	Rough	Flat	7.5	1.5	2.75	0.00	0.00	1.00	2.75	13.75	1.00	13.75		
66			Black	1	4	0	Plain	Flat	3	2.5	2.75	0.00	0.50	1.00	2.25	2.7	1.00	2.7		
67	TVS Flame		Black	1	4	0	Glossy	Flat	1.5	2.5	2.75	0.00	0.25	1.00	2.5	1.5	1.00	1.5		20.49326
68			Red	3	4	0	Glossy	.-ve	1	2	2.50	0.00	0.25	0.75	1.6875	0.84375	1.00	0.84375		
69			Red	2	3	0	Glossy	.-ve	1	1.5	2.50	0.00	0.25	0.75	1.6875	1.125	1.00	1.125		
70			Black	1	4	0	Glossy	.-ve	1	2	2.75	0.00	0.25	0.75	1.875	0.9375	1.00	0.9375		
71			White	4	4	0	Glossy	.-ve	0.5	2	2.00	0.00	0.25	0.75	1.3125	0.328125	1.00	0.328125		
72			Red	3	4	0	Glossy	.+ve	1.5	2	2.50	0.00	0.25	1.25	2.8125	2.109375	1.00	2.109375		
73			Black	1	4	0	Glossy	.+ve	1	1.5	2.75	0.00	0.25	1.25	3.125	2.0833333	1.00	2.083333		
74		Upper	White	4	3	0	Glossy	.+ve	1	3	1.75	0.00	0.25	1.25	1.875	0.625	1.00	0.625	44.19696	
			Grey	2	2	0	Plain	Flat	1	0.5	2.00	0.00	0.50	1.00	1.5	3	1.00	3		
75			White	4	3	0	Glossy	.+ve	1.5	1.5	1.75	0.00	0.25	1.25	1.875	1.875	1.00	1.875		
76			Red	3	4	0	Glossy	.+ve	3	3.5	2.50	0.00	0.25	1.25	2.8125	2.4107143	1.00	2.410714		
77			Yellow	3	3	0	Transparent	.+ve	1	1.5	1.25	0.00	0.75	1.25	0.625	0.4166667	1.00	0.416667		
			Grey	1	2	0	Plain	Flat	1	0.5	2.25	0.00	0.50	1.00	1.75	3.5	1.00	3.5		
			Silver	3	3	1	Glossy	.+ve	0.5	0.5	2.00	0.25	0.25	1.25	2.5	2.5	1.00	2.5		
78			Black	1	4	0	Plain	Flat	1	1	2.75	0.00	0.50	1.00	2.25	2.25	1.33	2.9925		
79			Black	1	4	0	Plain	Flat	1	1.5	2.75	0.00	0.50	1.00	2.25	1.5	1.00	1.5		
80			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
81			Silver	2	2	0	Plain	Flat	6	2.5	2.00	0.00	0.50	1.00	1.5	3.6	1.90	6.84		
82			Black	1	4	0	Glossy	Flat	3.5	2	2.75	0.00	0.25	1.00	2.5	4.375	1.00	4.375		
83			Grey	1	2	0	Plain	Flat	1.5	1.5	2.25	0.00	0.50	1.00	1.75	1.75	1.00	1.75		
84			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5		
85		Lower	Grey	1	2	0	Plain	Flat	12	2	2.25	0.00	0.50	1.00	1.75	10.5	1.00	10.5	64.135	
86			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
87			Silver	2	2	0	Plain	Flat	6	2.5	2.00	0.00	0.50	1.00	1.5	3.6	1.90	6.84		
88			Silver	4	3	0	Glossy	Flat	2	1	1.75	0.00	0.25	1.00	1.5	3	1.00	3		

89			Black	1	4	0	Plain	Flat	2	1.5	2.75	0.00	0.50	1.00	2.25	3	1.00	3		
90	Bajaj Discover		Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25		3.848584
91			Black	1	4	0	Plain	Flat	6	2	2.75	0.00	0.50	1.00	2.25	6.75	1.00	6.75		
92			Black	1	4	0	Glossy	.-ve	3	1	2.75	0.00	0.25	0.75	1.875	5.625	1.33	7.48125		
93			Black	1	4	0	Glossy	.+ve	2	1.5	2.75	0.00	0.25	1.25	3.125	4.1666667	1.00	4.166667		
94			Red	2	2	1	Glossy	.+ve	8	1.5	2.25	0.25	0.25	1.25	2.8125	15	1.50	22.5		
95			Black	1	4	0	Glossy	.+ve	3.5	3.5	2.75	0.00	0.25	1.25	3.125	3.125	1.00	3.125		
96		Upper	Silver	4	3	0	Glossy	Flat	1.5	1.5	1.75	0.00	0.25	1.00	1.5	1.5	1.50	2.25	59.38137	
97			Red	2	2	0	Glossy	.+ve	1	3.5	2.25	0.00	0.25	1.25	2.5	0.7142857	1.00	0.714286		
98			White	2	2	0	Transparent	Flat	1	3	2.00	0.00	0.75	1.00	1.25	0.4166667	1.00	0.416667		
99			Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		
100			Silver	4	3	0	Glossy	Flat	1	0.5	1.75	0.00	0.25	1.00	1.5	3	1.00	3		
101			Black	1	4	0	Plain	Flat	1	1	2.75	0.00	0.50	1.00	2.25	2.25	1.33	2.9925		
102			Black	1	4	0	Rough	Flat	6.5	2.5	2.75	0.00	0.00	1.00	2.75	7.15	1.90	13.585		
103			Black	1	4	0	Glossy	Flat	6	2.5	2.75	0.00	0.25	1.00	2.5	6	1.90	11.4		
104			Grey	1	2	0	Plain	Flat	1.5	1.5	2.25	0.00	0.50	1.00	1.75	1.75	1.00	1.75		
105			Black	1	4	0	Glossy	Flat	2.5	1.5	2.75	0.00	0.25	1.00	2.5	4.1666667	1.00	4.166667		
106			Black	1	4	0	Glossy	Flat	0.5	1.5	2.75	0.00	0.25	1.00	2.5	0.8333333	1.00	0.833333		
107			Grey	2	2	0	Plain	Flat	12	2.5	2.00	0.00	0.50	1.00	1.5	7.2	1.00	7.2		
108		Lower	Black	1	4	0	Rough	Flat	6.5	2.5	2.75	0.00	0.00	1.00	2.75	7.15	1.90	13.585	88.27417	
109			Black	1	4	0	Glossy	Flat	6	2.5	2.75	0.00	0.25	1.00	2.5	6	1.90	11.4		
110			Black	1	4	0	Plain	Flat	1.5	1	2.75	0.00	0.50	1.00	2.25	3.375	1.00	3.375		
111			Red	3	4	0	Glossy	.+ve	1	1	2.50	0.00	0.25	1.25	2.8125	2.8125	1.00	2.8125		
112			Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25		
113			Black	1	4	0	Plain	Flat	3	1	2.75	0.00	0.50	1.00	2.25	6.75	1.00	6.75		
114	TVS Apache		Red	3	4	2	Glossy	.+ve	1	0.5	2.50	0.50	0.25	1.25	3.4375	6.875	1.00	6.875		12.34405
115			Red	3	4	2	Glossy	.+ve	2	3	2.50	0.50	0.25	1.25	3.4375	2.2916667	1.00	2.291667		
116			Black	1	4	0	Rough	Flat	5.5	2.5	2.75	0.00	0.00	1.00	2.75	6.05	1.00	6.05		
117			Red	3	4	0	Glossy	Flat	5	2	2.50	0.00	0.25	1.00	2.25	5.625	1.00	5.625		
118			Red	3	4	0	Glossy	.+ve	6	2	2.50	0.00	0.25	1.25	2.8125	8.4375	1.00	8.4375		
119			Red	3	4	0	Glossy	.+ve	5	2	2.50	0.00	0.25	1.25	2.8125	7.03125	1.00	7.03125		
120			Black	1	4	0	Plain	.+ve	5.5	0.5	2.75	0.00	0.50	1.25	2.8125	30.9375	1.00	30.9375		
121		Upper	Silver	4	3	0	Glossy	Flat	1.5	1.5	1.75	0.00	0.25	1.00	1.5	1.5	1.50	2.25	68.87554	
122			Red	3	4	0	Glossy	.+ve	2.5	3.5	2.50	0.00	0.25	1.25	2.8125	2.0089286	1.00	2.008929		
123			White	3	2	0	Transparent	Flat	0.5	3.5	1.75	0.00	0.75	1.00	1	0.1428571	1.00	0.142857		
124			Black	1	4	0	Transparent	.+ve	0.5	5	2.75	0.00	0.75	1.25	2.5	0.25	1.00	0.25		
125			Black	1	4	0	Plain	Flat	3.5	2.5	2.75	0.00	0.50	1.00	2.25	3.15	1.00	3.15		
126			Black	1	4	0	Plain	Flat	1	1	2.75	0.00	0.50	1.00	2.25	2.25	1.33	2.9925		
127			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
128			Silver	3	2	0	Plain	Flat	5	2.5	1.75	0.00	0.50	1.00	1.25	2.5	1.90	4.75		
129			Grey	2	2	0	Plain	.+ve	3.5	2	2.00	0.00	0.50	1.25	1.875	3.28125	1.00	3.28125		
130			Black	1	4	0	Glossy	Flat	2.5	1.5	2.75	0.00	0.25	1.00	2.5	4.1666667	1.00	4.166667		
131			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5		
132		Lower	Silver	3	3	0	Plain	Flat	14	2.5	2.00	0.00	0.50	1.00	1.5	8.4	1.00	8.4	65.84042	
133			Silver	4	3	0	Glossy	.+ve	1.5	1	1.75	0.00	0.25	1.25	1.875	2.8125	1.00	2.8125		
134			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
135			Silver	3	2	0	Plain	Flat	3	2.5	1.75	0.00	0.50	1.00	1.25	1.5	1.90	2.85		
136			Black	1	4	0	Plain	Flat	1.5	0.5	2.75	0.00	0.50	1.00	2.25	6.75	1.00	6.75		
137			Silver	3	2	0	Plain	Flat	2	0.5	1.75	0.00	0.50	1.00	1.25	5	1.00	5		

138			Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25	
139			Black	1	4	0	Glossy	Flat	1.5	0.5	2.75	0.00	0.25	1.00	2.5	7.5	1.00	7.5	
140	Bajaj Pulsar		Black	1	4	0	Rough	Flat	7	2.5	2.75	0.00	0.00	1.00	2.75	7.7	1.00	7.7	2.406526
141			Black	1	4	0	Glossy	.+ve	4.5	2	2.75	0.00	0.25	1.25	3.125	7.03125	1.00	7.03125	
142			Black	1	4	0	Glossy	.+ve	4.5	3	2.75	0.00	0.25	1.25	3.125	4.6875	1.00	4.6875	
143			Black	1	4	0	Plain	.+ve	4	2	2.75	0.00	0.50	1.25	2.8125	5.625	1.67	9.39375	
144			Black	1	4	0	Plain	.-ve	1	2	2.75	0.00	0.50	0.75	1.6875	0.84375	1.00	0.84375	
145			Black	1	4	0	Plain	.+ve	5	2.5	2.75	0.00	0.50	1.25	2.8125	5.625	1.00	5.625	
146		Upper	Silver	3	3	0	Plain	Flat	0.5	3.5	2.00	0.00	0.50	1.00	1.5	0.2142857	1.00	0.214286	62.74595
147			Black	1	4	0	Plain	Flat	1.5	1	2.75	0.00	0.50	1.00	2.25	3.375	1.33	4.48875	
148			Black	1	4	0	Rough	Flat	1	1	2.75	0.00	0.00	1.00	2.75	2.75	1.33	3.6575	
149			Black	1	4	0	Glossy	.+ve	4.5	2.5	2.75	0.00	0.25	1.25	3.125	5.625	1.00	5.625	
			Black	1	4	0	Glossy	.+ve	4	3	2.75	0.00	0.25	1.25	3.125	4.1666667	1.00	4.166667	
150			Black	1	4	0	Transparent	.+ve	1.5	4	2.75	0.00	0.75	1.25	2.5	0.9375	1.00	0.9375	
151			White	3	3	0	Glossy	Flat	0.5	3	2.00	0.00	0.25	1.00	1.75	0.2916667	1.00	0.291667	
152			Silver	2	2	0	Glossy	Flat	1	3	2.00	0.00	0.25	1.00	1.75	0.5833333	1.00	0.583333	
153			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
154			Silver	2	2	0	Plain	Flat	6	2.5	2.00	0.00	0.50	1.00	1.5	3.6	1.90	6.84	
155			Black	1	4	0	Glossy	Flat	2	1.5	2.75	0.00	0.25	1.00	2.5	3.3333333	1.00	3.333333	
156			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5	
157			Silver	3	2	0	Plain	Flat	16	2.5	1.75	0.00	0.50	1.00	1.25	8	1.00	8	
158		Lower	Silver	4	3	0	Glossy	Flat	2	1	1.75	0.00	0.25	1.00	1.5	3	1.00	3	77.35333
159			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
160			Silver	3	2	0	Plain	Flat	3	2.5	1.75	0.00	0.50	1.00	1.25	1.5	1.90	2.85	
161			Silver	3	2	0	Glossy	Flat	0.5	0.5	1.75	0.00	0.25	1.00	1.5	1.5	1.00	1.5	
162			Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25	
163	Hero Honda Splendor		Black	1	4	0	Plain	Flat	16	1.5	2.75	0.00	0.50	1.00	2.25	24	1.00	24	
164	+		Black	1	4	0	Rough	Flat	6.5	2	2.75	0.00	0.00	1.00	2.75	8.9375	1.00	8.9375	16.90533
165			Silver	3	2	2	Glossy	.+ve	3	2	1.75	0.50	0.25	1.25	2.5	3.75	1.00	3.75	
166			Blue	3	3	2	Glossy	.+ve	0.5	1.5	1.75	0.50	0.25	1.25	2.5	0.8333333	1.00	0.833333	
167			Black	1	4	0	Glossy	.+ve	5	1.5	2.75	0.00	0.25	1.25	3.125	10.416667	1.50	15.625	
168			Black	1	4	0	Plain	Flat	3	1	2.75	0.00	0.50	1.00	2.25	6.75	1.33	8.9775	
169		Upper	Black	1	4	0	Glossy	.+ve	3.5	3.5	2.75	0.00	0.25	1.25	3.125	3.125	1.00	3.125	54.98167
170			Silver	4	3	0	Glossy	Flat	2	2	1.75	0.00	0.25	1.00	1.5	1.5	1.00	1.5	
171			Black	1	4	0	Plain	Flat	2	0.5	2.75	0.00	0.50	1.00	2.25	9	1.00	9	
172			Black	1	4	0	Glossy	Flat	1	1.5	2.75	0.00	0.25	1.00	2.5	1.6666667	1.00	1.666667	
173			Silver	4	3	0	Glossy	Flat	1.5	2.5	1.75	0.00	0.25	1.00	1.5	0.9	1.00	0.9	
174			Red	1	3	0	Transparent	Flat	0.5	1.5	2.75	0.00	0.75	1.00	2	0.6666667	1.00	0.666667	
175			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
176			Silver	2	2	0	Plain	Flat	6	2.5	2.00	0.00	0.50	1.00	1.5	3.6	1.90	6.84	
177			Black	1	4	0	Glossy	Flat	2	1.5	2.75	0.00	0.25	1.00	2.5	3.3333333	1.50	5	
178			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5	
179			Grey	1	1	0	Plain	Flat	16	2.5	2.00	0.00	0.50	1.00	1.5	9.6	1.00	9.6	
180		Lower	Silver	4	3	0	Glossy	.+ve	2.5	1	1.75	0.00	0.25	1.25	1.875	4.6875	1.33	6.234375	73.92438
181			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
182			Silver	2	2	0	Plain	Flat	3	2.5	2.00	0.00	0.50	1.00	1.5	1.8	1.90	3.42	
183			Black	1	4	0	Plain	Flat	2	0.5	2.75	0.00	0.50	1.00	2.25	9	1.00	9	
184			Red	4	2	0	Glossy	.+ve	1	0.5	1.75	0.00	0.25	1.25	1.875	3.75	1.00	3.75	
185	Hero Honda Splendor		Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5	

186	Hero Honda Splendor NXG	Upper	Black	1	4	0	Rough	Flat	5.5	2	2.75	0.00	0.00	1.00	2.75	7.5625	1.00	7.5625	62.95384	8.014815
187			Black	1	4	0	Glossy	Flat	1.5	1	2.75	0.00	0.25	1.00	2.5	3.75	1.33	4.9875		
188			Black	1	4	0	Glossy	.+ve	2.5	1	2.75	0.00	0.25	1.25	3.125	7.8125	1.33	10.39063		
189			Black	1	4	0	Glossy	.-ve	1	1.5	2.75	0.00	0.25	0.75	1.875	1.25	1.50	1.875		
190			Red	4	2	3	Glossy	.+ve	3	1.5	1.75	0.75	0.25	1.25	2.8125	5.625	1.50	8.4375		
191			White	4	3	3	Glossy	.+ve	3	1.5	1.75	0.75	0.25	1.25	2.8125	5.625	1.50	8.4375		
192			White	4	3	3	Glossy	.-ve	1	1.5	1.75	0.75	0.25	0.75	1.6875	1.125	1.50	1.6875		
193			Silver	4	3	0	Glossy	.+ve	1.5	1.5	1.75	0.00	0.25	1.25	1.875	1.875	1.50	2.8125		
194			Black	1	4	0	Glossy	.+ve	2	3.5	2.75	0.00	0.25	1.25	3.125	1.7857143	1.00	1.785714		
195			Black	1	4	0	Plain	Flat	3	1	2.75	0.00	0.50	1.00	2.25	6.75	1.33	8.9775		
196			Red	1	3	0	Transparent	Flat	1.5	2	2.75	0.00	0.75	1.00	2	1.5	1.00	1.5		
197			Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
198	Hero Honda Passion Plus	Lower	Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	72.67438	0.791706
199			Silver	2	2	0	Plain	Flat	6	2.5	2.00	0.00	0.50	1.00	1.5	3.6	1.90	6.84		
200			Black	1	4	0	Glossy	Flat	2	1.5	2.75	0.00	0.25	1.00	2.5	3.3333333	1.50	5		
201			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5		
202			Grey	1	1	0	Plain	Flat	16	2.5	2.00	0.00	0.50	1.00	1.5	9.6	1.00	9.6		
203			Silver	4	3	0	Glossy	.+ve	2.5	1	1.75	0.00	0.25	1.25	1.875	4.6875	1.33	6.234375		
204			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
205			Silver	2	2	0	Plain	Flat	3	2.5	2.00	0.00	0.50	1.00	1.5	1.8	1.90	3.42		
206			Black	1	4	0	Plain	Flat	2	0.5	2.75	0.00	0.50	1.00	2.25	9	1.00	9		
207			Red	2	2	0	Glossy	Flat	1.5	0.5	2.25	0.00	0.25	1.00	2	6	1.00	6		
208			Yellow	3	3	2	Transparent	Flat	0.5	0.5	1.25	0.50	0.75	1.00	1	1	1.00	1		
209		Upper	Black	1	4	0	Rough	Flat	7	2.5	2.75	0.00	0.00	1.00	2.75	7.7	1.00	7.7	71.53268	
210			Red	2	2	1	Glossy	.+ve	14	1.5	2.25	0.25	0.25	1.25	2.8125	26.25	1.50	39.375		
211			Black	1	4	0	Glossy	.+ve	0.5	3.5	2.75	0.00	0.25	1.25	3.125	0.4464286	1.00	0.446429		
212			White	3	2	0	Glossy	Flat	1	2.5	1.75	0.00	0.25	1.00	1.5	0.6	1.00	0.6		
213			Black	1	4	0	Glossy	Flat	1	2.5	2.75	0.00	0.25	1.00	2.5	1	1.00	1		
214			Red	2	2	1	Glossy	.+ve	1	4	2.25	0.25	0.25	1.25	2.8125	0.703125	1.00	0.703125		
215			Black	1	4	0	Glossy	.+ve	2.5	4	2.75	0.00	0.25	1.25	3.125	1.953125	1.00	1.953125		
216			Silver	4	3	0	Glossy	.+ve	1.5	1.5	1.75	0.00	0.25	1.25	1.875	1.875	1.50	2.8125		
217			Black	1	4	0	Plain	Flat	1	1	2.75	0.00	0.50	1.00	2.25	2.25	1.33	2.9925		
218			Black	1	4	0	Plain	Flat	1	5	2.75	0.00	0.50	1.00	2.25	0.45	1.00	0.45		
219			Black	1	4	0	Plain	Flat	3	0.5	2.75	0.00	0.50	1.00	2.25	13.5	1.00	13.5		
220	Hero Honda CD Dlx	Lower	Black	1	4	0	Rough	Flat	7	2.5	2.75	0.00	0.00	1.00	2.75	7.7	1.90	14.63	62.0525	28.12328
221			Silver	3	2	0	Plain	Flat	6	2.5	1.75	0.00	0.50	1.00	1.25	3	1.90	5.7		
222			Black	1	4	0	Glossy	Flat	2	1	2.75	0.00	0.25	1.00	2.5	5	1.33	6.65		
223			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5		
224			Silver	3	2	0	Plain	Flat	16	2.5	1.75	0.00	0.50	1.00	1.25	8	1.00	8		
225			Silver	4	3	0	Glossy	Flat	1	1	1.75	0.00	0.25	1.00	1.5	1.5	1.33	1.995		
226			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54		
227			Silver	3	2	0	Plain	Flat	3	2.5	1.75	0.00	0.50	1.00	1.25	1.5	1.90	2.85		
228			Red	4	2	0	Glossy	Flat	1	0.5	1.75	0.00	0.25	1.00	1.5	3	1.00	3		
229			Black	1	4	0	Plain	Flat	1	0.5	2.75	0.00	0.50	1.00	2.25	4.5	1.00	4.5		
230			Black	1	4	0	Plain	Flat	0.5	1.5	2.75	0.00	0.50	1.00	2.25	0.75	1.00	0.75		
231			Silver	4	3	0	Glossy	.+ve	0.5	1	1.75	0.00	0.25	1.25	1.875	0.9375	1.00	0.9375		
232			Black	1	4	0	Rough	Flat	8	2	2.75	0.00	0.00	1.00	2.75	11	1.00	11		
233			Red	4	3	0	Glossy	.-ve	4	2	2.00	0.00	0.25	0.75	1.3125	2.625	1.00	2.625		
234			Red	4	2	0	Glossy	Flat	2	0.5	1.75	0.00	0.25	1.00	1.5	6	1.00	6		

235			Silver	3	2	0	Glossy	Flat	1	0.5	1.75	0.00	0.25	1.00	1.5	3	1.00	3	
236			Silver	3	2	2	Glossy	Flat	1	2.5	1.75	0.50	0.25	1.00	2	0.8	1.00	0.8	
237			Black	1	4	0	Glossy	.-ve	1.5	2.5	2.75	0.00	0.25	0.75	1.875	1.125	1.00	1.125	
238			Red	4	3	0	Glossy	.+ve	2	2	1.75	0.00	0.25	1.25	1.875	1.875	1.00	1.875	
239		Upper	Red	1	2	0	Glossy	Flat	1.5	2	2.25	0.00	0.25	1.00	2	1.5	1.00	1.5	34.81116
240			Silver	3	2	0	Plain	Flat	1	2.5	1.75	0.00	0.50	1.00	1.25	0.5	1.00	0.5	
241			Silver	4	3	0	Glossy	Flat	2	2	1.75	0.00	0.25	1.00	1.5	1.5	1.00	1.5	
242			Red	2	3	0	Glossy	.+ve	1	3.5	2.25	0.00	0.25	1.25	2.5	0.7142857	1.00	0.714286	
243			Black	1	4	0	Plain	Flat	2	2	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25	
244			Black	1	3	0	Transparent	.+ve	1	4	2.50	0.00	0.75	1.25	2.1875	0.546875	1.00	0.546875	
245			White	3	4	0	Transparent	Flat	0.5	3	2.25	0.00	0.75	1.00	1.5	0.25	1.00	0.25	
246			Red	1	4	0	Transparent	Flat	1	2	3.00	0.00	0.75	1.00	2.25	1.125	1.00	1.125	
247			Black	1	4	0	Rough	Flat	6.5	2.5	2.75	0.00	0.00	1.00	2.75	7.15	1.90	13.585	
248			Black	1	4	0	Glossy	Flat	6	2.5	2.75	0.00	0.25	1.00	2.5	6	1.90	11.4	
249			Grey	2	2	0	Plain	Flat	1.5	1.5	2.00	0.00	0.50	1.00	1.5	1.5	1.00	1.5	
250			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5	
251			Black	1	2	0	Plain	Flat	6	1.5	2.25	0.00	0.50	1.00	1.75	7	1.50	10.5	
252			Silver	4	3	0	Plain	Flat	9	2	1.75	0.00	0.50	1.00	1.25	5.625	1.67	9.39375	
253		Lower	Black	1	2	0	Plain	Flat	4	2.5	2.25	0.00	0.50	1.00	1.75	2.8	1.00	2.8	83.16875
254			Red	3	4	0	Plain	.+ve	0.5	0.5	2.50	0.00	0.50	1.25	2.5	2.5	1.00	2.5	
255			Silver	4	3	0	Glossy	Flat	0.5	0.5	1.75	0.00	0.25	1.00	1.5	1.5	1.00	1.5	
256			Black	1	4	0	Plain	Flat	2	0.5	2.75	0.00	0.50	1.00	2.25	9	1.00	9	
257			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
258			Black	1	4	0	Glossy	Flat	3	2.5	2.75	0.00	0.25	1.00	2.5	3	1.90	5.7	
259	Hero Honda CBZ Extreme		Black	1	4	0	Plain	Flat	0.5	0.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25	21.15777
260			Black	1	4	0	Rough	Flat	4	2.5	2.75	0.00	0.00	1.00	2.75	4.4	1.00	4.4	
261			Black	1	4	0	Glossy	.-ve	10	1.5	2.75	0.00	0.25	0.75	1.875	12.5	1.50	18.75	
262			Black	1	4	0	Glossy	.+ve	3.5	2	2.75	0.00	0.25	1.25	3.125	5.46875	1.00	5.46875	
263			Black	1	4	0	Plain	.+ve	2	0.5	2.75	0.00	0.50	1.25	2.8125	11.25	1.00	11.25	
264			Black	3	4	2	Glossy	.+ve	1	3	2.75	0.50	0.25	1.25	3.75	1.25	1.00	1.25	
265		Upper	Red	3	4	2	Glossy	.+ve	2	3	2.50	0.50	0.25	1.25	3.4375	2.2916667	1.00	2.291667	54.12125
266			Black	1	4	0	Glossy	.+ve	2	1.5	2.75	0.00	0.25	1.25	3.125	4.1666667	1.50	6.25	
267			Black	1	2	0	Plain	Flat	1.5	1		0.00	0.50	1.00	-0.5	-0.75	1.33	-0.9975	
268			Silver	4	3	0	Glossy	.+ve	1.5	1.5	1.75	0.00	0.25	1.25	1.875	1.875	1.00	1.875	
269			Black	1	4	0	Glossy	.+ve	3.5	3.5	2.75	0.00	0.25	1.25	3.125	3.125	1.00	3.125	
270			White	3	3	0	Transparent	Flat	0.5	3	2.00	0.00	0.75	1.00	1.25	0.2083333	1.00	0.208333	
271			White	3	3	0	Transparent	Flat	0.5	2.5	2.00	0.00	0.75	1.00	1.25	0.25	1.00	0.25	
272			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
273			Black	1	4	0	Plain	Flat	6	2.5	2.75	0.00	0.50	1.00	2.25	5.4	1.90	10.26	
274			Black	1	4	0	Glossy	Flat	2.5	1.5	2.75	0.00	0.25	1.00	2.5	4.1666667	1.00	4.166667	
275			Black	1	4	0	Plain	Flat	1.5	1.5	2.75	0.00	0.50	1.00	2.25	2.25	1.00	2.25	
276			Red	3	4	0	Glossy	.+ve	1	0.5	2.50	0.00	0.25	1.25	2.8125	5.625	1.00	5.625	
277		Lower	Red	3	3	0	Glossy	.+ve	0.5	0.5	2.25	0.00	0.25	1.25	2.5	2.5	1.00	2.5	85.33167
278			Black	1	4	0	Plain	Flat	17	2.5	2.75	0.00	0.50	1.00	2.25	15.3	1.90	29.07	
279			Black	1	4	0	Rough	Flat	6	2.5	2.75	0.00	0.00	1.00	2.75	6.6	1.90	12.54	
280			Black	1	4	0	Plain	Flat	3	2.5	2.75	0.00	0.50	1.00	2.25	2.7	1.90	5.13	
281			Black	1	4	0	Plain	Flat	0.5	1.5	2.75	0.00	0.50	1.00	2.25	0.75	1.00	0.75	
282			Silver	4	3	0	Glossy	Flat	0.5	1.5	1.75	0.00	0.25	1.00	1.5	0.5	1.00	0.5	
283	Hero Honda Glamour		Black	1	4	0	Rough	Flat	7	2	2.75	0.00	0.00	1.00	2.75	9.625	1.00	9.625	

9.807822

284	Glamour		Black	1	4	0	Glossy	-ve	5.5	1.5	2.75	0.00	0.25	0.75	1.875	6.875	1.50	10.3125		
285			Red	2	4	1	Glossy	-ve	2.5	1	2.75	0.25	0.25	0.75	2.0625	5.15625	1.33	6.857813		
286			Black	1	4	0	Glossy	high +v	1.5	3	2.75	0.00	0.25	1.50	3.75	1.875	1.00	1.875		
287			Red	2	2	1	Glossy	high +v	1	3	2.25	0.25	0.25	1.50	3.375	1.125	1.00	1.125		
288		Upper	Red	3	4	0	Glossy	.+ve	6	1.5	2.50	0.00	0.25	1.25	2.8125	11.25	1.50	16.875	70.08835	
289			Red	1	2	0	Glossy	.+ve	2.5	1.5	2.50	0.00	0.25	1.25	2.8125	4.6875	1.50	7.03125		
			White	4	4	3	Glossy	Flat	0.5	0.5	2.00	0.75	0.25	1.00	2.5	2.5	1.00	2.5		
290			Black	1	4	0	Plain	Flat	2	1	2.75	0.00	0.50	1.00	2.25	4.5	1.33	5.985		
291			Black	1	4	0	Glossy	.+ve	1.5	3.5	2.75	0.00	0.25	1.25	3.125	1.3392857	1.00	1.339286		
292			Black	1	4	0	Plain	Flat	5	3	2.75	0.00	0.50	1.00	2.25	3.75	1.00	3.75		
293			Silver	4	3	0	Glossy	.+ve	1.5	1.5	1.75	0.00	0.25	1.25	1.875	1.875	1.50	2.8125		

Appendix-35.c: Calculation of visual dynamism

Character lines :

Diverging sharp	2
Diverging large fillet	1
Curve/straight/none	0

Character lines alignment :

Diverging and aligned	1
Straight or non aligned	0

Feature lines:

Inclined	1
Straight or curve	0

Character line/feature line/ graphics matching:

Fully matching (Divergir	2
Partial matching (Diverg	1
Not matching or straigh	0

Graphics:

Diverging horizontal	2
Diverging vertical	1
Straight or curve	0

Model	Character lines				Character lines alignment		Feature lines				Character/feature line matching	Graphics	Graphics/character lines matching	Graphics/feature lines matching	Score		Visual score	L/H	HB	VB	Final score	Dynamism	Unity
	visor	Fuel tank	Side cover	Muffler cover	Fuel tank/ visor	Fuel tank/side cover	Fuel tank	Side cover	Seat	Muffler													
	0-2	0-2	0-2	0-2	0-1	0-1	0-1	0-1	0-1	0-1	0-2	0-2	0-2	0-2									
Hunk	2	2	2	2	1	1	1	1	1	1	2	2	2	2	22	22	1.00	1.85	10.21	14.86	1.49	2.67	3
Splendor +	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	22	0.14	1.9	-4.63	16.9	0.45	0.80	2
CD-Deluxe	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	22	0.00	1.9	3.08	28.12	0.28	0.49	2
TVS Flame	2	2	2	2	1	0	0	0	1	1	1	2	1	1	16	22	0.73	1.85	-7.08	20.49	0.99	1.77	2
TVS Star City	0	0	2	0	0	0	0	1	0	0	0	2	0	0	5	22	0.23	1.85	2.68	6.75	0.73	1.30	2
Passion Pro	0	0	0	0	0	0	0	1	0	0	0	2	0	1	4	22	0.18	1.9	1.74	0.79	0.72	1.28	3
Splendor NXG	0	0	0	0	0	0	0	0	0	0	0	2	0	1	3	22	0.14	1.9	-6.53	8.01	0.52	0.92	2
Glamour	1	1	1	0	1	1	0	1	0	0	0	0	0	0	6	22	0.27	1.8	4.79	9.8	0.78	1.39	3
Discover	1	1	1	0	0	1	0	1	0	0	1	1	2	0	9	22	0.41	1.85	-0.22	3.84	0.91	1.62	2
CBZ	2	2	2	2	2	2	1	1	1	1	2	2	2	2	22	22	1.00	1.73	7.05	21.15	1.44	2.57	3
Pulser	2	2	2	2	1	1	0	1	1	1	1	2	2	2	20	22	0.91	1.79	23.59	2.4	1.68	3.00	2
Apache	2	1	2	2	0	0	0	1	1	1	1	0	1	0	12	22	0.55	1.74	17.8	12.34	1.17	2.10	2

Score 0-10=1
11-19=2
20-22=3

Appendix-36: Unity Calculation

Model	Form				Continuity			Character lines			Feature lines				Graphics	Character lines vs feature lines			Character lines vs graphics			Feature lines vs graphics			SCORE	Level
	Visor/ Fuel tank	Fuel Tank/ Seat	Fuel Tank/side cover	Side Cover/Side cowls	Fuel tank and seat	Fuel tank and side cover	Side cover/side cowl	Continuity or alignment	No character lines	Misalignmnt or dissonance	Fuel tank/visor	Fuel tank/ side cover	Fuel tank/ seat	Seat/ Muffler	Aligned/ not aligned	Visor	Fuel tank	Side cover	Visor	Fuel tank	Side cover	Visor	Fuel tank	Side cover		
	0-1	0-1	0-1	0-1	0-3	0-1	0-1	2			0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1	0-1		
Hunk	1	1	0	0	3	1	1	2	x	x	1	1	1	1	1	1	1	1	NA	1	1	NA	1	1	21/23	3
Splendor +	0	0	1	1	2	1	0	X	1	X	1	0	0	1	1	NA	NA	NA	NA	NA	NA	1	1	1	,12/19	2
CD-Deluxe	0	0	1	1	2	1	0	X	X	0	1	0	0	1	1	NA	NA	NA	NA	NA	NA	1	0	1	,10/19	2
TVS Flame	0	1	1	1	3	1	1	2	X	X	0	0	1	1	0	0	0	0	1	0	0	1	1	0	,15/25	2
TVS Star City	1	0	0	1	2	1	0	X	X	0	1	1	1	1	0	NA	NA	0	NA	NA	0	1	1	0	,11/21	2
Passion Pro	1	0	1	1	2	1	1	X	1	X	1	1	1	1	1	NA	NA	NA	NA	NA	NA	1	1	1	,16/19	2
Splendor NX(	0	0	0	0	2	1	1	X	1	X	1	1	0	1	1	NA	NA	NA	NA	NA	NA	1	0	0	,10/19	2
Glamour	0	1	1	1	3	1	1	2	X	X	1	1	1	1	1	1	1	1	1	1	1	1	1	1	24/25	3
Discover	0	0	1	1	1	1	0	X	1	X	1	0	0	1	0	NA	NA	NA	NA	NA	NA	1	1	1	,10/19	2
CBZ	1	1	1	1	3	1	1	2	X	X	1	1	1	1	1	1	0	0	1	1	1	1	1	0	22/25	3
Pulser	1	0	0	1	3	1	0	2	X	X	1	0	1	1	1	1	0	1	1	1	1	1	0	1	19/25	2
Apache	0	0	0	1	2	1	0	X	X	0	1	0	1	1	NA	1	0	1	NA	1	NA	NA	1	NA	,11/20	2

Vmax	X	1	0	1	3	1	0			0	X	1	1	0	1	X	1	1	X	1	1	X	1	1	13/20	2	
MT1	X	1	X	X	2	X	0			0	0	X	0	1	X	X	0	X	X	X	X	X	X	X	.4/11	1	
YZF R1	0	1	0	1	2	1	0			0	0	1	0	1	0	0	1	0	0	0	0	X	X	0	.6/21	1	
YZF R15	X	0	X	X	2	X	X			0	0	1	0	1	0	0	1	0	0	0	0	X	X	0	0.6/21	1	
FZ1	X	1	0	0	2	0	0	2			X	1	1	1	X	X	1	X	X	X	X	X	X	X	.10/15	2	
FZ16	0	0	0	0	1	1	1			0	1	0	0	1	1	1	1	1	0	1	1	1	0	1	13/25	2	
SZ	0	0	0	0	2	0	1			0	1	0	0	1	1	1	0	1	0	1	1	0	0	1	.10/25	1	
SZX	0	0	0	0	2	0	1			0	1	0	0	1	1	1	0	1	0	1	1	0	0	1	.11/25	1	
YBR 125	1	1	0	0	2	1	1	2			1	1	1	1	1	1	0	1	0	1	1	0	0	1	17/25	2	
YBR 110	1	1	X	0	2	1	0			0	1	1	1	1	1	1	1	0	0	0	0	0	0	0	13/21	1	
Crux	X	0	0	X	1	1	X			0	X	1	1	0	1	X	1	0	X	0	0	X	0	0	.5/19	1	

Appendix-37: SGDI Calculation for texture

Model	Side	Details			Texture Score(x)				n	xn				Total score=∑xn/∑n			
		Hue		Surf Texture	S	G	D	I		S	G	D	I				
Hunk	LHS	Red	MH	Glossy	0.6	1.49	0.48	0	6	3.6	8.94	2.88	0	0.43	1.08	0.89	0.95
		Red	MH	Glossy	0.6	1.49	0.48	0	6	3.6	8.94	2.88	0				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Black		Plain	0.3	0.51	0.89	1.1	0.5	0.15	0.255	0.445	0.55				
		Red	MH	Glossy	0.6	1.49	0.48	0	2.5	1.5	3.725	1.2	0				
		Red	MH	Glossy	0.6	1.49	0.48	0	2.5	1.5	3.725	1.2	0				
		Chrome		Glossy	2.02	2.8	3	2.78	1	2.02	2.8	3	2.78				
		Chrome		Glossy	2.02	2.8	3	2.78	1	2.02	2.8	3	2.78				
		Black		Glossy	0.71	0.39	0.6	0.3	2	1.42	0.78	1.2	0.6				
		Black		Rough	0.3	0.45	0.36	1.49	7	2.1	3.15	2.52	10.43				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	4	1.2	1.8	1.44	5.96				
		Black		Rough	0.3	0.45	0.36	1.49	8	2.4	3.6	2.88	11.92				
		Silver			1.15	0.59	1.27	0.24	4	4.6	2.36	5.08	0.96				
		Red	MH	Glossy	0.6	1.49	0.48	0	4	2.4	5.96	1.92	0				
		Chrome			2.02	2.8	3	2.78	7	14.14	19.6	21	19.46				
		Red	MH	Glossy	0.6	1.49	0.48	0	0.5	0.3	0.745	0.24	0				
		Silver			1.15	0.59	1.27	0.24	1	1.15	0.59	1.27	0.24				
		Black		Plain	0.3	0.51	0.89	1.1	2	0.6	1.02	1.78	2.2				
TVS Star	LHS	Red	MH	Glossy	0.6	1.49	0.48	0	3.5	2.1	5.215	1.68	0	0.87	0.64	0.78	0.45
		Yellow	ML	Glossy	1.13	0.21	0.86	0.06	4	4.52	0.84	3.44	0.24				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Black		Glossy	0.71	0.39	0.6	0.3	1	0.71	0.39	0.6	0.3				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
		Red	MH	Glossy	0.6	1.49	0.48	0	1.5	0.9	2.235	0.72	0				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				
		Red	MH	Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		Black		Glossy	0.71	0.39	0.6	0.3	5	3.55	1.95	3	1.5				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	5	1.5	2.25	1.8	7.45				
		Red	MH	Glossy	0.6	1.49	0.48	0	2	1.2	2.98	0.96	0				
		Yellow	LL	Glossy	1.04	0.42	0.21	0.48	2	2.08	0.84	0.42	0.96				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Silver			1.15	0.59	1.27	0.24	8	9.2	4.72	10.16	1.92				
		Black		Rough	0.3	0.45	0.36	1.49	5	1.5	2.25	1.8	7.45				
		Silver			1.15	0.59	1.27	0.24	2.5	2.875	1.475	3.175	0.6				
		White			1.65	0.41	0.12	0.22	2	3.3	0.82	0.24	0.44				
		Silver			1.15	0.59	1.27	0.24	1	1.15	0.59	1.27	0.24				
		Black		Plain	0.3	0.51	0.89	1.1	3	0.9	1.53	2.67	3.3				
TVS Flame	LHS	Black		Glossy	0.71	0.39	0.6	0.3	1.5	1.065	0.585	0.9	0.45	0.55	0.75	0.57	1.17
		Red	MH	Glossy	0.6	1.49	0.48	0	2.5	1.5	3.725	1.2	0				
		Red	MH	Glossy	0.6	1.49	0.48	0	1.5	0.9	2.235	0.72	0				
		Red	MH	Glossy	0.6	1.49	0.48	0	1	0.6	1.49	0.48	0				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Yellow	MH	Plain	1.01	0.77	0.86	0.24	1	1.01	0.77	0.86	0.24				
		Black		Rough	0.3	0.45	0.36	1.49	1	0.3	0.45	0.36	1.49				
		Black		Rough	0.3	0.45	0.36	1.49	7	2.1	3.15	2.52	10.43				
		White			1.65	0.41	0.12	0.22	2	3.3	0.82	0.24	0.44				
		Red	MH	Glossy	0.6	1.49	0.48	0	2.5	1.5	3.725	1.2	0				
		Black		Glossy	0.71	0.39	0.6	0.3	2	1.42	0.78	1.2	0.6				
		Black		Rough	0.3	0.45	0.36	1.49	8	2.4	3.6	2.88	11.92				
		Black		Rough	0.3	0.45	0.36	1.49	5	1.5	2.25	1.8	7.45				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	7	2.1	3.15	2.52	10.43				
		Black		Glossy	0.71	0.39	0.6	0.3	4	2.84	1.56	2.4	1.2				
		Chrome		Glossy	2.02	2.8	3	2.78	4.5	9.09	12.6	13.5	12.51				
		Black		Rough	0.3	0.45	0.36	1.49	11	3.3	4.95	3.96	16.39				
		Red	MH	Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		Black		Rough	0.3	0.45	0.36	1.49	7	2.1	3.15	2.52	10.43				

Model	Side	Details			Texture Score(x)				n	xn				Total score=∑xn/∑n			
		Hue		Surf Texture	S	G	D	I		**S**	**G**	**D**	**I**				
Discover	LHS	Black		Glossy	0.71	0.39	0.6	0.3	2	1.42	0.78	1.2	0.6	0.76	0.56	0.59	0.69
		Red	MH	Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
		Black		Plain	0.3	0.51	0.89	1.1	3	0.9	1.53	2.67	3.3				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Black		Glossy	0.71	0.39	0.6	0.3	7	4.97	2.73	4.2	2.1				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	5	1.5	2.25	1.8	7.45				
		Black		Rough	0.3	0.45	0.36	1.49	1	0.3	0.45	0.36	1.49				
		Red	MH	Glossy	0.6	1.49	0.48	0	2	1.2	2.98	0.96	0				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		White			1.65	0.41	0.12	0.22	3	4.95	1.23	0.36	0.66				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				
		Black		Rough	0.3	0.45	0.36	1.49	5	1.5	2.25	1.8	7.45				
Apache	LHS	Red		Glossy	0.6	1.49	0.48	0	5	3	7.45	2.4	0	0.83	0.71	0.68	0.48
		Red		Glossy	0.6	1.49	0.48	0	5	3	7.45	2.4	0				
		Black		Glossy	0.71	0.39	0.6	0.3	3	2.13	1.17	1.8	0.9				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		Red		Glossy	0.6	1.49	0.48	0	2	1.2	2.98	0.96	0				
		Black		Plain	0.3	0.51	0.89	1.1	2	0.6	1.02	1.78	2.2				
		Red	MH	Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Red	MH	Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		Black		Glossy	0.71	0.39	0.6	0.3	2.5	1.775	0.975	1.5	0.75				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Silver			1.15	0.59	1.27	0.24	6	6.9	3.54	7.62	1.44				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	4	1.2	1.8	1.44	5.96				
		Black		Glossy	0.71	0.39	0.6	0.3	4	2.84	1.56	2.4	1.2				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
		Silver			1.15	0.59	1.27	0.24	2.5	2.875	1.475	3.175	0.6				
		White			1.65	0.41	0.12	0.22	8	13.2	3.28	0.96	1.76				
		Black		Rough	0.3	0.45	0.36	1.49	7	2.1	3.15	2.52	10.43				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				
Pulsar	LHS	Black		Glossy	0.71	0.39	0.6	0.3	8	5.68	3.12	4.8	2.4	0.80	0.47	0.73	0.61
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Silver			1.15	0.59	1.27	0.24	2.5	2.875	1.475	3.175	0.6				
		Silver			1.15	0.59	1.27	0.24	4	4.6	2.36	5.08	0.96				
		Black		Plain	0.3	0.51	0.89	1.1	0.2	0.06	0.102	0.178	0.22				
		Black		Plain	0.3	0.51	0.89	1.1	3	0.9	1.53	2.67	3.3				
		Black		Glossy	0.71	0.39	0.6	0.3	4	2.84	1.56	2.4	1.2				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		Silver			1.15	0.59	1.27	0.24	1.5	1.725	0.885	1.905	0.36				
		Black		Rough	0.3	0.45	0.36	1.49	1	0.3	0.45	0.36	1.49				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Black		Glossy	0.71	0.39	0.6	0.3	11	7.81	4.29	6.6	3.3				
		Silver			1.15	0.59	1.27	0.24	0.5	0.575	0.295	0.635	0.12				
		Silver			1.15	0.59	1.27	0.24	8.5	9.775	5.015	10.795	2.04				
		White			1.65	0.41	0.12	0.22	5	8.25	2.05	0.6	1.1				
		Black		Rough	0.3	0.45	0.36	1.49	4.5	1.35	2.025	1.62	6.705				
		Silver			1.15	0.59	1.27	0.24	2.5	2.875	1.475	3.175	0.6				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				

Model	Side	Details			Texture Score(x)				n	xn				Total score=∑xn/∑n			
		Hue		Surf Texture	S	G	D	I		**S**	**G**	**D**	**I**				
Splendor+	LHS	White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11	0.90	0.48	0.69	0.51
		Blue	MH	Glossy	0.92	0.98	0.71	0.12	0.5	0.46	0.49	0.355	0.06				
		White			1.65	0.41	0.12	0.22	3	4.95	1.23	0.36	0.66				
		Blue	MH	Glossy	0.92	0.98	0.71	0.12	0.5	0.46	0.49	0.355	0.06				
		Black		Glossy	0.71	0.39	0.6	0.3	4.5	3.195	1.755	2.7	1.35				
		Black		Glossy	0.71	0.39	0.6	0.3	3	2.13	1.17	1.8	0.9				
		Black		Glossy	0.71	0.39	0.6	0.3	2	1.42	0.78	1.2	0.6				
		Silver			1.15	0.59	1.27	0.24	9	10.35	5.31	11.43	2.16				
		Blue	MH	Glossy	0.92	0.98	0.71	0.12	0.5	0.46	0.49	0.355	0.06				
		Black		Glossy	0.71	0.39	0.6	0.3	13	9.23	5.07	7.8	3.9				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
	RHS	White			1.65	0.41	0.12	0.22	1.5	2.475	0.615	0.18	0.33				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Black		Glossy	0.71	0.39	0.6	0.3	1	0.71	0.39	0.6	0.3				
		Black		Glossy	0.71	0.39	0.6	0.3	1	0.71	0.39	0.6	0.3				
		Silver			1.15	0.59	1.27	0.24	9.5	10.925	5.605	12.065	2.28				
		Black		Rough	0.3	0.45	0.36	1.49	9	2.7	4.05	3.24	13.41				
		White			1.65	0.41	0.12	0.22	7	11.55	2.87	0.84	1.54				
		Red	MH	Plain	0.45	0.48	1.1	0.89	0.5	0.225	0.24	0.55	0.445				
		Black		Plain	0.3	0.51	0.89	1.1	2	0.6	1.02	1.78	2.2				
		Silver			1.15	0.59	1.27	0.24	1.5	1.725	0.885	1.905	0.36				
plendor NX(	LHS	White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22	0.76	0.57	0.79	0.72
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Chrome		Glossy	2.02	2.8	3	2.78	1	2.02	2.8	3	2.78				
		Red	MH	Glossy	0.6	1.49	0.48	0	2	1.2	2.98	0.96	0				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Red	MH	Glossy	0.6	1.49	0.48	0	1	0.6	1.49	0.48	0				
		Black		Glossy	0.71	0.39	0.6	0.3	1.5	1.065	0.585	0.9	0.45				
		Black		Glossy	0.71	0.39	0.6	0.3	2.5	1.775	0.975	1.5	0.75				
		Black		Glossy	0.71	0.39	0.6	0.3	4	2.84	1.56	2.4	1.2				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Red	MH	Plain	0.45	0.48	1.1	0.89	0.5	0.225	0.24	0.55	0.445				
		Black		Plain	0.3	0.51	0.89	1.1	6	1.8	3.06	5.34	6.6				
		Black		Plain	0.3	0.51	0.89	1.1	6	1.8	3.06	5.34	6.6				
		Silver			1.15	0.59	1.27	0.24	4.5	5.175	2.655	5.715	1.08				
	RHS	White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Red	LL	Glossy	1.16	0.21	0.36	0.27	0.5	0.58	0.105	0.18	0.135				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Black		Plain	0.3	0.51	0.89	1.1	4	1.2	2.04	3.56	4.4				
		Silver			1.15	0.59	1.27	0.24	8	9.2	4.72	10.16	1.92				
		Black		Rough	0.3	0.45	0.36	1.49	4	1.2	1.8	1.44	5.96				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		White			1.65	0.41	0.12	0.22	3.5	5.775	1.435	0.42	0.77				
		Red	MH	Plain	0.45	0.48	1.1	0.89	1	0.45	0.48	1.1	0.89				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				
Passion	LHS	Red	MH	Glossy	0.6	1.49	0.48	0	2	1.2	2.98	0.96	0	0.70	0.72	0.65	0.65
		Red	MH	Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		Black		Glossy	0.71	0.39	0.6	0.3	2	1.42	0.78	1.2	0.6				
		Black		Glossy	0.71	0.39	0.6	0.3	10	7.1	3.9	6	3				
		Red	MH	Glossy	0.6	1.49	0.48	0	0.5	0.3	0.745	0.24	0				
		Black		Glossy	0.71	0.39	0.6	0.3	4	2.84	1.56	2.4	1.2				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Black		Rough	0.3	0.45	0.36	1.49	4	1.2	1.8	1.44	5.96				
		Silver			1.15	0.59	1.27	0.24	1	1.15	0.59	1.27	0.24				
		Chrome		Glossy	2.02	2.8	3	2.78	1.5	3.03	4.2	4.5	4.17				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Black		Rough	0.3	0.45	0.36	1.49	0.5	0.15	0.225	0.18	0.745				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	5.5	1.65	2.475	1.98	8.195				
		Red		Glossy	0.6	1.49	0.48	0	2	1.2	2.98	0.96	0				
		Red	MH	Glossy	0.6	1.49	0.48	0	6	3.6	8.94	2.88	0				
		Silver			1.15	0.59	1.27	0.24	4	4.6	2.36	5.08	0.96				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		White			1.65	0.41	0.12	0.22	2.5	4.125	1.025	0.3	0.55				
		Black		Rough	0.3	0.45	0.36	1.49	4	1.2	1.8	1.44	5.96				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
		Silver			1.15	0.59	1.27	0.24	1	1.15	0.59	1.27	0.24				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				

Model	Side	Details			Texture Score(x)				n	xn				Total score=∑xn/∑n			
		Hue		Surf Texture	S	G	D	I		**S**	**G**	**D**	**I**				
CD Dlx	LHS	Red		Glossy	0.6	1.49	0.48	0	0.5	0.3	0.745	0.24	0	0.70	1.33	0.72	0.76
		Red		Glossy	0.6	1.49	0.48	0	1	0.6	1.49	0.48	0				
		Red		Glossy	0.6	1.49	0.48	0	4	2.4	5.96	1.92	0				
		Red		Glossy	0.6	1.49	0.48	0	1	0.6	1.49	0.48	0				
		Black		Glossy	0.71	0.39	0.6	0.3	2	1.42	0.78	1.2	0.6				
		Black		Plain	0.3	0.51	0.89	1.1	3.5	1.05	1.785	3.115	3.85				
		Black		Plain	0.3	0.51	0.89	1.1	2	0.6	1.02	1.78	2.2				
		Black		Rough	0.3	0.45	0.36	1.49	9	2.7	4.05	3.24	13.41				
		Silver			1.15	0.59	1.27	0.24	6	6.9	3.54	7.62	1.44				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Silver			1.15	0.59	1.27	0.24	1.5	1.725	0.885	1.905	0.36				
		White			1.65	0.41	0.12	0.22	3	4.95	1.23	0.36	0.66				
		Black		Rough	0.3	0.45	0.36	1.49	6.5	1.95	2.925	2.34	9.685				
		Silver			1.15	0.59	1.27	0.24	9	10.35	5.31	11.43	2.16				
		Red		Plain	0.45	0.48	1.1	0.89	1	0.45	0.48	1.1	0.89				
		Silver			1.15	0.59	1.27	0.24	2.5	2.875	1.475	3.175	0.6				
		Black		Plain	0.3	0.51	0.89	1.1	1	0.3	0.51	0.89	1.1				
CBZ	LHS	Black		Plain	0.3	0.51	0.89	1.1	4	1.2	2.04	3.56	4.4	0.75	0.51	0.89	0.70
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Red		Plain	0.45	0.48	1.1	0.89	1	0.45	0.48	1.1	0.89				
		Black		Glossy	0.71	0.39	0.6	0.3	5	3.55	1.95	3	1.5				
		Black		Plain	0.3	0.51	0.89	1.1	2.5	0.75	1.275	2.225	2.75				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
		Silver			1.15	0.59	1.27	0.24	3	3.45	1.77	3.81	0.72				
		Black		Plain	0.3	0.51	0.89	1.1	4	1.2	2.04	3.56	4.4				
		White			1.65	0.41	0.12	0.22	1	1.65	0.41	0.12	0.22				
		Black		Glossy	0.71	0.39	0.6	0.3	4	2.84	1.56	2.4	1.2				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	13	3.9	5.85	4.68	19.37				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Silver			1.15	0.59	1.27	0.24	1	1.15	0.59	1.27	0.24				
		Silver			1.15	0.59	1.27	0.24	10	11.5	5.9	12.7	2.4				
		Silver			1.15	0.59	1.27	0.24	3.5	4.025	2.065	4.445	0.84				
		Red		Plain	0.45	0.48	1.1	0.89	1	0.45	0.48	1.1	0.89				
		Black		Rough	0.3	0.45	0.36	1.49	3.5	1.05	1.575	1.26	5.215				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
		Red		Plain	0.45	0.48	1.1	0.89	2	0.9	0.96	2.2	1.78				
		Black		Plain	0.3	0.51	0.89	1.1	2	0.6	1.02	1.78	2.2				
Glamor	LHS	Black		Glossy	0.71	0.39	0.6	0.3	3.5	2.485	1.365	2.1	1.05	0.67	0.40	0.71	0.64
		Black		Glossy	0.71	0.39	0.6	0.3	1	0.71	0.39	0.6	0.3				
		Black		Glossy	0.71	0.39	0.6	0.3	3	2.13	1.17	1.8	0.9				
		Red		Glossy	0.6	1.49	0.48	0	3	1.8	4.47	1.44	0				
		Red		Glossy	0.6	1.49	0.48	0	1	0.6	1.49	0.48	0				
		Silver			1.15	0.59	1.27	0.24	2	2.3	1.18	2.54	0.48				
		Black		Glossy	0.71	0.39	0.6	0.3	3	2.13	1.17	1.8	0.9				
		Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Silver			1.15	0.59	1.27	0.24	5	5.75	2.95	6.35	1.2				
	RHS	Black		Rough	0.3	0.45	0.36	1.49	6	1.8	2.7	2.16	8.94				
		Red		Glossy	0.6	1.49	0.48	0	7	4.2	10.43	3.36	0				
		Silver			1.15	0.59	1.27	0.24	9	10.35	5.31	11.43	2.16				
		Black		Rough	0.3	0.45	0.36	1.49	5	1.5	2.25	1.8	7.45				
		Black		Plain	0.3	0.51	0.89	1.1	4	1.2	2.04	3.56	4.4				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		White			1.65	0.41	0.12	0.22	0.5	0.825	0.205	0.06	0.11				
		Black		Plain	0.3	0.51	0.89	1.1	2	0.6	1.02	1.78	2.2				

Appendix-37.b: Weighted SGDI Score(Texture)

Model								
	S	G	D	I	S	G	D	I
Hunk	0.43	1.08	0.89	0.95	0.98	2.43	2.00	2.15
TVS Star	0.87	0.64	0.78	0.45	1.96	1.45	1.76	1.02
TVS Flame	0.55	0.75	0.57	1.17	1.24	1.68	1.28	2.63
Discover	0.76	0.56	0.59	0.69	1.72	1.27	1.33	1.56
Apache	0.83	0.71	0.68	0.48	1.87	1.61	1.53	1.09
Pulsar	0.80	0.47	0.73	0.61	1.81	1.07	1.64	1.37
Splendor+	0.90	0.48	0.69	0.51	2.04	1.08	1.56	1.16
Splendor NXG	0.76	0.57	0.79	0.72	1.71	1.29	1.79	1.62
Passion	0.70	0.72	0.65	0.65	1.59	1.63	1.47	1.48
CD Dlx	0.70	1.33	0.72	0.76	1.59	3.00	1.62	1.72
CBZ	0.75	0.51	0.89	0.70	1.69	1.15	2.00	1.57
Glamor	0.67	0.40	0.71	0.64	1.50	0.90	1.59	1.44

Appendix-38.a:Hunk

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	
Body/seat comb	0.33	0.62	1.45	1.45	0.93	
Body/stripe comb	0.33	0.62	1.45	1.45	0.93	
Mean(a)	0.5	1.02	1.42	1.33	0.65	
Texture(b)	0.5	0.98	2.43	2.00	2.15	
Weighted Mean		0.998677	1.923033	1.664922	1.397682	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	1.31	0.95	0.58	0.21	
Seat	0.34	1.12	1.04	0.87	0.04	
Visor	0.31	0.47	1.66	1.28	1.09	
Side Cover	0.04	0.59	0.83	2.26	0.83	
Weighted Mean		0.9562	1.1959	0.9628	0.8162	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.855	0.57	0.52	0.585	N14/H21
Graphics	0.25	0.92	0.68	1.99	0.44	
Weighted Mean		0.87125	0.5975	0.8875	0.54875	

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.14	0.74	2.87	1.39	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.2	1.9	0.93	0.24	
Weighted Mean		0.1837	1.2644	2.9973	0.8748	

e.Unity and Dynamism

S	G	D	I	
0.64	1.36	2.25	1.88	U3D3

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	0.998677	1.923033	1.664922	1.397682	
Form	0.18	0.9562	1.1959	0.9628	0.8162	
Graphics	0.15	0.87125	0.5975	0.8875	0.54875	
Context	0.25	0.1837	1.2644	2.9973	0.8748	
Unity and Dynamism	0.3	0.64	1.36	2.25	1.88	
Weighted Mean		0.66057	1.259751	1.930545	1.17965	

Appendix-38.b: CBZ Extreme

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	0	1.33	2.24	2.45	bl
Body/seat comb	0.33	0	1.33	2.24	2.45	bl
Body/stripe comb	0.33	1.14	2.17	0.72	1.24	bl/r2
Mean(a)	0.5	0.38	1.61	1.733333	2.046667	
Texture(b)	0.5	1.69	1.15	2.00	1.57	
Weighted Mean		1.032728	1.38213	1.869156	1.808998	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.21	1.26	0.58	0.74	SR2
Seat	0.34	0.37	1.25	1.58	1.29	5F
Visor	0.31	1.04	0.76	1.14	1.57	122
Side Cover	0.04	0.78	1.42	1.57	0.69	7F
Weighted Mean		0.5445	1.108	1.1332	2.3737	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	1.425	0.93	0.455	0.31	O12/H21
Graphics	0.25	0.58	1.16	0.75	1.39	
Weighted Mean		1.21375	0.9875	0.52875	0.58	

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.09	0.74	2.41	1.25	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	1.04	1.9	0.93	0.24	
Weighted Mean		0.3499	1.2644	2.7489	0.7992	

e.Unity and

S	G	D	I	
0.64	1.36	2.25	1.88	U3D3

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.032728	1.38213	1.869156	1.808998	
Form	0.18	0.5445	1.108	1.1332	2.3737	
Graphics	0.15	1.21375	0.9875	0.52875	0.58	
Context	0.25	0.3499	1.2644	2.7489	0.7992	
Unity and Dynamism	0.3	0.64	1.36	2.25	1.88	
Weighted Mean		0.683475	1.237521	1.869812	1.495146	

Appendix-38.c: Glamour

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	0.1	1.24	1.45	1.86	bl.r2
Body/seat comb	0.33	0.1	1.24	1.45	1.86	bl.r2
Body/stripe comb	0.33	1.14	2.17	0.72	1.24	bl/r2
Mean(a)	0.5	0.446667	1.55	1.206667	1.653333	
Texture(b)	0.5	1.50	0.90	1.59	1.44	
Weighted Mean		0.975305	1.226601	1.400693	1.544437	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.53	1.63	0.42	0.32	SP3
Seat	0.34	0.58	1.33	1.41	0.33	5A
Visor	0.31	1.04	0.76	1.14	1.57	122
Side Cover	0.04	1.08	1.42	0.64	0.39	7J
Weighted Mean		0.7271	1.2499	0.9886	1.2715	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.815	0.495	0.675	0.61	N14/H21
Graphics	0.25	0.75	1.7	0.58	0.1	97
Weighted Mean		0.79875	0.79625	0.65125	0.46975	

d.Context

	Weightage	S	G	D	I	
Type	0.54	1.11	2.5	0.14	0.09	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.8478	2.1412	1.4431	0.1452	

e.Unity and Dynamism

S	G	D	I	
1.53	2.64	1.4	0.65	U3D2

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	0.975305	1.226601	1.400693	1.544437	
Form	0.18	0.7271	1.2499	0.9886	1.2715	
Graphics	0.15	0.79875	0.79625	0.65125	0.46975	
Context	0.25	0.8478	2.1412	1.4431	0.1452	
Unity and Dynamism	0.3	1.53	2.64	1.4	0.65	
Weighted Mean		1.038677	1.818912	1.224494	0.715965	

Appendix-38.d: Discover

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	0	1.33	2.24	2.45	bl
Body/seat comb	0.33	0	1.33	2.24	2.45	bl
Body/stripe comb	0.33	0.1	1.29	1.45	1.86	bl.r2
Mean(a)	0.5	0.033333	1.316667	1.976667	2.253333	
Texture(b)	0.5	1.718967	2.718967	3.718967	4.718967	
Weighted Mean		0.87615	2.017817	2.847817	3.48615	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	1.21	1.16	0.74	0.16	MP3
Seat	0.34	1.75	0.54	0.62	0.21	3A
Visor	0.31	0.9	1.14	1.14	1.23	126
Side Cover	0.04	1.67	1.13	0.88	0.64	64
Weighted Mean		1.3159	0.9418	0.8288	1.0065	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.52	0.96	1.5	0.31	S13
Graphics	0.25	0.82	1.9	0.65	0.17	163
Weighted Mean		0.595	1.195	1.2875	0.5755	

d.Context

	Weightage	S	G	D	I	
Type	0.54	3	0.09	0.14	0.23	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.32	1.9	0.93	0.24	
Weighted Mean		1.7557	0.9134	1.5231	0.2484	

e.Unity and Dynamism

S	G	D	I	
1.91	1.64	1.82	0.82	U2D2

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	0.87615	2.017817	2.847817	3.48615	
Form	0.18	1.3159	0.9418	0.8288	1.0065	
Graphics	0.15	0.595	1.195	1.2875	0.5755	
Context	0.25	1.7557	0.9134	1.5231	0.2484	
Unity and Dynamism	0.3	1.91	1.64	1.82	0.82	
Weighted Mean		1.443175	1.311262	1.610822	0.993933	

Appendix-38.e: Apache

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	r2
Body/seat comb	0.33	0.1	1.24	1.45	1.86	r2.bl
Body/stripe comb	0.33	0.27	1.55	0.91	0.82	r2/w
Mean(a)	0.5	0.73	1.383333	1.15	0.923333	
Texture(b)	0.5	1.865261	2.865261	3.865261	4.865261	
Weighted Mean		1.297631	2.124297	2.507631	2.894297	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.89	0.63	1.31	0	SG2
Seat	0.34	1.25	1.33	0.46	0.37	6E
Visor	0.31	0.81	1.28	1.52	0.52	64
Side Cover	0.04	0.98	1.23	1.13	0.49	6G
Weighted Mean		0.9912	1.0935	1.0789	0.8908	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	1.835	0.445	0.18	0.35	O24/Q11
Graphics	0.25	0.88	1.9	0.44	0.31	
Weighted Mean		1.59625	0.80875	0.245	0.34	

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.09	0.74	2.41	1.25	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.297	1.1908	2.6689	0.7716	

e.Unity and Dynamism

S	G	D	I	
1.91	1.64	1.82	0.82	U2D2

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.297631	2.124297	2.507631	2.894297	
Form	0.18	0.9912	1.0935	1.0789	0.8908	
Graphics	0.15	1.59625	0.80875	0.245	0.34	
Context	0.25	0.297	1.1908	2.6689	0.7716	
Unity and Dynamism	0.3	1.91	1.64	1.82	0.82	
Weighted Mean		1.220819	1.362758	1.745093	0.99756	

Appendix-38.f: Pulsar

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	2.82	0.18	0.55	0.45	b3
Body/seat comb	0.33	0.31	1.86	1.45	0.72	b3.bl
Body/stripe comb	0.33	1.76	0.83	0.72	0	b3/w
Mean(a)	0.5	1.63	0.956667	0.906667	0.39	
Texture(b)	0.5	1.806206	2.806206	3.806206	4.806206	
Weighted Mean		1.718103	1.881436	2.356436	2.598103	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.89	0.63	1.31	0	SG2
Seat	0.34	1.33	0.75	1.25	0.21	7E
Visor	0.31	1	1.28	1.23	1	66
Side Cover	0.04	0.54	0.88	1.72	0.98	5E
Weighted Mean		1.0597	0.8823	1.2812	0.8992	

	Weightage	S	G	D	I	
Typography	0.75	0.67	1.5	0.85	0.05	$O_1 4$
Graphics	0.25	0.92	0.68	1.19	0.44	15
Weighted Mean		0.7325	1.295	0.935	0.1475	O14

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.09	0.74	2.41	1.25	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.297	1.1908	2.6689	0.7716	

e.Unity and Dynamism

S	G	D	I	
1.91	1.64	1.82	0.82	U2D2

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.718103	1.881436	2.356436	2.598103	
Form	0.18	1.0597	0.8823	1.2812	0.8992	
Graphics	0.15	0.7325	1.295	0.935	0.1475	
Context	0.25	0.297	1.1908	2.6689	0.7716	
Unity and Dynamism	0.3	1.91	1.64	1.82	0.82	
Weighted Mean		1.154043	1.368536	1.866863	0.934653	

Appendix-38.g: Star City

a.Colour						
	Weightage	S	G	D	I	Details
Body colour	0.33	1.27	1.45	0.55	0	r1
Body/seat comb	0.33	1.14	1.65	0.72	0.52	r1/bl
Body/stripe comb	0.33	1.6	1.09	1.09	0.36	r1/w
Mean(a)	0.5	1.336667	1.396667	0.786667	0.293333	
Texture(b)	0.5	1.956414	2.956414	3.956414	4.956414	
Weighted Mean		1.646541	2.176541	2.371541	2.624874	

b.Form						
	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.53	1.05	1.58	0.16	LQ3
Seat	0.34	1.25	1.33	0.46	0.37	6E
Visor	0.31	1	1.28	1.23	1	66
Side Cover	0.04	0.78	1.37	1.08	0.64	3F
Weighted Mean		0.89	1.2575	1.0875	0.5425	

c.Graphics						
	Weightage	S	G	D	I	
Typography	0.75	2.095	0.415	0.18	0.22	J23/Q11
Graphics	0.25	1.12	1.36	0.37	0.2	
Weighted Mean		1.85125	0.65125	0.2275	0.1136	

d.Context						
	Weightage	S	G	D	I	
Type	0.54	3	0.09	0.14	0.23	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	0.58	0.85	0.12	
Weighted Mean		1.36	0.843333	0.776667	0.216667	

e.Unity and Dynamism						
		S	G	D	I	
		1.91	1.64	1.82	0.82	U2D2

f.Overall				r		
	Weightage (x)	S	G	D	I	
Colour	0.12	1.646541	2.176541	2.371541	2.624874	
Form	0.18	0.89	1.2575	1.0875	0.5425	
Graphics	0.15	1.85125	0.65125	0.2275	0.1136	
Context	0.25	1.36	0.843333	0.776667	0.216667	
Unity and Dynamism	0.3	1.91	1.64	1.82	0.82	
Weighted Mean		1.548472	1.288056	1.254627	0.729842	

Appendix-38.h: TVS Flame

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	r2
Body/seat comb	0.33	0.62	1.45	1.45	0.93	r2/bl
Body/stripe comb	0.33	0.62	1.45	1.45	0.93	r2/bl
Mean(a)	0.5	1.02	1.42	1.33	0.65	
Texture(b)	0.5	1.242168	2.242168	3.242168	4.242168	
Weighted Mean		1.131084	1.831084	2.286084	2.446084	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.53	1.05	1	0.42	SP4
Seat	0.34	1.04	1.25	1	0.17	
Visor	0.31	1	1.28	1.23	1	66
Side Cover	0.04	0.74	0.78	1.86	1.08	4F
Weighted Mean		0.8575	1.1785	1.1057	0.9934	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	1.955	0.855	0.35	0.195	O12/Q11
Graphics	0.25	1.46	0.41	0.78	0.24	121
Weighted Mean		1.83125	0.74375	0.4575	0.25545	

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.14	0.74	2.87	1.39	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.324	1.1908	2.9173	0.8472	

e.Unity and Dynamism

S	G	D	I	
1.91	1.64	1.82	0.82	U2D2

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.131084	1.831084	2.286084	2.446084	
Form	0.18	0.8575	1.1785	1.1057	0.9934	
Graphics	0.15	1.83125	0.74375	0.4575	0.25545	
Context	0.25	0.324	1.1908	2.9173	0.8472	
Unity and Dynamism	0.3	1.91	1.64	1.82	0.82	
Weighted Mean		1.218768	1.333123	1.817306	0.96846	

Appendix-38.i: CD Deluxe

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	0	1.33	2.24	2.45	bl
Body/seat comb	0.33	0	1.33	2.24	2.45	bl
Body/stripe comb	0.33	0.1	1.24	1.45	1.86	bl/r2
Mean(a)	0.5	0.033333	1.3	1.976667	2.253333	
Texture(b)	0.5	1.589014	2.589014	3.589014	4.589014	
Weighted Mean		0.811174	1.944507	2.78284	3.421174	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.79	0.68	1.68	0.11	MO3
Seat	0.34	2.08	0.08	0	0.12	
Visor	0.31	0.57	1.33	1.61	0.32	62
Side Cover	0.04	0.64	1.81	1.32	0.25	3D
Weighted Mean		1.1544	0.7227	1.0727	0.6033	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.805	0.465	0.855	0.6	N14/H11
Graphics	0.25	2.45	0.71	0.24	0.03	
Weighted Mean		1.21625	0.52625	0.70125	0.5202	

d.Context

	Weightage	S	G	D	I	
Type	0.54	3	0.09	0.14	0.23	
Fr facia	0.23	0.04	1.93	1.14	0.11	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		1.8155	0.8559	1.4178	0.1771	

e.Unity and Dynamism

S	G	D	I	
2.8	1.13	1.58	0.82	U2D1

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	0.811174	1.944507	2.78284	3.421174	
Form	0.18	1.1544	0.7227	1.0727	0.6033	
Graphics	0.15	1.21625	0.52625	0.70125	0.5202	
Context	0.25	1.8155	0.8559	1.4178	0.1771	
Unity and Dynamism	0.3	2.8	1.13	1.58	0.82	
Weighted Mean		1.781445	0.995339	1.460664	0.88744	

Appendix-38.j: Splendor +

a.Colour						
	Weightage	S	G	D	I	Details
Body colour	0.33	0	1.33	2.24	2.45	
Body/seat comb	0.33	0	1.33	2.24	2.45	
Body/stripe comb	0.33	0.52	1.55	1.45	1.24	
Mean(a)	0.5	0.173333	1.403333	1.976667	2.046667	
Texture(b)	0.5	2.039239	3.039239	4.039239	5.039239	
Weighted Mean		1.106286	2.221286	3.007953	3.542953	
b.Form						
	Weightage	S	G	D	I	Details
Fuel Tank	0.31	2.26	0.42	0.32	0.21	
Seat	0.34	1.75	0.54	0.62	0.21	
Visor	0.31	0.47	1.47	1.47	0.9	
Side Cover	0.04	0.93	0.93	1.86	0.59	
Weighted Mean		1.4785	0.8067	0.8401	0.9177	
c.Graphics						
	Weightage	S	G	D	I	
Typography	0.75	1.375	0.825	0.79	0.325	O12/H11
Graphics	0.25	3	0.61	0.17	0.07	
Weighted Mean		1.78125	0.77125	0.635	0.26865	
d.Context						
	Weightage	S	G	D	I	
Type	0.54	3	0.09	0.14	0.23	
Fr facia	0.23	2.28	1.25	0.27	0	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		2.3307	0.6995	1.2177	0.1518	
e.Unity and Dynamism						
		S	G	D	I	
		2.8	1.13	1.58	0.82	U2D1
f.Overall				r		
	Weightage (x)	S	G	D	I	
Colour	0.12	1.106286	2.221286	3.007953	3.542953	
Form	0.18	1.4785	0.8067	0.8401	0.9177	
Graphics	0.15	1.78125	0.77125	0.635	0.26865	
Context	0.25	2.3307	0.6995	1.2177	0.1518	
Unity and Dynamism	0.3	2.8	1.13	1.58	0.82	
Weighted Mean		2.088747	1.041323	1.385847	0.914588	

Appendix-38.k: Passion-Pro

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	r2
Body/seat comb	0.33	0.62	1.45	1.45	0.93	r2/bl
Body/stripe comb	0.33	0.62	1.45	1.45	0.93	r2/bl
Mean(a)	0.5	1.02	1.42	1.33	0.65	
Texture(b)	0.5	1.585441	2.585441	3.585441	4.585441	
Weighted Mean		1.30272	2.00272	2.45772	2.61772	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.21	1.31	0.32	0.42	LM2
Seat	0.34	1.12	0.96	1.25	0.21	5E
Visor	0.31	1.23	1.57	0.76	0.43	82
Side Cover	0.04	1.27	1.47	1.03	0.49	4G
Weighted Mean		0.878	1.278	0.801	0.8331	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	1.15	0.905	0.62	0.245	O14/H21
Graphics	0.25	0.58	1.56	0.95	0.31	143
Weighted Mean		1.0075	1.06875	0.7025	0.4464	

d.Context

	Weightage	S	G	D	I	
Type	0.54	1.11	2.5	0.14	0.09	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.8478	2.1412	1.4431	0.1452	

e.Unity and Dynamism

S	G	D	I	
1.53	2.64	1.4	0.65	U3D2

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.30272	2.00272	2.45772	2.61772	
Form	0.18	0.878	1.278	0.801	0.8331	
Graphics	0.15	1.0075	1.06875	0.7025	0.4464	
Context	0.25	0.8478	2.1412	1.4431	0.1452	
Unity and Dynamism	0.3	1.53	2.64	1.4	0.65	
Weighted Mean		1.136441	1.957979	1.325256	0.762344	

Appendix-39.a: Hunk (Modified)

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	
Body/seat comb	0.33	0.62	1.45	1.45	0.93	
Body/stripe comb	0.33	0.62	1.45	1.45	0.93	
Mean(a)	0.5	1.02	1.42	1.33	0.65	
Texture(b)	0.5	0.98	2.43	2.00	2.15	
Weighted Mean		0.998677	1.923033	1.664922	1.397682	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	1.31	0.95	0.58	0.21	
Seat	0.34	1.12	1.04	0.87	0.04	
Visor	0.31	0.47	1.66	1.28	1.09	
Side Cover	0.04	0.59	0.83	2.26	0.83	
Weighted Mean		0.9562	1.1959	0.9628	0.8162	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.855	0.57	0.52	0.585	N14/H21
Graphics	0.25	0.92	0.68	1.99	0.44	
Weighted Mean		0.87125	0.5975	0.8875	0.54875	

d.Context

	Weightage	S	G	D	I	
Type	0.7	0.14	0.74	2.87	1.39	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.2	1.4	0.93	0.96	
Weighted Mean		0.2061	1.2678	3.4565	1.2628	

e.Unity and Dynamism

S	G	D	I	
0.64	1.05	2.25	2.08	U3D3

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	0.998677	1.923033	1.664922	1.397682	
Form	0.18	0.9562	1.1959	0.9628	0.8162	
Graphics	0.15	0.87125	0.5975	0.8875	0.54875	
Context	0.25	0.2061	1.2678	3.4565	1.2628	
Unity and Dynamism	0.3	0.636667	1.05	2.246667	2.08	
Weighted Mean		0.66517	1.167601	2.044345	1.33665	

Appendix-39.b:CBZ Extreme(Modified)

a.Colour						
	Weightage	S	G	D	I	Details
Body colour	0.33	0	1.33	2.24	2.45	bl
Body/seat comb	0.33	0	1.33	2.24	2.45	bl
Body/stripe comb	0.33	1.14	2.17	0.72	1.24	bl/r2
Mean(a)	0.5	0.38	1.61	1.733333	2.046667	
Texture(b)	0.5	1.69	1.15	2.00	1.57	
Weighted Mean		1.032728	1.38213	1.869156	1.808998	
b.Form						
	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.21	1.26	0.58	0.74	SR2
Seat	0.34	0.37	1.25	1.58	1.29	5F
Visor	0.31	1.04	0.76	1.14	1.57	122
Side Cover	0.04	0.78	1.42	1.57	0.69	7F
Weighted Mean		0.5445	1.108	1.1332	2.3737	
c.Graphics						
	Weightage	S	G	D	I	
Typography	0.75	1.425	0.93	0.455	0.31	O12/H21
Graphics	0.25	0.58	1.16	0.75	1.39	
Weighted Mean		1.21375	0.9875	0.52875	0.58	
d.Context						
	Weightage	S	G	D	I	
Type	0.7	0.09	0.74	2.41	1.25	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	1.04	1.4	0.93	0.96	
Weighted Mean		0.3643	1.2678	3.1345	1.1648	
e.Unity and Dynamism						
		S	G	D	I	
		0.64	1.05	2.25	2.08	U3D3
f.Overall				r		
	Weightage (x)	S	G	D	I	
Colour	0.12	1.032728	1.38213	1.869156	1.808998	
Form	0.18	0.5445	1.108	1.1332	2.3737	
Graphics	0.15	1.21375	0.9875	0.52875	0.58	
Context	0.25	0.3643	1.2678	3.1345	1.1648	
Unity and Dynamism	0.3	0.636667	1.05	2.246667	2.08	
Weighted Mean		0.686075	1.145371	1.965212	1.646546	

Appendix-39.c: Discover (Modified)

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	0	1.33	2.24	2.45	bl
Body/seat comb	0.33	0	1.33	2.24	2.45	bl
Body/stripe comb	0.33	0.1	1.29	1.45	1.86	bl.r2
Mean(a)	0.5	0.033333	1.316667	1.976667	2.253333	
Texture(b)	0.5	1.718967	2.718967	3.718967	4.718967	
Weighted Mean		0.87615	2.017817	2.847817	3.48615	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	1.21	1.16	0.74	0.16	MP3
Seat	0.34	1.75	0.54	0.62	0.21	3A
Visor	0.31	0.9	1.14	1.14	1.23	126
Side Cover	0.04	1.67	1.13	0.88	0.64	64
Weighted Mean		1.3159	0.9418	0.8288	1.0065	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	0.52	0.96	1.5	0.31	S13
Graphics	0.25	0.82	1.9	0.65	0.17	163
Weighted Mean		0.595	1.195	1.2875	0.5755	

d.Context

	Weightage	S	G	D	I	
Type	0.54	3	0.09	0.14	0.23	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.32	1.4	0.93	0.96	
			0.7984	1.5231	0.414	

e.Unity and Dynamism

S	G	D	I	
1.91	1.64	1.82	0.82	U2D2

f.Overall

	Weightage (x)	S	G	D	I	
Colour	0.12	0.87615	2.017817	2.847817	3.48615	
Form	0.18	1.3159	0.9418	0.8288	1.0065	
Graphics	0.15	0.595	1.195	1.2875	0.5755	
Context	0.25	0	0.7984	1.5231	0.414	
Unity and D	0.3	1.91	1.64	1.82	0.82	
Weighted Mean		1.00425	1.282512	1.610822	1.035333	

Appendix-39.d: Apache (Modified)

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	1.82	1.36	1.09	0.09	r2
Body/seat comb	0.33	0.1	1.24	1.45	1.86	r2.bl
Body/stripe comb	0.33	0.27	1.55	0.91	0.82	r2/w
Mean(a)	0.5	0.73	1.383333	1.15	0.923333	
Texture(b)	0.5	1.865261	2.865261	3.865261	4.865261	
Weighted Mean		1.297631	2.124297	2.507631	2.894297	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.89	0.63	1.31	0	SG2
Seat	0.34	1.25	1.33	0.46	0.37	6E
Visor	0.31	0.81	1.28	1.52	0.52	64
Side Cover	0.04	0.98	1.23	1.13	0.49	6G
Weighted Mean		0.9912	1.0935	1.0789	0.8908	

c.Graphics

	Weightage	S	G	D	I	
Typography	0.75	1.835	0.445	0.18	0.35	O24/Q11
Graphics	0.25	0.88	1.9	0.44	0.31	
Weighted Mean		1.59625	0.80875	0.245	0.34	

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.09	0.74	2.41	1.25	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.297	1.1908	2.6689	0.7716	

e.Unity and Dynamism

S	G	D	I	
1.13	1.10	2.45	1.75	U2D3

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.297631	2.124297	2.507631	2.894297	
Form	0.18	0.9912	1.0935	1.0789	0.8908	
Graphics	0.15	1.59625	0.80875	0.245	0.34	
Context	0.25	0.297	1.1908	2.6689	0.7716	
Unity and Dynamism	0.3	1.125	1.1	2.45	1.75	
Weighted Mean		0.985319	1.200758	1.934093	1.27656	

Appendix-39.e: Pulsar(Modified)

a.Colour

	Weightage	S	G	D	I	Details
Body colour	0.33	2.82	0.18	0.55	0.45	b3
Body/seat comb	0.33	0.31	1.86	1.45	0.72	b3.bl
Body/stripe comb	0.33	1.76	0.83	0.72	0	b3/w
Mean(a)	0.5	1.63	0.956667	0.906667	0.39	
Texture(b)	0.5	1.806206	2.806206	3.806206	4.806206	
Weighted Mean		1.718103	1.881436	2.356436	2.598103	

b.Form

	Weightage	S	G	D	I	Details
Fuel Tank	0.31	0.89	0.63	1.31	0	SG2
Seat	0.34	1.33	0.75	1.25	0.21	7E
Visor	0.31	1	1.28	1.23	1	66
Side Cover	0.04	0.54	0.88	1.72	0.98	5E
Weighted Mean		1.0597	0.8823	1.2812	0.8992	

	Weightage	S	G	D	I	
Typography	0.75	0.67	1.5	0.85	0.05	$O_1$4
Graphics	0.25	0.92	0.68	1.19	0.44	15
Weighted Mean		0.7325	1.295	0.935	0.1475	O14

d.Context

	Weightage	S	G	D	I	
Type	0.54	0.09	0.74	2.41	1.25	
Fr facia	0.23	0.27	1.86	1.25	0.3	
Tyres and wheels	0.23	0.81	1.58	0.85	0.12	
Weighted Mean		0.297	1.1908	2.6689	0.7716	

e.Unity and Dynamism

S	G	D	I	
1.13	1.10	2.45	1.75	U2D3

f.Overall

r

	Weightage (x)	S	G	D	I	
Colour	0.12	1.718103	1.881436	2.356436	2.598103	
Form	0.18	1.0597	0.8823	1.2812	0.8992	
Graphics	0.15	0.7325	1.295	0.935	0.1475	
Context	0.25	0.297	1.1908	2.6689	0.7716	
Unity and Dynamism	0.3	1.125	1.1	2.45	1.75	
Weighted Mean		0.918543	1.206536	2.055863	1.213653	

Appendix-39.f: Weighted SGDI Scores

	S	Weighted S	G	Weighted G	D	Weighted D	I	Weighted i
CD-Dlx	1.78	2.56	1.00	1.43	1.46	2.10	0.89	1.27
Glamour	1.04	1.49	1.82	2.61	1.22	1.76	0.72	1.03
Passion	1.14	1.63	1.96	2.81	1.33	1.90	0.76	1.09
Splendor+	2.09	3.00	1.04	1.49	1.39	1.99	0.91	1.31
Hunk	0.66	0.95	1.26	1.81	1.93	2.77	1.18	1.69
CBZ Extreme	0.68	0.98	1.24	1.78	1.87	2.68	1.50	2.15
Discover	1.44	2.07	1.31	1.88	1.61	2.31	0.99	1.43
Pulser 150	1.15	1.66	1.37	1.96	1.87	2.68	0.93	1.34
Apache	1.22	1.75	1.36	1.96	1.75	2.50	1.00	1.43
Flame	1.22	1.75	1.33	1.91	1.82	2.61	0.97	1.39
Star City	1.55	2.22	1.29	1.85	1.25	1.80	0.73	1.05
Splendor NXG	1.83	2.63	1.15	1.65	1.39	1.99	0.85	1.21

Chapter 7: Conclusions and Scope of Future Study

7.1 Conclusions

1. To conclude the whole study, we first developed a concept to express the aesthetics of a motorcycle, drawing from ancient Indian literature and modern research in the field of design and neuro-sciences. This concept is through the circumplex of emotions in terms of intensities of emotions sobriety(S), glamour (G), dynamism (D) and intimidation (I).

2. Then we developed a mathematical formulation (equations 3.7 to 3.11) to determine these intensities.
3. Then by conducting extensive survey, we developed a databank of emotion coefficients for various factors and sub factors and the respective weightages for each of them.
4. Then we verified this tool by comparing the actual emotions generated by actual motorcycles to the calculated values. After comparison, we had to do some tweaking in the weightages and coefficients for the two to match.
5. This study, first and foremost, concludes that emotions generated by a design are scientifically identifiable and quantifiable. The mathematical tool generated in this study (Table 4.11) is able to identify correctly the top two dominant emotions in all 11 motorcycles. The relative positioning in Indian motorcycle market is correctly identified to a great extent. For emotions S and G, the top three bikes are matching. For D and I, top two bikes are exactly matching. The variation pattern for all emotions also matches whereas the standard deviation for physical evaluation is slightly higher compared to the calculated ratings. This is understandable because in human perception, only the dominant emotions prevail and non-dominant ones score lower than their actual rating.
6. The larger fundamental issue here is that of deconstruction. The basic question, where we started was whether the aspect of emotions generated by a design is mathematically deconstructible. To a great extent, this question has been answered in affirmative. The aspect of the whole meaning more than the sum of parts is resolved with a quantification of unity and dynamism. Moreover the parameter of context brings to the table the unstated socio-cultural narratives.

7. This study is in context of a motorcycle. But the methodology can be replicated for any other artifact. Here the methodology evolved by Kansei Engineering concept can be easily adopted for developing the weightages and the ratings.
8. This study has been conducted in the socio-cultural context of North Indian motorcycle market- the respondent mix represents the geographical, gender, economic, age and occupational divides.. In any other context the rating scores have to be established afresh as the socio-cultural context changes.
9. Thus, it can be concluded that emotions generated by an engineering object, in this case a motorcycle, can be quantitatively expressed and this quantification, by and large matches with users perception within the socioeconomic and geographic context.

Now, having verified the methodology and the values we can revisit the equations (3.7) and (3.8) with the exact values and coefficients.

$[r]_{s, g, d, i} = [\sum w_x r_x]_{s, g, d, I}$ (3.1) and

$[r_x]_{s, g, d, i} = [\sum w_a r_{xa}]_{s, g, d, i}$ (3.2)

Where the values for x and a are tabulated in the following table:

Table 7.1, Weightage Coefficients

x		a							
Color	0.12	Color	0.5	Texture	0.5				
Form	0.18	Fuel Tank	0.31	Seat	0.34	Side Cover	0.04	Visor	0.31
Context	0.25	Type	0.54	Fr Facia	0.23	Wheels	0.23		
Graphics	0.15	Typography	0.75	Stripes	0.25				
Unity and Dynamism	0.3								

Based on these values, the designer can estimate the aesthetic value with reference to the s, g, d and i values given by marketing using equation (2.6) i.e.

$V_{aesthetic} = 1 - ([\sum \delta r]_{s, g, d, i} / 12)$ (2.6)

Though this equation is only indicative and a detailed study is required to determine the aesthetic value based on emotion co-ordinates.

7.2 Scope for future study

1. Having established the intensities for the four emotions related to a motorcycle, the next study is to find a methodology to quantify the $V_{aesthetic}$ as a function of r and θ, used in equation (1) and (2), so that along with the functional value and snob value, the overall value proposition for the user can be determined

2. For impact of color, the scope of this study was very limited. Only four hues were selected and only three combinations of value and chroma was selected in order to keep the total numbers of survey sheets manageable. A complete study involving all possible hues, value and chroma can be taken up.

3. Combination of only two colors was taken up whereas actually it can be a combination of any number of colors. This can be taken up for future work.

4. Impact of some other parameters like gloss and surface texture has been taken up in a very limited context for considerations of practicality. This can be studied in detail in a separate study.

5. This study is based on a survey in North Indian population and hence is applicable for a limited area. Study for other geographical areas can be taken up.

4. This study has considered only mainstream motorcycle types. Non conventional designs have not been considered. A separate study can be taken up for them.

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List of Publications/Presentations

[1]. Chandra, Sushil and Atreya, S.K. "Lyricism in Design: History of Motorcycles in India' in Fall 2009 issue of 'International Journal of Motorcycle Studies'. Ref http://ijms.nova.edu/Fall2009/IJMS_Artcl.ChandraAtreya.html

[2]. Chandra, Sushil and Atreya, S.K. "Motorcycle Design: In search of Meaning' presented at IJMS conference at University of Colorado, Colorado Springs to be held from 3rd to 6th June 2010.

[3]. Chandra, Sushil and Atreya, S.K. "Semantics of Motorcycle Design: A Kansei Engineering Framework" India' in Spring 2011 issue of 'International Journal of Motorcycle Studies'. Ref http://ijms.nova.edu/Spring2011/IJMS_Artcl.ChandraAtreya.html

[4]. Chandra, Sushil and Atreya, S.K. "Sustainability in Motorbike Styling" presented at International Conference on Sustainable Manufacturing held at BITS, Pilani from 9-11th November, 2011

[5] Chandra, Sushil and Atreya, S.K. "The DNA of Design: A Motorcycle Case Study" presented at National Conference on Emerging Trends in Mechanical Engineering at ITM, Gurgaon on June 1-2, 2012.

[6] Chandra, Sushil and Atreya, S.K. "Deconstructing Dynamism in Motorcycle Design" for International Journal of Motoxurercycle Design for Spring issue of 2013. Ref http://ijms.nova.edu/Spring2013/IJMS_Artcl.ChandraAtreya.html

Publications/papers accepted for publication:

[7] Chandra, Sushil and Atreya, S.K. "Motorcycles, Scooters and the Feminist Discourse in India" at IJMS Conference on Motorcycles at Chelsea College of Art and Design, London 0n 4-7th July, 2013.