



The Application of Formal Beauty Rule in Bus Model

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Abstract. This paper briefly expounds on the basic elements and laws of the formal beauty rules. And uses the modeling design of existing models as an example.

Keywords: formal beauty rules · modeling design · basic elements

1 Introduction

As China's modern industrial start-up is relatively late, in the field of bus styling design, it is in the re-innovation phase of learning from foreign brands. In the fiercely competitive international market, it is the goal and responsibility of Chinese designers to create bus styling styles with Chinese characteristics to compete in the international market. However, the modeling of domestic buses tends to be homogeneous and there are few unique styles and characteristics. The styling design has become an effective way for bus manufacturers to win in the current fierce international market competition.

2 Bus Styling Design

The bus styling is different from the passenger cars. Passenger cars have a variety of styling styles, while buses are mainly box-shaped with flat heads due to the restriction factors of their use conditions. After several years of history, the current bus styling has evolved into two forms: square base tone and round base tone. Due to the slow speed in the urban area, the air resistance factor is rarely considered when designing the bus shape, thus forming a square base tone with small round corners. The lines of this square base tone are clean and neat, and the process is relatively simple, with a spacious interior. For highway buses, due to the faster speed than the bus, the design must consider the wind resistance coefficient, Large-radius curves and surfaces are mostly used.

3 Formal Beauty Rules

The principle of formal beauty [1] is the focus of design aesthetics research. It applies to all design fields, including industrial design, graphic design, architectural design, etc. It is a theory that people gradually produce and develop in the process of creative practice. It is a general summary of the main characteristics of formal beauty in design.

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M. F. b. Sedon et al. (Eds.): SSHA 2023, ASSEHR 752, pp. 673–679, 2023.

https://doi.org/10.2991/978-2-38476-062-6_86

Aesthetics are subjective, and different cultures and regions have differences, and there is no absolute standard. The principle of formal beauty is also not an immutable rule. In the design of bus styling, it is necessary to avoid forcing the application and dogmatism, and to make flexible changes according to the specific situation. This is something that must be taken into account when using it [2].

4 The Basic Elements of Formal Beauty and Its Reflection in Bus Styling Design

4.1 Symmetry and Balance

Symmetry means that the visual elements are of the same or equal proportions in relation to the up and down, front and back, and left and right. In terms of exterior modeling [3].

As shown in Fig. 1, the front headlights, high-profile lights, fog lights and bumper guards of the bus are completely symmetrical to the YO line. All these reflect the symmetrical beauty of bus design. The front wall modeling created by the symmetrical balance pattern gives people a sense of order, stability and a sense of dignity, solemnity and tranquility [4].

The balance in the design of buses does not refer to the actual weight balance, but to the balance in terms of visual judgment. In other words, it focuses on achieving



Fig. 1. Front Surface Modeling



Fig. 2. Asymmetric Front Surface Modeling

visual stability and psychological balance. For example, the weight sense of shape, color, material in the design of buses, the size of the area and the brightness and darkness of the color, etc., must maintain a balanced state in order to give people a feeling of stability. The most classic example is the front surface of SOLARIS in Fig. 2. It has a unique oblique line shape at the lower edge of the front windshield. The shape is obviously asymmetrical here. It looks transparent and light due to the transparent vision area in the low part of the bus, while the driving area, the instrument panel and the driver's enclosure in the high part of the bus have obvious visual weight relative to the left side. The front surface also achieves the visual balance of the steelyard type [5].

4.2 Proportion and Scale

Proportion, also known as the “law of relationships,” refers to the quantitative relationships between part and whole or between part and part. The golden ratio of ancient Greece was applied to the design of the structural relationship or physical relationship between the part and the whole, or between the part and the part. It is the basic element of the pursuit of unified and balanced quantity order of the bus model.

As shown in Fig. 3, The positive and negative proportions of the front surface tend to be classic utilitarianism. The component proportions are divided by functions, such as the open front maintenance door, the headlight panel that can be turned over for maintenance, etc. In comparison, Fig. 4 expands the proportion of positive and negative shapes of the front surface of the vehicle. The larger black area is beneficial to the visual permeability of the vehicle, and the shape boundary characteristics of many components



Fig. 3. Classic Front Surface Modeling



Fig. 4. Transparency Front Surface Modeling



Fig. 5. Partition Interior Modeling

are invisible. Different modeling ratios can clearly distinguish the recognition of new and old models [6]. The concise processing of modeling features and the transparent front style are the current trend of pure electric bus modeling.

Scale refers to the boundary and standard between the whole or part of a certain thing and human physiological functions, which refers to the measurement of the item itself and certain standards. It is mainly grasped by the impression of the senses. Proportion is rational and concrete, while the scale is subjective and abstract. As shown in Fig. 5, the driver's rear enclosure is almost half of the body width. So, it is decorated with dark semi-transparent glass material. The dark color will make the surrounding scale look smaller, and the semi-transparent material increases the overall transparency of the interior decoration. The combination of the two can well reduce the problem of blocking the view in the perceptual sense [7].

4.3 Rhythm and Cadence

The rhythm in visual modeling refers to the regular changes in visual elements. Rhythm sense is very important in bus modeling. In the processing of many lines and surfaces, the change of rhythm affects the feeling of the overall shape. Similarly, in the treatment of material changes, highlights and some modeling feature details, it is necessary to grasp the rhythm. The control buttons on the dashboard shown in Fig. 6 are arranged in a balanced layout, with three rows of buttons arranged at equal intervals, but interlaced. The design of the buttons not only maintains the sense of the order of the repeated layout, but also interlaces and changes colors, which nicely interprets the sense of the rhythm of the shape design.

In dealing with the changes of lines, it is necessary to learn to accurately appreciate the cadence of modeling lines, grasp the most moving cadence in various line changes, and move the viewers with it. This is especially obvious in some bus models with streamlined modeling as the theme. For example, the bus model shown in Fig. 7, the waistline starts from the bottom of the front headlights, and the wave-shaped characteristics run through the front and rear, and it is raised at the rear. It not only reflects the sense of low front and high back diving speed, but also takes into account the functional requirements of the rear cabin door height. The handling of the waistline is very rhythmic, which breaks the monotonous and rigid characteristics of the traditional bus rectangular box modeling.



Fig. 6. Instrument buttons



Fig. 7. Curved Waistline Modeling

4.4 Harmony and Contrast

The meaning of coordination in the modeling design is that all features need to be properly matched with each other, not prominent, and full of overall sense. In dealing with the actual bus design, designers often have to grasp the visual coordination between the various parts. This coordination relationship determines the integrity and integrity of the modeling [8]. As shown in Fig. 8, the front surface adopts the geometric typing characteristics of the U-shaped. The overall shape includes the geometric cutting style detailed modeling surface, the polygonal front lamp border, the trapezoidal license plate mounting surface, the triangular rear fog lamp, and the L-shaped high-level outline lamp. The geometric style makes it full of technology and future temperament.

Designers should pay attention to the consistency of the modeling in interior design, but too much consideration of the consistency of the modeling will also give people



Fig. 8. Geometric Style Front Surface



Fig. 9. Grey Interior

a sense of monotony and lack of change. Designers should control some exaggerated, emphasized and colored changes in some local areas to form a contrast with the overall large area features, thus forming a dramatic visual modeling effect. The same contrast treatment is also commonly used in the detail design of the interior color scheme of the 20 models shown in Fig. 9. The bright yellow is very visually dynamic, and is particularly lively and cute in the black-and-white interior, making people feel comfortable.

5 Conclusion

The law of formal beauty has a far-reaching influence on bus modeling design. Bus styling design is actually an application field of formal beauty law in industrial design. In-depth understanding of formal beauty law can effectively help designers complete bus styling that is more in line with people's aesthetics, avoid major aesthetic problems in design, and reduce the risk of new product investment. The author introduces the basic elements of the law of formal beauty: symmetry and balance, proportion and scale, rhythm and rhythm, coordination and contrast, and the application in the actual model. It provides a theoretical basis for how to do a good job in the overall and local design relationship, and the details of the exterior and interior design.

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