

# Design and Optimization Analysis of Automobile Electronic and Electrical structure

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**key words** Automobile; Electronic and Electrical Architecture Design; Optimization Analysis

**Abstract** At present, as an important means of transportation, automobile plays a more and more important role in modern human life and production process. With the expansion of the scope of use and the use of the population, consumers pay more and more attention to the technology and function of the automobile, and the requirements are getting higher and higher, and the complexity of the function and technology of the automobile is much more than in the past. Among many functional technologies of automobile, electronic and electrical design architecture gradually highlights its important position, and has become a key technology that people pay more and more attention to, and it has been regarded as a primary work in the process of modern automobile design, and the success of its design is directly related to the success of the whole vehicle design. I'm here. years of work in the automotive field, this paper based on the previous accumulated experience, for the design including the optimization of automotive electronic and electrical architecture, the relevant analysis.

## 1. The design and optimization of the electronic and electrical structure of the automobile

### 1.1 Database

Benchmark database: at present, the major automobile production service providers all over the world are included in the model data. The market development database contains the enterprise data of the major automobile production service providers existing in the global market, as well as the related data of the major automobile parts suppliers. The database is used to complete the research and development of electronic and electrical technical products. Solution database. According to the data of the first two databases, combined with the current design requirements, the database synthesizes the data of each vehicle type, compares and analyzes the data, and then obtains the final design goal.

### 1.2 Electronic and electrical architecture optimization tools

The optimization tool builds a docking platform between the structure and management of the electronic and electrical architecture to connect the two and realize an interrelated relationship. REEvision software has powerful and rich functions, through which the improvement and optimization of the electronic and electrical architecture system can be realized. In addition, the software can also help designers docking database system. The important functions of the software also include defining different kinds of electronic components and defining the position of the components of the automobile structure. Calculating the price cost of electronic components is also an important function of the software, which helps designers to control the design cost.

## 2. The Design and Optimization of the Electronic and Electrical Architecture of the Automobile

### 2.1 Database for optimizing the design of automotive electronic and electrical architecture

#### 2.1.1 Optimization of the standard database

The data in the standard database are complicated, and the data of each type of vehicle models recorded by the automobile manufacturers all over the world are different from each other, so it is difficult to analyze and compare, so it is necessary to optimize the data in the database and set a

unified standard.

#### *2.1.2 Optimizing the database of the development trend of the market*

In the design process of electronic and electrical structure, it is necessary to refer to the design technology of other automobile manufacturers and the relevant data of parts suppliers, so it is necessary to optimize the market development database, update the market data in time, formulate the market development data, and master the frontier development trend and advanced technology.

#### *2.1.3 Optimization of the database applied to the solution design*

Improve the database system to achieve a reasonable design. Collect the problems encountered in the design process, establish a comparative database, through this data platform, analyze the data in the database, in order to find out a targeted solution to the problem.

### **2.2 appropriate tools need to be used in the design and optimization process**

In the design process of electronic and electrical system, we need to choose an efficient design tool. And use the optimization tool efficiently and reasonably, through the architecture management tool to assist the design, make the reasonable configuration, and request in the design process, the design tool is not only one-time use, but the request can be reused many times, reuse the design result. It is required that the design tool can realize the graphical user interface, and on this basis, it is also required to meet the requirements of the user to call the database.

### **2.3 selection of sound communication network design and optimization tools**

The design of communication network is also very important, and the selection of design tools should also be cautious. As far as the current development technology is concerned, this field is relatively mature. Vector function library is a very good tool, in the design of electronic and electrical architecture, the use of this tool can achieve the improvement of object array. By using C template library, its function can be fully utilized. For the design optimization load rate and structure topology, the use of this tool can also meet the corresponding requirements.

## **3. Process optimization of automobile electronic and electrical architecture**

### **3.1 do a good job in the positioning of market models**

The automobile enterprises should master the market demand information in time. The relevant departments responsible for the strategic deployment of market research and model design shall promptly investigate and learn the vehicle type information prevailing in the market, understand the needs of the customers, and take control of the change of the market development in time, and have a reasonable judgment on the future demand of the market, and find the market position of the market. The model is designed to meet the market demand in the future. And the corresponding automobile products are pushed out according to different regional market demands. In order to plan the production and development of the enterprise scientifically and reasonably.

### **3.2 correct analysis of benchmarking models**

In the field of automobile production, benchmarking management has been widely used by major automobile manufacturers in the process of automobile design and production. It is important for automakers to know which benchmarking cars are of high quality on the market. Therefore, the relevant department personnel should strengthen the analysis of benchmarking vehicle, the early analysis work is in place, then the later product design process will save more time and effort, and save the design cost. According to the characteristics of their own technical level, automobile manufacturers should reasonably control the design cost of electronics and electricity, make a reasonable trade-off configuration of performance configuration, and comprehensively consider the power supply system of the automobile and many other important aspects. Complete your product design.

### **3.3 Design models need to be based on specific market demand**

When the automobile manufacturer designs and produces the car, there is no doubt that it should be

based on the needs of the users. According to what kind of performance customers need to complete the configuration design of the car. Automobile manufacturer is a key index in the cost calculation of a model. When the product enters the market to set the price standard, it should also be based on the configuration of the model. Different customers need different, market demand diversification, so only one configuration of a model is not enough, through different performance combination configuration, enrich the configuration diversification of models, to meet the needs of the market, to meet the consumer needs of different consumers. But this also means that in the process of automobile product design, there are more aspects to be considered, and the design difficulty and workload will undoubtedly be greatly increased.

### **3.4 effective design of electronic and electrical architecture models**

In the process of the design of the electronic electrical architecture of the automobile, there are many fields to be involved, and the technical level to be considered is also very wide. Including wire harness, network, logic function and so on, are aspects that the automobile designer needs to consider at the time of design. The completion of a car product is accomplished by the full cooperation of a number of technical departments. Therefore, the design department of the automobile manufacturer should coordinate the planning, and maintain the information exchange among the design departments. Each department will carry out their own work according to the principle of the layered design.

In the design of the electronic electrical architecture model, the following aspects are relevant: first, the most basic step in the whole design process is to complete the function definition of the electronic electrical structure. Secondly, the logical function of the electronic electrical structure is defined. The main purpose of this work is to constrain the logic function of the whole system. Third, in the design of the hardware system, the hardware system plays an important role in the automobile design process. There are three parts of the hardware system, which are the component layer, the network layer and the principle layer, respectively. In these three levels, the component layer requires an accurate description of the internal structure and the external interface base information. Fourth, topology layer design. This layer can accurately describe the distribution of parts and components in automobile electronic and electrical system.

First of all, it is necessary to define the requirements of the whole vehicle, on the one hand, the design of the system architecture, including the design of electronic and electrical devices and the development of electronic appliances; on the other hand, the verification of the requirements of the whole vehicle, the verification of the design of the system architecture and the verification of electronic and electrical devices. The definition of the requirements of the whole vehicle and the verification of the requirements of the whole vehicle are a two-way process, and the design verification of electronic and electrical devices can also guide the design of electronic and electrical devices.

### **4. Conclusion:**

To sum up, in the current situation of fierce competition in the automobile industry, if the automobile service provider wants to obtain more vigorous vitality and improve the brand influence, it is necessary to make a breakthrough in the direction of automobile electronic and electrical structure design, improve the corresponding technology and perfect the design in order to complete the automobile products which are more in line with the market demand. In this paper, some analysis and thinking on the design and optimization of electronic and electrical structure are carried out, and some relevant suggestions are put forward in order to help the automobile industry in China to achieve rapid and benign development.

### **References:**

- [1] Li Bai. Delforpike Electric Robert Sedler, the solution to technical integration, talks about automotive electronics and electrical architecture [J]. Automobile and Accessories, 2010 (16).

- [2] Li is pure. Design and Research of Automobile Electronic and Electrical Architecture based on PREEvision [J]. Shanghai Jiaotong University, 2012 (01).
- [3] Fan Zijie, Gui Liangjin, Su Ruiyi. Research and Development of Automobile Light-weight Technology[J]. Journal of Automotive Safety & Energy,2014 (01):1-16.
- [4] Ni Bin. Research on Design and Optimization of Automobile Electronic and Electrical Architecture [J]. Electronic Technology and Software Engineering, 2013, (17): 270.
- [5] Feng Xiangzhi, Hu Zhaofeng, Zhang Haitao. Design of Automobile Electronic and Electrical Architecture based on PREEvision [J]. Automobile, 2013, (10): 43 / 46.
- [6] Gao Huanji. Design and Optimization of Automobile Electronic and Electrical Architecture [J]. Automotive Appliances, 2011, (6): 7 / 9.
- [7] Fan Zijie, Gui Liangjin, Su Ruiyi. Research and Development of Automobile lightweight Technology [J]. Journal of Automobile Safety and Energy Saving, 2014 (01): 1 / 16.
- [8] Feng Xiangzhi, Hu Zhaofeng, Zhang Haitao. Design of Automobile Electronic and Electrical Architecture based on PREEvision [J]. Automotive Appliances, 2013 (10): 187 / 188