Research on Application of Computer Aided Design in Microelectronics Assembly

Yang Wang¹,*

¹Lianyungang Jierui Electronics Co. Ltd, No. 18, Shenghu Road, Lianyungang, Jiangsu, China

*Corresponding author e-mail: wangyang@jariec.com

Abstract. Since the end of last century, each supplier of computer aided system began to introduce the data management products which are used with computer aided system, which can be said to have achieved the preliminary integration of CAD information at that time, and the tool used for the integration is CAD system. CAD technology is widely used in the world, this technology can measure a country in the industrial level of an indicator, is also a measure of the advanced level of enterprise technology vane. Calculation and auxiliary design plays an extremely important role in daily production and life. It can improve the design and drawing work from all angles, so as to improve the production efficiency. Take the current microelectronics assembly as an example. In the current microelectronics assembly industry, due to the continuous update of technology, the industry has a great competitiveness, customers' requirements for enterprise products are constantly improving, and enterprises' requirements for employees are also constantly improving. The appearance of three-dimensional CAD has brought a new innovation and challenge for the designers. The 3D model created by 3D CAD technology contains all the attributes of the CAE system. The application of this technology can make the CAD system in 3D modeling, the CAE system is also constantly processing and exchanging the model, which greatly improves the design level and quality of the product. This paper analyzes the application of computer aided technology in today's society from multiple perspectives, and analyzes the advantages and disadvantages of the use of this technology in microelectronics assembly, and finally looks into the development prospects of computer aided technology.

Keywords: Computer-Aided Design, Microelectronics Assembly

1. The application and present situation of computer aided design in production
From the end of the last century, each computer aided system suppliers began to gradually launch and computer aided system with the use of data management products, which can be said to be a preliminary to achieve the integration of CAD information, its integration of the tool is the CAD system [1]. CAD technology is widely used in the world, this technology can measure a country in the industrial level of an indicator, is also a measure of the advanced level of enterprise technology value. The design and production realized by using CAD technology can effectively reduce the labor cost in the engineering design of enterprises, but also can improve the accuracy of products, which has a great priority in the competition with other engineering companies. The essence of using computer to design and drawing is to establish some new mode or method so that the computer can design and drawing work like human beings, and finally can quickly and effectively produce the corresponding products. CAD system in the use of time, the first is the need for users to software itself basic function Settings, this setting is based on the intention of the user to carry out, users can be based on their own design concept to configure, this is also a prerequisite for the use of technology environment [2-3]. After the environment is configured, the user can begin the design drawing. In the computer input related instructions, so that the computer according to their own input instructions to carry out the corresponding command changes, so as to the display above the two-dimensional picture for drawing. In this process, the computer must follow the relevant program specifications, of course, this requirement has been completed in the previous environment configuration. When the user carries on the design drawing on the computer, he can carry on the related operation such as the offset, scale and adjustment of the two-dimensional drawing, and input the corresponding instruction to the computer, and the computer will enter the program under the instruction, and then let the user carry out the specific operation of the instruction.

Calculation and auxiliary design plays an extremely important role in daily production and life. It can improve the design and drawing work from all angles, so as to improve the production efficiency. Take the current microelectronics assembly as an example. In the current microelectronics assembly industry, due to the continuous update of technology, the industry has a great competitiveness, customers' requirements for enterprise products are constantly improving, and enterprises' requirements for employees are also constantly improving. In the microelectronics assembly, the most important point is the precision, because of the particularity of microelectronics, so in the assembly work need to be very high precision, which requires the design of the design drawings need to be refined. In the traditional design, first of all, the assembly process needs to be split into many steps, and then according to the split steps, the design drawing is drawn, and for some parts requiring rigorous details, the drawing is required to achieve the degree of precision [4]. After the preliminary design, it is necessary to communicate with customers to seek their opinions and improve the preliminary design. Only after meeting the requirements of customers will the formal drawing work begin. In this process, a lot of time and energy have been consumed, which not only increases the cost of design, but also wastes a lot of valuable time of customers.

The use of computer-aided design in the design and drawing, you can first according to the initial requirements of the customer for the design of the content of the drawing, and can be refined in the process of steps to be refined decomposition, these can be completed in real time on the computer. After the completion of the preliminary design, there is no need to print out the drawing, you can directly send the drawing to the customer for customers to check, after the customer puts forward the need to change the opinion, according to the customer's needs on the basis of the preliminary design of
the drawing to change, so as to improve the time efficiency, reduce labor costs.

Although computer aided design of 2 d drawings design to meet customer demand, to a certain extent but for clients use this drawing workers have certain requirements, first of all employees must be able to read drawings, every detail of the drawing can be from 2 d plane drawing above reflect to the actual production process. However, in fact, many employees of the enterprise can not meet such requirements, in the traditional microelectronics assembly, only some senior technical staff can meet such requirements [5-6]. Therefore, in order to enable ordinary employees to understand the design drawings, the application of 3D CAD technology successfully solved this problem.

In the new era of microelectronics assembly design, designers can first carry out two-dimensional design according to the overall process flow, which is also known as the general plan. Next, the overall design drawings are refined, the overall process is decomposed into each refinement environment and the detailed drawings are designed. After the completion of a whole two-dimensional drawing design, designers can also according to the detail drawings for 3 d design, detail drawings to 3 d modeling, and use the corresponding rendering tools can make it details in the form of three-dimensional show in front of our eyes, send these drawings to the customer, the customer can through comprehensive 2 d drawings and 3 d model to interpret the process power flow, so as to improve the production efficiency of enterprise employees.

2. Computer aided design principle and its key technology

2.1. CAD based integrated design technology

The appearance of three-dimensional CAD has brought a new innovation and challenge for the designers [7]. The 3D model created by 3D CAD technology contains all the attributes of the CAE system. The application of this technology can make the CAD system in 3D modeling, the CAE system is also constantly processing and exchanging the model, which greatly improves the design level and quality of the product.

2.2. Implementation technology of computer integrated manufacturing system

Based on the continuous expansion of the concept and connotation of the computer integrated manufacturing system, this technology is also constantly developing. Up to now, the technology of the computer integrated manufacturing system has been developed from design, management, processing and production to the integrated computer integrated manufacturing system technology system. It is mainly manifested in the following aspects:

System integration technology: including design, production, management and logistics is equal to the integration technology between systems, personnel, management, technology and information, logistics, value and other integration technology in the enterprise.

Standardization technology: including product information standards, process information standards, data exchange and format standards, graphics standards and parts library standards, etc.

Enterprise modeling and simulation technology: including the establishment, validation and simulation technology of enterprise functions, information, workflow, resources and organizational
models. (figure 1)

![Diagram](image)

**Figure 1.** Implementation technology of computer integrated manufacturing system

3. **Application of computer aided design in microelectronics assembly**

The packaging of semiconductor is very important in the production of microelectronics assembly. The semiconductor package is to pass the test, the quality of the performance of the chip without problems for bonding test, will be combined into a semiconductor. The chip cutting process can be used to cut a complete wafer into several small wafers, which are attached to the basic frame and then connected by a welding bonding process [8-9]. The connection should be made by using ultra-fine metal wires. During the whole packaging process, due to the small size of the semiconductor and the high difficulty of the operation of the wafer soldering, the output of the product has been unable to be improved under the traditional semiconductor packaging process.

This process can be changed into a fully automatic and intelligent process by computer aided design. First semiconductor packaging needs the details of the whole division and the technological process of concise, using virtual model in computer to refining process flow design and simulation implementation, to ensure the integrity of the process, in the next to the operation of the wafer to connect, must design a good connection between different wafer sequence and location and the use of wire specifications, in the 3d modeling for simulating the process flow, and then under the premise of without changing the quality of the products to the semiconductor encapsulation process to simplify the design, so as to achieve the aim of improving production efficiency.

4. **Development prospect of computer aided design**

Computer aided design software has provided great convenience to people's design work, but its own is still in the continuous improvement, but also towards the following directions:

4.1. **Graphics exchange technology**

For designers, a simple and clear work window can not only make designers' design ideas more clear, but also allow designers to put forward more creativity. CAD software is a necessary tool for product innovation, for this kind of tool software, simple and easy to learn is the most important, complex functions concise, intelligent instruction identification is also very important. Therefore, a series of humanized functions, such as intelligent icon menu, real-time generated modeling, dynamic tips and guidance, can provide great convenience for designers.
4.2. Virtual reality technology

Virtual reality technology has already started to be applied in the CAD technology, the designers in the virtual space to product innovation and transformation, can according to the reality of all kinds of limiting factors to improve products, designers can operate directly on the product in the virtual space, so that the reliability of the simulation to check products, timely find product deficiencies and to upgrade the product [10]. The realization of this virtual reality technology can make the traditional design work more direct, do not let the enterprise in practice to test the shortcomings of toadskin you, in the virtual space, designers can find the shortcomings of these products and then improve, finally let the customer get the ideal product. (figure 2)

![Diagram of virtual reality technology development](image)

**Figure 2.** Development prospect of computer-aided design

5. Conclusion

Application of three-dimensional CAD system for product development, fundamentally changed the traditional manual drawing mode, make the traditional plane drawings become more vivid and visual, let employees can more rapid interpretation of the designer's design intention, thus accelerating product manufacturing, reduce the waste caused by thoughtless design time and business losses. The application of this technology can enhance the competitiveness of enterprises in the industry, so that enterprises can seek more long-term development. Therefore, computer aided design technology will play a vital role in daily production and life. This paper analyzes the application of computer aided technology in today's society from multiple perspectives, and analyzes the advantages and disadvantages of the use of this technology in microelectronics assembly, and finally looks into the development prospects of computer aided technology.

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