

# Analysis of the Combined Application of Mechanical Design and Manufacturing and Computer-Aided Technology

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**Abstract:** With the development of science and technology in our country, various industries are advancing rapidly, and computer technology is widely available, playing an important role in mechanical design and manufacturing, and the level of mechanical design and manufacturing has been greatly enhanced. By fully integrating with computer-aided technology, we can improve the shortcomings in the past mechanical design and manufacturing, and make the mechanical design and manufacturing methods more digital and efficient.

## 1. Introduction

The mechanical design and manufacturing industry is an industry that requires high technical capabilities. Nowadays, when the economy is developing steadily, competition in the industry is becoming more and more fierce, and the requirements for precision in mechanical design and manufacturing are gradually increasing. Related companies want to improve the efficiency of mechanical design and manufacturing to obtain corresponding benefits in the fierce industry competition, it is necessary to make reasonable use of computer-aided technology to integrate computer-aided technology with mechanical design and manufacturing, enhance the accuracy of mechanical design and manufacturing, reduce the probability of error in the process of mechanical design and manufacturing, so that promotes the stable development and progress of the mechanical design industry.

## 2. The Concept of Mechanical Design and Manufacturing

Mechanical design and mechanical manufacturing together constitute mechanical design and manufacturing. Mechanical manufacturing mainly refers to the production and manufacturing of related instruments and machinery; mechanical design is the analysis and research of the dimensions of various materials and components in the machinery, the analysis should be carried out in accordance with the working principles of mechanical equipment, and according to the specific production and manufacturing situation, optimize materials and components in the manufacturing situation to ensure that the mechanical manufacturing work can proceed smoothly. With the progress of my country's economy, the working mode of the mechanical design and manufacturing industry has also been sufficiently optimized. Coupled with the emergence of various modern advanced technologies, the mechanical design and mechanical manufacturing links are becoming more automated and intellectualization. With the application scope of computer-aided technology is gradually expanding, it plays an important value and advantage in the mechanical design and manufacturing work. Therefore, machinery manufacturing enterprises should pay attention to computer-aided technology, combine it with mechanical design and manufacturing through various means, change the traditional production mode, and urge enterprises to follow the development and progress of the times.

### **3. The Concept of Computer-Aided Technology**

Computer-aided design, manufacturing, engineering and other contents together constitute computer-aided technology. It mainly follows the human-oriented concept and builds a close human-computer interaction system to allow users and computers to be closely related. At present, with the development of society, computer aided technology is becoming more and more perfect, and the scope of application in various manufacturing fields in the society is gradually increasing, such as aircraft, automobiles, ships and other manufacturing industries <sup>[1]</sup>.

### **4. Combination of Computer Aided Technology and Mechanical Design and Manufacturing**

#### **4.1 Use of Graphics and Symbols**

When using computer-aided technology to carry out mechanical design and manufacturing work, many graphics and symbols will appear. These graphics and symbols have corresponding meanings and express different contents. If they can be well classified and stored, then can fully reduce the difficulty of work. Designers need to reasonably master these graphics and symbols to ensure that they can be arranged so that they can be put into use as soon as possible afterwards, so that the design work can be carried out more smoothly.

#### **4.2 Apply Computer-Aided Technology to Drawing Design Work**

In mechanical design and manufacturing, drawing design is a very important work. The drawing design has strong technicality and high requirements for designers. In the process of producing and manufacturing machinery, it is necessary to design drawings to proceed. In the past, most of the drawing design was done independently by the designer through his own experience and corresponding technology. It took a certain amount of time, and because it was designed manually, there may be some problems, which would waste a lot of resources. The use of computer technology to assist designers in the design of drawings will make the design of drawings more efficient. At the same time, when it is necessary to design some more complicated drawings, the designer will face huge pressure. Although they can design with their own ability, it will waste more time. At this time, the computer can be used to assist the design of the drawings<sup>[2]</sup>. In the design process, if there is a mistake, the designer needs to redraw the drawing in the past, and use computer-aided technology to modify it, then the modification can be made in the first time, which greatly reduces the difficulty of the designer's work. Therefore, it is necessary to increase the application of computer-aided technology and combine it with drawing design work reasonably. For example, various drawing softwares are constantly appearing, and many enterprises are fully applying them. They can modify the problems that appear in the mechanical design and manufacturing process in a timely manner, and more new types of equipment can be designed through the drawing software.

#### **4.3 Constructing Three-Dimensional Solid Model**

In the process of designing drawings, it is necessary to design strictly in accordance with customer needs, and some customers may require three-dimensional solid models. However, the traditional two-dimensional drawings cannot accurately grasp the details, and can not effectively display the three-dimensional characteristics of the mechanical structure, and it is difficult to describe it only by the explanation of the designer<sup>[3]</sup>. Nowadays, 3D technology is becoming more and more perfect. 3D digital design software can adequately display three-dimensional solid model, and intuitively present the characteristics of three-dimensional solid model to customers. The designer can use the printer to build the 3D model of the product before making a new product to optimize the mechanical design process.

#### **4.4 Enhancing the Digitization and Automation Level of Mechanical Design and Manufacturing**

Digitization and automation is a kind of ability that must be promoted in the current enterprise

development, and it also plays an important role in mechanical design and manufacturing. Only by continuously enhancing the level of digitization and automation can the quality of the designed products be higher. Therefore, with the application of computer-aided technology becoming more and more widespread nowadays, PLC (programmable controller) can be fully used to control the entire process of mechanical design and manufacturing, and rationally integrate and manage various aspects of mechanical design and manufacturing through relevant instructions, so as to achieve the purpose of automated production. At the same time, the automation of mechanical design and manufacturing can reduce the waste of human resources, reduce the probability of errors in the production and manufacturing process, increase economic benefits, strengthen the economic capacity of the enterprise, and gain the recognition of related cooperative enterprises and customers.

#### **4.5 Using Computer to Assist Simulation Technology**

With the advancement of science and technology, the current 3D modeling technology is becoming more and more perfect, and people's requirements for it are gradually increasing. Simulation technology emerges accordingly. As a brand-new technology, it needs to use the corresponding digital model when it is used. It must be supported by computer-aided technology to ensure the efficiency of the simulation technology. At the same time, through the simulation technology, we can also visually simulate the mechanical design and manufacturing process, observe the existing problems, and carry out corresponding solutions.

### **5. The Development Prospects of the Combination of Mechanical Design and Manufacturing and Computer-Aided Technology**

At present, computer-aided technology has been completely integrated into the manufacturing industry, becoming an indispensable and important auxiliary tool in manufacturing industry, providing great convenience. In mechanical design and manufacturing, computer-aided technology also plays an important role, and is widely applied to all aspects of mechanical design. However, there are still some problems in the application process, and relevant designers need to be proficient in the use of computer-aided technology, and continue to learn advanced concept, method, technology, optimize the application method according to own work experience, improve the shortcomings in traditional mechanical design and manufacture, make the application mode of computer-aided technology more diversified, and let the advantages of computer-aided technology in mechanical design and manufacture give full play to it to ensure that the two can be effectively combined.

### **6. Conclusion**

In summary, as a continuously developing technology, computer-aided technology is fully applied to the mechanical design and manufacturing industry, and combined with mechanical design and manufacturing, it can effectively improve the efficiency of mechanical design and mechanical manufacturing, and enhance the level of manufacturing. computer-aided technology makes the mechanical design and manufacturing work more digitization, automation and intellectualization, reduces the waste of human resources, and can reduce the difficulty of the designer's work, predict the problems that may occur in the manufacturing process, and solve the problem in advance before the actual manufacturing. At present, relevant computer-aided technologies are used more and more widely in the mechanical design and manufacturing industry, which greatly promotes the development and progress of relevant enterprises.

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