The Characteristics and Development Trend of Automation of Intelligent Machinery Design and Manufacturing

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Abstract: With the continuous progress of science and technology, mechanical design and manufacturing also has advanced technology as support, promoting the development of mechanical design and manufacturing industry in China has been improved by leaps and bounds. Therefore, the relevant technical personnel should update their ideas and technical means in time, so that mechanical design and manufacture and automation can better promote the needs of economic development. This paper analyzes the characteristics of intelligent machinery design and manufacture automation, and discusses its development trend, and gives my opinion.

1. Overview of Automation in Mechanical Design and Manufacturing

When it comes to mechanical design and manufacturing automation, many people have the first impression of machines and busy workers in the workshop. Nowadays, mechanical design and manufacturing and automation have penetrated into all aspects of people's lives, ranging from aerospace industry to washing machines and mobile phones in life. Mechanical design and manufacturing automation is to use advanced automation technology and electronic technology in the development of mechanical design and manufacture, and extend to more design technology, so that people's production and operation can be improved in quality and efficiency, and make these technologies more intelligent, automation, virtualization, networking and other advantages.

Mechanical design and manufacture, that is, the design of mechanical products, and then according to the design drawings to make a project of physical machinery. And mechanical design and manufacture automation through the computer technology and has the automation control technology, makes the mechanical production in the automation condition, simultaneously has the informationization characteristic. In the process of mechanical design and manufacturing automation, we can effectively change the previous manual design and manufacturing. Intelligent mechanical design and manufacturing automation is composed of a variety of advanced technologies. The automation and intelligence of mechanical design and manufacturing are comprehensively promoted, which provides strong technical support and guarantee for the development of manufacturing field.The following figure is the application of intelligent mechanical design and manufacturing automation in actual production as shown in figure (1).

Figure 1 Intelligent mechanical design

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2. Automation Characteristics and Advantages of Mechanical Design and Manufacture

2.1. Automation Features

Mechanical design and manufacturing has the characteristics of automation. Compared with traditional mechanical design and manufacture, mechanical design and manufacture with automatic characteristics does not simply refer to the superposition of various technologies, but rather effectively integrates various design technologies so that each design technology can integrate each other, highlight the advantages and characteristics of each technology, and form a set of to ensure the improvement of the quality and efficiency of mechanical production, and promote the more practical design and manufacturing technology. Automated technology machinery internal can achieve accurate mechanical inspection, can effectively troubleshooting, and achieve automatic operation, effectively reduce the failure rate, ensure the safety of mechanical operation. In addition, automatic mechanical production can replace manual operation, especially in the harsh conditions of production environment, not only can bring great convenience to production, but also ensure the production safety of workers, so that production efficiency can be greatly improved.

2.2. Strong Security

Strong safety is the most obvious feature of mechanical design and manufacturing automation. First of all, manual control of the operation process and procedures, as well as artificial control of the unstable operation process, as well as the production process is prone to failures and loopholes or some special operations will have adverse effects on the human body, and so on, can be replaced by automatic mechanical design and manufacture. Secondly, in the traditional mechanical manufacturing process, due to the lack of intelligent systems such as monitoring, diagnosis, alarm and so on, the operation of the machinery can not be checked and supervised in real time. In the event of failure, the failure can not be checked and solved in time. greatly ensure the safety of the production process. Finally, the automatic mechanical design and manufacture can carry on the self-inspection to the internal system, if the system itself has the problem, the automation system will carry on the self-inspection in time, discovers the own fault in time, and opens the system self-protection measure, carries on the fault diagnosis and the elimination one by one, then guarantees the mechanical design manufacture automation production safety and the reliability, as shown in figure 2.

Figure 2 Intelligent mechanical design

2.3. High Productivity

Mechanized design and manufacturing automation greatly improves production efficiency. First reflected in the reduction of operational difficulty. The operation flow of traditional mechanized design and manufacture is more complex, which increases the difficulty of control and the risk of operation, greatly reduces the safety and reliability of mechanized design and manufacture, and greatly reduces the operation efficiency of mechanized design and manufacture. Secondly, the operation accuracy is improved. The automatic mechanized design and manufacture can realize the control of mechanical design and manufacture through computer technology, improve the operation precision, reduce the probability of production error, save the production time, and greatly improve

the production efficiency. Finally, the production volume and production quality were improved. Traditional mechanized design and manufacture have high error rate, low qualified rate, no effective guarantee of quality and no guarantee of output, and automatic mechanized design and manufacture can effectively improve production precision, make the qualified rate of products greatly improved, and the production output is guaranteed [1].

3. Trends in Mechanized Design and Manufacturing and Automation

3.1. Virtualization

In the process of mechanical design and manufacture, the design of drawings is done by manual, and the characteristics and functions of the product are determined by sample drawing, and then the sample is produced, if the sample is not a problem, the final batch production is carried out according to the sample. In this process, from the design, sample, production, need a lot of manpower, material and financial resources, any link problems, will affect the normal progress of other processes, will greatly affect the production progress, but also increase the loss of enterprises. So virtualization is very important in the process of mechanical design and manufacture. If the design of the sample tends to be virtualized and the sample is inspected effectively, once the problem occurs, the designer can change the sample design in a virtual environment without any cost, and it also greatly reduces the time cost, improves the efficiency of the sample design, and helps the enterprise to reduce certain losses, as shown in figure 3.

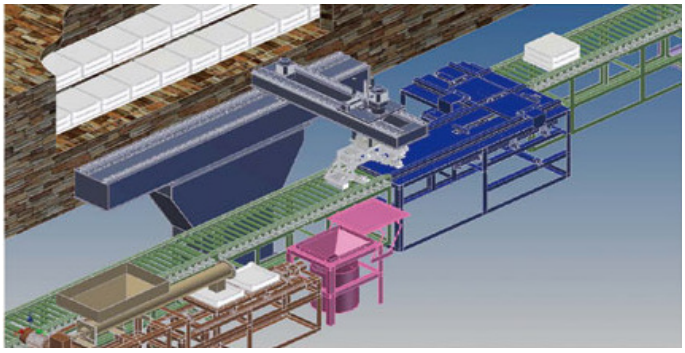

Figure 3 Intelligent mechanical design

3.2. Intelligence

With the continuous development of science and technology, people's life is more intelligent, and the process of mechanical design and manufacturing is more so, and the most critical development trend of automatic mechanical design and manufacturing is intelligence. In the process of mechanical design and manufacturing automation, a large number of information technology and electronic technology need to be applied to promote the automation of mechanical design and manufacturing to get a comprehensive promotion, at the same time, the application of electronic information technology to integrate various technologies, so as to make the whole automatic manufacturing more systematic and standardized, so as to promote the production quality and production efficiency of enterprises to be effectively improved. Therefore, for the mechanical manufacturing industry, intelligent mechanical design and production is the main direction of enterprise development, through the computer set a good program to make the whole mechanical manufacturing process more smooth, improve production efficiency, improve the economic benefits of enterprises [2].

3.3. Networking

With the rapid pace of the information age, computer network technology is applied to all walks of life, mechanical design and manufacturing automation through the use of network technology to control production to achieve the effect of networking. Mechanical design and manufacturing automation makes full use of computer network technology to link up the various production

technology processes, at the same time can carry on the dynamic management to each operation flow, the staff of each section can supervise and manage the mechanical operation flow that they are responsible for through the computer technology, if the failure phenomenon occurs, can take targeted measures to adjust and correct the specific problems, to ensure the smooth completion of production. In addition, if a fault is found in the daily work, and the relevant technical personnel are not in the first scene, the enterprise has to stop production, which will greatly reduce the production efficiency of the enterprise. And the mechanical design and production controlled by the network technology can avoid this problem, through the network technology can build the enterprise information network management system, the staff of each department can check the product design, manufacture, logistics and so on according to this system, once there is any problem, the relevant technical personnel can check in the system, and timely put forward corrective opinions on specific problems [3].

4. Conclusion

In a word, in the process of manufacturing and production, mechanical design and manufacture is a very important link, on the one hand, it improves the production efficiency of enterprises, on the other hand, it also improves the economic benefits of enterprises. With the increasingly fierce market competition, enterprises want to get considerable development, it is necessary for enterprises to carry out in-depth research on mechanical design and manufacturing technology, to realize the automation of mechanical design and manufacturing, and to help enterprises' production can meet the needs of social development. This paper analyzes the characteristics and advantages of automatic production of mechanical design and manufacturing, and analyzes the development trend of this technology, which is mainly manifested in virtualization, intelligence, networking and so on.

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