

Exploring the Application of Automation Technology in Mechanical Design and Manufacture

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Abstract: The development of society and the progress of economic level can not be separated from science and technology, and the development of industrialization and the construction of modern city are constantly added under the support of technical level. Automation technology is developed and applied based on information technology and network technology. In the design and manufacture of industrial machinery, the application effect of automation technology is very obvious. Therefore, the industrial machinery manufacturing industry has been widely accepted. This article first introduces the general situation of automation technology and its main components, then expounds the advantages of the application of automation technology, and finally discusses the practical application of automation technology in mechanical design and manufacturing.

1. On automation Technology

Machinery manufacturing industry is an important part of China's industrial industry, but also an important component of economic construction. Its main manufacturing areas include power machinery, agricultural machinery, textile machinery and other related production facilities. The modern industrial machinery manufacturing industry has gradually developed to automation and intelligence with the support of the wide application of information technology and network technology. The increasing market demand and the rapid development of information technology and communication technology have promoted the development of automation technology in the machinery manufacturing industry.

Automation technology is based on information technology and network technology and communication technology on the basis of research and development and application, mainly including machinery in the environment of no one to intervene, according to the established input procedures to send instructions, so that machinery and equipment in the linkage of the execution of instructions to achieve automatic production control. The control of all equipment is connected to the automatic control program operation platform, and the uniform instruction is sent to the execution of the equipment operation. To a large extent, it saves the cost input of manual operation, and also reduces the error rate of manual operation execution, which has a high guarantee for the efficiency and quality of production [1]. As shown in Figure 1:

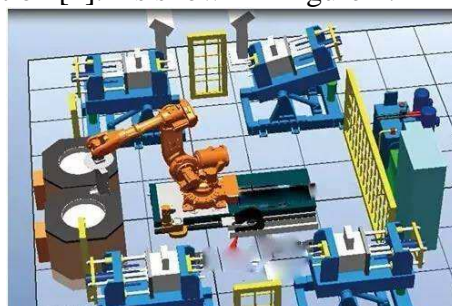


Figure 1 Connection diagram of mechanical equipment in automation technology

Compared with foreign developed countries, the application level of automation technology in China is poor. But in recent years to the automation technology research, our country has invested a lot of funds and manpower, has also obtained the big success. Basically realized a small part of the machinery manufacturing industry to automation technology. However, there are still some restrictions on the scale, and it is still necessary for the relevant technicians to continuously improve and improve.

The fields and disciplines involved in automation technology are more complicated and belong to comprehensive technology. At present, the mechanical automation technology used in our country mainly includes: sensor system, information transmission system, program operating system platform, information processing system and instruction system. The sensor system is mainly responsible for the automation technology, the system carries on the equipment comprehensive inspection and the data reception, through the quantitative way carries on the load division. The signals received in the system are analyzed and processed through the information processing system and sent to each mechanical equipment system through the instruction system. The information transmission system is through the information processing system analysis and the processing data information carries on the secondary transmission, causes the entire mechanical equipment system to carry out the concrete instruction execution, thus realizes the mechanical automation control.

2. Advantages of Automation Technology

2.1. Effective Improvement of Mechanical Design and Manufacturing Efficiency

The application of automatic automation technology can change the performance of the traditional mechanical design and manufacture technology, compared with the traditional mechanical design and manufacture has a great change in energy consumption. It can achieve great savings in material resources, and can reduce the failure rate and error through accurate control in the utilization of materials. Improving production quality reduces cost waste due to non-compliance with quality standards [2]. In addition, the application of automation technology in the actual control process can be continuously improved and improved to make the raw materials more adaptable to the performance requirements of mechanical equipment.

2.2. Save a Lot of Human Resources

Through the application of automation technology, the mechanical equipment of each production link is connected with the communication technology network, and the operation of the individual mechanical equipment is combined into a unified control platform, which simplifies the step by which the human resources operate the mechanical equipment. And the mechanical design and manufacturing process has been more refined and intelligent changes. has obvious promotion effect on production efficiency and production quality. As shown in figure 2:



Figure 2 Automated production line

This will save a lot of human resources costs, liberate more production personnel to carry out other aspects of operational production, and increase production. To help enterprises to enhance the core competitiveness of enterprises, so that enterprises can deploy more human resources for diversified development.

2.3. Enhanced Mechanical Equipment Failure Warning and Maintenance Level

Through the application of automation technology and the connection between the mechanical equipment, the technicians use the relevant procedures to set up the self-inspection and fault warning function of the mechanical equipment. Once the mechanical equipment finds the hidden trouble, it can collect the information data through the sensor, and feedback the system to the technical personnel, when the mechanical equipment failure hidden danger is eliminated in time, it is greatly beneficial to the improvement of the maintenance level of the mechanical equipment, which prolongs the service life of the mechanical equipment and reduces the operation and maintenance cost of the mechanical equipment [3].

3. Application of Automation Technology in Mechanical Design and Manufacture

3.1. Intelligent Application of Automation Technology in Mechanical Design and Manufacture

Intelligent technology is one of the directions for the future integration of automation technology. Through the mature application of information technology, the concept of intelligence is integrated into automation technology. The comprehensive level of design and manufacture of mechanical equipment is greatly promoted. In a sense, artificial intelligence technology, intelligent technology and automation technology are the important components of intelligent machinery production in the future. As shown in figure 3:



Figure 3 Manipulator in automation technology control

Through the penetration and fusion of artificial intelligence technology, intelligent technology and automation technology, the artificial intelligence performance of modern mechanical manufacturing production system is improved effectively, and the manufacturing process of mechanical equipment has high intelligent analysis and logic ability, and the overall improvement of mechanical design and manufacturing is realized, and the whole process is effectively controlled. To improve and optimize the production efficiency and the problems in the production process, to ensure the development of the machinery production enterprise [4].

3.2. Integrated Application of Automation Technology in Mechanical Design and Manufacture

With the development of mechanical design and manufacturing industry and the increasing market demand, the increasing requirements of integration and its development trend make people integrate automation technology into integration. Based on this, the practical application efficiency of automation technology in the process of mechanical design and manufacture is improved. Judging from the actual effect of the integrated function of automation technology at present, the

original mechanical design and manufacturing structure has been more refined adjustment and performance optimization to a great extent [5]. It also shows a more obvious role in the process reorganization, for example, the speed and effect of the related software program running in the process of mechanical design and manufacture in the information data processing has been greatly improved, and the efficiency of production and the quality of production have been effectively improved.

3.3. NC Application of Automation Technology in Mechanical Design and Manufacture

The numerical control of mechanical design and manufacturing mainly includes the use of computer hardware and digital technology and mechanical automation technology to control the organic combination, so that the whole production process of mechanical design and manufacturing equipment has been upgraded. The application of automation technology to numerical control technology has a certain scale at present, but its fusion application has a high professional requirement for technical operators, which requires technical personnel to have a high theoretical professional basis and technical operation skills basis [6].

For example, in the process of integrating NC application of automation technology, the writing of program and the sending of instruction must be based on the relevant data information and specification requirements of mechanical design and manufacture, and the accuracy and precision of instruction data must be guaranteed, so as to ensure the precise process of execution of instruction by mechanical equipment in the process of production. At the same time, in order to avoid the problems in the mechanical design and manufacturing equipment, it is necessary for the relevant technicians to effectively control and strictly supervise it, so as to achieve the real-time collection of data and information to ensure that the operation of the equipment remains stable.

4. Conclusion

The application of automation technology in mechanical design and manufacture can not only improve the production efficiency of mechanical products, but also improve the quality of production to the greatest extent. At the same time, the application of automation technology can also effectively save the input of human resources, improve the production technology and production efficiency effectively and increase the comprehensive capacity of industry. In addition, automation technology is the basis for industrial production and manufacturing industry to realize intelligent production. At present, the application of automation technology in industrial machinery automation production in our country is more extensive and attention, and a lot of manpower and material resources have been invested in research and development, compared with the western developed countries, there are still some poor technology application and talent training. Therefore, the relevant technical departments must strengthen research, the government should also provide more support, actively learn from foreign developed automation technology, vigorously train professional mechanical automation personnel, effectively improve the core technology competitiveness of machinery manufacturing industry, so as to promote the rapid development of industrial machinery manufacturing industry in China.

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