

Research and Thinking on the Future Development Direction of Mechanical Design, Manufacturing and Automation

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Abstract: *With the rapid development of science and technology, the mechanical design and manufacturing work has been continuously optimized and efficiently applied to practical operation and theory. The mechanical design and manufacturing automation technology can be used to meet the diverse needs of people. At the same time, it can also carry out the mechanical structure design and processing and manufacturing work, strengthen the connection between structural components, and improve relevant measures. This paper focuses on the development trend of mechanical design, manufacturing and automation in China.*

Keywords: *Automation; Mechanical Design and Manufacturing; Development Direction*

1. Introduction

The automation of mechanical design and manufacturing has been widely used in all walks of life, with great development prospects and huge development space, and has brought great convenience to people's production and production. In the machine manufacturing industry, the use of automatic control technology can reduce the occurrence of human error and avoid the impact on the machine. At the same time, it also highlights the importance of intelligent machines and speeds up the modernization drive. Improving the working efficiency of the machine is the guarantee for the development of the machine industry.

2. Describe the relevant knowledge of mechanical design, manufacturing and automation

2.1 Describe the concept of mechanical design and manufacturing and its automation

Mechanical design, manufacturing and automation is a comprehensive technical science with industrial mechanical equipment and electromechanical products as its main content. It combines mechanical design, manufacturing and electronic data from "design" to "production". To enhance the vitality of machine design and production, it is necessary to improve the flexibility of the machine. Mechanical design and automation technology is a technology that combines various technologies, among which automatic control is the main, and it is also the development trend in the future. The purpose of automatic machinery design and manufacturing is to cultivate high-quality engineering and technical talents. This discipline is based on machinery design and manufacturing and integrates information technology, computer technology, automatic control technology, etc. To achieve this goal, it is necessary to carry out the research and development of specialized technology on the premise of mastering computers to ensure the reasonable use of specialized technology. In mechanical design, it is necessary to have a comprehensive understanding of the knowledge and knowledge of various disciplines. Therefore, in the process of mechanical design and production, it is cumbersome.

2.2 Features of mechanical design, manufacturing and automation

Mechanical design, manufacturing and automation have obvious advantages, are the integration of science and technology, and are intelligent and advanced. The application of technology and information technology has improved the efficiency and quality of mechanical equipment, reduced the production cycle and ensured the role of information technology. Mechanical design, manufacturing and automation are automation centric, so we should pay attention to the design of automation systems,

improve the quality of products, and ensure that the needs of modern social development are met.[1]From the current situation, the design, production and automatic control of machines are widely used. Ensure the efficient management of relevant technical content, and reduce the number of errors, thus improving the efficiency of work. All kinds of information technologies have their own functions. They can define the goods to be produced in detail, so as to make them more precise. They can also provide a direction for the development of mechanical design, manufacturing and automation. The design, manufacture and automation of machinery can simplify the operation process, thus avoiding the safety risks brought by conventional mechanical operation, thus reducing the production difficulty and allowing the staff to carry out the corresponding operation smoothly. In mechanical design, manufacturing and automation, advanced information technology is applied to it. During operation, information technology can be used to set work orders to lay the foundation for subsequent production work[2].

3. Problems in China's machinery industry at present

3.1 Low standard, unable to meet international requirements

From the perspective of industry and enterprises, the benefits of implementing international standards are not temporary benefits, but long-term benefits. From scratch, from weak to strong, it benefits from China's international and domestic standardization cooperation. But in this process, we still face many problems. Some standards of our country's machinery industry are translated from foreign standards, and have been improved on this basis. Most of them are based on foreign standards, with only small size changes. As a result, it is impossible to label the equivalent objects or substitute them. Domestic mechanical engineers should not only understand the metric system, but also understand the English system and the American system, which adds a lot of unnecessary work for users. In addition, some enterprises now only focus on the development and production of new products, and lack of research on performance indicators, technical requirements and test methods, so they cannot form technical standards. They are only interested in national standards, but not industrial standards [3].

3.2 The high-end manufacturing industry is not strong

At present, China's manufacturing industry has become the largest and most competitive country in the world, but the "big" and "weak" situation forces China's manufacturing industry to accelerate the transformation to "small". In today's world, whether it is rail transit equipment, industrial robots, high-end medical equipment, or medicine, all are facing fierce competition. Among them, "high-end shipbuilding and marine engineering equipment", "new energy vehicles" and "modern agricultural machinery" are the key areas that the major countries in the world compete for. The formation of high-end manufacturing products stems from the accumulation of years of research and development, from the initial simple type; To gradually improve, gradually improve, and finally form the current high efficiency product. In the western developed countries, after a complete transformation of the steam era and the electrical era, their traditional manufacturing techniques have been very mature, and their manufacturing industry has also experienced a faster development period than China. Compared with the advanced manufacturing technology of developed countries, our manufacturing technology is still very simple and at the stage of development. For example, one of the most advanced warships is still using a 1941 tractor and two 12-meter tractors provided by Japan to China from 1956. We can obtain advanced production technology by trading or by various means. But we have neglected one thing, that is, there must be a set of procedures suitable for developing a composite product; Ensure the development process and quality of products, and collect relevant data for each period. Without a scientific development system, it will be difficult to achieve sustainable development. Similarly, since we do not have the previous research and development process and documents, we get a sketch. A slight change will lead to deviation in product performance. This is an outdated design method. With the improvement of the advanced level of industry, CAD/CAM technology has been widely used in the advanced manufacturing industry, and large companies have realized the "zero drawing" design and manufacturing. In China, the proportion of CAD/CAM technology application is very small. In industrial developed countries, high-precision processing, fine processing, micro-processing and other processing methods, as well as new technological means such as nanotechnology and laser processing, are widely used, but their popularity in China is not high, and they are still being developed and mastered. Therefore, it puts forward higher requirements for the development of China's high-end manufacturing industry.

4. Analysis of advantages of mechanical automation system

4.1 Perform system repair and adjustment independently

With the popularization of computer technology, people can test the machine according to various requirements, so as to manufacture the required machine. The equipment can be maintained automatically without dismantling the equipment. Any automatic control device must ensure that the device has the storage function, and the stored data must be stored regularly. When errors occur during system operation, the system can maintain the system according to the stored system, which greatly saves labor. The work of each job is set in advance, without manual operation, and can run automatically. Today, due to the progress of science and technology, automatic products can be adjusted automatically according to the controlled target, so it is a major breakthrough in technology.

4.2 Automatic processing and control of information

The automation products of mechanical design and manufacturing can make information processing and control automation. Compared with traditional mechanical-electrical products, automated mechanical-electrical products have great advantages, and have been greatly improved in processing accuracy and control. In addition, the machine can be extended in depth according to the wishes of people, greatly improving the performance of the machine. Automatic processing, in the process of product processing, eliminates human error, which can largely ensure the accuracy and quality of products.

4.3 Production safety has been greatly improved

The safety and stability of the manufacturing equipment must be ensured when the automatic system is used for manufacturing, which requires the equipment to be set in advance. When any problem occurs during processing, the automatic control device can give an alarm at the first time. In the process of work, when encountering sudden power interruption, it can quickly switch to other working modes and turn off the power at the same time, thus avoiding large-scale casualties. Because it contains a large number of electronic devices, it can replace some moving parts, thus reducing the probability of failure and improving the safety of use. Because of the automatic production process, some possible safety events have reduced the impact of human factors, and its manufacturing safety has been greatly improved, whether for people or devices.

5. Expounding the development direction of mechanical design, manufacturing and automation

With the rapid development of science and technology, the design, production and automatic control of machines are organically integrated with computer technology. It also improves the level of science and technology, so it is necessary to explore the future development trend in combination with the design and production characteristics of the machine.

5.1 Intelligence and modularization

Intelligence is an important trend in the development of mechanical design, manufacturing and automation, and is also the key. In intelligent technology, artificial intelligence technology and computer technology are combined to make it have human reasoning ability and thinking. When used, it should also replace people to build. Future machine design, production and automation have intelligent characteristics, which can ensure that machines have the same working ability as people. When construction is carried out in areas with high risk factors, machines can be used for construction to reduce man-made accidents. In terms of the development of machines and the design, manufacture and automatic control of machines, the intelligent processing of machines can also be achieved in the future. When applying intelligent technology, we should pay attention to the protection of its intellectual property rights to avoid technology leakage during application. When researching and making unit modules such as mechanical interface and electrical interface, there is no unified design mode and idea for them, which has hindered the development of technology, such as image processing technology and recognition module. The integration of these two models is often interfered by various reasons, and thus fails to achieve the intended purpose. It has obvious advantages in the development of modularization. In the production of machine design and automatic control products, modularization is a main trend of development. When modular technology is adopted, it can be fully utilized; It is also an ideal prospect for future development.

5.2 Networking

With the rapid development of information technology, Internet technology has been widely used in various fields, and has an ideal effect. It is constantly changing people's production, life and work. With the rapid development of science and technology, the application scope of information technology has been continuously expanded, which has played an important role in business communication and information exchange. At the same time, network technology has also been adopted in the automatic manufacturing of machines; With the development of Internet technology, the level of remote control and detection technology can be improved, and monitoring technology can be used to monitor all indoor processes. If problems occur in production, they should be dealt with immediately to ensure the safe production of the machinery industry. The development of machine automation with the Internet of Things technology as its core has applied it to computers, enhanced the connection between various devices, and ensured complete remote control. In the management process of engineering projects, the use of network technology can improve the quality and efficiency of management and ensure that the manufacturing process of the project is effectively controlled. In the manufacturing process of mechanical equipment, the operation shall be carried out according to the provisions of the standard to ensure the efficient development of machine automation products by using computer technology in the future.

5.3 Greenization and miniaturization

Since the country advocated the concept of sustainable development, people have more recognition of the concept of green development in production and life. The so-called "green" means that it is not polluted by any external factors, has no harm to the human body, and has no harm to the surrounding ecology. In the future, we should also pay attention to the use of green technology; In the process of food processing and industrialization, the idea of environmental protection and sustainable development must be implemented to ensure the automatic manufacturing of machine-style, to achieve pollution-free production standards, and to improve future market competitiveness; In order to ensure long-term development in the fierce market environment, miniaturization means that the automatic control of the machine has been rapidly developed in a small range. When the machine is applied, it can use a larger machine to show its advantages. This small device has the characteristics of small size and no energy consumption. Because of its portability, it has been widely used in security, military, medical and other aspects. The manufacturing of mechanical equipment involves a wide range of fields and has a strong complexity. In the manufacturing process, high-precision instruments are needed. In the manufacturing process, the professional skills and comprehensive quality of the staff are also very high. Ensure that the work level of employees meets the requirements, and ensure the normal operation of mechanical equipment. With the progress of society, the development of science and technology has gradually expanded to the application field of miniaturization.

6. Conclusion

In short, China is a large agricultural and industrial country. Its main economic pillar is machinery manufacturing, which is also the main component of the production of enterprises. It is guaranteed for the economic development of the nation. Therefore, mechanical design and manufacturing must be combined with mechanical design and manufacturing automation technology to improve its production efficiency and achieve better economic benefits. In the process of scientific and technological progress, there will be some new development trends and more applications.

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