

Analysis on the Characteristics and Advantages of Mechanical Design, Manufacturing and Automation

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Abstracts: With the rapid development of social science and technology, China's mechanical design and manufacturing level has also been greatly improved. It is developing towards automation and intelligence. The traditional mechanical design and manufacturing can no longer meet the requirements. Based on this, this paper analyzes the characteristics and advantages of mechanical manufacturing design and its automation, and discusses its development prospect for reference.

Keywords: Mechanical Design and Manufacturing; Automation; Characteristic; Advantage

1. Introduction

Industry is an important part of promoting China's economic development, and mechanical design and manufacturing are the power source of industrial development. Throughout the historical process, the improvement of national economic strength and core competitiveness has a great relationship with mechanical design, manufacturing and automation. Therefore, China should pay attention to mechanical design and manufacturing and its automation development, strengthen the research and development of technology, as well as application of technology, and lay the foundation for China's industrial development.

2. Characteristics and advantages of mechanical design, manufacturing design and automation

2.1 Features

First, the characteristics of a wide range of applications. In terms of application scope, compared with the traditional mechanical design and manufacturing industry, the application scope of mechanical design and manufacturing and automation is wider. The application of technology has the characteristics of integration, intelligence and convenience, which makes the direction of mechanical design broader.

Second, the characteristics of humanization. Compared with the traditional mechanical design and manufacturing process, the humanized characteristics of the automation system are more prominent. Using automation to replace the traditional manual operation effectively improves the quality and efficiency of the work and reduces the occurrence of human errors. Although there are some problems in some special time automation, due to the automatic safety detection program set in the automation system, once a problem is found, the system will automatically give an alarm, so that technicians can timely use scientific means to remedy and minimize safety accidents.

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Third, the characteristics of energy conservation and environmental protection. In terms of environment, the automation system has set up supervision procedures that can protect resources and environment, which can save resources and protect the environment in the production and manufacturing process.

2.2 Advantages

First, in the traditional mechanical design and manufacturing system, due to the lack of supervision and alarm equipment, in the mechanical design and manufacturing, if there is an abnormality, it will lead to a series of faults, and the staff cannot find and solve them at the first time, which will have a great impact on the application of the equipment, and even some safety accidents. The application of automation technology can solve this problem. An alarm device will be set in the automation system, which can automatically check the equipment, quickly find the problem after detecting the fault, and solve some small problems by itself, which comprehensively improves the safety of mechanical design and manufacturing equipment.

Second, it is more environmentally friendly. In the traditional mechanical manufacturing process, even if the technical level of technicians is very high and the experience is very rich, the product quality cannot be guaranteed, because manual operation consumes a lot of time and energy. If the working time is too long, it will inevitably produce a sense of fatigue, make mistakes, and the production progress is difficult to control. In order to achieve the production goal faster, some enterprises must catch up with the work and produce products that meet the requirements after eliminating the substandard products. During this period, there will inevitably be a waste of resources, which will also have a certain impact on the environment. However, with the application of automation technology, mechanical manufacturing can be completed by computer. Compared with traditional manual operation, it has higher qualification rate and efficiency. At the same time, the application of automation technology can effectively control the emission of various pollutants in mechanical manufacturing production, save resources and protect the environment.

Third, it can effectively improve work efficiency and alleviate the work pressure of staff. Nowadays, there is great competitive pressure in all walks of life. If machinery manufacturing enterprises want to occupy a favorable position in the fierce competitive environment, they must innovate the machinery manufacturing mode and improve the production efficiency of machinery manufacturing. The application of automation technology can produce efficiently. At the same time, with automation technology, all links of mechanical manufacturing can be strictly controlled to reduce the error rate of mechanical manufacturing. In addition, the application of automation saves a lot of human resources. With the help of automation equipment, the mechanical manufacturing efficiency has been greatly improved.

Fourth, higher safety performance. In the traditional mechanical manufacturing process, manual operation accounts for a large proportion, and it itself faces some safety problems. Especially when the production task becomes heavier, the risk of operating machinery will also increase. If the operators pay little attention, there will be safety problems. After the application of automation technology, some complex and dangerous operations can be operated by machines and equipment, which can reduce the replacement. In addition, the application of automation technology can also improve the accuracy of mechanical production and make mechanical control more accurate. Although, during the work, the staff will still be exposed to various machines and production equipment, and there are some dangers. However the mechanical manufacturing with automation technology can set protection procedures, the protection program can be set to prevent and ensure personnel safety when there is a danger.

3. Analysis on the development prospect of mechanical design, manufacturing design and automation

Sixth with the continuous development and application of artificial intelligence technology in various industries, mechanical design, manufacturing and automation have also been effectively used. In the intelligent environment, we should establish and improve the manufacturing system to make the mechanical production process more college and unified. In the future, intelligent computer programs may be used in mechanical production management. For special problems, computer programs can automatically solve them and release more labor. For example, professional teams can develop programs that can be produced automatically, so that computers can operate easily, release labor and meet the needs of other emerging industries.

Second, networking. Due to the continuous development of communication and information technology, the mechanical design and manufacturing industry will produce more efficiently in the future. Each work area can be

connected to the network, and the staff can supervise the whole process of production and manufacturing by sitting in the office. When a problem occurs, the staff can also find it at the first time and solve it by scientific means to minimize the harm of the accident.

Third, virtualization. The development of science and technology will inevitably drive the development of mechanical design and manufacturing industry. In the future, mechanical design, manufacturing and automation will develop in the direction of virtualization, which is the necessity of the development of the times. The mechanical design task can be realized on the computer, and the class uses holographic technology to project, so that people can see the finished products, which can save energy resources and create more economic value for the enterprise. For example, in the process of mechanical design, manufacturing and production, the technical software course draws 3D model drawings on the computer, and then projects the model drawings with 3D technology to visually see more complete data or processes.

Fourth, miniaturization. Miniaturization will become the development trend of mechanical design, manufacturing and automation. If the mechanical volume is too large, it will occupy a lot of space, which will cause a lot of inconvenience. The micromechanical automation system can solve the problems of large volume occupation and higher precision. Of course, the realization of this process still faces some problems, which requires technicians to strengthen the research on this technology.

Fifth, digitization. Digitization is also the necessity of the development of the times. For the mechanical design and manufacturing industry, it is to integrate manufacturing technology and computer technology, take digital technology as the core, and use high-performance computers to comprehensively design and process digital information. After integrating digital technology, enterprises can improve the sorting efficiency of design and product manufacturing quality, meet the needs of users to the greatest extent and stimulate consumption.

sixth green. Energy conservation and environmental protection has always been advocated in China. The realization of this work requires the strength of all sectors of society. Therefore, mechanical automation technology should put greening and environmental protection in an important position in the future to produce low-energy and green products. In this way, mechanical automation can develop in a further direction and attract people's attention.

4. Conclusion

In short, with the progress of the times and the development of science and technology, mechanical design and manufacturing should also keep pace with the times and strive for technological innovation. The application of automation technology is the embodiment of technological development, which effectively improves the automation level and efficiency of mechanical manufacturing production. In the future, mechanical manufacturing and its automation will develop in the direction of virtualization and digitization, and promote the development of China's industry.

References

1. Yang G, Deng W, et al. Analysis on the development trend of mechanical design based on the characteristics of mechanical design, manufacturing and automation. *Food Science* 2017; (18): 110-111.
2. Li Y, et al. Characteristics, advantages and development trend of mechanical design, manufacturing and automation. *Equipment Engineering in China* 2021; (01): 149-150.
3. Deng J, et al. Characteristics, advantages and development trend of mechanical design, manufacturing and automation. *Southern Agricultural Machinery* 2020; 51(19): 129-130.
4. Lei X. Analysis on the characteristics, advantages and development trend of mechanical design, manufacturing and automation. *Digital Technology and Application* 2020; 38(07): 217-219.
5. Xun J, et al. Research on the characteristics, advantages and development trend of mechanical design, manufacturing and automation. *Technology Wind* 2019; (18): 159-160.
6. Li Y, et al. Exploration on the characteristics, advantages and development trend of mechanical design, manufacturing and automation. *Family Life Guide* 2019; (05): 291-292.