Development Direction of Mechanical Design, Manufacturing and Automation

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Keywords: Machinery; Automation; Design and Manufacture; Development Direction

Abstract: Mechanical design, manufacturing and automation is a new subject, which is developed by integrating various technologies. Thus, the reliability and stability of mechanical facilities are improved, and the mechanical facilities are more humanized and intelligent. Machinery design, manufacturing and automation improve the performance of machinery and equipment, improve the efficiency of enterprises, save production costs, reduce the cost of manpower and material resources. The automation of mechanical design and manufacturing has brought a lot of convenience to people's production and life, which has made mechanical design and manufacturing and its automation technology continue to develop and improve in recent years. More tend to be miniaturized, virtualized and intelligent. This paper mainly describes the development direction of mechanical design, manufacturing and automation from the concept of mechanical manufacturing, the characteristics of mechanical manufacturing, the development of mechanical design and manufacturing and automation.

1. Introduction

The important source of our national economic and technological equipment is the machinery manufacturing industry, which is conducive to the continuous improvement of our industrial system [1]. People can not only use advanced design technology and manufacturing technology in mechanical design and manufacturing and automation to make the structure and performance of mechanical equipment more stable and reasonable [2]. Moreover, through the automation technology in this subject, the mechanical equipment can be more intelligent, humanized and automated. In mechanical design and manufacturing, the integration of automation technology is not only a way to improve production efficiency and accelerate industrial reform. Machinery automation has gradually become the main technology development trend of mechanical design and manufacturing industry [3]. Mechanical design, manufacturing and automation have been further developed, continuously improved and innovated, and mechanical design has made great progress. The future direction of mechanical design and manufacturing is automation [4]. This will make it more widely applicable and more convenient. In the actual production process, transforming scientific research results into productivity and improving the economic efficiency of enterprises is the core factor for the sustainable development of machinery manufacturing industry [5].

Mechanical automation is a new and comprehensive technology. It is based on the effective combination of network technology, information technology, electronic technology, sensing technology, automatic control technology, mechanical technology and software programming technology [6]. The mechanical production process is effectively controlled by an automated control system. Mechanical design, manufacturing and automation are a discipline developed by the integration of various technologies. Through continuous development and practical exploration, a technical system with automation as its main feature has gradually formed. Mechanical design, manufacturing and automation have improved the performance of mechanical equipment, improved the efficiency of the enterprise, saved production costs, and reduced the cost of manpower and material resources [7]. At the same time, let the modern manufacturing industry develop towards digitalization, intellectualization and humanization. After these years of development, although there are still some problems in some details, mechanical automation technology has become mature and further improved and developed [8]. In the development of mechanical design and manufacturing and automation technology, some key types of technology are involved, and they are

  DOI: 10.25236/icetem.2019.211

closely related and penetrated into each other. Therefore, we should actively explore and seek new development goals of machinery manufacturing industry.

2. Mechanical Design and Manufacturing and Its Automation Characteristics

2.1. Higher efficiency and quality of work

Although mechanical design, manufacturing and automation are formed by integrating various technical means, they are not simply the accumulation and superposition of multiple technologies. However, according to the actual situation, all kinds of science and technology will be integrated into the practical application. The research of mechanical design, manufacturing and automation highlights the systematicness and complexity, and puts forward higher requirements for machine refinement, which fundamentally guarantees the diversification of mechanical products. In the process of changing users'needs, the existing mechanical automation technology can not meet the needs of users. Mechatronics technology is an extension of modern mechanical automation technology. The extensive use of computer technology allows mechanical automation products to be commissioned according to different needs to produce the products required by the premises [9]. Each product has its own unique product characteristics and production requirements, which is also the main purpose of the product developed. The main task of mechanical design and manufacturing is to produce the products smoothly under the premise of meeting the characteristics and production requirements of these products.

2.2. Higher working stability and reliability

In the process of designing products, the global machinery manufacturing enterprises first need to design drawings and then test the finished products with drawings. Only in this way can the product be effectively designed. Use numerical control technology, information processing technology and other related technical means. It can make the mechanical operation more close to intelligent, and better implement the production activities according to our requirements. It is necessary to clarify the development trend and direction of mechanical design, manufacturing and automation, which is of great significance to the future of the whole machinery manufacturing industry. Great attention should be paid to ensure that machinery manufacturing is maintained at a relatively high level of development. Modern machinery manufacturing enterprises take the road of mechatronics, which is in line with the development needs of modern machinery manufacturing enterprises. It can make the machinery manufacturing enterprises rejuvenate and promote the development of modern machinery manufacturing enterprises.

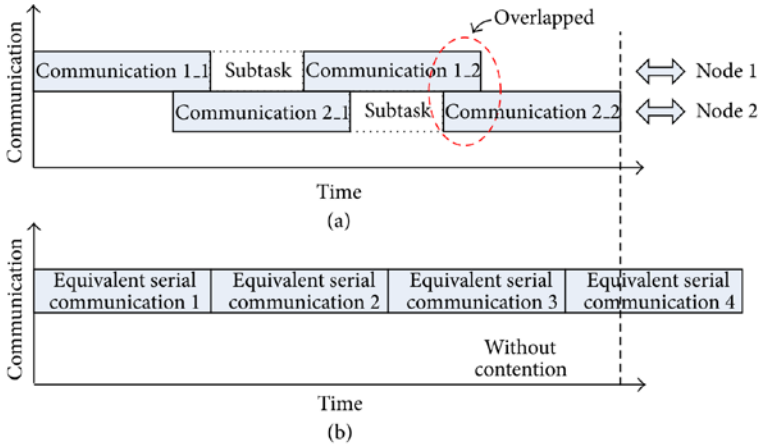

Fig.1. Example of communication in a 3D network

Every kind of automation equipment should ensure that the equipment has storage capacity, and the stored data should be maintained regularly. If the program fails, the product can be repaired automatically according to the stored program. Realizing the intellectualization and automation of mechanical design and manufacturing can not only avoid the occurrence of design and

manufacturing errors, but also improve the production capacity and efficiency of mechanical design and manufacturing. If the transmission line is converted into a telephone line, it can be used as long as the data signal is converted into an analog signal and then into a data signal. For the best case where all nodes are completely concurrent and there is no network competition. In the worst case where the communication sequence of all nodes occurs, the number of equivalent serial communications equals the sum of the actual communications in each node. Figure 1 is a communication example in a three-dimensional network.

3. Development Prospect of Mechanical Design, Manufacturing and Automation

The main advantage of mechanical equipment manufactured by mechanical design and manufacturing and its automation technology is that it can significantly improve the automatic control level of machinery and enhance the intelligence of machinery through advanced automation technology, control technology and information processing technology. In most production processes, we encounter situations where manpower cannot be controlled and operated. In this case, we can apply mechanical design and manufacturing and automation technology to replace the manpower itself. For mechanical design, manufacturing and automation, the result of continuous deepening and extension is mechatronics. Especially with the support of information technology, the development of mechatronics is rapid. If there is a sudden power failure in production, you can quickly switch it to another mode and cut off the circuit at the same time to prevent large safety accidents [10]. With the continuous development of science and technology and its application in mechanical design and manufacturing, product design virtualization can be realized in the future. Intelligence of mechanical automation technology is the future development direction of industrial technology. In the process of improving the level of modern science and technology, it is possible to intelligentize mechanical automation technology.

Automation clients can create automation objects, access objects provided by automation servers, acquire or set properties of objects, or call methods of objects. The interaction between automated objects and automated customers is shown in Figure 2.

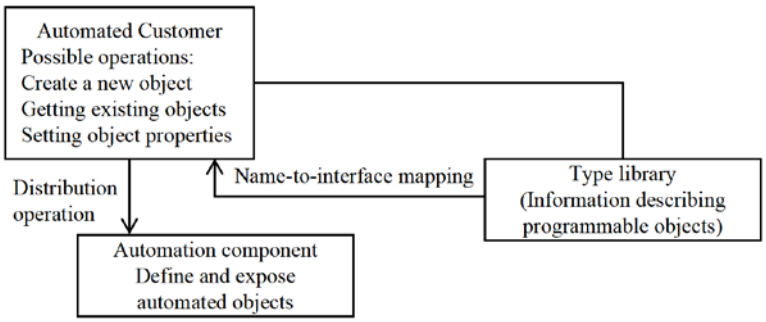

Fig.2. Interaction between automation customers and automation components

Under the influence of the continuous advancement of technology, network communication and computer technology are developing day by day, and through the developed electronic computer facilities, people can simulate some work. The use of mechatronics technology can make the mechanical equipment designed and manufactured not only have a stable and reasonable structure. Relative to the manpower itself, the mechanical operation will, to a certain extent, complete the predetermined process more accurately, and avoid the related losses caused by improper human operation. With the integration of computer and network technology, it has an impact on many industries in the whole society. In the process of design and manufacture, we need to enhance the rigor to ensure that the product meets the design requirements. Mechanical design has an important impact on the quality of mechanical products. It is necessary to carry out mechanical design scientifically. According to the demand of the market, mechanical design should be carried out reasonably. The products designed need to have certain market application value, which can bring certain economic benefits to enterprises. With the development of science and technology, the future mechanical automation equipment will be smaller and more powerful.

4. Conclusions

Because the mechanical automation technology has the characteristics of high quality and low energy consumption in design and manufacture. Therefore, the design and manufacture of machinery rely on automation. This paper mainly discusses the design principles and advantages of mechanical design and manufacturing and its automation, as well as the development direction of mechanical design and manufacturing and its automation in the future. The future mechanical automation equipment can not only complete the related work efficiently and accurately, but also has the characteristics of less environmental pollution, and is easy to be recycled. Mechanical design, manufacturing and automation are the best ways to improve industrial production capacity and efficiency. At the same time, driven by the continuous development of science and technology and the continuous advancement of modern industry, mechanical design, manufacturing and automation are also constantly developing and improving. For the development of mechanical design, manufacturing and automation, its advantages are obvious, the quality is higher and the stability is stronger. It is necessary to correctly understand the meaning of mechanical manufacturing, clarify its own characteristics, and ensure that mechanical design has a more correct development direction. As people continue to make progress, the future use of the knowledge of this discipline will create more powerful machine equipment and contribute to the development and reproduction of human beings.

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