Analysis of Mechanical Design Manufacture and Automation Characteristics, Advantages and Development Trends

Li Wei
Public inspection and testing center of Xiangyang City, 441001 Xiangyang, Hubei Province

Abstract: Mechanical manufacturing design is an important direction in the field of automation in China which promotes the development of China's productivity and economy. Based on this, this paper discusses the advantages and trends of automation in mechanical manufacturing so as to improve the efficiency of machinery manufacturing and promote economic development. Therefore, it is hoped that this paper can provide some references for related researchers.

1. Introduction
Machinery manufacturing takes machinery as the main means, also known as mechanical engineering. Mechanical equipment provides important technical support for China as well as new opportunities for the improvement of people's living standards. Mechanical products are important import and export commodities in international trade and China has gradually changed from a big manufacturing country to a powerful manufacturing country in recent years. Therefore, mechanical design and manufacturing occupies a very important position in our country. Only by continuously improving the level of mechanical manufacturing can we improve the production efficiency and promote the rapid economic growth of our country.

2. Characteristics of mechanical design manufacture and automation
Compared with the traditional model, mechanical design is not simply superimposed on technology, but also formed through the integration of multiple technologies and absorbing the advantages of different methods so that to improve the improve the production efficiency and quality of mechanical products. By improving some traditional methods, it is more convenient for the development of the mechanical design and manufacturing industry.

In addition to fixed production links, mechanical manufacturing not only can meet the requirements of products, but also can be combined with the requirements of the corresponding products in the design and production process. Due to the long production cycle of traditional machinery construction, it is often unable to produce alternative products to meet the needs of customers in time. Therefore, intelligent manufacturing technology promotes the development of industry, improves the precision and efficiency of products, and brings many benefits. This technology is widely used in various production fields in China.

3. Necessity of mechanical design manufacture and automation
First of all, mechanical design and manufacturing and automation are safe. In the traditional mechanical manufacturing process, basically all the procedures are done manually and many technicians have heavy and arduous tasks. Automation and intelligent work task is simple, the
traditional production method has been unable to meet the production requirements. Therefore, in the manufacturing process, machinery manufacturing has abandoned the traditional production mode and is developing towards automation which can completely or partly replace most of the work in the production process, reduce the pressure and difficulties of the manufacturer, improve the free production capacity, optimize and improve the operating environment. So compared with the traditional machinery production, the efficiency of automation development is also greatly improved.

Based on the development of the Internet in the era, any industry and field will pay attention to the efficiency and speed of products in the development process. However, in the process of the development of mechanical design automation, the direction of automation meets the requirements in the process of the production. Especially under the application of SPS or flexible manufacturing technology, the development of machinery has strengthened production efficiency, and at the same time, it can reduce a certain production cost time and improve the productivity of machinery in a short.

Compared with traditional production areas, intelligent control system is added in mechanical design. The development of intelligence has greatly promoted the operating and maintenance efficiency of the staff. It can quickly check the interior of the machine reflect the cause of failure and automatically detect the failure parts in a short time. This series of automatic intelligent production reduces the waste of human resources. The integration of operating system and cloud platform is an important means to control environmental advantages. Industrial manufacturing, automotive Internet and smart home are important areas for the development of intelligent machinery in my country. Especially by the year of 2020, the Internet has basically taken shape and it is also an important technology for competition in China's industrial system. Only by fully realizing the networking of internet intelligent technology and increasing the proportion of information services can we promote the Internet planning and design of measurement system. The number of M2M connections in the public network has reached 1.7 billion.

The scale of the Internet of Things continues to expand in the field of machinery manufacturing, and the ubiquitous and secure Internet of Things has basically taken shape.

Mechanical design manufacture and automation meet the needs of the equipment and the operation is simpler and more comfortable. The ultimate purpose of mechanical equipment is to facilitate people's lives. Due to different core functions, its products have different requirements. For example, the main activity of the crane is lifting and rescue and that is why we should fully consider the needs of users when using automation technology in the machinery industry. But the traditional mechanical equipment is mostly blocked and the operation is more difficult and cumbersome and lacking of humanized design. Therefore, the direction of mechanical design needs to face different groups of people and combine different technologies to meet everyone's needs. Although there are automatic control components in the traditional mechanical design, it contains more manual operations. Generally speaking, manual operation largely depends on the professional level of the operator which cannot ensure the product consistency. Automatic operation can ensure high production level and high precision. Compared with manual operation, there will be no big mistakes. Automatic operation can be processed day and night. The efficiency is much higher than the traditional production level, and the production cost is greatly reduced.

4. Development trend of mechanical design manufacture and automation

With the continuous development of society, artificial intelligence has been widely used and the application of artificial intelligence is also the general trend. At present, intelligence promotes the transformation of labor technology into high-tech industry in China. Computer technology, as an important tool, is more and more widely used which can effectively realize intelligence, promote the rapid development of China's industry and ensure the smooth development of industrial intelligent technology. The most important feature of its practical application is that it fundamentally changes the operation mode of mechanical equipment, promotes mechanical production and develops in the direction of automation and computerization. It can be said that the combination of the two provides new opportunities for the development of our country's machinery industry which ensures the
development of the economy smoothly and make rapid progress for our country’s economy.

4.1 Networking
With the development of our country, the Internet technology has been integrated into every corner and greatly changed our lifestyle. Machine design and manufacturing can also use the Internet. The application of mechanical design greatly improves the efficiency of the production process through the application of the Internet. It can also monitor the production process in real time, record the data in real time and find out various problems in the production process in time. To quickly respond to mechanical failures of traditional products requires more complicated procedures in the maintenance and repair process. Once network operation is performed, even if there is no professional person, it can be operated remotely through the Internet.

4.2 Digitization
The modern society is in the digital age and the Internet is constantly developing various innovative data concepts. Digitization is a new driving force for the development of the entire society. The corresponding system of mechanical industry needs corresponding data processing which used in product simulation and later production. In the process of designing mechanical products, it is generally presented in the form of design drawings, and then the construction design is carried out by professionals, and finally use the corresponding drawing software to design it. This process is time-consuming, so in the product design process, the use of digital technology for virtual design can simplify the design process, shorten the construction time and improve product quality. Advanced technology applications are reflected in all areas of life. A more common situation is that after the design center completes the drawing design, it sends manufacturing instructions directly to the production equipment through remote transmission. The whole process is automated for there is no paper transmission and the production machine is unattended. At this stage, our country still needs a lot of mechanical control technology. Although the advanced level has been improved compared with the time before the reform and opening up, it still needs to be optimized. That is why with the passing of time, only by constantly adding the latest technology to the equipment can the infinite development space of mechanical intelligence be given.

4.3 Green
With the development of society, people not only actively pursue economic benefits and improve efficiency, but also pay more attention to the essence of comfort and humanized design. Although in recent years, our country’s economy has developed rapidly, there are also some major problems. Our country’s production methods are relatively backward and many resources are wasted, especially the pollution in the processing industry has attracted the attention of environmental protection departments. In recent years, in the environmental governance of our country, a large amount of dust or noise interference often occurs in the production process which seriously affects the environment and the physical and mental health of workers. This inevitably requires the development of machinery production in the direction of environmental protection and ecology. The development of our country’s economy, culture and production are all based on sustainable development strategies as well as the development of mechanical design manufacture and automation. With regard to the overall development of China, the main purpose of mechanical design and manufacturing is to improve production efficiency, so as to reduce the waste of materials. With the concept of the sustainable development, only by solving the problems existing in mechanical design and manufacturing can we improve the level of mechanical design and production as well as automation technology.

4.4 Low energy-consumption
With the continuous development of industrialization, the consumption of social resources in our country is also increasing. Therefore, low energy consumption is the main goal of the development process of our society. In addition, environmental protection is also a major problem faced by our
country in the development process which proposes the construction direction for the development of mechanical design manufacture. When designing, not only the issue of materials must be considered, but also the issue of effective use. In traditional production, only the application of mechanical production is considered, which will lead to excessive energy consumption in the designation of products. At present, the development direction of mechanical design requires low power consumption, low weight, energy conservation and environmental protection. Machine technology focuses on low-power processor technology and integrated circuit development of the Internet of Things, and the main research area is low-cost and low-consumption products and technologies. Only comprehensive application and support for the research and industrialization of the Internet of Things in the machinery manufacturing process can continuously ensure the improvement of machinery design and production efficiency.

4.5 Diversification
Different disciplines are not limited to a certain stage, but gradually enter a certain stage. Interdisciplinary is an interdisciplinary research activity. The knowledge system formed by interdisciplinary research constitutes interdisciplinary science. Interdisciplinary is often a new growth point and a new frontier of science which will be very likely to lead to major scientific breakthroughs and bring revolutionary changes in science. At the same time, interdisciplinary science is a comprehensive and interdisciplinary product which solves human contributions, scientific, social and global issues and is also the practical significance of mechatronics. Mechatronics can not only greatly reduce the error rate and improve the competitiveness of products in social production, but also promote the rapid development of our country’s machinery industry and the whole manufacturing industry. We will vigorously develop the “13th five year plan”, develop the comprehensive utilization of the Internet of things and the manufacturing industry. We should focus on the major links among manufacturing units, production lines, workshops and workshops in key industries so that to realize in-depth perception, dynamic monitoring, data aggregation and intelligent decision-making of the entire industry chain and the entire life cycle.

5. Conclusion
To sum up, although the impact of mechanical manufacturing and automation issues at this stage is smaller than that of computer technology and other industries, it is a basic discipline, and its importance is irreplaceable through other disciplines. Mechanical design and manufacturing and automation should be managed on the basis of the integration of advanced manufacturing technology in the mechanical design process. The implementation of industrial Internet of things is the basis of intelligent production. The combination of intelligent manufacturing and industrial Internet of things can reasonably allocate supply chain resources and improve production service efficiency.

Reference
[1] Lu Rui, Discuss Mechanical Design and Manufacturing and Automation Characteristics, Advantages and Development Tends[J]. Architectural Engineering Technology and Design, 2020,(23):3762.
[2] Li Hengwen, Discussion on the Characteristics, Advantages and Development Trends of Mechanical Design and Manufacturing and Automation[J]. Architectural Engineering Technology and Design, 2020,(23):667.
[3] Xu Xianfu, Fan Qingfei, Discussion on the Characteristics and Advantages of Mechanical Design and Manufacturing and Its Automation[J]. Architectural Engineering Technology and Design, 2020,(22):618.
[4] Lei Xuening, Analysis on the Characteristics, Advantages and Development Trends of Mechanical Design and Manufacturing and Its Automation[J]. Digital Technology and Application, 2020,(22):618.
[5] Zuo Guangyi, The Characteristics, Advantages and Development Trends of Mechanical Design and
Manufacturing and Its Automation[J]. Architectural Engineering Technology and Design, 2020,(17):4310.