

# Application of Mechanical Automation Technology in Mechanical Manufacturing

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**Abstract:** With the improvement of people's living standards, people have put forward higher requirements for products, such as diversity and reasonable prices, so the traditional mechanical manufacturing process has been unable to effectively meet the needs of consumers. Mechanical automation technology can not only improve the quality of manufacturing, but also effectively improve the efficiency of manufacturing. In this paper, the mechanical automation technology is deeply discussed, the application form of mechanical automation technology is analyzed, and the development prospect of automation technology is analyzed.

**Keywords:** Mechanical automation technology; Products; The application form

## 1. Introduction

### 1.1. The manufacturing process of mechanical manufacturing technology

Although domestic mechanical manufacturing enterprises continue to adopt advanced manufacturing technology in manufacturing process, there is still a certain gap compared with the mechanical manufacturing enterprises in industrial developed countries. Machinery manufacturing enterprises in industrial developed countries have widely used nanotechnology and composite processing technology and other new processing methods. And the manufacturing process of domestic machinery manufacturing technology is still in the development stage, and the popularity rate is not high.

### 1.2. Automation of mechanical manufacturing technology

With the highly integration of computers, mechanical manufacturing enterprises in developed countries have begun to adopt CNC machine tools and computer integrated manufacturing system technology, which further accelerates the development of mechanical manufacturing automation. But the domestic mechanical manufacturing enterprises are still in the stage of single machine automation and primary operation automation, and only a few mechanical manufacturing enterprises are using FMS and FMU.[1]

## 2. Application of Automation Technology in Machinery Manufacturing

In the actual operation of machinery manufacturing, more attention is paid to the practical application of mechanical automation production. With the deepening

of theoretical research on mechanical manufacturing automation, the purpose of automation is more clear, which makes it more applicable to actual production. Therefore, in the study of mechanical manufacturing automation, we should mainly combine the needs of enterprise development, make it more in line with the needs of enterprises, while promoting the continuous development of automation technology. In view of the actual situation of our country's machinery manufacturing automation technology, automation technology mainly focuses on the technology with less investment and quick return. Especially the level of machinery manufacturing in China is relatively backward, so we should pay more attention to the development potential, low cost, and can get rapid return on automation technology, which can make the economic benefits of enterprises can get rapid return. Massachusetts Institute of Technology (MIT) in the twentieth century proposed LP fine production model, which can effectively achieve low input and high return on the typical representative technology [2]. Combined with the current situation in China, most of the production equipment used by machinery manufacturers is general equipment. With the continuous development of automated mechanical manufacturing process, enterprises constantly improve the automated production equipment, but all around the actual needs to promote the production layout of automated equipment.

At present, in terms of the level of mechanical manufacturing automation in China, the development of automation in China's enterprises is mainly in a step-by-step manner, and focus on the development of mechanical automation with modern characteristics. At present, mechanical manufacturing automation technology mainly follows the development process from low-level to high-level, which effectively speeds up the improvement of automation management quality.

In the current machinery manufacturing industry, most of the enterprises have basically realized the automatic control equipment, and gradually realized the automation, digitization and intellectualization of mechanical control in the mechanical manufacturing process.

In the factory which realizes the mechanization and automation production, it uses the single machine automation production facility to realize the automation of the production line, and manages the production line through the comprehensive automation equipment, thus can control the production more effectively. For this reason, most enterprises do not fully apply computers in the production process, and the pursuit of "high automation" is slightly deficient. For example: in the automobile manufacturing industry, automation technology is widely used, and the use of PLC technology has reached more than 90% of the coverage rate; Frequency converter technology in the automobile manufacturing process involves almost all the speed control and soft start process, and basically replaced the mechanical transmission; In the mechanical manufacturing industry, IT technology is basically covering all aspects of office and logistics, and has become an important pillar of enterprise production ; Most enterprises integrate identification system and flexible production into the production process, which forms a flexible multi-species mixed-flow production based on identification technology and IT system. On this basis, the automation production can be realized by accumulating experience of automation technology. The ultimate goal is to achieve highly automated CIMS production. As shown in Figure 1.

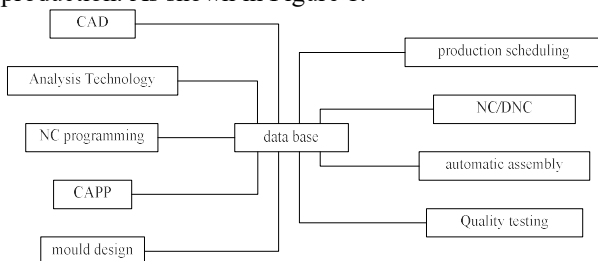


Figure 1. CMS diagram

### 3. Application and Development Trend of Automation Technology In Machinery Manufacturing

At present, China's automation in equipment, technology and management methods have been greatly improved. Through gradual accumulation, China's experience in mechanical manufacturing automation technology is richer and more mature.

#### 3.1. Globalization of mechanical manufacturing technology

With the increasingly fierce competition between domestic market and international market, many well-known domestic machinery manufacturing enterprises have lost or been annexed by other enterprises in the fierce competition. At the same time, the rapid development of network technology and the wide application of computers have further intensified the competition in the machinery manufacturing industry. In order to realize the global development of mechanical manufacturing technology, first of all, the networking of mechanical manufacturing technology should be realized.

#### 3.2. Highly integrated

In the development direction of mechanical manufacturing automation in the 21st century, integrated manufacturing technology can be said to be the most important direction, but also the current continuous reform of the production mode of mechanical manufacturing enterprises [3]. Based on the computer combination application, the manufacturing system can be operated as a whole through effective integration.

#### 3.3. Intelligentization

With the development of computer, intelligent technology is becoming more and more powerful, man-machine integration of mechanical manufacturing equipment also entered the machinery manufacturing enterprises.[4] Through intelligent manufacturing system production, the human-machine interaction is realized intelligently. For example, in the process of conception and design, as well as logical reasoning and analytical judgment. Mechanical intelligence provides a very good environment for man-machine, which is a very important feature of intelligence. [5]In manufacturing production, through effective man-machine communication and interaction, not only can effectively improve automation, but also can better improve the practicability and coordination of mechanical automation system.[6]

#### 3.4. Green application of mechanical manufacturing technology

The green application of mechanical manufacturing includes many aspects, such as green production, green design, green equipment, green packaging and green management. Green manufacturing technology can not only improve the utilization of energy and raw materials, but also reduce the environmental impact caused by adverse by-products.[7]

#### 3.5. Virtualization

Virtualization is the combination of control theory and computer technology to enable mechanical products to be fully simulated in the design and production process.

For example, combined with computer simulation technology and information control technology, in mechanical manufacturing, the actual operation process is fully simulated, and then effectively find hidden problems in production, so that the quality of mechanical manufacturing products is better and more efficient. Virtualization can greatly save costs, improve product production cycle, and promote market competitiveness.

#### **4. Conclusion**

The continuous development and wide application of mechanical manufacturing automation technology is the inevitable trend of the development of mechanical manufacturing enterprises, which has also brought tremendous leaps to the mechanical manufacturing industry. The technical level of mechanical manufacturing automation not only affects the overall development level of the mechanical manufacturing industry, but also shows the improvement of the national economy and industrial development level of this country. Therefore, we must increase the input of human

and material resources in the machinery manufacturing industry, and promote the continuous update and development of machinery manufacturing automation technology.

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