

# The Application and Analysis of Mechatronics System in Mechanical Engineering

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**Abstract:** In recent years, China's economic level has been steadily improved, and the development of various industries has greatly improved the quality of life of people, and the use of machinery has contributed greatly to this process. In view of the application of mechatronics in mechanical engineering, this article makes a simple discussion on three aspects of its application field, development trend and coping strategy. And to help the development of mechanical engineering, to make the contribution of our country's economic development.

**Keywords:** Mechatronics; mechanical engineering; development trend

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Nowadays, mechanization, informatization, automation and intellectualization provide fresh blood for the rapid development of China's economy and society. It provides the innovative idea and the "technical bridge" for the convenience of people's life. At the same time, this reality is counterproductive to mechanization, and higher requirements are put forward for the integration of the technology, concept and mechanization of mechanization and intellectualization, automation and intelligence<sup>[1]</sup>. And has become the mechanization further development of a realistic direct strong power. We can find that science and technology are the original motive force, which is the source of all development trend and innovation. We consider that mechanization is the foundation of automation. The fusion of the two is the prerequisite of the current hot information technology, and intelligence is the current stage goal. This paper focuses on the integration of mechanization and automation. The main research object of this paper is mechatronics technology. This technology is nothing new, but its research has been a key issue in the industry for a long time. The study of this problem, especially its integration with machinery, is of great significance for improving the efficiency of mechanical production and elaborating mechanical manufacturing.

## 1. Overview of mechatronics

### 1.1 The meaning of mechatronics

The concept of electromechanical integration is a new technology in the development and practice of mechanical engineering technology. The development and development of a new discipline is a new technology that is born out of

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multiple parent technologies such as information technology and electronic engineering<sup>[2]</sup>. This new technology has an inseparable connection with the traditional mechanical system, which can be described as the modern mechanical system. Some scholars believe that the electromechanical integration system is a kind of modern mechanical system with strong control function through non-mechanical methods<sup>[3]</sup>.

## **1.2 The main content of mechatronics**

First, it contains information processing technology. It is a very important problem to have the complete science and systematic information processing technology. There is a direct interest in the efficient operation of mechatronics system. Therefore, the industry has reached the consensus on this aspect, and the importance of information processing technology to the electromechanical integration system is self-evident. And how to get the best function of information processing techniques, strengthening standardization, guarantee its advanced nature, and then to electromechanical integration system of exploration on the reliability, stability and anti-interference<sup>[4]</sup>, which is our constant research topic and direction. Second, the sensing technology is very important for the electromechanical integration. This is because the organs detection sensor technology is equivalent to the feelings of people, only effective control ensures that its precision can be combined with data from sound, light, electricity and other aspects to complete the receiving technology of the data together and then receives a technology. Third, the importance and influence of control technology is also a problem, especially the application of automatic control technology and automation concept. The development of automatic control technology itself has not yet reached a fully mature stage, and some of its own problems have indirectly influenced the stability of the mechatronics technology, which has aggravated the already complicated situation and difficulty. Therefore, our research on the principle, problem and development direction of automation is not only necessary but also fundamental to the application field and application of mechatronics system.

## **2. The application of mechatronics in the field of mechanical engineering**

As we all know, the industrial revolution has changed the world and has also promoted major economic changes. This laid the initial foundation for the development of mechanization, especially mechanical engineering. However, the integration of mechatronics will bring a new impetus to the development of the world and push forward the new changes, and its application field will be very extensive. Generally speaking, the promotion of work efficiency will be direct and will have a far-reaching impact.

### **2.1 Applied to machine tool modification**

Numerical control machine tool for mechanical equipment is like the human gut for the meaning of life movement. Therefore, the corresponding equipment on the workbench and machine tool is very strict, and the allowable deviation value is very small<sup>[5]</sup>, so as to ensure the quality and precision of the product. The application of mechatronics technology to the transformation of machine tools is very significant to improve the efficiency of the machine tool, for example, the open-loop servo system is widely used. With the rapid development of information technology, the integration of computer technology and CNC machine tools has accumulated certain experience. To some extent, the automation of data and information can be realized, and the real-time challenge technology and function can be realized according to different products. The production cost of the company has been greatly reduced while increasing production efficiency.

### **2.2 Applied to textile machinery**

During the operation of the textile machinery system, the winding bobbin generally adopts the way of positive transmission. The control system is composed of the guide motor, speed sensor, etc. We usually choose the means of winding and stepping precision winding to reduce the probability of overlapping problems. Through sophisticated system operation, specific signals are output from the sensor. It is transferred to TPU for processing, and then transferred to PCC. After the data is searched, the appropriate winding ratio is selected to check whether there is any

overlapped part<sup>[6]</sup>. The output of the control signal will be controlled to achieve the final goal of fast and accurate transmission of the data.

### **2.3 Applied to packaging machinery**

The biggest characteristic of packaging machinery is the complexity of its structure. In the past, many safeguard machines, because the principle is mostly through the circuit control to connect multiple components and brought some disadvantages. On the one hand, it leads to the irregularity and unconformity of the packaging machinery equipment, on the other hand, it also indirectly causes the equipment maintenance difficulty and maintenance inconvenience caused by the multiple standard deviation of the equipment<sup>[7]</sup>. Electromechanical integration to solve the long-term problems now provides a new method, its application to packaging machinery application greatly improved the efficiency of opening a new door, at the same time its modular management for mechanical packaging is also of far-reaching significance.

## **3. The development trend of mechatronics**

The importance of mechatronics does not need our verbosity. But according to the development direction of its development history and the present society, we believe that clear the development direction of mechanical and electrical integration, understand its developing trend, timely for us to grasp the research emphasis has great practical significance.

### **3.1 Individualization**

In today's world, whether it is in the construction industry, garment industry as the typical representative of the real economy is represented by information field, the network game virtual new economy, individuation, innovation has become an inevitable trend, and this kind of situation worse will have a significant and cannot be estimated on the world today. Diversified consumption trends and diversified markets have given us a common inspiration. It is the electromechanical integration technology that should not be abandoned by the world in the future development. In the future society, it must adapt to the development of individuation, and take the personalized express. Constantly updating the design concept and the specific technology, attaching importance to the personalized demand on the basis of basic functions, taking into account individual needs and mass production.

### **3.2. Intelligentize**

With the development of information technology and the improvement of automation level, intelligent products are not new in our life, and gradually come to the thousands of families. Compared with the traditional production mode and the electromechanical integration system, the future of mechatronics must pay attention to the intelligent elements. Strengthen the man-machine relationship between the system and human, improve the innovation and innovation ability, and integrate into the human brain simulation concept, and make full preparations for the birth of the new generation of mechatronics system<sup>[8]</sup>.

### **3.3 Sustainable development**

At present, the concept of green development, harmonious development and sustainable development is the development direction of various industries in China. For electromechanical integration, we must strengthen relevant research, take advantage of new technology, new technology and new concept, and pay full attention to resource conservation, recycling and environmental protection.

### **3.4 Networking**

Internet technology, big data technology has been born and gradually merged with various industries. Network is a relatively obvious development direction, using network technology and continuous improvement of network environment, mechatronics system will have great potential. We can use the network to connect some precision instruments and devices, realize the control of the household, save resources and improve work efficiency<sup>[9]</sup>.

## 4. The improvement strategy of mechatronics system

### 4.1 Control the consumption of mechanical and electrical equipment, stick to the "energy saving" position

Previous experience shows that the general method of energy saving and energy control is to improve the proportion of technical factors, reduce the amount of diesel fuel and reduce the emission of waste gas and waste residue to achieve the goal of energy conservation and environmental protection. In this process, our goal is two aspects, one is to maximize efficiency, improve the combustion efficiency of diesel, reduce diesel input to save energy; the second is to control pollution emissions to achieve the goal of reducing emissions. In this process, we can use the electronic control system to strictly control and record the input of diesel, reduce the invalid consumption and achieve the purpose of saving energy.

### 4.2 Promoting the level of automation and paying attention to the trend of intelligence

Mechatronics is a new generation of automation technology. Compared with the low level automation of traditional electromechanical integration, the current or future development direction of mechatronics is an increasing level of automation. Intelligence will be the new stage of its development, the intelligent development of electromechanical automation will be a new world. We should fully believe that under the Internet environment, under the great situation of our innovation, the intelligent integration of mechatronics will bring great changes to our life and production in the near future.

### 4.3 Formulating a systematic development strategy

Electromechanical integration is a complete system based on electromechanical technology and electromechanical equipment. We must focus on this system, strengthen the scientific nature of the system, and use the principle and method of system theory and cybernetics to support the development of mechatronics<sup>[10]</sup>. In general, systematic development refers to the design and construction of electromechanical system. The construction of this system should be based on the premise of independence, aim at scientificity, strengthen the coordination of all parties, and design a systematic plan. Prepare and respond to the changes of the environment, and perform mechanical engineering work more perfectly. However, in the current era of information technology, we should correctly recognize and highlight the systematic direction of mechanical and electrical engineering development. Combined with artificial intelligence technology, this system is updated to a more perfect scientific system.<sup>[11]</sup>

## 5. Conclusion

As a newborn in information technology, the development prospect of mechatronics technology is certain. We need to grasp the pulse of development and formulate the development direction accurately, so that this technology can better serve the mechanical engineering and human society.

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