

Analysis on the Application of Mechanical Automation Technology in Mechanical Manufacturing

Zhiyuan Zhou

Coventry University, Coventry, UK

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Abstract: At present, with the rapid development of science and technology, mechanical automation technology is increasingly applied to all walks of life, especially the mechanical manufacturing industry. At the same time, with the rapid update of automation technology and corresponding equipment, the manufacturing efficiency is improved to a certain extent, which provides theoretical and technical support and guarantee for more refined processing work. Thanks to the support of mechanical automation, it is possible to better analyze and evaluate the problems and potential risks in each link of mechanical manufacturing, so as to enhance its effectiveness, keep pace with the times and add new impetus to the positive development of society. Therefore, based on the above considerations, this paper will theoretically analyze the meaning of mechanical automation technology, its significance in mechanical manufacturing, its application in mechanical manufacturing and its development prospects and trends.

1. Introduction

The emergence of mechanical automation technology can be said to be a good medicine for mechanical manufacturing, which changes the traditional production mode, reduces the cost in production and improves the production quality and efficiency of products. It can be said that in China, the machinery manufacturing industry holds up half the sky in social production, so the development of machinery manufacturing industry will drive the rapid economic development of the whole society.

2. Meaning of Mechanical Automation

Mechanical automation, as its name implies, refers to the application of automation technology to mechanical manufacturing in the traditional sense, so as to achieve a more intelligent level of mechanical manufacturing with the help of the advantages of automation technology, and then to carry out some independent industrial production. With the application of today's mechanical automation technology, the production line can be optimized in the process of mechanical production, and at the same time, the efficiency of mechanical production can be promoted, which injects new vitality into the sustainable development of many enterprises. Compared with the traditional mechanical manufacturing process, the application of automation technology has improved productivity and production efficiency to a certain extent, and reduced the input of

personnel and production cost. In addition, in the industrial development of our country in recent years, the mechanical automation technology provides a reliable guarantee for the development of the manufacturing industry through continuous innovation, and further promotes the rapid development of the national economy.

3. Significance of Automation Technology in Mechanical Design and Manufacture

In mechanical design and manufacture, the application of mechanical automation technology can not only improve the production efficiency, but also further reduce the production cost, so as to improve the use of various machines, thus laying a good foundation for modern industrial development.

3.1 Reduce Resource Costs

Traditional machinery manufacturing adopts extensive mode, which leads to lower production efficiency. At the same time, with the low production efficiency, the energy consumption is quite large, which not only increases the manufacturing cost of enterprises, but also has a quite adverse impact on the long-term sustainable development of enterprises. Now, with the application of mechanical automation technology, a new type of refined production mode can be produced, and various wastes can be integrated and rationally utilized for mechanical manufacturing, thus realizing effective control of production cost and maintaining good performance in comprehensive economy. In addition, the application of automation technology is constantly improving in the process of mechanical design and manufacturing, and the whole system is gradually improving, which will ensure the reliability and practicability of mechanical automation technology in mechanical manufacturing to a certain extent, and then realize the saving of various resource costs. Especially with the application of mechanical automation technology, the input of human resources is greatly reduced, that is to say, the cost output of enterprise manpower is greatly saved.

3.2 Improve Production Efficiency

The application of mechanical automation has played a great role in realizing the refinement and intelligence of mechanical manufacturing and promoting the improvement of production efficiency. Under the current fierce market competition, if enterprises want to develop better, they need to work harder to improve their production efficiency, and with the advantage of current mechanical automation technology, promote the promotion and development of core competitiveness, so as to seize a larger market share. To put it simply, the application of mechanical automation technology has improved various defects existing in the traditional mechanical manufacturing process to a certain extent, and realized the continuous upgrading and improvement of the product quality of mechanical manufacturing. It provides a more diversified development direction for the development of enterprises in the current society.

3.3 Improve the Use of Machinery

In the current application of mechanical manufacturing and mechanical automation technology, more efficient monitoring and management work can be carried out, so that as long as the mechanical equipment has problems, it can be handled in time, so as to improve the mechanical performance. In the process of using mechanical automation technology, the advantages of computer science and technology are brought into full play. After a series of operations on mechanical equipment, precise control is implemented according to the specified predetermined

procedures, so as to avoid the damage to mechanical equipment caused by human error as much as possible. In this way, the service life of mechanical equipment can be continuously extended, and in this case, the production cost of enterprises can be effectively controlled, so that the benefits of enterprises can be improved. At the same time, with the application of mechanical automation technology, it can effectively monitor the mechanical manufacturing in real time, and correct the problems in the production process in time, which can produce a whole, systematic and correct cognition of the whole operation situation, and then carry out more detailed analysis to improve the maintenance level of machinery.

4. Application of Mechanical Automation Technology in Mechanical Manufacturing

In the current stage of mechanical manufacturing, the application of mechanical automation technology can be said to be quite extensive. On the basis of improving various mechanical manufacturing processes, it also improves the production efficiency of enterprise mechanical manufacturing, which provides a good technical support for the development of modern industrialization.

4.1 Application of Integrated Automation Technology

Computer integrated manufacturing has gone through three development stages: engineering information subsystem, management information subsystem and manufacturing automation subsystem. Integrated automation technology is very important in mechanical manufacturing, and there are more and more requirements for integrated automation technology under the current situation. With the improvement of customers' living standards, the demand for products is constantly increasing, and more and more customers bring more and more different demands, which constantly show a diversified trend. Therefore, the application of integrated automatic technology is very necessary, and it is necessary to make rational use in machining to create products with different needs of different customers, which requires continuous improvement on the basis of integrated technology.

4.2 Application of Automation Technology in Virtualization

In the process of machinery manufacturing, scientific and reasonable application of computer internet technology can continuously improve the precision of machinery manufacturing effectively. For example, the application of drawing technology such as CAD in computer technology can bring great convenience to the process of mechanical manufacturing. With the support of these drawing technologies, real objects and virtual parts can be accurately drawn, and with the support of virtualization technology, errors in these details can be avoided as much as possible in actual production.

4.3 Application of Flexible Automation Technology

With more and more applications of mechanical automation in mechanical manufacturing, the flexible characteristics of mechanical automation technology can be reflected more and more. By analyzing the external environment, the demand of machinery manufacturing and the present situation of the market, we can find that flexible automation technology is used in many production links. This also indicates that flexible automation technology has a close relationship with mechanical automation technology, which can realize automatic technical operation in the process of mechanical production, and can modify the drawings of production design, thus optimizing every

link of mechanical production design to the greatest extent. The application of flexible automation technology fully reflects the creativity of the combination of mechanical technology and electronic technology, and provides a lot of convenient operation for the work of mechanical manufacturing. In addition, with the support of this technology, the automatic monitoring and processing of each working link can be realized in the mechanical manufacturing process, thus greatly improving the flexibility of enterprises in mechanical manufacturing and mechanical production. Simply put, flexible automation technology plays an irreplaceable role in the process of mechanical automation production, which can greatly improve the actual efficiency of mechanical production and promote the development of mechanical production.

4.4 Application of Intelligent Automation Technology

With the continuous progress and development of science and technology, the intelligent level of mechanical automation technology is constantly rising, which promotes the development and innovation of mechanical manufacturing industry to a certain extent. In the manufacturing process of some products, the application of intelligent automation technology greatly reduces the output of human and material resources in the processing, manufacturing and production of products, and reduces the work intensity of workers. Enterprises use intelligent automation technology, which effectively improves the work efficiency of employees in the process of machinery manufacturing, thus further realizing the accurate, safe and efficient operation mode in enterprises, which plays a very important role in promoting the standardized and high-quality benign development of enterprises.

5. Development Trend of Mechanical Automation Technology

5.1 Digitization

Digitization is one of the core contents of the advanced development of manufacturing technology. It is a comprehensive combination of manufacturing technology, computer technology and management science, and its content is very extensive, including digital design, manufacturing and control, etc. From the perspective of equipment manufacturing, all equipment manufacturing parameters are expressed in the form of digital signals.

5.2 Integration

In the mechanical manufacturing industry, the integrated manufacturing industry has been playing an important role. Especially under the background that various mechanical manufacturing enterprises are eager to innovate and reform their production mode, they will integrate the integrated manufacturing technology based on computer foundation and application, and make the whole production process as a whole to carry out production activities. Because the mechanical automation technology is run on the basis of computer, the whole system can be divided into many subsystems, so that many subsystems are independent but interrelated, showing a combined module, which is also convenient for operators to manage. In order to make the manufacturing development of machinery better and perfect, and improve the application and degree of application in mechanical automation technology. Therefore, mechanical automation technology and mechanical manufacturing can complement each other and develop together. It is very practical and reasonable to apply automation integration widely in the field of mechanical manufacturing.

5.3 Intelligentize

The outstanding advantage of mechanical automation technology is intelligence, because the operation of mechanical automation is carried out by computer, so the use of mechanical automation technology can realize man-machine interaction well in the whole manufacturing process, and analyze and process the information feedback of its production, so that mechanical automation technology can be better applied to machining. In today's society, intelligence and convenience have become the urgent needs of people and enterprises, so the implementation of automation in the field of machinery manufacturing is also a manifestation of adapting to the development trend of the times. The emergence and development of mechanical automation has also had a favorable impact on China's mechanical manufacturing industry, making mechanical manufacturing reach a new height. As a brand-new mechanical manufacturing system that can better realize man-machine interaction, the use of mechanical automation technology for mechanical manufacturing can further liberate productivity, reduce the working pressure of workers, enable managers to observe the problems in the process of mechanical production faster, reduce the risk of accidents, and improve the service life of machines and the interests of factories or enterprises.

6. Conclusion

To sum up, with the continuous development and progress of society and science and technology, the use of mechanical automation technology, which can improve the quality and efficiency of products produced by enterprises, is of great significance to the development of enterprises, which can not only ensure the personal safety of workers and less work pressure, but also provide more convenience for residents' daily life. After entering the mechanical automation technology in the field of mechanical manufacturing, it can guarantee the intelligent development of the mechanical manufacturing industry. Comply with the development needs of the times, improve the product quality and core competitiveness of enterprises in production, at the same time, promote the benign development and progress of the whole machinery manufacturing field to a certain extent, enhance their innovative consciousness and realize sustainable development.

References

- [1] Ding Gang. *Application of Mechanical Automation Technology in Mechanical Manufacturing Industry*[J];*Papermaking Equipment & Materials*;2020,49(4):40.
- [2] Zhou Wen. *Brief Analysis of the Application of Automation Technology in Mechanical Design and Manufacture*[J];*China Southern Agricultural Machinery*;2020,51(11):126.
- [3] Wang Junqiang. *Research on the Application of Inspection Technology in Mechanical Automation Manufacturing System*[J];*Internal Combustion Engine & Parts*;2020(11):170-171.