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An Analysis of Modern Machinery Manufacturing Technology and Precision Processing Technology

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Abstract

Nowadays, China's machinery manufacturing industry is developing rapidly, machinery production technology and precision processing technology is an important driving force for the development of machinery manufacturing industry. If machinery enterprises want to improve their own competitive strength, they must do a good job in the comprehensive research of machinery manufacturing technology and precision processing technology, according to the problems existing in the current machinery manufacturing to play the technical advantages, improve the economic benefits of enterprises. Modern machinery manufacturing industry and precision machining technology has a systematic, relevant, global characteristics, this paper mainly from the characteristics of modern machinery manufacturing technology and precision machining technology analysis, introduce machinery manufacturing technology and precision machining technology, discuss the optimization of machinery manufacturing technology and precision machining technology related strategies.

Keywords

Mechanical manufacturing process; Precision machining technology; Modern machinery

Social development is changing with each passing day, which has also put forward higher requirements for various industries. The development of the manufacturing machinery industry must break through technical bottlenecks and meet the market's higher technical needs. Manufacturing machinery technology and precision processing technology are technical means that machinery manufacturing companies must optimize. Only by optimizing technology can they gain momentum for corporate development. However, the current development of the machinery industry is also facing severe challenges. It is necessary to break through the limitations of traditional machinery production technology and create the cornerstone for the long-term development of the machinery processing industry.

1. Characteristics of modern mechanical manufacturing technology and precision processing technology

The characteristics of modern mechanical manufacturing technology and precision machining technology are relatively obvious, as shown in Figure 1, which are mainly reflected in the aspects of systematization, technical relevance, efficiency, and globalization.

1.1 Systematic

In the machinery manufacturing industry, both traditional machinery manufacturing processes and precision machining technologies reflect the characteristics of systematization. The application of fine machining technology can not

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only improve the accuracy of products, but also improve the quality of products and optimize the benefits of the whole machine. The integration of modern machinery production processes and traditional fine machining technologies strengthens the characteristics of precision and further improves the quality of designed products.

1.2 Technical relevance

Mechanical manufacturing technology and fine processing technology are closely related, not only in the practical production process, but also in the research and development stage of mechanical products. If you want to ensure that mechanical manufacturing products are in a relatively stable working state, you must closely combine mechanical manufacturing technology and fine processing technology to achieve stable operation of the product.

1.3 Efficiency

Modern mechanical manufacturing technology has broken through the limitations of traditional mechanical manufacturing technology and embodies the characteristics of high efficiency. The current mechanical manufacturing technology is relatively modern, liberating human resources, effectively avoiding errors in the manual production process, and improving the level of manufacturing refinement. Modern mechanical manufacturing technology has high requirements for materials and equipment, and it is necessary to reasonably configure various hardware resources to achieve high efficiency in mechanical processing.

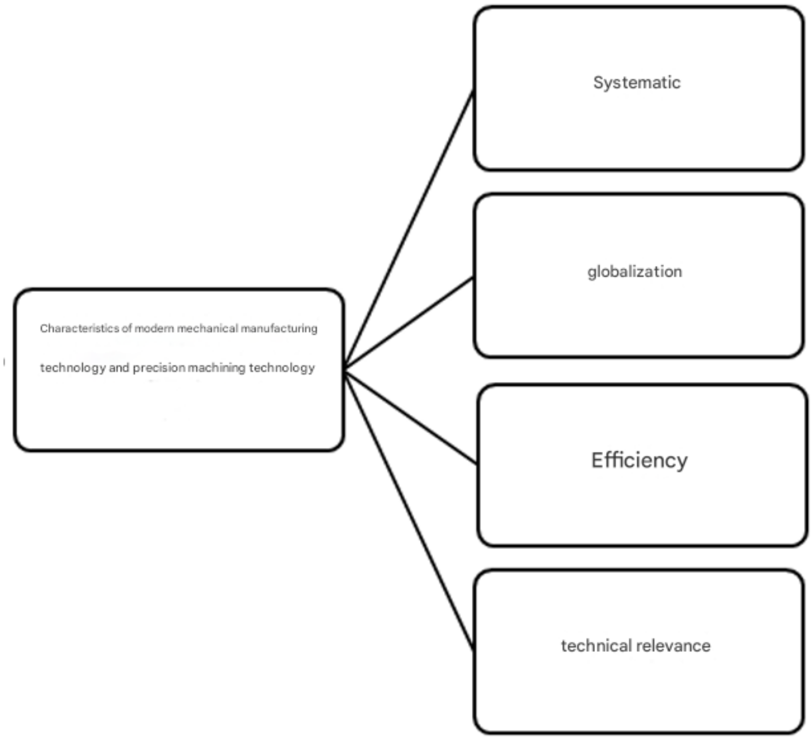

Figure 1. Characteristics of modern mechanical manufacturing technology and precision machining technology.

1.4 Globalization

With the opening of the international market, the current development of the machinery manufacturing industry is facing not only the pressure of domestic market competition, but also the need to reasonably respond to the greater challenges brought by the international market. Continuously improve the quality of its own machinery products, so as to strive for a larger share of the international market, export higher quality machinery products to the world, and promote the modernization of China. Based on the global market, machinery manufacturing enterprises must comprehensively analyze machinery manufacturing processes and precision machining technologies, master the latest scientific and technological forces, and thus improve the modernization level of machinery manufacturing [1].

2. Types of modern mechanical manufacturing technology and precision machining technology

2.1 Basic types of modern mechanical manufacturing processes

The basic types of modern mechanical manufacturing processes are shown in Figure 2, including resistance welding, gas shielded welding, and submerged arc welding.

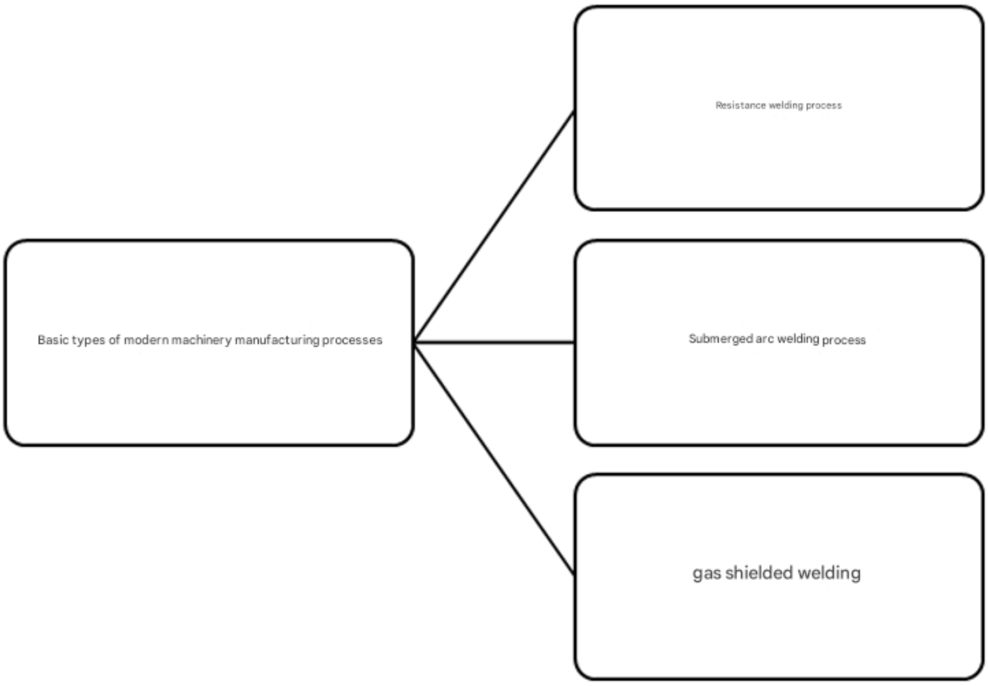

Figure 2. Schematic diagram of basic types of modern mechanical manufacturing processes.

2.1.1 Resistance welding process

The resistance welding process uses motor equipment to apply pressure to the workpiece, thereby achieving welding of the workpiece. During the welding process, welding is performed with the help of resistance heat released by the current. It is not limited to the use of materials in traditional welding methods, reduces the media cost investment of filler metals such as welding wires and electrodes, and reasonably controls the cost of mechanical manufacturing. At the same time, the operation method of the resistance welding process is relatively simple, which is convenient for the promotion and popularization of welding automation. The resistance welding process is a relatively common type of welding process. Although it has advantages such as simple operation, it is difficult to effectively guarantee product quality due to the complex structure of the resistance welding equipment.

2.1.2 Gas shielded welding

Gas shielded welding is also a common welding process. It mainly uses some protective gas as the arc medium for welding. This welding process is highly professional. If the protective gas is missing during the welding process, the welding effect is difficult to guarantee. At the same time, if the protective gas is not properly managed, the protective gas will come into contact with harmful gases in the air, which is likely to produce adverse chemical reactions. Carbon dioxide gas shielded welding is one of the types of gas shielded welding. Carbon dioxide is selected as the protective gas. The heat comes from the arc. Carbon dioxide is used to isolate the air and create a better arc combustion environment. Carbon dioxide, as an isolation gas, not only has a relatively stable property, but also can reasonably control the welding cost. When welding, it is also necessary to properly handle the details and select the appropriate welding method according to the thickness of the welding plate [2]. If the thickness of the welding plate is less than 1.2 mm, it is necessary to adopt the double-sided single-pass welding method of the I-shaped groove to carry out the welding operation. During the welding process, the welding gun should be swung horizontally to ensure the smoothness of the weld. During fillet welding, the weld seam should be properly handled. If the weld seam is 8 mm, horizontal movement can be used. If the weld seam is 6 mm, linear movement is required. Wind should be avoided during the operation to achieve a more ideal welding effect.

2.1.3 Submerged arc welding process

The submerged arc welding process is to burn the arc under the flux layer and use the heat released by the burning to perform arc welding. There are two types of atmosphere semi-automatic and automatic. In the welding of steel structure products, the submerged arc welding process is widely used, showing the advantages of high stability, no pollution, and high efficiency.

2.2 Basic types of precision machining technology

2.2.1 Nanotechnology

Nanotechnology has a high level of research interest and has important application value in the development of various industries. The research of nanotechnology involves the principles of physics and modern advanced engineering technology. As the research of nanotechnology becomes more advanced and mature, its application is becoming more and more extensive, such as the engraving of finished products in the machinery manufacturing industry. Nanotechnology represents a new height and a new stage in the development of the machinery manufacturing industry to a certain extent. It is necessary to continuously improve and innovate the application of nanotechnology in the machinery manufacturing industry [3].

2.2.2 Precision cutting technology

Precision cutting technology uses tools to cut metals, which has the advantages of high cutting accuracy and smoothness. However, attention should be paid to detail processing in specific cutting. First of all, the accuracy of the cutting machine should be improved, and the temperature of the tools should be properly controlled to avoid deformation of the tool due to excessive temperature. In addition, environmental changes during the cutting process should be avoided. Interference factors such as vibration can easily reduce the cutting accuracy of the product.

2.2.3 Precision grinding process

Precision grinding process is the basic step for mechanical precision processing, and it is also very important. Precision grinding process can achieve higher grinding accuracy. Specifically, the ultra-precision grinding process uses atomic-level grinding and polishing technology to meet people's high requirements for substrate silicon wafers. When applying a precision grinding process, the processing pressure is adjusted based on the actual use of the item. Reasonably adjust the parameters during the grinding process to improve the integration between the processing original parts and the equipment. Precision grinding technology has a significant application in cast iron, steel manufacturing and other processes, and can control the overall deviation value within 0.4 μm [4].

3. The significance of the integration of modern machinery manufacturing and precision processing technology

In the current new technology era, the integration of mechanical manufacturing and precision machining technology has been assisted by science and technology, and it is more likely to achieve a more ideal integration effect. The role of precision machining technology depends on high-precision equipment, which is inseparable from the process design software with high technological content. Therefore, in the manufacturing of modern mechanical equipment, it is necessary to actively introduce new manufacturing processes and combine precision machining technology to produce the required equipment. Traditional mechanical manufacturing mainly relies on human resource investment, and the precision of the mechanical equipment produced is relatively low. In the modern mechanical manufacturing industry, automation and informationization are prominent. For mechanical manufacturing companies, improving the level of production automation symbolizes the improvement of competitive strength. It is necessary to actively promote the integration of modern mechanical manufacturing and precision machining technology, so as to improve the production quality of corporate products and reasonably control production costs.

4. Discussion on optimization strategies to improve the application level of modern mechanical manufacturing technology and precision machining technology

4.1 Ensure technical uniformity

Modern mechanical manufacturing technology and precision machining technology have a strong correlation, which is reflected in the entire process of mechanical manufacturing, including design, production, testing and other links.

Only by reasonably coordinating mechanical manufacturing technology and precision machining technology can the production quality of each link be effectively guaranteed. Mechanical manufacturing enterprises need to formulate reasonable production design plans according to actual conditions, configure targeted machining technologies, make overall plans, strengthen the top-level design of technical management, and promote the integration and unification of technological development, so as to achieve life goals and production technology optimization goals [5].

4.2 Ensure the quality of materials

Modern machinery manufacturing must be based on high-quality processing materials. When selecting materials, enterprises need to consider production goals, not only to ensure product quality, but also to control production costs, to achieve a close combination of high-quality materials and advanced technologies, and to improve the production level of their own enterprises. In the current pursuit of ecological environmental protection, machinery manufacturing enterprises should also choose materials with less pollution during production, reduce the energy consumption of enterprises, meet the current sustainable development requirements, and promote the long-term development of enterprises.

5. Conclusion

The characteristics of modern machinery manufacturing technology and precision machining technology are exactly what the current era requires. The application of artificial intelligence technology and automation technology in the machinery manufacturing industry has effectively improved the efficiency and quality of machinery production, reflecting the determination and emerging of enterprises' intelligent reforms, improving the market competitiveness of enterprises, and playing a positive role in promoting the sustainable development of the machinery manufacturing industry.

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