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Research on the Application of Automation Technology in the Design and Manufacture of Mechanical Equipment

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Abstract: Under the background of the information technology era, the related work of mechanical equipment design and manufacturing needs to be backed by automation technology, so as to achieve more efficient and scientific development. The scientific application of automation technology can greatly reduce the input resources and costs in the process of designing and manufacturing mechanical equipment, and comprehensively improve the development efficiency of mechanical equipment and manufacturing. In view of this, this paper in the process of research, firstly, a brief overview of the content of automation technology, secondly, put forward the application of automation technology in the design and manufacturing of mechanical equipment, for reference only.

Keywords: Automation technology; Mechanical equipment; Design and manufacture

Introduction

For China's manufacturing and economic development, the value of mechanical design and manufacturing is extremely prominent, the application and rise of automation technology can continue to strengthen the overall economic output value of the machinery manufacturing industry, not only to achieve the purpose of reducing material and labor costs, but also to meet the strategic needs of green environmental protection, helpful for the sustainable development of the mechanical design and manufacturing industry. The automation technology that people come into contact with and understand is not only a comprehensive technical field involving theoretical knowledge and operational skills, but also a key technique that people need to attach great importance to and actively use. Only by persistently promoting the deep application of automation technology in the mechanical design and manufacturing process, At the same time, continuous innovation research and development of automation technology can bring more significant economic benefits to China's machinery manufacturing industry, so as to further promote the steady development of China's economic construction, which has theoretical significance for the comprehensive application of automation technology, and has guiding significance for the innovation of mechanical equipment design and manufacturing.

1. Introduction of automation technology

In essence, the so-called automation technology mainly refers to the pre-programmed program as the premise, on the basis of no human intervention, the mechanical equipment can control and operate. This technology can promote all or part of the manual operation can be replaced by machinery and equipment, not only can effectively ensure work efficiency and work accuracy, but also can greatly release human resources, thereby essentially accelerating the innovation and development of the industry. Automation technology that tends to be perfected and sound has an increasingly wide range of applications in the current development process, which can not only create value for residents' life fields such as agriculture, transportation and medical care, but also expand the proportion of applications in national core industries such as industry and military [1]. Therefore, on a certain level, automation technology is the main driving force in the current process of comprehensive development of society. At present, the automation technology implemented in various industries in China covers the stages of information processing, automatic detection, operation control and analysis and judgment. It can establish a close relationship with hydraulic pressure technology, systems engineering, computer technology and electronics, among which the most prominent aspect is industrial robots.

2. Application of automation technology in the design and manufacture of mechanical equipment

2.1 Application integrated system

With the help of automation technology, a diversified manufacturing system can be promoted to establish a collaborative relationship, so as to cooperate in a more scientific and correct way to complete the manufacturing system of each process, and then achieve the production and processing of complex mechanical products. In the specific production process, optimize all aspects of mechanical design and manufacturing, optimize the overall process and effect of manufacturing. In the process of the implementation of mechanical equipment design and

manufacturing, the microcomputer integrated manufacturing system can be used to comprehensively manage the whole process of design and production, and through the analysis and integration of automation systems at various stages, the framework becomes a complete and new production process, which can not only comprehensively organize the mechanical equipment design and manufacturing, mechanical product development and market research data. In addition, it can perfectly link up a series of later work such as business sales, operation management, mechanical equipment design and manufacturing, so as to maintain the consistency of various manufacturing, information, operation and other management contents in the whole process of production [2]. For example, in the process of mechanical equipment design and manufacturing, the overall control process of its production line, the core content of which is PLC, can not only manage and control the overall operation system, but also issue relevant instructions in combination with the actual situation, but electrical equipment, CNC machine tools and industrial robots need to complete the specified input and output according to the established information. Thus, the corresponding equipment is mobilized to enable it to complete the required practical operation.

2.2 Intelligent application

With the rapid development of intelligence in China's modern science and technology, the automation technology involved in the design and manufacturing of mechanical equipment also needs to gradually develop towards the trend of intelligence, in essence to achieve the comprehensive development of collaborative intelligence and automation technology, and finally achieve a unified management and development system of artificial intelligence automation. Only in this way can we promote the long-term development of the mechanical equipment design and manufacturing industry, and bring more abundant economic benefits and huge social value to the enterprises. It should be noted that whether it is mechanical equipment manufacturing technology, intelligent technology or automation technology, it does not exist independently in the process of practical implementation, and it is necessary to construct a complete mechanical equipment design and manufacturing system through a complementary way to ensure the smooth operation of mechanical equipment process and excellent performance of product quality. In addition, the scientific application of intelligent technology in the design and manufacturing of mechanical equipment can also effectively reduce labor costs and production cycles, and can improve the overall quality of products as a premise. Take Lingong Group as an example, the company has introduced intelligent simulation optimization technology in cooperation with robot and intelligent manufacturing solution providers such as sinsun. The technology is applied to product design including 3D modeling, mechanical analysis, thermal analysis, process planning and other production scenarios. Through simulation, engineers can test and optimize products in a full range of virtual environments, and find potential design defects and process problems in time, thus ensuring the stability of product quality. And shorten the product design cycle and trial production time, improve production efficiency, further reduce the consumption of raw materials and energy to reduce production costs.

2.3 Automatic detection operation

With the perfect development of automation technology, the production efficiency of mechanical manufacturing is also constantly improving and improving, and the assembly line journey in the design and manufacturing of mechanical equipment is not only long, but also the overall production process is complex and changeable. Different links and processes will present diversified problems such as operation, production and control [3]. Therefore, enterprises engaged in the design and manufacturing of mechanical equipment are also constantly improving the requirements of testing work, but in the manufacturing of mechanical equipment, the efficiency, speed and accuracy of manual testing can not be matched with the requirements of enterprises. Therefore, the application of automation technology in the testing work can improve the efficiency of all aspects. So as to further protect the stable development of mechanical equipment design and manufacturing industry.

2.4 Core technology development and application

The continuous development of intelligence and science and technology has promoted the innovation and development of machinery and equipment manufacturing and design industry, and the development of core technologies that can meet the development needs of enterprises themselves has important value for improving the competition level, automation level and industry influence of machinery and equipment design and manufacturing, and can also promote the healthy and stable development of machinery and equipment manufacturing enterprises.

First, strengthening the research of core technology needs the support and attention of enterprise leaders, mechanical equipment design and manufacturing enterprises can design a complete research and management system, and vigorously support its information, manpower, economy and technology in economic and policy aspects, to ensure that the research and development of core technology can be worry free; Second, the architecture of the core technology center. To provide excellent basic development space for mechanical equipment design and manufacturing, the operation needs to be based on the actual development trend of the enterprise, the purchase and installation of advanced inspection, production, transportation equipment and facilities, and the construction of advanced workshops and technology research and development office buildings.

2.5 Mechanical equipment virtual model design application

Nowadays, the technology of using virtual simulation to build mechanical equipment design model is becoming more and more popular in its industry. Engineering practitioners can use the power of modern technology to create realistic three-dimensional mechanical equipment models. These models enable people to observe the structural characteristics of different parts of the mechanical system in a more clear and intuitive way, and identify the detailed parameters of the corresponding positions in the model, so as to realize the three-dimensional design drawing display, but also to ensure the accuracy of the structural parameters. In addition, the virtual simulation of mechanical equipment design model technology also helps to greatly reduce the mechanical equipment design process of the labor cost. At present, some enterprises have adopted digital, intelligent and automated BIM design models in the mechanical equipment design process.

3. Conclusion

All in all, in the current era of the sustainable development of science and technology, the application of automation technology in the design and manufacturing of mechanical equipment can bring earth-shaking changes to the innovation and development of the industry, which can reduce labor costs, optimize information resources, and greatly improve the efficiency of production and manufacturing, but also reduce the production pollution and waste of resources in the manufacturing process of mechanical equipment. Thus creating greater economic benefits and social value for the development of mechanical equipment design and manufacturing industry, and promoting the healthy and sustainable development of the industry.

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