Application Analysis of Energy Saving Design Concept Based on Mechanical Manufacturing and Automation

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Abstract: With the rapid development of China's economy, the machinery manufacturing and automation industries have also achieved fruitful results, and industrial production efficiency has been significantly improved. With the accelerating pace of industry, the related applications of machinery manufacturing and automation have become more and more, which has greatly accelerated the demand for energy consumption in various industries, and many non-renewable resources are facing an increasingly depleted status quo. Therefore, in order to reduce the consumption of related energy without affecting the pace of industrial development, some more advanced energy-saving design concepts are needed. Here, this paper mainly analyzes the energy-saving design concept based on mechanical manufacturing and automation, and hopes to provide some reference and thinking for related research and application.

1. Introduction

Along with the rapid development of the industrial era, a series of negative problems have arisen, such as environmental pollution, population expansion and greenhouse effect. In particular, the rapid development of the machinery manufacturing and automation industries has brought about a great impact on the ecological environment and energy consumption. At this time, the concept of energy-saving and environmental protection design is very important. In the related applications of machinery manufacturing and automation, the effective use of energy-saving and environmentally-friendly design can maximize the utilization of resources, and the integration and optimization of various resources also greatly alleviate the current energy shortage crisis, which is also very concerned and the link of attention. Therefore, in the future economic development trend, we not only need to pay attention to the development speed of related manufacturing industries, but also integrate and apply environmental protection design concepts, try our best to reduce energy consumption, energy conservation and environmental protection, protect the ecological environment, and rationally use ecological resources. Wait truly let the economy and manufacturing industry achieve sustainable and healthy development [1].

2. Overview of Machinery Manufacturing and Automation

Mechanical manufacturing and automation belong to a new type of production process, covering many advanced engineering technologies such as microelectronics technology, PLC programming technology, mechanical technology, computer technology and single chip microcomputer, which can effectively improve the overall production efficiency of machinery and improve machinery. The quality of production, which plays a decisive role in the development of contemporary industry, its main features are as follows: 1 high safety factor, compared to the traditional mechanical manufacturing industry, contemporary mechanical manufacturing and automation technology It is more secure and can be automated and intelligently produced in many cases [2]. For example, in some factories, after the failure of the mechanical equipment of the production line, the mechanical equipment will automatically suspend the operation according to the internal programming procedure, and the internal program will be called to handle the related faults, effectively avoiding various safety accidents and greatly improving the production. Safety; 2 the scope of application is more extensive, many traditional mechanical manufacturing applications are very limited, generally

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in the field of heavy industry, and contemporary mechanical manufacturing and automation gradually penetrate into various sectors of society, such as health care, In the electronics, computer and other industries, this has provided more power and space for innovation and development in various industries. The scope of application has become very wide. 3 The appearance is more compact and compact, and many traditional machines are relatively large and clumsy. The mechanical appearance of manufacturing and automated manufacturing can be truly miniaturized, and the performance is perfect while being light and simple, which is more convenient when installed on site [3].

3. Analysis of the Development Status of Machinery Manufacturing and Automation and Future Trend

At present, the development of machinery manufacturing and automation technology is gradually accelerating, which has greatly promoted the related generation and development of China's industry. Its future development trend also directly affects the relevant manufacturing industry and the development direction of social economy. . In recent years, along with the rapid development of computer technology, the development of machinery manufacturing and automation has gradually demonstrated its advantages such as fast speed, high safety factor and simple operation. It is also effective in the rapid development of the machinery manufacturing industry. The overall sales and quality of the equipment are guaranteed and widely used in various industry sectors.

But things are often double-sided. China's machinery manufacturing and automation are still at a stage of primary development. Our research on many knowledge and theories is not deep enough. Compared with some developed countries, it is still In the case of backwardness, the gap is large. Moreover, it is still not mature enough for the application of some sophisticated technology. There are still many problems in the process of application; in many cases, the final product quality cannot meet the high requirements because the equipment is not perfect. Therefore, we should learn more advanced technologies and experiences from abroad, thoroughly digest and absorb our own knowledge reserves, and then carry out innovative research in light of China's actual conditions, constantly improve our technical capabilities and improve the overall quality of equipment [4]. .

In the actual process of mechanical manufacturing, the integration of automation technology greatly simplifies the related processes of mechanical manufacturing, effectively improves the efficiency of industrial development and the efficiency of equipment, and ensures the safety performance of equipment. At the same time, in the context of the rapid development of the machinery manufacturing industry, the development of machinery manufacturing and automation is also entering the direction of international development, which has played a very important guiding role in strengthening international exchanges and cooperation [5]. In order to better establish a foothold in the international development wave, we must strengthen research on mechanical manufacturing and automation, continuously optimize and improve our technical level, improve the overall design quality, and integrate the latest energy-saving and environmentally friendly design concepts.

4. The Application Analysis of Energy-Saving Design Concepts in Mechanical Manufacturing and Automation

As a very important design concept in today's society, energy-saving design concept is getting more and more people's attention and research. It also plays a leading position in the current industrial development field, which is of great significance for mitigating energy consumption. By applying the energy-saving design concept in the entire mechanical industry production process, the energy consumption of each link of the mechanical industry production can be effectively reduced. Therefore, in the current machinery manufacturing and automation, we should pay close attention to material selection, process design, production and processing, and effectively achieve the core objectives of energy saving and sustainable development [6].

When designing mechanical materials, the energy-saving design concept should be implemented. First, try to select some materials that can be recycled, recycled, and reused. This can make the industrial waste produced by the production - waste gas, waste water and waste in quantity. It is effectively reduced, which in turn reduces the damage caused by industrial production to the natural environment. Especially when selecting mechanical parts and materials, try to choose non-toxic materials that can be recycled and disassembled. On the one hand, it can reduce energy consumption on the other hand, it can prevent a large amount of waste of industrial machinery materials. Secondly, the choice of materials should adhere to the principle of long life cycle, low weight, low energy consumption and low price, to minimize the energy consumption caused by machinery manufacturing. Third, choose materials with low pollution coefficient, and do not use materials containing toxic components such as freon, asbestos and chlorine-containing rubber to prevent serious environmental pollution caused by machinery manufacturing and automation [7]. Fourth, for materials with low quality, high price and high pollution coefficient, energy-saving and emission-reducing materials should be gradually replaced. In short, through the effective implementation of energy-saving design concepts in the selection, use, maintenance of mechanical materials and other aspects, and effectively reduce energy consumption and ecological pollution.

In mechanical manufacturing and automation, optimizing the mechanical manufacturing and automation structure design by applying energy-saving design concepts is a basic and important content. Only by implementing the energy-saving design concept in the early stage can we ensure that the entire process of mechanical manufacturing implements the effect of energy-saving design. Applying the energy-saving design concept to optimize the mechanical manufacturing and automation structure design, mainly from the following points:

First, choose a low-consumption, low-pollution, low-hazard mechanical manufacturing engine. The engine is like the heart of mechanical manufacturing, which inevitably emits noise, waste, and exhaust gas during operation, which causes a certain degree of damage to the environment. Therefore, in order to implement the energy-saving design concept, when selecting the engine, we should adhere to the five basic principles of “low consumption, low pollution, low emission, low noise, high efficiency“, which can effectively reduce the damage caused by mechanical manufacturing. And promote the sustainable development of machinery manufacturing and automation [8].

Second, optimize the system structure design. In mechanical manufacturing, the hydraulic system occupies a critical position, and the operation of the hydraulic system is closely related to the cleanliness of the transmission fluid. In the design of the hydraulic system, the designer should optimize the design of the hydraulic system components, degreasing and operation process based on the energy-saving design concept. Effectively controlling the components of the hydraulic system to prevent damage, on the one hand, it is beneficial to extend the life cycle of the hydraulic components, and on the other hand, it is beneficial to reduce the probability of failure of the hydraulic system. Improve the utilization rate of hydraulic oil to prevent damage to the ecological environment, and help to achieve the goal of energy saving and environmental protection by effectively controlling the consumption of hydraulic oil. Second, optimize the design of the anti-leakage system. The hydraulic system often leaks during operation, which not only makes the hydraulic oil leak waste, but also causes damage to the environment. Therefore, when designing the anti-leakage system, the designer should fully consider the factors that will cause leakage of the hydraulic system, and optimize the design to improve the utilization of hydraulic oil and prevent leakage.

Third, optimize the machinery manufacturing cab. In the mechanical manufacturing process, the cab is an important place for the operation of construction machinery. Applying the energy-saving design concept to optimize the machinery manufacturing cab and design a safe, environmentally friendly and efficient operating cab can not only optimize the mechanical manufacturing efficiency, but also an important guarantee for the safety of the life and property of the driver. When designing a mechanical manufacturing cab, the designer should consider the space design, functional design, radiation protection and work efficiency to create a cab with a strong sealing effect. In addition, in

order to reduce the degree of radiation, the cab glass can be selected from materials that are resistant to ultraviolet rays and radiation. In addition, in order to better protect the driver's personal safety, operational safety, and improve the driver's work comfort, handles, seats, etc. should be reasonably designed based on ergonomic theory, for example, to provide adjusTable functions when designing seats. In this way, the driver can select a seat posture suiTable for his or her own physiological characteristics; when designing the handle, it is possible to design a single-purpose handle that is integrated into one body, so that the driver can operate more easily. The application of the energy-saving design concept to optimize the cab structure not only improves the comfort of the driver, but also greatly enhances the automation operation efficiency.

The application of energy-saving design concepts in mechanical manufacturing and automation design is not only reflected in material selection and structural design, but also in optimizing manufacturing processes. By applying the energy-saving design concept and optimizing the mechanical manufacturing products, it is also possible to effectively prevent the product from being wasted energy, and to achieve energy conservation and environmental protection by improving resource utilization. In addition, industrial production technology should be optimized. Different production processes also have different production processes, and there are also great differences in energy consumption. For example, due to the waiting time between processes, the processing time is different, the type and shape of the blank will affect the processing of the stepped shaft parts, and the energy consumption in the production process is affected by the specific process, so in the production when the parts are used, the machining allowance should be reasonably reduced. By optimizing the production process, the energy waste caused by the overall program operation can be effectively reduced, and the economic benefits can be improved. Reasonable setting of process parameters such as machining allowance, focusing on clearing various blank energy consumption, the arrangement of production process directly affects the processing time, so the processing time should also be optimized to prevent energy waste due to time problems, which also requires specific In the production process, we must do a good job in overall planning and scientifically and rationally arrange the processes.

5. Conclusion

In summary, the energy-saving design concept belongs to the emerging design concept. In view of the current situation of serious waste and excessive energy consumption in the field of mechanical manufacturing and automation, the concept of energy-saving design is integrated from the source of design, and more From the aspects of energy conservation, materials, structure and other aspects, the design and application of machinery manufacturing and automation technology have become more efficient, energy-saving and more reliable, laying a good foundation for the development of China's industry.

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