

Analysis on the application strategy of energy conservation and environmental protection concept in construction machinery automation

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Abstract: *With the rapid development of economic level and science and technology, although the field of construction machinery automation has achieved certain development, but there are still many practical problems. Due to the large amount of energy consumed during the operation of construction machinery, certain waste materials are produced, which will affect the natural environment and living environment of our country to a great extent. Therefore, the introduction of the concept of energy conservation and environmental protection into the automation of construction machinery will highlight the important value significance and long-term impact. This paper mainly analyzes the application strategy of energy conservation and environmental protection concept in construction machinery automation.*

Keywords: *Construction machinery automation; Energy conservation and environmental protection; Realistic significance; The application strategy*

1. Introduction

Sustainable development strategy as a major national strategy and policy deployment, is profoundly affecting people's production, work and life, energy conservation and environmental protection as the key to sustainable development, has a very close connection with all walks of life. Construction machinery automation as an important category of China's industrial sector, should take the initiative to integrate into the concept of energy conservation and environmental protection, consciously shoulder the industry responsibility of energy conservation and emission reduction, actively practice carbon peak, carbon neutral industry task, consciously complete the responsibility of emission reduction stipulated by the Party Central Committee and The State Council.

2. Energy conservation and environmental protection requirements in construction machinery automation

Construction machinery automation industry of energy conservation and environmental protection concept mainly focuses on the selection of environmental protection materials and mechanical equipment design. First of all, from the point of view of material selection, it should follow the requirements of energy conservation, high efficiency and environmental protection, that is, through the minimum energy consumption can maximize external work while generating the least waste. At the same time, the selection of materials should follow the principle of saving and efficiency, and choose recycled materials and composite materials as far as possible to reduce the utilization rate of precious metals and rare metals. At the same time, because some materials have specific disposal process and preservation specifications, they need to be stored under extremely strict storage conditions, which makes the loss rate of special materials tend to be higher. Therefore, in the selection of materials, non-metallic materials and plastic materials should be selected as far as possible, and through the corresponding technology to make the material easy to replace, recycling, only in this way to make the construction machinery meet the requirements of energy conservation and environmental protection, and further drive the recycling and harmless environmental protection.^[1]

From the point of view of the finished design of construction machinery automation, machinery should also meet the requirements of energy conservation and environmental protection. First of all, in terms of product quality, the product should be used for a long time, replaced slowly, and can be effectively promoted and applied between different regions. Only when the mechanical achievements

have universal popularization, can the replacement frequency of products be effectively reduced, and the use efficiency and frequency of resources be further improved. From the general law of construction machinery, the selection of lighter quality machinery can effectively reduce the load load formed by production or work, enhance the efficiency and ability of mechanical external work, can effectively reduce the generation of useless work, further improve the efficiency of fuel and resources, achieve good energy conservation and environmental protection effect. At the same time, the parts and the selection of process, also should adopt standardized process or processes, in order to further improve the matching degree between different parts, reduce invalid due to different standards and wear, effectively to ensure that the equipment has good performance and quality, to ensure that the energy conservation and environmental protection concept introduction and application of automation equipment, mechanical engineering to achieve the purpose of energy conservation and environmental protection.

3. The practical significance of introducing energy conservation and environmental protection concept into construction machinery automation

With the continuous enrichment of industrial categories and technological level of continuous progress, construction machinery automation design is becoming an effective power to promote productivity progress. Nowadays, the pattern of productivity development has been driven by science and technology, and the contribution ratio of industrial manufacturing to productivity is also increasing year by year. As an important basis of industrial manufacturing, automation control technology and construction machinery and equipment play an important role in improving industrial production efficiency, reducing labor cost burden, optimizing production process flow, reducing the application of raw materials and manufacturing costs.^[2] An isothermal mechanical equipment need great support power, and power source is still mainly fire, electricity and oil, because of automation technology in China started late, there is a lot of technology is not mature and perfect, for the use of resources and energy efficiency is not high, still it is to a certain extent, the energy consumption and environmental pollution problems. At the same time, due to the structural contradiction of China's energy reserves, it also aggravates the exhaustion of energy and mineral resources in a certain sense. Therefore, the introduction of energy conservation and environmental protection concepts in the field of construction machinery automation can effectively change people's logic, thinking and concepts from the ideological point of view, and further create a green and energy-saving industry atmosphere in the field of construction machinery.

The reform of ideas often brings practical innovation to a certain extent. In the future, with the further promotion of energy conservation and environmental protection concept and wide application of mechanical industrial automation equipment design will pay more attention to environmental protection, polluting the entropy value and effective utilization of energy mineral resources will become the important measure of a product quality and the function indexes, further reduce pollution of the environment, promote the construction of green, healthy, beautiful China.^[3] At the same time, it can also effectively drive the upgrading of China's industrial machinery automation industry, further promote the structural adjustment of the industry in the field of construction machinery automation, and drive the progress of China's productivity level and technology.

4. Application strategy of energy conservation and environmental protection concept in construction machinery automation

The application strategy of energy conservation and environmental protection concept in construction machinery automation can be explored and practice from reasonable selection of engines according to the actual situation, continuous optimization of the process flow of construction machinery, enhancement of anti-leakage treatment of mechanical hydraulic system and attention to the maintenance and updating of existing machinery equipment.

4.1. Choose the engine reasonably according to the actual situation

As the core functional parts of automation equipment, engine plays an important role in external work. However, due to technical limitations, the existing engine works by converting internal energy into kinetic energy, that is, by burning fossil energy to obtain internal energy, and through a series of energy conversion of the engine to convert the internal energy generated by fossil energy combustion into kinetic energy, so as to drive the equipment to work. At present, the engine of mechanical equipment is generally

multi-stroke, which requires internal energy to be converted into kinetic energy through multiple processes.^[4] Therefore, in the selection of engines, we should choose those engines with fewer strokes as far as possible to reduce internal energy loss caused by cumbersome processes, thus improving the use efficiency of fossil energy and reducing environmental pollution caused by fossil energy combustion. At the same time, the displacement of equipment also affects the working efficiency of the engine to a certain extent. The selection of engines with different displacement must be combined with the actual situation. Some industries are large in scale, requiring large displacement engines to drive; In some small industries, if the engine with large displacement is also used to drive, the service life of the engine will not only be reduced, but also a large amount of waste gas will be generated due to the lack of fossil energy combustion to a certain extent, which is not conducive to environmental protection.

4.2. Continuously optimize the process flow of construction machinery

In the field of engineering machinery automation, want to work in effective energy conservation and environmental protection concepts, further improve the efficiency of resource utilization, reduce because of engineering machinery production caused by environmental pollution and resource waste, it is necessary to fundamentally, and combining with the situation to optimize the industrial engineering machinery process flow, setting up reasonable manufacturing process. Due to the connection between different processes, this will also cause a certain amount of heat and internal energy waste. When the process setting is reasonable, the time difference between different processes will be reduced to the minimum, and more work times can be completed in the same working time, avoiding the waste of resources caused by process connection. When the process setting is not reasonable, it will not only waste energy and resources due to process connection, but also lead to idle human resources. At the same time, the equipment cannot work effectively due to process convergence, which will also cause insufficient combustion of fossil energy to a certain extent, resulting in a large amount of waste heat and waste residue. Therefore, it is necessary to reasonably arrange the process connection between different processes, and arrange the process of different links, different departments and different processes as a whole.^[5]

4.3. Enhance the anti-leakage treatment of mechanical hydraulic system

As the core part of mechanical equipment, the rational use of mechanical hydraulic system can effectively enhance the system stability of equipment. However, due to technical problems and precision errors, part of the hydraulic system may appear in the process of working and oil leakage. Once leakage occurs, not only can the hydraulic system not work properly, but the whole project can be delayed. At the same time, it will reduce the stability of the whole system engineering, resulting in the waste of resources.^[6] Therefore, it is necessary to combine the basic situation and performance characteristics of the whole system, through taking certain measures to strengthen the sealing and stability of the whole equipment, in order to reduce the oil leakage caused by the work, to ensure the efficient operation and stable operation of the equipment. In addition, in addition to strengthen the sealing device, but also from the running environment of equipment, through isolation easy accumulation of material such as dust, to build a good environment of equipment operation, reduce the operating pressure, further reducing equipment load, prolong the service life of the hydraulic system, thereby reducing from the updated resource depletion and environmental waste.

4.4. Pay attention to the maintenance and update of existing mechanical equipment

As the major fixed assets of the whole project, mechanical equipment has an important impact on the schedule of the whole project. If you do not pay attention to the daily maintenance and update of mechanical equipment, then when the mechanical equipment damage or failure is forced to choose replacement. This will not only cause delays on the construction period, but also cause a waste of resources. Through the daily maintenance of mechanical equipment, can minimize the failure of equipment in the process of operation, but also can effectively prolong the service life of mechanical equipment, reduce the frequency of equipment replacement, the limited resources into production recycling, forming a good production order. At the same time, the maintenance and update of equipment can also effectively make the production equipment better adapt to the production reality and improve production efficiency.^[7] By optimizing and upgrading related production facilities, the energy consumption required for production can be reduced, which can effectively reduce the average energy consumption of production, thus realizing energy conservation and environmental protection to a certain extent.

5. Conclusions

As an important industrial field in China, the automation of construction machinery has an important impact on the development of productive forces and environmental protection. At this stage, due to the subjective and objective conditions of many restrictions, China's construction machinery automation field still has the characteristics of extensive development, and performance in the fuel consumption, resource consumption, waste generation and other main aspects. Affected by the policy of resource conservation and environmental protection, we must integrate the idea of energy conservation and environmental protection in the field of construction machinery automation, and start from the selection of engine, the optimization of process flow, anti-leakage treatment and the updating of mechanical equipment, so as to change the long-term development mode of the field of construction machinery automation in China.

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