Research on the Application of Hybrid Power Technology in Vehicle Engineering

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Keywords: Hybrid power technology, Vehicle engineering field, Application

Abstract: Energy conservation and environmental protection are the focus of the current society. If vehicle engineering wants to meet the development needs of society, hybrid power technology must be the core of its development, and it is also the inevitable trend of future development. The effective application of hybrid power technology not only improves vehicle kinetic energy utilization, but also promotes energy saving and emission reduction. Based on the overview of hybrid power technology and its development in the field of vehicles, this paper briefly expounds the application of hybrid power technology in the field of vehicle engineering to lay a foundation for future technical reform

1. Introduction

With the deterioration of ecological environment and the shortage of non-renewable energy such as coal and oil, all sectors of society have begun to pay attention to the protection of ecological environment and energy conservation and utilization. Hybrid electric vehicles with energy-saving and environmental protection functions have become the focus of research and development of automobile manufacturers at present, especially in western developed countries where the automobile R&D technology has developed rapidly, and hybrid electric vehicles in the United States and Japan have been applied. Through exchange and learning, hybrid power technology in the field of automobile engineering in China have been continuously innovated and developed, with the potential of achieving the production goals of energy conservation, environmental protection and green development. At present, hybrid electric vehicles have been used in urban public transportation, engineering construction, military and other fields. From the long-term development point of view, hybrid electric vehicles have broad application prospects and application value.

2. Brief Analysis of Hybrid Power Technology

1.1 Definition of Hybrid power Technology: Hybrid power technology is a kind of composite energy technology, which consists of oil-electric hybrid power system and hydraulic hybrid power system, and its connection methods can be divided into series connection, parallel connection and series connection. On the premise of retaining the structure of automobile internal combustion engine, the oil-electric hybrid power technology provides auxiliary power for automobile by using the engine to start the generator to complete power generation. The system or the driver monitors the running situation of the automobile and makes flexible regulation, thus ensuring the best efficiency of the engine and realizing stable operation, which can effectively reduce oil consumption and emissions and achieve the purpose of energy saving and emission reduction. Hydraulic hybrid power system is a key part composed of engine and hydraulic power system, which can reduce operation cost, improve economic benefit and operation stability.

2.1 Advantages and Disadvantages of Hybrid Electric Vehicles

1.2.1 Advantages of Hybrid Electric Vehicles: The power transmission ft of the engine itself is directly related to the speed and torque. In many cases, the power of a single engine is low, which will cause a lot of invalid transmission ft and increase the energy loss. Hybrid electric vehicle can keep the engine in a good running state, effectively avoid the limitation of traditional power system, and effectively reduce the energy loss through braking energy recovery; With the uninterrupted

power transmission ft, the hybrid power technology can realize the automatic switching of the driving system, which will not interrupt the power of ft shift, and can meet the needs of drivers in different driving habits, different road conditions and different locations, and enhance the driving experience of vehicles; The hybrid power system can reduce people's labor cost and improve work efficiency through the mutual cooperation of generator and engine. In the process of auto start and acceleration, the electric motor generates powerful auxiliary power to provide sufficient energy support for vehicle starting, thus effectively reducing fuel consumption and emissions, reducing air pollution and improving the economic and social benefits of hybrid electric vehicles.

1.2.2 Disadvantages of Hybrid Electric Vehicle: Hybrid electric system realizes intelligent control by means of intelligent sensors, thus ensuring efficient and stable operation of the driving system. However, it is difficult to control its parameters because of complex components of hybrid power system. The advanced technology of hybrid power technology is insufficient, and there are some problems such as low electric energy storage level, high battery cost and short service life of hybrid electric vehicles; The speed-combined power coupling device itself has certain limitations, which makes the research and development and manufacturing costs of hybrid electric vehicles too high, and it is impossible to fully grasp the service life of all parts of the vehicle.

3. Research on the Application of Hybrid Power System in the Field of Vehicle Engineering

Series-parallel system structure design: There are differences in design flow, connection sequence and energy storage components between series and parallel vehicle systems, but both series and parallel vehicle systems mainly rely on the interconnection of internal engine and generator to ensure the stability of electrical linkage. And they carry out intelligent comparison and integration analysis on the energy supplied by internal generator and energy needed by energy storage components to drive the vehicle, improve the maximum utilization effect of energy and improve people's driving experience. In the process of vehicle repair and maintenance, through the analysis of vehicle running method and running state, the control method can be clearly defined and vehicle dynamics can be reasonably distributed, which can scientifically adjust the running state of vehicles and realize the value of vehicle running on the basis of ensuring the stable running of vehicles.

2.1 Control of power energy distribution coefficient: In the process of kinetic energy coefficient distribution of hybrid electric vehicles, it is necessary to complete the index detection of the high-pressure part of vehicle operation with the help of fine filter, judge the working state of the fuel injector of the vehicle through the detection results, and optimize the electronic control unit equipment through rail pressure sensors and other equipment to ensure the stable operation of the vehicle in high-pressure operation state; The low-pressure part of the vehicle should use the coarse filter of the hand oil pump to control, analyze and design the running effect of the vehicle to ensure that the crankshaft speed sensor can keep running smoothly; To realize the power control of the project, the accelerator pedal and camshaft sensors can be monitored by the electronic control unit, and the corresponding operation indexes can be obtained, thus showing the value of the project design; Scientifically design the total braking torque, and adopt two correct the torque, improve the operation effect of braking system and torque, and reduce the interference and influence of other external environment and adverse factors such as human operation, thus ensuring the safety of automobile operation and improving the stability of automobile operation.

2.2 Parameters of Hybrid Loader: New construction vehicles generally adopt hydraulic hybrid technology, which relies on high-pressure accumulator to boost power. In the process of practice, relevant technicians should pay more attention to intelligent sensor control, do a good job of proportional distribution between electro-hydraulic, reasonably adjust the frequency of pulse signal discrete signal, simplify the progress process of the internal system of loader car, and ensure the stable state of vehicle operation; Strengthen the analysis and control of the clutch, and effectively control the opening and closing of the clutch of the hybrid loader by hydraulic control; By using high-pressure accumulator to support a large amount of kinetic energy of variable pump and series

engine to control the parameters of hybrid loader, the workflow of the whole power system can be simplified and the application value of hybrid loader can be brought into full play.

2.3 Power coupling device: Power coupling device is not only the focus of research and development of hybrid power technology, but also a difficult problem. The research results of this device directly affect the comprehensive performance of automobiles. At present, power coupling device of hybrid power technology consists of speed coupling, driving force coupling and torque coupling. However, these three types of power coupling devices have certain advantages, defects and deficiencies in practical application, such as saving energy effectively, but they have such disadvantages as high control coefficient and high operation difficulty. Therefore, in the process of selecting the type of power coupling device, we should fully consider our own interests and the current actual situation, and clarify our own actual needs, so that we can choose the best power coupling device scientifically, efficiently and reasonably. At the same time, we should scientifically predict the future development direction of hybrid power technology according to the existing automobile usage in the consumer market, and constantly innovate and optimize our own design scheme, so that hybrid electric vehicles can not only meet the short-term use needs of current users, but also actively adapt to the development needs of future scientific and technological society, thus improving the hybrid technology.

The actual forming process of CNC lathe sheet metal production can not be separated from sheet metal process, and the complex production structure of vehicle sheet metal work need to strengthen the professional skills of technicians to make them clear about the basic parts processing process in the lathe production process, so as to improve the accuracy of operation; Strengthen quality supervision and management and law enforcement, set up reward and punishment system, improve management personnel's awareness of law enforcement, implement differentiated management, ensure that problems existing in design and production processes can be found in time, and find the corresponding responsible person, so as to put forward ft efficient rectification plan; Cultivate the operator's sense of responsibility, and the operator can carry out standardized operation in strict accordance with the parts processing, blanking process, welding, painting and other construction processes; Intensify publicity and education, so that operators can make clear the importance of parts splitting to improve the quality and efficiency of sheet metal production, improve employees' sense of collectivity and honor, and encourage employees to realize their self-worth; Using hybrid power technology can improve the quality of welding work, find defective products in time, and improve the standardized production of products, thus ensuring the production efficiency of enterprises.

4. Current Application Status of Hybrid Electric Vehicles

3.1 Public transport: Urban public transport vehicles have such characteristics as large volume, large load capacity, fixed running lines and frequent braking starts. Constantly starting, braking, accelerating and decelerating in the process of bus driving increases the loss of vehicle driving system, which not only wastes engine kinetic energy, consumes a large amount of oil, produces a large amount of tail gas pollution, but also increases engine maintenance costs. Using hybrid bus to effectively combine motor and internal combustion engine can realize effective recovery of braking energy and effectively solve the problems of excessive oil consumption, large exhaust emissions and energy waste; Hybrid power system has strong running stability, which can protect the performance of engine, reduce maintenance cost, prolong the service life of engine, ensure the safety and stability of automobile during running, and effectively protect the ecological environment while improving passengers' sense of security and experience.

3.2 Engineering vehicles: Engineering vehicles have such characteristics as large volume, inflexible use, harsh working environment, high working intensity and long construction period. Due to the empty engineering construction environment in most cases, using traditional fuel engineering vehicles to carry out work will lead to excessive oil consumption, serious energy waste, large emissions and serious pollution. Especially in the process of mining operations or winter engineering construction environment is complex and the haze weather increases.

The waste gas generated during the construction process will spread to the whole atmosphere along with the air flow, thus polluting the air, increasing the incidence of respiratory diseases and affecting people's health. The use of hybrid power system in construction vehicles can effectively reduce the emission of fuel consumption, and the kinetic energy generated by sudden braking can be converted into the internal power of the engine in time, thus achieving the production goal of energy saving, emission reduction and environmental protection under the concept of green development.

3.3 Military vehicles: Due to the limited natural resources and space of countries all over the world, all countries pay attention to the construction of military reserves to improve their comprehensive national strength. With the continuous improvement of information technology, the future war is bound to develop towards high-tech level. Traditional oil-fired military vehicles will have a huge roar and a large amount of automobile exhaust in the course of combat, and the heat released by ft in the process of engine operation is easily locked by the enemy, and the continuous consumption of non-renewable energy makes it difficult to meet the military needs of various countries. Using hybrid power system, switching from engine system to generator system in the process of avoiding enemy attack can reduce noise transmission ft and exhaust emission, thus improving the survival rate of battlefield.

5. Conclusion

In conclusion, the use of hybrid power technology in the field of vehicle engineering can effectively solve such environmental problems as noise and air pollution, improve the utilization rate of energy, reduce the loss of energy and power, improve people's driving experience, and ensure the safe and stable operation of vehicles, thus promoting the continuous development of vehicle engineering in a more scientific, standardized and sustainable direction.

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