

HYBRID CARS

H. R. Gaffarov

Bukhara Institute of Engineering Technology. Republic of Uzbekistan

M. N. Saidov

Bukhara Institute of Engineering Technology. Republic of Uzbekistan

ANNOTATION

The article provides information about modern hybrid cars and their shortcomings. Based on the results of the research, a technical development has been provided.

Keywords: Hybrid cars, automotive industry, fuel tank, internal combustion engine, transmission, battery, inverter, electric motor, distribution mechanism, front-wheel drive bridge.

INTRODUCTION

Hybrid cars are now widely developed. The word "hybrid" is derived from the Greek word meaning to combine the properties of two or more (mixed) forces. If we look at the hybrid representatives of the automotive industry - they are basically two sources of power; can be seen to consist of a combination of an internal combustion engine and an electric motor. Hybrid representatives of the automotive industry first began production in 1897 under the brand Parisienne des Voitures Electriques. The company began producing hybrids in 1900. Production of hybrid and electric cars has been suspended for some time. The main reason for this is the discovery of new oil fields and the introduction of improved oil production. This has led to an increase in fuel consumption.

Today, various types of hybrid devices are being developed on the market and they are becoming more widespread. In some hybrid cars, the electric motor is given only an auxiliary function and the internal combustion engine is suitable for the main operation. But more modern hybrid cars use powerful electric motors, which are combined with an internal combustion engine. They can move the vehicle independently in this form. Due to the electronic system, in hybrids, the driver cannot independently select the driving mode. Hybrid car the starting scheme is as follows: the electric motor and batteries start running, which feed the energy center that directs the energy to the motor. With this process, the car starts moving without noise and vibration. When the electric motor reaches maximum speed, the fuel engine is started. When the internal combustion engine is running, some of the energy from it goes to recharge the battery.

The main parts of a hybrid car.



1-Fuel tank, 2-Internal combustion engine, 3-Transmission, 4-Battery, 5-Inverter, 6-Electric motor, 7-Distribution mechanism, 8-Front drive bridge.

Hybrid cars have several advantages in use.

- Fuel economy. Hybrid cars use 35% less fuel than a car with an internal combustion engine.
- Low emissions of toxic substances (smoke) into the atmosphere. This is especially true of preventing environmental poisoning.
- When the car is stationary, there will be no noise inside as the electric motor is completely silent during operation. No noise while driving is an added convenience.
- High speed.

Today, the need for hybrid or electric vehicles is growing due to the deteriorating environmental situation and the depletion of underground oil fields. Given the increase in fuel prices for internal combustion engines, the idea of improving mixed power units has become relevant in our time. Serial production of the hybrids was the first to be carried out by Toyota. Toyota Prius liftback cars were produced in 1997. In 1999, the Honda Insight model was introduced. The main advantage of such machines is that they run on both electricity and fuel. And sports car manufacturers have long been using hybrid technology to make their cars move faster - after all, the maximum power of an electric motor is available anytime, anywhere, and this gasoline engine is a great help in acceleration that has not yet reached its level. The first example of such a car was the Porsche 918 Spyder.

A hybrid engine in a car is a device that consists of a system of gasoline, diesel or electric power units. Other computer-controlled systems have been developed for the full operation of the engine.

A description of its structure will help to understand how a modern hybrid car engine works. The engine consists of:

-Internal combustion engine. The design of the unit is designed to reduce weight, reduce fuel consumption and the amount of harmful waste;

The principle of smooth operation of a modern hybrid engine is based on the fact that the internal combustion engine and the electric motor operate separately or simultaneously. An on-board computer is used to control the system. The device determines the type of active power unit depending on the driving mode:

- Low-power electric motors are required on city roads;
- Fuel engine is used when driving on the suburban highway;
- In mixed mode (interval stops and accelerations), the units work together.

The level of electrification of the machine indicates the electrical installation capacity. In one case it works as an app, while in the other it allows full movement in electric traction. To understand how far there is progress, we will look at the electrification steps in sequence.

Microhybrid A micro-hybrid engine is the simplest form of hybridization. The car is equipped with a Start-Stop system, in which the electrical system is used as a starter and generator, but does not transmit energy to the wheels. When the car does not start, the control unit shuts off the gasoline engine, saving fuel. The average consumption in the city is reduced by 10%.

The need to save fuel and adhere to stricter environmental standards has led to the production of such machines.

Parallel hybrids can be called the usual, most common hybrids. Here the battery capacity is already higher and the electric motor is usually located between the internal combustion engine and the transmission, so that the elements of this chain can work together and separately.

This allows the car to run in real hybrid mode, both when the car is powered by pure electricity - When the internal combustion engine is muted and disconnected from the wheels - and when fuel and electricity are used to accelerate. It is also possible to charge the batteries during braking due to recuperation, as well as from a conventional motor that acts as a generator in this case.

The hybrid series internal combustion engine does not provide mechanical connection of the wheels at all - it only produces energy for electric motors. The theoretical advantages are clear: the driver is able to control the traction without stopping and delays gets the convenience of "electricity", the internal combustion engine runs in optimal mode and does not turn off, and the car becomes a pleasant and almost environmentally friendly system.

Parallel-series-hybrid is a special category, which is, in fact, represented only by Toyota's patented inventions and separate power plants produced under license. Here, the internal combustion engine and electric power work as a unit, distributing energy continuously where needed.

The basic principle in plug-in hybrids (PHEV) is the same: the presence of a separate connector to charge the batteries. However, the hybrid itself can be serial (same BMW 3 or Fisker Karma) or parallel (Porsche Cayenne e-Hybrid or Volvo XC60 Recharge).

Performance characteristics of hybrid cars. In general, a hybrid car is no more difficult than a traditional car - in some cases even more useful. On average, they have to cover a distance of about 150 thousand kilometers - for which Toyota, for example, provides a ten-year warranty. Once the resource is exhausted, the battery life will continue to deteriorate, and the hybrid car will be as normal. However, replacing the battery is an expensive task, so it makes no sense to buy a very old hybrid with a high range.

The main task facing the world's automakers today is to produce hybrid cars that are resistant to any climatic conditions.

Scientists from the Bukhara Institute of Engineering and Technology have developed a hybrid tractor.

BOOKS

1. Harry L. Field and John V. Solie Introduction to Agricultural Engineering Technology. Oklahoma State University Stillwater, OK, USA.65-75.
2. Eichhom Horst. Landtechnik. LandwirtschaftlichesLehrbuch. 4 Ulmer, Stuttgart, 1985.
3. Kamilov A.I, Sharipov K.A., Umirov N.T, Yusupov G.Yu. Tractors and cars. Tashkent: 2011, -334 p. (textbook)
4. Gaffarov H.R., Kamolov M.Q. Experimental training in the field of repair of vehicle parts. Tashkent: 2021-115 p. (tutorial)
5. Mirziyoyev Sh.M. The rule of law and the protection of human interests are the key to the development of the country and the well-being of the people. Tashkent, Uzbekistan, 2017.- 48 p.

6. Gafforov H.R. Glubokorixliteli i metodi obespechvayushego snijeniya energoyomkosti prosessa rixleniya podpaxotnogo sloya pochvi. Bukhara.2021.-103 B (monograph)
7. <http://bookree.org/www.lex.uz> - National Database of Legislation of the Republic of Uzbekistan.
8. www.ziyonet.uz - educational portal of the Republic of Uzbekistan.