



PROSPECTS FOR THE USE OF ALTERNATIVE FUELS

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Abstract: This article describes the types of motor fuels for vehicles, their physical and chemical properties. The advantages of using alternative fuels as motor fuels are highlighted and the environmental and economic efficiency indicators of natural gas fuels are analyzed. Aspects of the use of different types of alternative fuels that will ensure economic stability and reduce the harmful effects on the environment are considered. More than a dozen alternative fuels are in production or under development for use in alternative fuel vehicles and advanced technology vehicles. Government and private-sector vehicle fleets are the primary users for most of these fuels and vehicles, but individual consumers are increasingly interested in them. Using alternative fuels and advanced vehicles instead of conventional fuels and vehicles helps conserve fuel and lower vehicle emissions. The world is preparing to shift to a new version of the future that releases us from a reliance on fossil fuels for transportation. Most passenger cars will switch to using batteries and electric motors.

Keywords: alternative fuels, emissions, fuel cell electric vehicles, hydrogen-powered cars, automobile, engine, fuel, ecology, economy, engine power, fuel properties, alternative motor fuels, natural gas fuel, gas cylinder equipment.

INTRODUCTION

Recently, a large number of foreign research centers of engine companies are conducting research aimed at saving fuel and replacing traditional liquid hydrocarbon fuels with new ones. The growing interest in alternative fuels for cars and trucks is due to three important considerations: alternative fuels tend to produce fewer emissions that exacerbate air pollution and global warming; most alternative fuels are produced from inexhaustible reserves; the use of alternative fuels allows any state to increase energy independence and security. Russia's war in Ukraine, its oil and gas blackmail, have clearly demonstrated the importance of energy security. The global trend towards increasing prices for hydrocarbon fuels is pushing



consumers to look for cheaper alternative energy sources. European emission standards determine acceptable emission levels for new cars sold in the Member States of the European Union. In order to limit the pollution caused by road motor vehicles, general requirements for emission standards from cars and certain spare parts (Euro 5 and Euro 6 standards) have been introduced. The European Union has developed new emission standards for internal combustion engines - Euro 7, they will be five to ten times tougher than Euro 6. Emission standards for passenger cars will be 95 g/km CO₂. In 2018, the average CO₂ emissions of new cars were 120 g/km. That is, now the "average" new car needs to be made more economical by 21%. Which means a faster transition to new models using alternative fuels. The rapid growth of the motor transport fleet has led to unacceptable levels of air pollution. In large cities, car exhaust gases account for up to 60-80% of all toxic emissions into the atmosphere, and even with the use of modern technologies, it is becoming increasingly difficult to achieve a significant reduction in emissions from gasoline or diesel engines. The replacement of diesel and gasoline fuels with alternative fuels can play an important role in reducing emissions. The energy of the future must have an ecological and economic direction and solve the problem of risk minimization, climate protection, and sustainable development [1]. It is the environmental indicators that have become one of the reasons for the large-scale transition of vehicles to LNG in Western Europe and the North American continent, large metropolitan cities. In the world, about 2 million vehicles run on CNG. Interesting/ The experience of Egypt is interesting, where over the past 10 years, starting almost from zero, the number of cars running on CNG has been increased to 32 thousand, as a result of which Egypt took 9th place among 49 countries that have implemented a "clean air" program [1]. The main factor of anthropogenic impact on the environment is the use of fuels produced from the components of fossil raw materials, which leads to an imbalance of carbon dioxide in the atmosphere. The degree of ecological "purity" of any fuel is manifested not only at the combustion stage. It is also determined by the specific technology of its preparation, the nature and method of preparation and processing of raw materials. Among alternative fuels for internal combustion engines with a positive environmental effect, three groups are distinguished: gaseous mineral fuels and biofuels, liquid biofuels, and synthetic liquid biofuels. In the future, a special place in this direction is given to hydrogen as an "absolutely clean" fuel [2].

The authors of argue that it is necessary to highlight the fundamental possibility of obtaining artificial liquid fuel from underground coal gasification gas, which can



be synthesized, in particular, by the method of catalytic conversion of carbon monoxide and hydrogen. The use of gas is also associated with the release of hydrogen (its content in the product gas is 20–25%). This is a universal product, the consumption of which will increase radically in the near future. Many leading aircraft manufacturing companies in different countries have begun developments to provide aviation with a new type of fuel[3]. Under consideration alternative to kerosene: biofuels, synthetic oil, liquefied natural gas (LNG), hydrogen . Natural gas is the least hazardous motor fuel in terms of fire and explosion risks. Accumulations of gasoline storage containers create a fire hazard. Natural gas is almost twice as light as air and, unlike gasoline, "disperses" into the atmosphere when it leaks. The high temperature and limited concentration range of autoignition greatly reduces the chance of accidental ignition or explosion of natural gas. As a rule, gas cylinders are installed in the least vulnerable and statistically unlikely places for damage to the car. Based on actual data, BMW has calculated the probability of damage and structural failure of the car body . The results of calculations indicate that the probability of destruction of the car body in the area where gas cylinders are located is only 1-5% (Fig. 1).

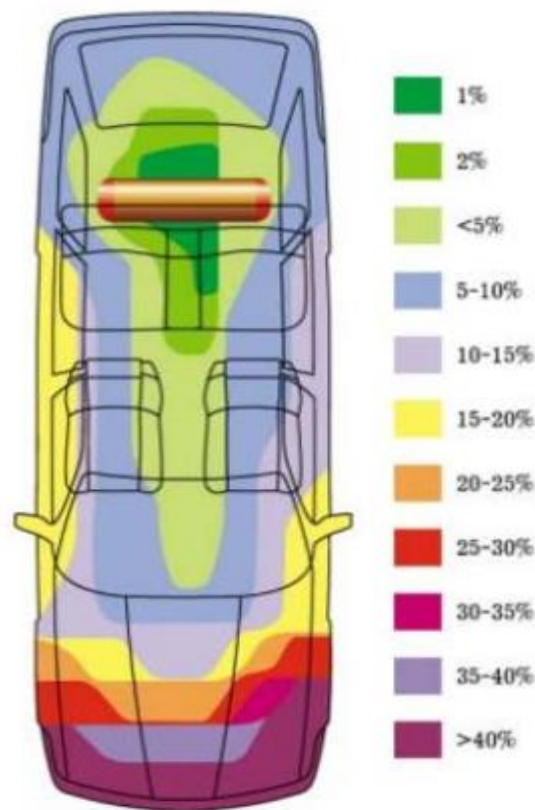


Fig. 1. The probability of damage to the car body



Natural gas plays the role of an optimal transition link to transport systems based on hydrogen fuel cells[4]. Getting hydrogen at local stations from natural gas and storing hydrogen on board cars is the most optimal solution in terms of energy, ecology and costs. In addition, given the multilateral synergies between the natural gas vehicles and hydrogen fuel cell vehicles, today's growing market for the natural gas vehicles will fuel tomorrow's growth in hydrogen vehicle production. European emission standards determine acceptable emission levels for new cars sold in the Member States of the European Union. In order to limit the pollution caused by road motor vehicles, general requirements for emission standards from cars and certain spare parts (Euro 5 and Euro 6 standards) have been introduced. The European Union has developed new emission standards for internal[5].

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