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Research Article

PROSPECTS FOR THE USE OF ALTERNATIVE FUELS AS ENGINE FUEL

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ABSTRACT

This article describes the types of motor fuels for vehicles, and their physical and chemical properties. The advantages of using alternative fuels as motor fuel are highlighted and the environmental and economic efficiency indicators of natural gas fuel are analysed.

KEYWORDS

Automobile, engine, fuel, ecology, economy, engine power, fuel properties, alternative motor fuels, natural gas fuel, gas cylinder equipment.

INTRODUCTION

Currently, there is little to the environment to further stabilize the economy it is necessary to increase and improve the production structure of cars that emit harmful substances and have high fuel efficiency. The following main requirements are imposed on modern piston internal combustion engines: the lowest level of negative impact on the environment; the degree of perfection of conversion of thermal energy into mechanical energy, or the smallest value of the specific fuel consumption and the smallest consumption of friction; a wide range of maximum torque and power values; the high value of litre capacity; the smallest values of specific mass and overall dimensions; reliability and long-term service of construction elements;

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simplicity of construction; ease of service and low cost of operation and maintenance; reliable firing and adaptation to variable modes of operation; performance and perspective of the construction in different types of fuel; modernization of the construction; The above-mentioned requirements largely depend on the type of petroleum-derived motor fuels used, which have a limited resource [1-4]. According to IAEA, OPEC, UN Industrial Development Department and World Energy Agency (WEA) forecasts, the share of oil in the world energy balance in 2030 is 40%, gas - 27%, coal - 24%, and others - 9% does. The above-mentioned requirements largely depend on the type of petroleum-derived motor fuels used, which have a limited resource. According to IAEA, OPEC, UN Industrial Development Department and World Energy Agency (WEA) forecasts, the share of oil in the world energy balance in 2030 is 40%, gas - 27%, coal - 24%, and others - 9% does. The above-mentioned requirements largely depend on the type of petroleum-derived motor fuels used, which have a limited resource. According to IAEA, OPEC, UN Industrial Development Department and World Energy Agency (WEA) forecasts, the share of oil in the world energy balance in 2030 is 40%, gas - 27%, coal - 24%, and others - 9% does [5-7].

Currently, in the world, approximately 5 billion in 1 year. tons, in Russia - 0.5 billion tons, and in Uzbekistan - 6 million. tons of oil is being extracted. It should be noted that 19 million in 1 year in the USA. barrels (2.9 million tons) of oil are used, and according to the American Petroleum Institute, 43% of oil products are used as light fuel for cars, 11% - as diesel fuel, 9% - as aviation fuel, 16% is used as an oil, tar, plastic, 4% as furnace fuel, 5% as heavy fuel and 12% as miscellaneous fuel. Such dynamics of the use of oil products require the use of their substitutes - alternative motor fuels. In this regard, in almost all highly developed countries, scientific and practical work related to the rationalization of the balance of fuel and energy resources and alternative fuels for various types of transport as the most energy-consuming sector of the economy is carried out. is going It is known that the following are included in the range of alternative fuels: synthetic gasoline derived from coal, combustible shale, peat, natural gas; benzo-methanol and benzo-ethanol mixtures; hydrogen; liquefied petroleum gas propane-butane (SNG); compressed natural gas (SPG) or liquefied natural gas (SJPG); gas generator, domain, plastic gases; biogas; gas condensate fuels; ammonia; water-fuel emulsions, etc. In addition, they can be divided into domestic, promising and other alternative fuels. plastic gases; biogas; gas condensate fuels; ammonia; water-fuel emulsions, etc [8-11]. In addition, they can be divided into domestic, promising and other alternative fuels. plastic gases; biogas; gas condensate fuels; ammonia; water-fuel emulsions, etc. In addition, they can be divided into domestic, promising and other alternative fuels.

The main requirements for motor fuels are formed based on the provision of the necessary indicators and characteristics of internal combustion engines (ICOM). Detonation

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resistance of fuel, fractional composition, combustion released heat, corrosion activity, etc. is their main indicators [12-17].

LITERATURE ANALYSIS AND METHODOLOGY

The results of studies on the toxicity of gas cylinder cars analysis show that when natural gas is used instead of gasoline, the release of toxic substances into the environment (g/km) is, on average, 8 times higher in carbon monoxide, 3 times higher in hydrocarbons, and 3 times higher in nitrogen oxides. by 2 times, by PAU – 10 times, by smokiness – 9 times. Therefore, the world's leading scientists and researchers are doing a lot of work on the use of alternative fuels for vehicles, as well as on improving the transition of vehicles to gas fuel. In our republic, there are several regulatory legal documents on the use of gas cylinder cars and their safe operation, and special requirements are set in them [18-21]. Including No. 30 of the Cabinet of Ministers of the Republic of Uzbekistan dated February 10, 2007 "Measures for the development of compressor stations for filling cars with gas and gas filling stations for cars, as well as for the gradual transition of motor vehicles to liquefied and compressed gas" on" decision. In this decision, the strategic directions for the conversion of motor vehicles of individuals and legal entities in our republic to liquefied and compressed gas and the construction of liquefied and compressed gas supply branches were defined. "Uzbekistan motor transport in the past and years of independence" in this book, motor transport and ecology, the emergence of motor transport, Information such as automobile transport of Uzbekistan until the years of independence is presented. N.G.Pevnev, A.P.Yelgin, L.N.Bukharov, "Technical exploitation of gas balloon vehicles". This book provides information on the use of gas-cylinder cars and the use of gas fuel as fuel for cars. Akhmetov L.A., Ivanov V.I., Erokhov V.I. "Economic efficiency and operational properties of gas balloons". This guide provides information on the environmental and economic benefits of using gas cylinders for cars [22-27]. B.I. Bazarovnig "Scientific basis of energy-ecological efficiency of use of alternative motor fuels" This book provides information on the use of gas cylinder cars and the use of gas fuel as a fuel for cars. Akhmetov L.A., Ivanov V.I., Erokhov V.I. "Economic efficiency and operational properties of gas balloons". This guide provides information on the environmental and economic benefits of using gas cylinders for cars. BI Bazarovnig "Scientific basis of energy-ecological efficiency of use of alternative motor fuels" This book provides information on the use of gas cylinder cars and the use of gas fuel as a fuel for cars [29-36]. Akhmetov L.A., Ivanov V.I., Erokhov V.I. "Economic efficiency and operational properties of gas balloons". This guide provides information on the environmental and economic benefits of using gas cylinders for cars [37-46]. B.I. Bazarov "Scientific basis of energy-ecological efficiency of use of alternative motor fuels" This guide provides information on the environmental and economic benefits of using gas cylinders for cars [47-58]. B.I. Bazarov "Scientific basis of energy-ecological efficiency of use of alternative motor fuels" This guide provides information on the environmental and economic benefits of using

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gas cylinders for cars. B.I. Bazarov "Scientific basis of energy-ecological efficiency of use of alternative motor fuels" in the dissertation, the principles of environmental efficiency of using alternative fuels for vehicles are presented and justified.

RESULTS

The results of experimental studies show that compressed natural gas containing 83...96% methane contains 25% hydrogen by mass and has a high octane number (OCHM=130) and therefore =13 can burn without detonation, which makes it possible to reach the effective useful work coefficient ηe=0.36. Natural gas produces on average 40% less SN, 75% less SO, 25% less SO2 than gasoline, and 80% less SN+NOx and 50% less SO than diesel. is formed. In a gas engine created based on a diesel engine, the emission of nitrogen oxides is 0.44...14.0 g/km, the emission of hydrocarbons is 0.8...1.9 g/km, and the emission of carbon oxides is 2.8...11, reduced by 6 g/km. The problem of transferring different types of fuel to the engine cannot be solved without analyzing and taking into account their following properties: - physical-chemical properties, which usually determine the engine's operation and the structural features of the fuel supply or supply system, energy (thermal-technical) properties, they determine the quality and character of the combustion process and the working process of the engine; - gasodynamic and technological-production properties, which are connected with obtaining, transportation, refuelling and storage of fuels; toxicity properties, which determine the effect on the environment. According to the above, alternative motor fuels can be classified according to a number of their characteristic features (Chart 1). Smoke the gas can be burned without forming soot and other products of incomplete combustion. It is relatively easy to clean gas from sulfur compounds and provide high-quality consumers with sulfur-free fuel, which does not produce SO2 and SO3.

Classification of alternative motor fuels natural gas has several important advantages compared to oil-derived or other alternative motor fuels, as well as unique physicochemical and operational properties. Thermomechanical characteristics of gaseous fuel are usually under normal conditions for 1 m3 of gas, i.e. pressure 760 mm sim above and conducted when the temperature is 0 °C. In addition to the normal conditions of the gas, its standard conditions are also distinguished, the pressure of which is 760 mm rt. St. and the temperature are 20°C. In technical literature, the pressure is 760 mm rt. St. and the characteristics of the gas at a temperature of 15 °C are given

DISCUSSION

Currently, natural gas is used as motor fuel in the world there are more than 20 million vehicles. The unique physicochemical properties of natural gas, its considerable natural reserves, the development of the gas pipelines from the place of extraction to the place of delivery, and the environmental advantages of natural gas compared to traditional types of fuel make natural gas the most promising and universal

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engine of the 21st century. Allows you to look at it as fuel. The use of natural gas as a motor fuel is an intensively developing direction, which will become an independent high-profit sector of the gas industry shortly. There are all reasons for the annual volume of natural gas use in automobile transport to reach 5...6 billion m3 in 7...10 years, and to increase from 20...25 billion m3 in the long term. Our republic also has many reserves of natural gas, and these reserves contain high-quality natural gases that can be used as fuel for automobile engines directly, without the use of excess gas processing or chemical treatment technologies. Can be used as fuel. From 1991, the production of natural gas in Uzbekistan increased from 41.9 billion cubic meters to 50.4 billion cubic meters in 1997, per m3 and 60 billion in 2013, m3, which made our country eighth place in the world in terms of gas extraction. The richest gas region is Ustyurt, 60% of its territory is in Uzbekistan. Gas extraction is mainly based on 12 fields, which are mainly located in the southeastern region of our country. The main advantage of the use of gaseous types of fuel is the economical use of tractor equipment. The reasons for this are: their price is cheap compared to types of fuel obtained from oil; extended engine service life, spark plug and oil change periods, higher fuel octane number and no soot formation during combustion. In practice, all types of wheeled machinery and stationary equipment running on gasoline and diesel can be converted to natural gas fuel. However, during the transfer of vehicles to gas fuel, it is necessary to transfer vehicles with the following functions: intercity and intercity passenger buses; cars of municipal utilities; route buses and minibuses; all types of trucks operating in the city; agricultural and road construction equipment and stationary devices with appropriate infrastructure; trucks working in closed buildings and warehouses. The operational properties and fields of application of gases are determined by their composition. The need for gas and its transportability largely depend on the heat of combustion. Gases with a high heat of combustion are transported over long distances, and those with a low heat are used near the place of production. According to the combustion heat, gases are divided into the following groups: very high combustion heat (above 25000 kDj/m3) – liquefied, released together with oil, natural; with high combustion heat (12000...25000 kDj/m3) - coke, biogas, mine, carburized water obtained by degassing of coal seams; medium heat of combustion (5000...12000 kDj/m3) - water, oxygen vapour, coke oven, bituminous fuel mixture generator; with a lower combustion heat (3000...5000 kDj/m3) - with a mixture generator from unproductive fuel, air domain; the heat of combustion is very small (less than 3000 kDj/m3) - vagrant, water gas generators with aerial spraying, obtained in the ventilation of coal mines. When the engine runs on gas fuel, due to the resistance of gas fuel to detonation, it is much easier to fire it and service the devices that use the fuel. Steam-oxygen, coke oven, mixture generator from bituminous fuel; with a lower combustion heat (3000...5000 kDj/m3) - with a mixture generator from unproductive fuel, air domain; the heat of combustion is very small (less than 3000 kDj/m3) - vagrant, water gas generators with

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aerial spraying, obtained in the ventilation of coal mines. When the engine runs on gas fuel, due to the resistance of gas fuel to detonation, it is much easier to fire it and service the devices that use the fuel. Steam-oxygen, coke oven, mixture generator from bituminous fuel; with a lower combustion heat (3000...5000 kDj/m3) - with a mixture generator from unproductive fuel, air domain; the heat of combustion is very small (less than 3000 kDj/m3) - vagrant, water gas generators with aerial spraying, obtained in the ventilation of coal mines. When the engine runs on gas fuel, due to the resistance of gas fuel to detonation, it is much easier to fire it and service the devices that use the fuel. Water gas generators are air-blasted, extracted from the ventilation of coal mines. When the engine runs on gas fuel, due to the resistance of gas fuel to detonation, it is much easier to fire it and service the devices that use the fuel. Water gas generators are air-blasted, extracted from the ventilation of coal mines. When the engine runs on gas fuel, due to the resistance of gas fuel to detonation, it is much easier to fire it and service the devices that use the fuel.

Conclusion

It runs on natural gas, which is cheap today engines are widely used in modern city vehicles. It mainly uses natural, industrial and synthetic gases in compressed or liquefied form. Natural gas used as a motor fuel has several advantages over petroleum products. When using them, high technical and economic indicators of the engine are achieved, because natural gas has very good anti-detonation properties, and the property of forming a mixture with air is very good. When the engine runs on gas fuel, the mixture burns almost completely, and the environment is less damaged due to the much lower toxicity of the used gases. Therefore, approximately 70-80% of cars in our republic run on natural gas fuel. Compressed natural gas is a gaseous state under normal conditions at any pressure, and its composition consists mainly of methane and hydrogen. The use of gases eliminates the washout of the oil film from the walls of the piston and sleeve, and reduces the formation of soot in the combustion chambers, due to the absence of gasoline vapours, the oil on the walls of the cylinder liners does not burn, as a result, the life of the engine and the oil change period is 1.5 - Extends by 2 times. The use of gas fuel reduces the total amount of harmful carbon monoxide, nitrogen dioxide and hydrocarbons in the exhaust gases from the engine. The toxicity of exhaust gases is 3 times less when burning gas fuel than when working with gasoline, and the level of noise emitted by the engine when it correctly selects the operating mode is low, and this condition is especially important in urban conditions. Therefore, a lot of work is being done to convert cars to gas fuel and improve gas cylinder equipment.

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