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INVESTIGATING ALTERNATIVE FUELS FOR MOTOR VEHICLES

There is a current global need for alternative and renewable energy sources. The solution of this task requires considerable labour and material expenditures. Significant volume of fuel consumption by motor vehicles is associated with high energy intensity of road transport: it is 12 – 14 times greater than that of river transport, and 17 – 20 times greater than that of railway one. The report presents an analysis of the prospects for the use of alcohol gasoline in road transport.

The most common alternative fuels for automobiles are compressed natural gas, liquefied petroleum gas, and hydrogen. But when using water, there is a big explosion hazard. Therefore, hydrogen has not found wide application. Nowadays, the most promising direction is the use of alcohols as a fuel.

In all countries, gasoline that contains alcohol is indicated by "E" numbers, which describe the percentage of ethanol fuel in the mixture. For example, E5, E7, E10 can be poured into any car.

Ethanol has a high-octane number and it is very easily manufactured and processed using a technique that is similar to producing alcohol. Ethanol is obtained from wood waste and sugar cane. It provides high engine efficiency and low emissions. Ethanol is a very renewable resource, which is especially popular in warm countries [1, p. 83].

Experts say that it is important that bioethanol contains no more than 0.2% of water, as it seriously affects the quality of the fuel, especially during the winter. Ethanol is very hydroscopic and there is a theoretical risk that the engine can split the mixture into gasoline and water-alcohol mixtures [2, p. 55]. And as a result, the following problems might be observed: excessive fuel

consumption, detonation, ignition failure. Ethanol is an excellent solvent and oxidizing agent, here is why ethanol in gasoline can damage gaskets and other plastic parts of the car. To avoid this, stainless steel should be used. One of the most important performance indicators of ethanol is corrosiveness. Ethanol is a strong solvent and it can erode rubber and plastic parts of the fuel system. In order to avoid this, it is necessary to use a special additive, which can increase acid pH [3, p. 14].

From the conducted research it is clear that with the use of alcohol gasoline the fuel consumption increases by 15−20% compared with the use of traditional fuel. Ethanol is cheaper than pure gasoline, which means that a fuel that contains ethanol is cheaper.

The energy content of ethanol is about 33% less than pure gasoline. The impact of fuel ethanol on vehicle fuel economy varies depending on the amount of denaturant that is added to the ethanol. The energy content of denaturant is about equal to the energy content of pure gasoline.

Ethanol is an excellent fuel for internal combustion engines. Ethanol burns faster, allows more efficient toque development, and gives a vehicle increased power. Compared to gasoline, ethanol has poor cold-start properties due to its high heat of vaporization. Gasoline requires less heat to vaporize than ethanol and is blended with ethanol to improve its cold-start properties.

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