

Section 03. Challenges in Environmental Protection

Vadim Snisar

I. Y. Klymenko, research supervisor

V. V. Sukhova, language adviser

National Mining University, Dnipro, Ukraine

Environmental Impact of the Motor Transport

Issues of ecological safety of the motor transport are a part of ecological safety of the country. The importance and acuteness of this problem grows from year to year. The fact that release of pollutants in the atmosphere from vehicles increases on average by 3, 1% per a year causes alarm.

Now there are more than half a billion of cars in the world. Statistics shows that cars are owned by every tenth Ukrainian inhabitant and in big cities every fifth one has got the car. The main source of urban air pollution in Ukraine is traffic. Exhaust gases in the cities are especially dangerous because they pollute air at the level of 60-90 cm from the Earth's surface on average. It exceeds threshold limit values of harmful substances by 5-10 times.

Cars emit dioxide, carbon oxide, nitrogen oxide, formaldehyde, benzene, benzpyrene, soot (about 300 toxic substances in total) into the atmosphere. During road travel car releases lead impurities from gasoline polluting soils by this heavy metal. As aftereffect of asphalt tire scuffing rubber dust soils the atmosphere being unhealthy to humans.

The car weekly consumes as much oxygen as its four passengers breathe in per year. Car washing produces contaminated water containing engine oil causing waterbody pollution. Cars are a source of noise pollution as well.

It is necessary to reduce harmful impact of cars on the environment as much as possible. The internal combustion engine remains the main driving force of the car. In this regard the only step to a solution of power problem of the motor transport is to create alternative types of fuel. New fuel has to meet a lot of requirements: substantial raw material resources, low cost, maintenance of engine capacity, reduction of harmful substances emission, incorporation into current fuel supply system.

People know three main modernizations of cars which could become a solution to current ecological situation: hydrogen as fuel, electric vehicles and hybrid engines.

From the ecological point of view hydrogen is the most promising fuel for cars. Technically, the storage tank becomes the place where an exchange of electrons between molecules of two gases (hydrogen and oxygen) occurs. Therefore energy is emitted with water as its by-product. One kilogram of hydrogen contains three times as much energy as gasoline.

Current production cost of hydrogen is five dollars but its energy capacity equals to one liter of gasoline. Hydrogen is highly volatile (the filled stationary car with the idle engine constantly loses fuel), highly explosive (it is impossible to store the car in a garage or in a container), because of a small running time between gas stations it demands very volumetric petrol tank etc.

Another alternative solution is to use electric vehicles. They will considerably improve environmental situation. The electric vehicle doesn't consume carboniferous fuel and doesn't pollute air by the exhaust gases, works almost silently, isn't flammable and is easily controlled.

Disadvantages related to the high cost of the car, lack of infrastructure, small mileage between gas stations, heavy car mass in comparison with the car with DVS hamper full-scale use of electric vehicles.

Hybrid engines can be used everywhere as “intermediate” and commercially more justified option. For example the liquefied gas has all qualities of full-fledged fuel for internal combustion engines.

It is recognized around the world as cheap, environmentally friendly fuel outperforming gasoline in many properties. It is important that natural gas conversion procedures don't demand a car design changes allowing using both gasoline and gasing motor fuel.

To reduce pollution of atmospheric air planted borders are recommend. Dense green wall of deciduous trees with young plantation and bushes in the understory isolates transport corridor providing additional green area especially useful in urban and industrial zones.

The solution of environmental problems caused by motor transport demands considerable financial means which can't be raised by current manufacturers. Therefore it is necessary to set the economic leverage stimulating acquisition and operation of environmentally friendly vehicles, mobilization of funds for their production.