Pollution from motor Vehicle fumes

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In Sri Lanka motor cycles, scooters, three-wheelers, most cars and vans are powered by petrol engines. A significant number of cars, almost all heavy vehicles, buses and machinery are diesel driven. In future there could be an increase in the number of diesel powered cars as the diesel engine is much improved and also because of the cheaper cost of diesel fuel.

There is a misconception among majority of the Sri Lankans that exhaust fumes from diesel engines are a bigger danger to the health than fumes from petrol vehicles. It will be shown in the following paragraphs that fumes from petrol vehicles are more deleterious to health than fumes from diesel fumes.

The nature of exhaust fumes from petrol engines differ from that from diesel engines. In petrol engines, the fuel is ignited by a spark and is burnt in an inadequate quantity of air. As a result, fumes from petrol engines contain a poisonousgas called carbon-monoxide. (CO)

Although leaded petrol was used by majority of owners of petrol driven vehicles until recently, causing subclinical lead poisoning, thanks to the Sri Lanka Petroleum Corporation, both grades of petrol available in Sri Lanka at present are unleaded.

In addition to above chemical fumes from petrol vehicles contain hydrocarbons produced as a result of chemical reactions taking place in the engine. Hydrocarbons are also formed due to feeding of excess of fuel.

Some hydrocarbons especially the orefines take part in chemical reactions in the presence of ozone and oxides of nitrogen and strong sunlight resulting in peroxyacyl nitrates which cause lacrimation (tearing of eyes).

Narrow crowded streets, bus stands, large car parks, three wheeler stands and other places where traffic congestion occurs may contain significant quantities of CO in the air causing subclinical CO poisoning. Atmosphere pollution due to CO, hydrocarbons and peroxyacyl nitrates is more common in urban and suburban areas than rural areas.

To summarise the most important poisonous chemicals emitted by petrol engines is carbon monoxide(CO) gas. The amount of CO in the blood depends on the duration of exposure to petrol fumes. CO forms a chemical compound called carboxy-Haemoglobin (COHb) by combining with haemoglobin (Hb) thus reducing the amount of Hb which can carry oxygen into vital organs of your body, causing hypoxia (lack of oxygen) to vital organs.

Other common cause of hypoxia due to COHb is smoking, In smokers the blood level of COHb is between 5-15 percent.

But in non smokers the level of COHb rarely exceeds 3 percent. But in non smokers exposed to petrol fumes the level of COHb can be very high and in smokers the level of COHb can be very much higher than 15 percent causing severe hypoxia to vital organs.

High concentrations of CO in the blood can cause impairment of perception and performance of fine tasks and thus interfere with decisions taken during driving because of hypoxia to the brain. CO and other gases such as hydrocarbons in petrol fumes can increase symptoms such as dyspnoea (Difficulty in breathing) in patients suffering from respiratory diseases such as bronchial asthma and bronchitis.

Exhaust fumes from diesel engines on the other hand do not contain significant quantities of CO. In diesel engines the air is compressed to a high degree and the fuel is injected as a very fine spray which self-ignites in an adequate quantity of air and the exhaust fumes contain only a trace of CO.

As in case of petrol engines, diesel engines too emit oxides of nitrogen due to fixation of atmospheric oxygen and nitrogen in the combustion chambers of the engine at high temperature and pressure and nitric oxide predominates.

If a diesel engine is over loaded or maladjusted it m ay emit soot containing fine carbon particles which are mixed with small amounts of polycyclic hydrocarbons. Even a good diesel engine may emit a small amount of smoke when starting.

Exhaust fumes from diesel engines have a more disagreeble odour than fumes from petrol vehicles. When a diesel engine is started, it emits fumes containing polycyclic hydrocarbons which are potentially carcinogenic. Soot emitted by diesel engines is more offensive to the nose, eyes and sinuses when compared to petrol fumes. As far as I am aware polycyclic compounds and oxides of nitrogen and sulpher dioxide emitted by diesel engines do not cause serious problems.

To conclude fumes from petrol engines are more dangerous to health as these cause CO poisoning unlike diesel fumes. People like traffic constables, people living in congested streets and school children should be protected from the dangers of vehicle fumes. Very old vehicles which are not roadworthy should be prevented from using public roads.