

CARBON MONOXIDE POLLUTION



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Introduction

- Carbon monoxide (CO) is a silent killer.
- CO is a colorless, odorless, and tasteless flammable gas that is slightly less dense than air.
- CO is toxic to humans and animals that use hemoglobin as an oxygen carrier (both invertebrate and vertebrate) when encountered in concentrations above about 35 ppm.
- CO is also produced in normal animal metabolism in low quantities, and is thought to have some normal biological functions.

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- In the atmosphere, CO is spatially variable and short lived, having a role in the formation of ground-level ozone.
- Carbon monoxide is also a greenhouse gas.

Sources of Carbon Monoxide

- Carbon monoxide (CO) is a by-product of incomplete combustion of hydrocarbons.
- Man-made activities also emit tons of CO, in fact we are the main cause for CO emissions.
- Vehicle exhaust contributes roughly 60% of all CO emissions.
- Common household items, such as gas fires, oil-burning furnaces, portable generators, charcoal grills, among others, put people at risk of exposure to this poison gas.

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- Carbon monoxide can also be generated by volcanoes, forest fires, and other natural combustion processes.
- CO concentrations typically are highest during cold weather because cold temperatures make combustion less complete and cause inversions that trap pollutants low to the ground.

Fig.: Due to global warming, wildfire incidents are increasing which is the natural source of carbon monoxide, a greenhouse gas.



Sources of CO

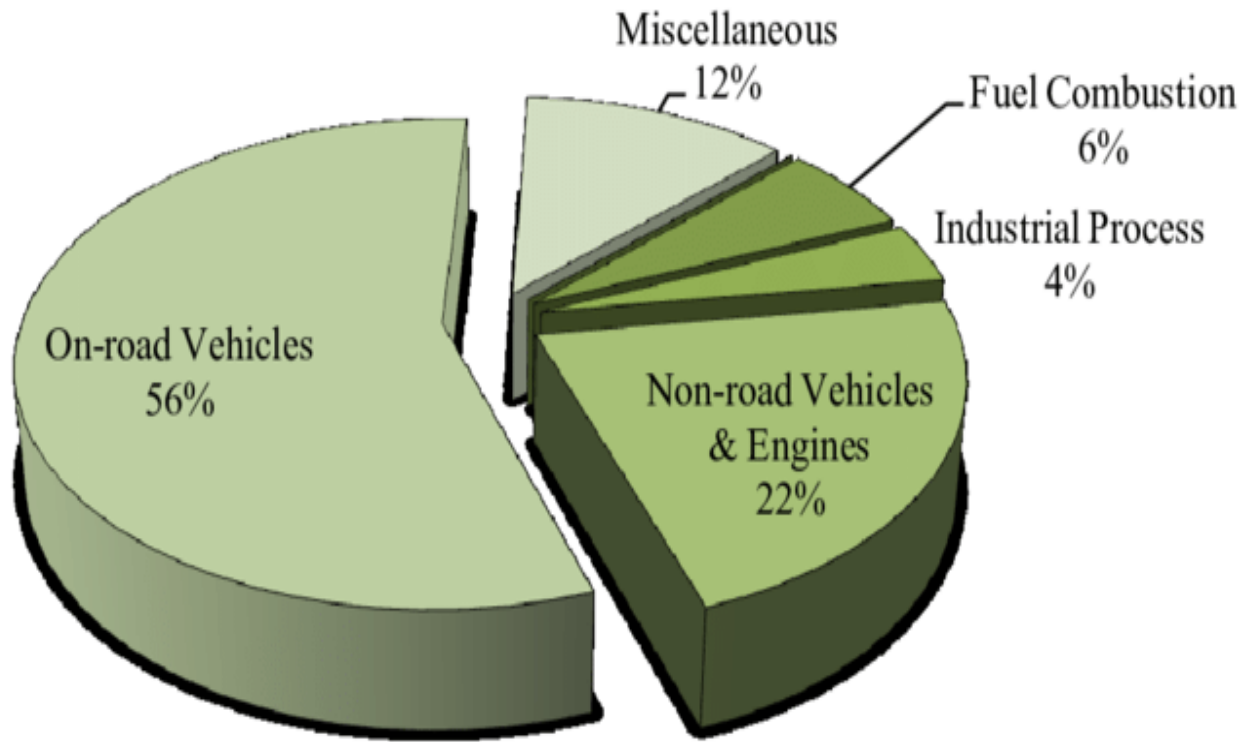


Fig.: Percentage contribution of different types of sources of Carbon monoxide (USEPA)



Fig.: Vehicle emission is the main source of CO in the atmosphere.

Effects of Carbon Monoxide

- Carbon monoxide (CO) is a toxic air pollutant produced largely from vehicle emissions.
- CO has a greater affinity for hemoglobin than oxygen does.
- Breathing CO at high concentrations leads to reduced oxygen transport by hemoglobin, which has health effects that include impaired reaction timing, headaches, lightheadedness, nausea, vomiting, weakness, clouding of consciousness, coma, and, at high enough concentrations and long enough exposure, death.

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- Indoors and outdoors, breathing high concentrations of CO reduces the amount of oxygen transported in the bloodstream. This can increase the probability of carbon monoxide poisoning in critical organs like the heart or the brain.
- Carbon monoxide cannot be detected by humans naturally, and special equipment is used to measure it. However, there are a few symptoms that can help you identify carbon monoxide poisoning.
- Symptoms are often described as similar to flu. Most common are weakness, headache, dizziness, confusion, chest pain, fatigue, nausea or even death.

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- Long-term exposure to CO can produce memory loss, feeling tired or movement problems. Continued and constant CO exposure over the time may cause chronic poisoning, making you feel the mentioned symptoms for life.

Effects of carbon monoxide on environment

- Carbon monoxide is different from other pollutants since it has not a direct impact on the environment and it can persist over a month in the atmosphere.
- Although considered a greenhouse gas, it contributes indirectly to climate change. Its presence affects concentrations of other greenhouse gases like methane, tropospheric ozone and carbon dioxide, creating particles and other harmful pollutants.

Control Measures

Following measures could be adopted to significantly reduce the CO emission into the atmosphere:

- Implementing stringent national fuel quality standards.
- Promoting alternative fuels. It may be compressed natural gas (CNG) and liquefied natural gas (LNG)
- Supporting the implementation of tighter vehicle emission standards.
- Use of catalytic converters in two stages helps in eliminating pollutants for exhaust gases before they are discharged into the atmosphere. for complete combustion of fuel.

A close-up photograph of a person's hand holding a thin, light-colored branch with several vibrant green leaves. The background is a soft, out-of-focus green, suggesting a natural outdoor setting. The lighting is bright and natural, highlighting the textures of the skin, the branch, and the leaves.

Thank You