Spot The Safety Violation: Avoiding CO Poisoning in Enclosed Work Spaces

This equipment appears to be powered by gasoline. Why could using it in this location and manner be a problem'

Carbon monoxide (CO) is a colourless, odourless gas, which is usually formed from the combustion of fuels such as coal, coke, wood, oil and gasoline. Carbon monoxide is often called 'the silent killer,' because it's an invisible gas that won't cause any unusual feeling in the nose, mouth or throat as it's inhaled.

When we talk about exposure to CO in the workplace, it's often in the context of space heaters or the emissions from vehicles and powered mobile equipment, such as forklifts. But *any* equipment or tools that are powered by such fuels pose a risk of exposure to CO'especially if these items are used indoors and without proper ventilation.

This picture from elCOSH shows a worker inside a room starting a mixer that's gasoline-powered. But there doesn't appear to be adequate ventilation'in fact, the windows behind the worker aren't even open. So he could be exposed to hazardous levels of CO from the equipment's exhaust. And he could be overcome by the fumes before he even realized he was in danger.

Look what happened to workers in Great Britain. According to the HSE, workers for a construction company were using a petrol-powered saw to cut out an existing concrete floor at a fish factory. To protect the factory surfaces from dust, they built a sealed and unventilated enclosure from timber and polythene. While the workers were inside the area working over a weekend, there was a build-up of CO, which lead to one worker being hospitalized.

Similar workplace incidents involving CO exposure in enclosed areas have occurred in Canada:

- Workers in Ontario were cleaning an underground parking garage using gas-powered washers. But the internal exhaust fans in the garage stopped working. One worker died from CO toxicity, while the others were treated for carbon monoxide exposure. The company pleaded guilty to failing to limit the exposure of workers to CO and was fined $75,000 [*Ground Maintenance Cleaning Contractors Inc.*, Govt. News Release, July 13, 2016].
- A farm worker in Qu□bec died of CO poisoning after using a gas-powered pressure washer to clean a non-ventilated pigsty inside a building.

AVOIDING CO POISONING IN ENCLOSED WORK SPACES

All fuel-burning equipment emits some CO, including forklift engines, equipment powered by propane or gasoline, and non-electric heaters. Carbon monoxide tends to build up in pockets in the poorly ventilated areas of workplaces, which can occur even in semi-enclosed work spaces.

Ideally, any fuel-burning equipment should be used outdoors. But if that’s not possible, take these precautions when workers must use such equipment in an enclosed space:

- Make sure that all areas where fuel-burning equipment is being used is ventilated by mechanical means to the outside. (It also doesn’t hurt to open doors and windows when possible, which is what the worker in the picture should do.)
- Always use equipment according to the manufacturer’s instructions. For example, if equipment is designed for outdoor use only, ensure workers don’t use it indoors.
- Maintain engines and other equipment regularly. Poorly maintained equipment usually emits more CO: a poorly tuned gas engine may give off up to 12 times as much CO as a well-maintained one.
- Where practical, install air-monitoring devices with audible alarms that go off when CO reaches a dangerous level. Also, consider giving workers personal CO monitors with audible alarms if potential exposure to CO exists.
- Train workers on the dangers of CO poisoning from fuel-burning equipment. A worker who doesn’t know about CO poisoning may ignore the first symptoms’headache, faintness, dizziness, confusion, nausea and irregular heartbeat’or write them off as not being serious. But continuing exposure to CO can cause confusion, loss of consciousness’and even death. Workers should be told to never ignore those symptoms when working where fuel-burning equipment is being used. (You can give them this handout as part of a safety talk on this topic.)
- In emergency situations, use appropriate respiratory protection to enter areas where CO may be present.