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Using Portable Generators Safely

One of the most common causes of death associated with weather disasters is carbon monoxide poisoning due to the improper use of portable generators. A significant ice storm, tornado, or major winter storm can result in power being lost for days or weeks, and means that many people will rely on portable generators to operate home furnaces, air conditioners, and appliances.

Portable generators are internal combustion engines used to generate electricity. They are useful when temporary or remote power is needed, and are commonly used during cleanup and recovery efforts following disasters such as ice storms, tornadoes, etc. This article was adapted from OSHA FactSheet #3286 and discusses specific hazards inherent with the use of generators and also provides helpful information to ensure that users of portable generators (and others nearby) remain safe.

Hazards Associated with Generators

• Shocks and electrocution from improper use of power or accidentally energizing other electrical systems.

• Carbon monoxide from a generator's exhaust.

• Fires from improperly refueling a generator or inappropriately storing the fuel for a generator.

• Noise and vibration hazards.

Shock and Electrocution

The electricity created by generators has the same hazards as normal utility-supplied electricity. It also has some additional hazards because generator users often bypass the safety devices (such as circuit breakers) that are built into electrical systems. The following precautions are provided to reduce shock and electrocution hazards:

• Never attach a generator directly to the electrical system of a structure (home, office, trailer, etc.) unless a qualified electrician has properly installed the generator with a transfer switch. Attaching a generator directly to a building electrical system without a properly installed transfer switch can energize wiring systems for great distances. This creates a risk of electrocution for utility workers and others in the area.

• Always plug electrical appliances directly into the generator using the manufacturer's supplied cords or extension cords that are grounded (3-pronged). Inspect the cords to make sure they are fully intact and not damaged, cut or abraded. Never use frayed or damaged extension cords. Ensure the cords are appropriately rated in watts or amps for the intended use. Do not use underrated cords—replace them with appropriately rated cords that use heavier gauge wires. Do not overload a generator; this can lead to overheating which can create a fire hazard.

• Use ground fault circuit interrupters (GFCIs), especially where electrical equipment is used in or around wet or damp locations. GFCIs shut off power when an electrical current is detected outside normal paths. GFCIs and extension cords with built-in GFCI protection can be purchased at hardware stores, do-ityourself centers, and other locations that sell electrical equipment. Regardless of GFCI use, electrical equipment used in wet and damp locations must be listed and approved for those conditions.

PREPnotes are adapted from the "Disaster Handbook for Extension Agents".. Reviewed and updated February 2021. Additional sources cited as appropriate.

• Make sure a generator is properly grounded and the grounding connections are tight. Consult the manufacturer's instructions for proper grounding methods.

• Keep a generator dry; do not use it in the rain or wet conditions. If needed, protect a generator with a canopy. Never manipulate a generator's electrical components if you are wet or standing in water.

• Do not use electrical equipment that has been submerged in water. Equipment must be thoroughly dried out and properly evaluated before using. Power off and do not use any electrical equipment that has strange odors or begins smoking.

Carbon Monoxide Poisoning

Carbon monoxide (CO) is a colorless, odorless, toxic gas. Many people have died from CO poisoning because their generator was not adequately ventilated.

• Never use a generator indoors or in enclosed spaces such as garages, crawl spaces, and basements. NOTE: Open windows and doors may NOT prevent CO from building up when a generator is located in an enclosed space.

• Make sure a generator has 3 to 4 feet of clear space on all sides and above it to ensure adequate ventilation.

• Do not use a generator outdoors if its placement near doors, windows, and vents could allow CO to enter and build up in occupied spaces.

• If you or others show symptoms of CO poisoning—dizziness, headaches, nausea, tiredness—get to fresh air immediately and seek medical attention. Do not re-enter the area until it is determined to be safe by trained and properly equipped personnel.

Fire Hazards

• Generators become hot while running and remain hot for long periods after they are stopped. Generator fuels (gasoline, kerosene, etc.) can ignite when spilled on hot engine parts.

• Before refueling, shut down the generator and allow it to cool.

• Gasoline and other generator fuels should be stored and transported in approved containers that are properly designed and marked for their contents, and vented.

• Keep fuel containers away from flame producing and heat generating devices (such as the generator itself, water heaters, cigarettes, lighters, and matches). Do not smoke around fuel containers. Escaping vapors or vapors from spilled materials can travel long distances to ignition sources.

• Do not store generator fuels in your home. Store fuels away from living areas.

Noise and Vibration Hazards

• Generator engines vibrate and create noise. Excessive noise and vibration could cause hearing loss and fatigue that may affect job performance.

• Keep portable generators as far away as possible from work areas and gathering spaces.

• Wear hearing protection if this is not possible.