Carbon Monoxide Risk in Hotels

Having a carbon monoxide exposure prevention plan in place can greatly reduce your exposure to severe losses and help protect your guests.

The hospitality industry has experienced a number of carbon monoxide (CO) occurrences resulting in serious illness and death to guests. The frequency of these incidents is low; however, the severity has been high and may result in negligence claims. Hoteliers have an obligation to exercise reasonable care in maintaining guest safety, including making sure their facilities are free of CO concentrations.

Carbon monoxide accidents
Approximately 500 Americans die each year from the poisonous gas, according to the U.S. Centers for Disease Control. The study also indicates that 15,000 Americans are poisoned from unintentional, non-fire-related carbon monoxide.

Within the hospitality industry, there have been a number of documented carbon monoxide incidents over the years. From 1989 to 2004, there were 68 cases of carbon monoxide poisoning at resorts, hotels, and motels in the U.S. In these cases, there were a reported 27 fatalities and 772 illnesses. Many of these accidents have resulted in medical claims, lawsuits, and business interruption claims, as well as bad publicity from the incident.

Carbon monoxide characteristics
Carbon monoxide is produced by the incomplete combustion of the fossil fuels — gas, oil, coal, and wood used in boilers, engines, oil burners, gas fires, water heaters, solid fuel appliances, and open fires. It is a colorless, odorless, tasteless gas that can be deadly and provides little or no clue that it has entered an atmosphere. This substance is approximately the same weight as air and will dispense through an area once released. The gas is highly flammable in air, and strong oxidizers may cause fires and explosions.

There are many sources where CO can be generated at hospitality establishments. Some of the more common sources include:

- Pool heaters
- Boilers
- Laundry equipment
- Diesel fire pumps
- Ranges
- Portable generators

Carbon monoxide exposure
Dangerous amounts of carbon monoxide can accumulate when, as a result of poor installation, poor maintenance, or failure or damage to an appliance in service, the fuel is not burned properly. It also can happen when rooms are poorly ventilated and the CO is unable to escape.
When inhaled, CO inhibits the blood's ability to carry oxygen by replacing oxygen in the red blood cells, preventing the oxygen supply from reaching the organs in the body. This oxygen deprivation can cause varying amounts of damage depending on the level of exposure. Low-level exposure can cause flu-like symptoms including shortness of breath, mild headaches, fatigue, and nausea. Higher-level exposure may cause dizziness, mental confusion, severe headaches, nausea, and fainting. Prolonged high-level exposure can cause death. A description of symptoms, based on exposure levels, is listed below.

- 35 parts per million (ppm) = No adverse effects within eight hours
- 200 ppm = Mild headache after two to three hours of exposure
- 400 ppm = Headache and nausea after one to two hours
- 800 ppm = Headache, nausea, and dizziness after 45 minutes; collapse after two hours
- 1,000 ppm = Loss of consciousness after one hour
- 1,600 ppm = Headache, nausea, and dizziness after 20 minutes; unconsciousness after 30 minutes
- 3,200 ppm = Headache, nausea, and dizziness after 5-10 minutes; unconsciousness after 30 minutes
- 12,800 ppm = Immediate physiological effects; unconsciousness and danger of death after only one to three minutes

Corrective actions should be taken if there is believed to be a carbon monoxide exposure. The three actions to remember are (1) evacuate, (2) ventilate, and (3) investigate:

- Move the affected person to fresh air. Administer oxygen if available.
- Seek medical help.
- If the person is not breathing, perform artificial respiration as taught in CPR training until medical help arrives.
- Ventilate the area.
- Investigate the source of carbon monoxide and make necessary repairs.

**Preventive measures**

Proper installation is critical to the safe operation of combustion appliances. Installation should be in accordance with the manufacturers' specifications as well as building codes. All appliances should be installed by professionals.

For existing facilities, the first step in assuring a property will not experience a CO incident is to identify equipment that produces the gas. Facility or engineering personnel should develop a list of CO-producing equipment. Each device should be placed on a regularly scheduled inspection and preventive maintenance program. The manufacturer's recommended preventive maintenance schedule should be followed and documented.

Understand that portable appliances also produce CO and therefore need to be monitored. Make sure the room where an unvented gas or kerosene space heater is used is well-ventilated; doors leading to another room should be open to ensure proper ventilation.

**CO detectors**

More and more states are adopting laws requiring the installation of CO detectors in lodging rooms. The device must have been tested and listed as complying with the most recent Underwriters Laboratories, Inc. Standard 2034 or its equivalent, and make a sound when it detects the gas. All new construction will have to have a CO detector installed in rooms with equipment that can create the CO (such as boiler rooms, garages, appliances that burn fossil fuel, etc.). This went into effect July 1, 2008. Additionally, any room that is used for sleeping purposes, that is within 10 feet of the room that could potentially create CO, also has to have CO detectors installed.
Summary
Proper CO detection can be effective in reducing the exposures at your hotel. The likelihood of a CO leak can be greatly reduced by following established guidelines, maintaining your equipment, and supporting awareness. A competent person should inspect all applicable equipment regularly to ensure the condition and integrity is good. Please check with your local fire marshal for any local requirements and refer to ANSI/UL 2034 standard for additional information about the installation of CO detectors and alarms. While the frequency of CO accidents is not significant, the severity of the accidents is very significant. It is our hope that the information in this document can be used to help manage these types of losses.