Smoke Detectors Provide Early Warning of Danger

March 2010

Smoke and other combustion products are the first signs of a potential fire. Thus, detecting smoke particles or toxic combustion gases is one of the fastest known ways to alert people 24/7 to the existence of a potential fire. This will provide more time for a safe evacuation. Automatic detection devices, such as smoke detectors, that are properly installed and maintained, play a vital role in reducing fire deaths and injuries in workplaces and homes. Since the late 1970's, smoke detectors contributed to an almost 50 percent decrease in fire deaths. Therefore, it is imperative to make sure that smoke detectors and smoke alarms are present and in good working condition for the protection of life and property.

TOXIC GASES IN SMOKE

The cause of death and injury in a fire is mainly due to smoke inhalation and not actual contact by flames, unless a person is extremely close to the fire location. According to the National Fire Protection Association (NFPA) Fire Analysis & Research Division, about two-thirds of all fatal injuries in fires are due to smoke inhalation, possibly in combination with other fire effects, with more than half of such deaths attributed to smoke inhalation alone. Smoke is a typical by-product of fire that may be accompanied by carbon monoxide and other toxic gases depending on the nature of the burning material. When exposed to toxic gases and smoke, a person will usually experience headaches and nausea, then partial incapacitation that reduces a person's chance of escape, followed by loss of consciousness and danger of death depending on the concentration of toxic gases and length of time of the exposure.

SMOKE ALARM VS. SMOKE DETECTOR

Both smoke alarms and smoke detectors work by detecting tiny smoke particles and gases given off when a combustible material burns. Smoke alarms (most common in residential buildings) immediately sound the alarm when a high concentration of smoke is detected. Smoke detectors (most common in businesses) are one component of an alarm system with a fire panel. Sounding the alarm, smoke detectors typically transmit a signal to the control panel to notify and allow an official to investigate an area where a detector has been activated. During this time, the alarm system may initiate other actions such as closing fire doors and activating the building's smoke controls. If three minutes pass without an assessment of potential fire, the Life Safety Code NFPA 101 and NFPA 72 require that the building's fire alarm system be programmed to automatically trigger an evacuation alarm.

INOPERABLE SMOKE DETECTORS

Blocked and Covered

Figure 1: Covered Smoke Detector

When ceilings and pipes are repainted, nearby smoke detectors are usually covered to make sure no paint gets onto the detectors. A smoke detector will not function properly until the bag is removed. Figure 1 shows a photo of an active smoke detector covered with a plastic bag that was not removed after the painting was complete.

Figure 2: New Smoke Detector

New smoke detectors are usually protected with a plastic cover as shown in Figure 2 to prevent the smoke detector from accumulating dust during shipping and installation. However, this cover must be removed immediately after the work is completed in the area and the smoke detector is activated.

Smoke detectors are covered temporarily to prevent operation during construction work in the area, but the cover needs to be removed when the work is finished. These blocked and covered conditions demonstrate the importance of periodic inspection of fire protection systems to ensure that they are maintained in serviceable condition.

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Missing, disconnected, or dead battery

Missing or disconnected batteries are the leading cause of smoke alarm failures. Frequently, the owners remove or disconnect batteries because of nuisance activations. NFPA reports show that more than half (54%) of the smoke alarm failures were due to missing or disconnected batteries and 19% were due to dead batteries. There is a simple test button on most smoke alarms that can be pressed to make sure the smoke alarm is properly working. If the test button does not work, the battery should be checked and replaced as necessary. It is recommended that when we change our clocks for daylight savings purposes, approximately every six months, we also test or change the batteries in our smoke detectors.

fast stats

2000-2004: 43% of all home fire deaths resulted from fires in homes with no smoke alarms, while 22% resulted from fires in homes where smoke alarms were present but did not operate. The death rate per 100 reported fires was twice as high in homes without a working smoke alarm as it was in homes with a working smoke alarm.

*Source: NFPA Fire Analysis and Research Division

2003-2007: Of the thousands of occupational fatalities that occurred during this four year period, 86 of those were caused by smoke inhalation. (Smoke inhalation fatalities are defined as those caused by poisoning and toxic effects, smoke, and fire gases.)

*Source: United States Department of Labor, Bureau of Labor Statistics

Occupational Safety and Health Administration (OSHA) Standards require:
Each employer to provide and maintain an employee alarm system. This employee alarm system must notify each employee that there is an emergency and must be kept in an operable condition throughout the building or work area. (29 CFR§ 1910.37 (e)). The OSHA employee alarm standard also requires tactile alerting devices that may be used for those employees who would not perceive the emergency alarm via lighting nor sounding devices. (29CFR§1910.165)

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