MIFACE INVESTIGATION REPORT: #06MI204

SUBJECT: Security Guard Died as a Result of Carbon Monoxide Poisoning

Summary

On November 5, 2006, a 70-year-old male providing security services for a church died as a result of carbon monoxide poisoning. The decedent entered the church with the head deacon and proceeded up the stairs to the second floor where two generators were located. The generators were placed in the second story room because a generator had been stolen when they were located outside the building. The room's window was closed. When the decedent and the head deacon entered the room with the generators, the decedent indicated he was having trouble breathing. The head deacon told the decedent to go downstairs and get into fresh air. The decedent collapsed in a nearby upstairs room. When the head deacon went downstairs, he could not find the decedent. Two female church members were working in the church area. The head deacon asked them if they had seen the decedent and they replied they had not seen him. All three individuals went upstairs and found the decedent on the floor in the room. One of the female church members stayed with the decedent and provided CPR. The other church member and the head deacon went downstairs and the female church member called 911. When the ambulance arrived, they could smell the exhaust from the generator and decided not to enter the church. The ambulance called for fire department assistance. When the fire department arrived, they entered the church and proceeded to the second floor room where the decedent and the now unconscious female church member were located. The fire department brought the decedent and this church member outside and they began resuscitative efforts. Fire department personnel transported the decedent and the unconscious church member to a local hospital. The decedent was declared dead at the hospital. The church member was hospitalized and recovered.

Figure 1. Incident scene showing outside of building

Key Words: CO Poisoning, Generator, Toxic Exposure

RECOMMENDATIONS

- Generators or similar fuel-burning equipment, such as propane radiant heaters, should not be operated indoors or in enclosed or partially enclosed spaces.
- Carbon monoxide (CO) detectors/alarms that meet the requirements of the current Underwriters' Laboratory (UL) standard 2034 or the requirements of the International Approval Services (IAS) 6-96 standard should be installed on each building level in areas when fuel-burning devices are present.
- Portable generator manufacturers should label their products and should supply stores carrying their equipment with the Danger label required by the 2007 Consumer Product Safety Commission.

INTRODUCTION

On November 5, 2006, a 70-year-old male providing security services for a church died due to carbon monoxide poisoning. The Michigan Occupational Safety and Health Administration (MIOSHA) personnel received the fatality report on their 24-hour-a-day hotline on December 8, 2006. MIOSHA notified MIFACE personnel later that day. The MIFACE researcher interviewed one of the decedent's family members on August 31, 2007. MIFACE visited the incident site on the same day as the interview. The church building was being sold and locked. During the course of writing this report, the death certificate, medical examiner report, and the police report that was shared with the MIFACE researcher by the family member were reviewed. The picture used in Figure 1 was taken by the MIFACE researcher at the time of the site visit.

The church for whom the decedent worked had hired him as an independent contractor. The decedent had been an independent contractor for seven years providing security services for various firms. He had provided security services for the church for the past three years during church-sponsored activities, such as church services, Bible study, picnics, etc. The decedent always arrived at least one hour prior to the activity and waited for the pastor or associate pastor to arrive. After opening the church, the decedent waited for church members to arrive and escorted them into the church. While the church members were in the church, the decedent ensured cars in the parking lot were not vandalized. After the activity, the decedent escorted the church members to their cars and remained on-site until the last church workers left the church.

The church did not have a written health and safety policy. According to the decedent's family member, the head deacon maintained the generators. The church members who were cleaning the church were using church-supplied cleaning products. MIFACE contacted the family member interviewed and obtained the church's new address. On October 15, 2007, MIFACE visited the church. A phone number was on a flyer on the church window. When MIFACE researcher called the number, the number was disconnected. Therefore, MIFACE was unable to contact the church staff to answer questions about the particulars of the incident, such as room size, brand/age of generators, generator wattage, or frequency or duration of generator use.

INVESTIGATION

Three generators had been used to provide electrical power to the church. The decedent had purchased one of these three generators for the church. The family member located the receipt and indicated that he had purchased a 10 horsepower, 550-watt generator. The church had been using the three generators to provide electrical power for the past three months. The generators had been located outside of the building. One week prior to the incident, one of the generators was stolen. After the generator was stolen, the head deacon decided to relocate the remaining two generators inside of the building. It is unknown if the generator purchased by the decedent was one of the generators in the building.

The church building had two distinct areas. The vestibule and sanctuary were located on the first floor. The meeting rooms were located on the second floor and could be accessed via a stairway near the vestibule or by using a door located on the outside of the two-floor attached building (Figure 1). The generators were placed in an upstairs classroom/meeting room. The room dimensions where the generators were located is unknown. This room had one window that was kept locked. The wattage of the generators is unknown. Also unknown is the frequency of use of the generators and how long a time period the generators had been running prior to the incident.

The decedent arrived at the church at approximately 8:00 a.m. Bible study classes were scheduled to begin at 9:00 a.m. He sat in his personal vehicle until the head deacon arrived. Together, they entered through the church entrance. Two female church members were cleaning the church and the vestibule. After conversing with them, the head deacon and the decedent ascended the stairs to reach the second floor. After passing the doorway of one room, the decedent and head deacon entered the room housing the generators. An exhaust odor emanating from the generators were evident to both individuals. The decedent indicated that he was having problems breathing. The head deacon instructed him to go downstairs and outside. The head deacon remained in the room for an unknown period of time. He opened the window and worked on the generators.

The head deacon eventually left the room and proceeded downstairs. He asked the two female church members cleaning the church about the decedent's location. The two individuals stated that they had not seen him. The head deacon and the two church members went upstairs and found the decedent lying on the floor in the room the head deacon and the decedent had passed on their first trip to the second floor.

One of the female church members stayed with the decedent and provided CPR. The head deacon and other church member went downstairs. The church member called for emergency response. When the ambulance arrived, they could smell the generator exhaust and decided not to enter the church. The ambulance called for fire department assistance. When the fire department arrived 10 minutes after the ambulance call, they entered the church and proceeded to the second floor room where the decedent and the now unconscious female church member were located. The fire department brought the decedent and this church member outside approximately 25 minutes after the initial 911

call was made. After beginning resuscitative efforts, fire department personnel transported the decedent and the unconscious church member to a local hospital. The decedent was declared dead at the hospital. The church member was hospitalized and recovered.

CAUSE OF DEATH

The death certificate listed the cause of death as carbon monoxide poisoning. Toxicological tests indicated a high level of carbon monoxide (48%) in the blood. No tests were performed for alcohol and illicit drugs and no autopsy was performed.

RECOMMENDATIONS/DISCUSSION

- Generators or similar fuel-burning equipment, such as propane radiant heaters, should not be operated indoors or in enclosed or partially enclosed spaces.

Carbon monoxide (CO) is produced whenever any material is burnt and is a component of engine exhaust when fuels are burned. Fuels include gas, both natural and liquefied petroleum; kerosene; oil; coal; and wood. CO is colorless, tasteless, odorless and nonirritating. An exposed person can be overcome by CO without warning. Mild symptoms of CO poisoning may mimic flu symptoms, but without the fever. As exposure levels increase, the severity of symptoms may include: tightness across the chest, shortness of breath, headache, nausea, dizziness, confusion, and muscle weakness. Carbon monoxide may cause a heart arrhythmia, heart attack or stroke. Individuals with underlying atherosclerosis will be at particular high risk. At high enough levels, carbon monoxide will cause coma and death.

The severity of symptoms of CO exposure is influenced by three main factors: (1) the concentration of CO in the environment; (2) how long the exposure lasts, and (3) work-load and breathing rate. The concentration of carbon monoxide in the upstairs area was unknown. The decedent's family member indicated that the decedent was a diabetic. The decedent had a BMI of 26.4, which indicated he was overweight. Given his age and diabetes, the decedent presumably had atherosclerosis. Also it is likely after ascending the stairs to the second floor, he would have been breathing heavily, thus increasing his breathing rate and intake of CO.

MIFACE recommends that fuel-fired generators not be used indoors. When this equipment is used indoors, adequate ventilation must be provided and the equipment exhaust vented to the outdoors away from air intakes, such as doors, windows or fresh air vents so that the exhaust will not be drawn back indoors.

- Carbon monoxide (CO) detectors/alarms that meet the requirements of the current Underwriters' Laboratory (UL) standard 2034 or the requirements of the International Approval Services (IAS) 6-96 standard should be installed on each building level in areas when fuel-burning devices are present.

UL listed CO alarms are designed to detect elevated levels of CO and sound an alarm to alert individuals of a potential poisoning risk. At least one CO detector/alarm should be installed on each building level. Larger floors areas or areas partitioned into separate rooms might require additional detectors/alarms.

MIFACE recommends that the local fire department be contacted to determine if the number of detectors installed is sufficient. If the church had installed a CO alarm on the second level, and informed their church members who performed work at the church of what actions to take if the alarm sounded, this tragic incident might have been prevented.

- Portable generator manufacturers should label their products and should supply stores carrying their equipment with the Danger label required by the 2007 Consumer Product Safety Commission.

In January 2007, U.S. Consumer Product Safety Commission (CPSC) required manufacturers of portable generators to warn consumers of carbon monoxide (CO) hazards through a new "Danger" label. The label states that, "Using a generator indoors CAN KILL YOU IN MINUTES." Manufacturers will be required to place the "Danger" label on all new generators and the generators' packaging. The label warns consumers that a generator's exhaust contains carbon monoxide, a poison that cannot be seen and has no odor, and that generators should never be used inside homes or garages, even if doors and windows are open. The regulation became effective May 14, 2007 and applies to any portable generator manufactured or imported on or after that date.

The stores to which these labels are sent should distribute these labels when equipment manufactured prior to May 2007 is sold. Also, rental stores should apply these labels to all generators and instruct rental customers to read this label and follow manufacturer operating instructions.

REFERENCES

MIOSHA Standards cited in this report can be directly accessed from the Michigan Department of Labor and Economic Growth, MIOSHA website www.michigan.gov/mioshastandards. The Standards may also be obtained for a fee by writing to the following address: Michigan Department of Labor and Economic Growth, MIOSHA, MIOSHA Standards Section, P.O. Box 30643, Lansing, Michigan, 48909-8143. MIOSHA Standard Section phone number is (517) 322-1845.

- NIOSH Alert: Preventing Carbon Monoxide Poisoning from Small Gasoline-Powered Engines and Tools. NIOSHA Alert: 1996. DHHS (NIOSH) Publication No. 96-118. Internet Address: http://www.cdc.gov/niosh/carbon2.html.
- Underwriters' Laboratory Product Safety Tips: Carbon Monoxide Alarms. Internet Address: http://www.ul.com/consumers/co.html
- Portable Generator Hazards. A Fact Sheet on Portable Generator Safety. U. S. Fire Administration. Internet Address: http://www.usfa.dhs.gov/downloads/pdf/fswy24.pdf

- Portable Generators; Final Rule; Labeling Requirements. Consumer Products Safety Commission. Internet Address: http://www.cpsc.gov/businfo/frnotices/fr07/pglabelingcorr.pdf

MIFACE
Investigation Report #06 MI 204
Evaluation

To improve the quality of the MIFACE program and our investigation reports, we would like to ask you a few questions about this report:

Please rate the report using a scale of:

Excellent	Good	Fair	Poor
1	2	3	4

What was your general impression of this MIFACE investigation report?

Excellent	Good	Fair	Poor
1	2	3	4

Was the report…	**Excellent**	**Good**	**Fair**	**Poor**
Objective?	1	2	3	4
Clearly written?	1	2	3	4
Useful?	1	2	3	4

Were the recommendations …	**Excellent**	**Good**	**Fair**	**Poor**
Clearly written?	1	2	3	4
Practical?	1	2	3	4
Useful?	1	2	3	4

How will you use this report? (Check all that apply)

- ❑ Distribute to employees
- ❑ Post on bulletin board
- ❑ Use in employee training
- ❑ File for future reference
- ❑ Will not use it
- ❑ Other (specify) _____

Thank You!

Please Return To:

MIFACE
Michigan State University
117 West Fee Hall
East Lansing, MI 48824
FAX: 517-432-3606

If you would like to receive e-mail notifications of future MIFACE work-related fatality investigation reports, please complete the information below:

Name: _____

e-mail address: _____

Comments:

_____

_____