Firefighters guidance note #6-XX: Hydrogen sulphide chemical suicides

Special considerations for safely responding to incidents of suicide due to hydrogen sulphide exposure.

Issued: December 2017

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Background

One suicide method currently being used is the mixing of a sulphur based insecticide and an acid solution, both of which can be purchased over the counter at local stores. Once mixed, these chemicals produce heat and a flammable, noxious gas called hydrogen sulphide. Sometimes people attempting suicide in this manner will leave a warning note for emergency responders so they are not exposed. The location of such acts may occur in vehicles and small rooms inside the residence because the area has to be isolated and sealed for suicide to occur.

Concerns/hazards

An elevated level of hydrogen sulphide of 100 parts per million (ppm) is immediately dangerous to life and health due to its toxicity.

Actions for employers

Employers should develop operational guidelines/procedures which consider the following:

- recognizing when this type of suicide has been attempted/committed
- warning signs for the presence of hazardous materials that when mixed produce this gas, such as pesticides and muriatic or hydrochloric acid
- how to identify the presence of hydrogen sulphide itself – as it has a distinctive odour
- mandatory use of self-contained breathing apparatus
- treatment protocols for assisting patients who are exposed/contaminated
- protocols for responders who are exposed/contaminated
- scene investigation to prevent exposure of other tenants/emergency responders

Hydrogen sulphide

Here are some basic facts about this gas:

- colourless gas with a notable odour similar to rotten eggs or sewer gas
- detectable at low levels, measured in parts per million (ppm)
- the odour threshold is 0.13 ppm
- although pungent at first it quickly deadens the sense of smell at higher concentrations
- heavier than air and tends to accumulate at the bottom of poorly ventilated spaces
- levels dissipate quickly with the introduction of air currents, such as positive pressure ventilation
- considered a broad-spectrum poison as it can poison several different systems in the body, although the nervous system is most affected
- flammable/explosive

- exposure to lower concentrations can result in eye irritation, sore throat and cough, nausea, shortness of breath and fluid in the lungs
- an elevated level of 100 ppm is immediately dangerous to life and health due to its toxicity

Personal protective equipment for hydrogen sulphide exposure

- self-contained breathing apparatus should be used when entering a suspected contaminated area
- protective clothing should be worn that provides adequate skin protection which could include structural firefighting turnout gear or splash suits

Additional precautions

- air sampling equipment, if available, can be used to determine the presence or absence of hydrogen sulphide
- eliminate ignition sources whenever possible
- agitation of the chemical mixture may produce further off-gassing so continued use of self-contained breathing apparatus is recommended even with zero readings on the monitor sensor

There have been no incidents of fire reported with hydrogen sulphide suicides, and it is believed that concentrations do not typically reach the lower explosive limit except at close proximity to the mixing container.

Decontamination of firefighters and others

Decontamination for first responders should be set up appropriately for the degree of contamination encountered at the scene.

Hydrogen sulphide poses a minimal risk through skin absorption and also a minimal risk of secondary contamination for first responders.

Consider the following measures:

- at a minimum, skin should be washed with water for three to five minutes
- if eyes or skin appear to be irritated, continue to flush with water during medical observation and transport to a nearby medical facility
- use soap and water to decontaminate anyone who has been exposed to vapours
- remove and double bag clothing
- launder contaminated clothing and personal protective equipment before reuse, following the recognized procedures for doing same

Care of victims of chemical suicides

Fire Services may be called upon for assistance with body recovery, removal, or decontamination, depending on local jurisdiction protocols. Police must be consulted before the body is moved.

Contamination of victims of chemical suicides may be more acute and decontamination may require more time and attention than other types of victims.

Consider the following measures:

- remove and double bag the victim’s clothing
- decontaminate the body as dictated per normal standard operating procedures or guidelines
- victims may off-gas from their lungs after they have been deceased for a significant period of time - this may pose a risk for those transporting victims and those performing autopsies
- cover the victim with a sheet – do not use a body bag for transporting victims unless they must be transported in an enclosed vehicle in which they will be occupying the same space as the driver

Applicable regulations, acts and standards

Read:

- *Occupational Health and Safety Act*
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable to protect workers
- *Regulation 833 – Control of Exposure to Biological or Chemical Agents*
  - occupational exposure limits for hydrogen sulphide – a time-weighted average (TWA) of 10 ppm and a short term exposure limit (STEL) of 15 ppm

Related

Guidance note 4-8 Care, maintenance, inspection and replacement of structural firefighting personal protective equipment

Guidance note 4-9 Respiratory protection program

This resource does not replace the *Occupational Health and Safety Act* (OHSA) and its regulations, and should not be used as or considered legal advice. Health and safety inspectors apply the law based on the facts in the workplace.