Protective Services Committee

AGENDA

Monday, November 18, 2024
Following the Waste Management Committee Meeting

1. Call meeting to order
2. Declaration of Pecuniary Interest
3. Proposed Fire Hall Garage / Fire Hall Expansion Report

   a. Ministry of Labour, Training and Skills Development
      - Firefighter's Cancer prevention checklist

   b. Firefighter Guidance Notes – Ontario.ca

   c. Fire Protection Grant Guidelines
4. Renfrew Detachment OPP Police Services Board Budget – Cost Allocation Alternatives
5. Call Alert / Call Dispatch Report
6. Verbal Update on 2024/2025 Fire Permits Procedure
7. Question Period
8. Next Meeting
9. Adjournment

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REPORT

Date: November 18, 2024

To: Protective Services Committee

From: Jennifer Charkavi / Chief McHale

Re: Fire Hall Garage / Fire Hall Expansion

Background and Discussion:

In 2015 discussions were had on a Fire Hall expansion. The rational for an expansion was due to the new fire trucks being larger and taller than the current Fire Hall could accommodate. Preparations were to be completed to close a portion of Hill Street between Queen and King Streets to prepare for the expansion. In 2019 the Operations Committee directed staff to defer the decision to make site preparations for an expansion until 2020.

In 2020 staff presented a report to Council on the history of the Fire Hall expansion and notification released by the Federal and Provincial governments from Investing in Canada Infrastructure Program (ICIP) -COVID-19 Resilience Infrastructure Stream funding for up to $100,000. Discussion was had in 2020 on the closing and stopping up of the road allowance next to the fire hall and the surveying of lots 130 and 131 for the expansion project, this was not completed until 2023. However, the application for funding for a building was applied through the ICIP-COVID-19 Stream Local Government Intake. (ICIP – Investing in Canada Infrastructure Program). In the report to Committee, staff did not know the financial implications of a Fire Hall Garage Expansion and assumed that $100,000 would build a garage. In December 2021 the Township was successful in the grant application and received $100,000 for a Fire Hall Garage Expansion.

Draft drawings were completed of the desired Fire Hall Garage for the grant in 2020, however they weren't completed by a professional nor stamped by an engineer. Staff changes took place, Fire Chief retired and the Clerk-Treasurer resigned, the project was at a standstill.

In 2022, staff investigated, and it was learned that all Municipal buildings that require a building permit must have an engineer sign off on the drawings, staff had this

completed. The Protective Services Committee at that time was surprised when the drawings from the engineer were provided and they included measures that went beyond those required for a garage, but instead were measures for a post-disaster building. Buildings associated with rescue services are considered Post-Disaster in the Building Code. This drastically changed the cost of the expansion project. Engineered drawings were completed and the septic tank was relocated. The Fire Department also had the propane tanks moved and a permanent generator installed. The generator was not an eligible expense under the grant.

Rough estimates received for the shell of the building was $300,000,as per the drawings, not including the concrete pad. The Fire Committee had also not included the relocation of the communications tower, this has led to some issues in accessing the grant. The tower would be in the way of a new expansion. Staff have been working with our ICIP advisors to be able to relocate the tower which is in the way of the proposed Fire Hall Garage Expansion. We were approved this scope change which took nearly 8 months, only to be told that we didn't need a scope change for this as it was on property owned by the Township. Staff have been told that the current tower cannot be used once moved due to its age and state. When staff last spoke to our ICIP Advisor, we were then told that a new tower did not fall under the scope of the project. We have initiated another scope change and have requested an extension as the grant was to be completed December 31, 2024.

We are waiting for approval. Purchasing a new tower with the remainder of the funds is before ICIP now and the fact that a garage will not be substantially built with the remainder of the money. There was no reserve to add to this $100,000 to build a garage expansion, so all that there is the possibility of this grant money. However, none of the money spent can be collected from ICIP if the Township's scope change is not approved. A fire hall garage will not be substantially built with the remaining $65,000 from the grant. Should the township not be successful in the scope change with ICIP, we will be responsible for the approximately $35,000 spent on site preparations and the drawings and will not have access to the remainder of the funding.

In addition, staff have reported to this Committee in the past changes coming forth for Fire Departments through the Ministry of Labour, Health and Safety on the Cancer Prevention Program (attached). Other documentation provided from the Province is the Firefighter Guidance Notes (attached), which outlines best practices for protecting the health and safety of fire service workers in Ontario. The Ontario Fire Marshal is now putting this information before Fire Chiefs. The Ontario Fire Marshal's Office has also introduced funding over a 3 year period, Fire Protection Grant, (*The **Fire Protection (FP) Grant** program was announced in the government's 2024 Budget and is designed to support cancer prevention efforts by municipal fire departments across Ontario. The FP Grant will assist fire departments in acquiring critical equipment to enhance firefighter health and safety, and minor infrastructure at the local level.*) The Fire Chiefs across the County feel that this grant is a prelude to the recommendations becoming legislation and that we are being given an opportunity to prepare. Unfortunately, the grant is only for a maximum of $8,000 - $10,000 for the next 3 years, so not a substantial amount of money, but enough to build a second set of bunker gear which is

one of the recommendations of the grant, to provide time for cleaning and drying of gear after every use. Staff submitted the grant request in September 2024.

The current Fire Hall does not have adequate showering space, showering is encouraged as soon as possible after a fire call, with only one shower this is difficult and the firefighters are to shower before going home so as to not bring contaminants with them, or at least to wash their exposed areas. A second shower is also required so that all genders can be accommodated.

Staff have provided the Firefighters with space and boxes for a clean change of clothes, as even the clothing under their PPE is considered contaminated and must be removed and washed immediately, following a fire call. Washing the clothing that they wear at the firehall is the preferred action, but there is no space available for a washer/dryer. As well, there is no space for a commercial washer/dryer for the bunker gear, at this time it is sent to the Renfrew Fire Department for washing but they do not have a dryer, it takes up to 4 days for the bunker gear to dry fully and is out of commission until it is dry. This is one of the necessities of building a second set of bunker gear, so that no firefighter is out of commission.

Adequate space musts be provided for the bunker gear (PPE). This space also has requirements as even after the gear is washed it still is off-gassing and should *be stored in an enclosed and ventilated locker or in an enclosed area off the apparatus floor that prevents exposure to contaminants and UV light.* (NFPA 1500). The Fire Department also requires an adequate training/meeting area, and one that is away from the PPE and the equipment.

Staff have moved the Fire Committee from the Fire Hall this past January as members of the public should not be permitted in the hall until measures are in place to ensure that the off gasses of the bunker gear are sealed off properly, in addition, the Fire Hall is no longer available for organizations/public to use.

The current Fire Hall does not meet accessibility requirements for the office nor does the bathroom. As well, the office is not completely separated from the bunker gear and the fire trucks as per the recommendations.

Rough estimates for the expansion and renovation of the current fire hall are estimated at $1.2 million. This estimate is created through the recent projects conducted in the area, the building was estimated at $300,000, we can assume that this price is now approximately $500,000, adding a training area and more showers/washrooms and a space for bunker gear will increase that amount to approximately $700,000. A concrete pad for the Sand/Salt Shed was over $200,000. In addition, the existing drawings will have to be re-visited to incorporate these changes, this will also have a cost. A contingency of 20%, $240,000. Staff would rather come in under so the project is estimated at $1,200,000.

Without a reserve fund, or the ability to build a substantial reserve fund to be prepared for any large grant announcements for fire departments, such as a 50/50 ($600,000/$600,000) or 70/30 ($840,000/$360,000) or 30/30/30 ($400,000/$400,000/$400,000) grant, and we would still have to be approved for a grant which staff are assuming will be greatly sought after. A grant portion can also be debentured, however, the time that grants allow for submission, we may not know the Infrastructure Ontario's decision in time.

Placing this item in the 2025 budget will not affect the 2025 tax rate as the project would hopefully be debentured. This action allows for staff to investigate, research, prepare proposals for a Fire Hall Expansion, all which will still have to come before Council for approval.

This project would affect the 2026 or 2027 budget, depending on the completion date, with a debenture payment due. Staff would be applying for a Construction Loan that provides funding up front, as the Township does not have $1.2 million to spend. This will affect our debt repayment limit, but we do have a debenture ending in 2025, however are adding one as well.

Financial Implications:

Placing this item in the 2025 budget will not affect the 2025 tax rate as the project would hopefully be debentured. This action allows for staff to investigate, research, prepare proposals for a Fire Hall Expansion, all which will still have to come before Council for approval.

This project would affect the 2026 or 2027 budget, depending on the completion date, with a debenture payment due. Staff would be applying for a Construction Loan that provides funding up front, as the Township does not have $1.2 million to spend. This will affect our debt repayment limit, but we do have a debenture ending in 2025, however are adding one as well.

People Consulted:

Fire Chief
Treasurer-Deputy CAO/Clerk

Committee Recommendation:

BE IT RESOLVED THAT the Protective Services Committee receives this report as information;

AND BE IT RESOLVED THAT the Protective Services Committee recommends to the Finance & Administration Committee to add to the 2025 Budget a Fire Hall Garage / Fire Hall Expansion for an upset limit of $1.2 million.

Ministry of Labour, Training and Skills Development

Firefighter's cancer prevention checklist

Ontario

Use this self-audit tool for fire services to learn how to protect fire personnel from exposure to contaminants that may cause cancer or other occupational illnesses.

Overview

Employers, supervisors and workers all play a role in taking responsibility for health and safety in the workplace. Understanding your duties, responsibilities and rights under *Ontario's Occupational Health and Safety Act* (OHSA) is integral to ensuring all workers stay safe and healthy at work. The goal is to prevent workplace injuries, illnesses and deaths.

Purpose

The purpose of this checklist is to help Ontario's fire service employers and workers increase their knowledge about measures to prevent exposure to contaminants, including those that cause cancers and other occupational illnesses. Fire services must take steps to minimize or prevent exposures, to keep their workplaces healthy and safe.

How to use this checklist

We encourage employers and workers of fire services to work through this checklist together. Using this self-audit tool, employers can identify opportunities to prevent or reduce exposure to cancer-causing contaminants and take steps to improve health and safety in the workplace.

Checklist items are numbered to make it easy for workplaces to discuss and reference items as they work through the checklist

You can read the Firefighter guidance notes for more information and materials.

Background

Routes of entry

The two major routes of entry for contaminants affecting firefighters are inhalation and skin absorption.

Inhalation

Inhalation exposure may occur by:

- not wearing a respiratory protection device during fire suppression, salvage, overhaul or investigations
- handling or cleaning soiled personal protection equipment (PPE) and other equipment without a respirator
- respirator leakage
    - facepiece problems including distortion, valves and deterioration
    - facepiece seal if the user is not clean shaven where the facepiece meets the skin
    - fit testing not conducted
- overbreathing while wearing a respirator during high workload

Skin absorption

Skin absorption exposure may occur by:

- unprotected skin due to improperly wearing PPE
- permeation through bunker gear, balaclava and gloves, resulting in contamination of neck, face, wrists, hands or groin
- handling or cleaning soiled PPE or other equipment without rubber gloves
- wearing contaminated PPE and clothing (wash them thoroughly and replace as needed)
- insufficient personal hygiene (not thoroughly washing or showering after fire)

As you work through the checklist, consider the measures and procedures that the fire service can implement to prevent the inhalation and skin absorption of contaminants.

Decontamination

Contaminants from fire suppression activities can be inhaled and absorbed through the skin. Soiled or contaminated ensembles and ensemble elements are a hazard to firefighters since soils and contaminants can be flammable, toxic, or carcinogenic. Additionally, soiled or contaminated ensemble elements can have reduced protective performance.

Firefighter bunker gear is designed for protection against heat at the fire scene. However, contaminants can penetrate through the bunker gear. The balaclava and gloves are of different construction than the bunker gear, potentially resulting in skin contamination at the face, neck, hands, and wrist. Contaminants detected in the groin area can come through the bunker pants zipper or waistline.

Routine cleaning of soiled equipment, apparatus and PPE items is important to reduce the risk of exposure.

Respirators must also be properly cleaned and sanitized. Filtering facepiece respirators (such as the N95 disposable mask) are not to be washed and must be disposed of after use.

After use, the following should be decontaminated to remove any residual contaminants:

- areas where PPE is washed
- equipment used for decontamination (such as extractors)
- shower facilities for workers

Checklist

Part A: programs

Respiratory protection program

A respiratory protection program protects workers from airborne contaminants.

Refer to Regulation 833 – Control of Exposure to Biological or Chemical Agents for the relevant occupational exposure limits, and requirements for the employer to develop written measures and procedures regarding the selection, care and use of respirators.

Refer to CAN/CSA-Z94.4-19, Selection, use, and care of respirators for guidance on the administration of an effective respiratory protection program in the workplace.

The table below contains recommended elements to be included in a respiratory protection program.

Number	Respiratory protection program element	Is this element included in your program?
1	Program administration - the program is administered by a competent person	Yes/No Comments:
2	Roles and responsibilities - the roles and responsibilities of the workplace parties are established	Yes/No Comments:
3	Hazard situations - situations where respirators are required to be worn are identified	Yes/No Comments:

Number	Respiratory protection program element	Is this element included in your program?
4	Hazard assessment - potential airborne contaminants have been identified	Yes/No Comments:
5	Respirator selection - appropriate respirators have been chosen based on the hazard assessment and requirements of Reg. 833	Yes/No Comments:
6	Fit testing - worker fit testing occurs at least every 2 years	Yes/No Comments:
7	Training - workers are trained on the use, care, storage, inspection, maintenance, cleaning, proper fitting, and limitations of the respirator, before first use	Yes/No Comments:

Number	Respiratory protection program element	Is this element included in your program?
8	Use, maintenance, storage - procedures are in place for the proper use, maintenance and storage of the respirators	Yes/No Comments:
9	User screening – workers are screened to determine whether they are medically eligible to use a respirator	Yes/No Comments:
10	Records and program evaluation - records are retained and the program is regularly evaluated to ensure it remains effective	Yes/No Comments:

Air management program

An air management program ensures workers using self-contained breathing apparatus (SCBA) are provided with an adequate volume of safe air to breathe from safe cylinders and that the cylinders are stored and transported safely.

Refer to CSA Z180.1-19 Compressed breathing air and systems for guidance on the design, construction, commissioning, calibration, testing, operation and maintenance of components for compressed breathing air systems.

The table below contains recommended elements to be included in an air management program.

Number	Air management program element (CSA Z180.1-19)	Is this element included in your program?
11	Monitoring of air levels during SCBA use – procedures are in place to ensure workers regularly monitor their air levels while using SCBA to prevent an out-of-air situation	Yes/No Comments:
12	Filling of cylinders - procedures are in place to fill cylinders safely with clean air that meets the purity requirements in CSA Z180.1-19	Yes/No Comments:
13	Cylinder replacement - procedures are in place to ensure cylinders are replaced as recommended by the manufacturer	Yes/No Comments:

Number	Air management program element (CSA Z180.1-19)	Is this element included in your program?
14	Secure transportation of cylinders - when transported in vehicles, cylinders are secured against tipping, falling or damage	Yes/No Comments:
15	Secure storage of cylinders – cylinders are stored securely to prevent tipping, falling or damage	Yes/No Comments:
16	Hydrostatic testing of cylinders - procedures are in place to ensure cylinders receive hydrostatic testing every 5 years	Yes/No Comments:

Part B: work practices – scene/fire training ground

On the fireground or fire training ground, PPE protects firefighters from contaminants. In order to be effective, PPE must be worn properly and at all times when exposure can occur.

Some best practices for using and decontaminating PPE at the scene are listed below. The goal is to decrease worker exposure to contaminants by:

- using appropriate PPE
- limiting the spread of contaminants through a combination of personal hygiene practices
- cleaning gear on the fire ground (gross decontamination)
- isolation of contaminated PPE

One example of gross decontamination would be using water from a hose to remove visible contaminants from bunker gear and other equipment.

Bagging soiled gear at the scene is a good practice to reduce exposure to firefighters during transportation from the fire scene to the assigned fire hall for cleaning. Bagging soiled bunker gear at the scene will also prevent unnecessary contamination of the interior crew compartment of the apparatus and personal vehicles.

ALARA

The 'As Low As Reasonably Achievable' (ALARA) principle should apply to all activities. The ALARA principle recognizes that although it may not be possible to reduce exposures to zero, efforts should be made to reduce workplace exposures as much as necessary to limit harm.

The table below contains best practices for work on scene or on the fire training ground.

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
17	Apparatus windows and doors are kept shut	Yes/No Comments:	Yes/No Comments:
18	PPE is properly worn at all times on the fireground or fire training ground	Yes/No Comments:	Yes/No Comments:
19	PPE, including appropriate respiratory protection, is properly worn at all times during salvage and overhaul and during fire investigations	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
20	Hood is exchanged when air cylinder exchanged	Yes/No Comments:	Yes/No Comments:
21	No person enters the hot zone without full PPE	Yes/No Comments:	Yes/No Comments:
22	Pump operators wear PPE, including SCBA, if smoke present	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
23	Gross decontamination of PPE is done before removing face piece – see above for note on ALARA principle	Yes/No Comments:	Yes/No Comments:
24	PPE is removed before entering rehab area, where weather permits	Yes/No Comments:	Yes/No Comments:
25	Air quality is monitored in rehab area	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
26	Hands and face are cleaned before eating	Yes/No Comments:	Yes/No Comments:
27	Post-fire wipes are provided and used for head and neck	Yes/No Comments:	Yes/No Comments:
28	Contaminated crew do not enter truck	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
29	Contaminated gear is allowed to air out for 30 minutes before bagging, if possible	Yes/No Comments:	Yes/No Comments:
30	Contaminated gear is bagged at scene	Yes/No Comments:	Yes/No Comments:
31	Contaminated gear is transported from scene outside crew compartment	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
32	Where weather does not allow gear removal, disposable coveralls are worn over dirty PPE in apparatus to reduce cross-contamination	Yes/No Comments:	Yes/No Comments:
33	Contaminated gear is taken to fire hall for cleaning (not home)	Yes/No Comments:	Yes/No Comments:
34	Where crew compartment seats have integrated SCBA brackets: • clean SCBA is placed in seats, or • dirty SCBA has undergone gross decontamination and is bagged before placing in seat	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
35	Gross decontamination of hose and equipment is done at scene, as much as possible	Yes/No Comments:	Yes/No Comments:
36	Contaminated gear that is carried in personal vehicles is in a closed container	Yes/No Comments:	Yes/No Comments:
37	Crew returns directly to fire hall for further decontamination	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place on scene?	Is there a SOP[1]?
38	Fire investigators: • wear SCBA, or • wear powered air-purifying respirator (PAPR) with air monitoring per NFPA 1500, or • wear respiratory protection as determined by an assessment per CSA Z94.4-19	Yes/No Comments:	Yes/No Comments:

[1] *Standard operating procedure*

Part C: work practices – fire hall

Laundry rooms and laundry areas

If a ventilated laundry room is available, the laundry room should be kept under slight negative pressure at more than 1 cfm/ square foot to prevent the spread of contaminants from soiled gear to the rest of the workplace. If there is no laundry room, the laundry area should be located away from bunker gear air dryers, clean bunker gear storage areas and other occupied areas, so as not to expose workers nearby or contaminate clean gear.

Laundering and drying bunker gear

To prevent damage to bunker gear, the manufacturer's recommendations should be followed.

Refer to NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting for guidance on laundering bunker gear.

Wash/dry temperatures should be less than 40 C. Detergent within a pH range between 6 to 10.5 should be used.

Extractors are commonly used for routine cleaning of bunker gear outer shell, bunker gear inner lining, balaclava and gloves. The g-force of extractors should not exceed 100 g for all elements.

Gear air dryers are commonly used for drying clean bunker gear.

Showering

Taking a shower with soap and water is encouraged as soon as possible after a fire call to remove contaminants on the skin, which can be absorbed into the body. If a shower is not available, washing of any potentially exposed skin (such as the face, neck, wrists and hands) is encouraged after a fire call.

Clean vs dirty areas

Bunker gear should be kept in restricted areas of the fire hall and should never enter the living areas. A combination of signage and markings on the floor can help separate clean areas from dirty areas.

Storing clean bunker gear on the apparatus floor

If the apparatus floor is not equipped with a direct local exhaust system from the tailpipes of vehicles, then exhaust emissions from the apparatus can be captured by general mechanical ventilation at 20,000 cfm (or more) per operating truck and 100 cfm/horsepower for diesel-fuelled vehicles. If the apparatus floor has only natural ventilation, then clean bunker gear should not be stored on the apparatus floor to prevent contamination of clean gear with diesel soot.

The table below contains best practices for work at the fire hall.

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
39	Fire hall has a laundry room (a separate laundry room is recommended)	Yes/No Comments:	N/A
40	Laundry room has ventilation	Yes/No Comments:	N/A

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
41	Laundry room ventilation is under slight negative pressure	Yes/No Comments:	N/A
42	Laundry room is decontaminated after use	Yes/No Comments:	Yes/No Comments:
43	Fire hall has a laundry area (a reasonable alternative when there is no separate laundry room)	Yes/No Comments:	N/A

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
44	Laundry area is away from other work spaces	Yes/No Comments:	N/A
45	Laundry area is away from unprotected workers	Yes/No Comments:	N/A
46	Laundry area is away from clean PPE storage	Yes/No Comments:	N/A

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
47	Laundry area is away from gear air dryer	Yes/No Comments:	N/A
48	Extractor used for soft gear	Yes/No Comments:	N/A
49	Extractor instructions are posted	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
50	Extractor maintenance program in place	Yes/No Comments:	Yes/No Comments:
51	Correct pH level soap available for extractor	Yes/No Comments:	N/A
52	Extractor is decontaminated after use	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
53	Gear air dryer available	Yes/No Comments:	N/A
54	Clothing worn under bunker gear is washed separately from regular laundry	Yes/No Comments:	Yes/No Comments:
55	Crews have spare clean clothing at the station to wear after showering	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
56	Truck bay / apparatus floor ventilation is adequate for storing clean bunker gear on the apparatus floor (see introductory paragraph on "Storing clean bunker gear on the apparatus floor")	Yes/No Comments:	N/A
57	Apparatus is washed inside and out after every fire call	Yes/No Comments:	Yes/No Comments:
58	Apparatus cabin air filter inspected after every fire call and replaced as needed	Yes/No Comments:	Yes/No Comments:

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
59	Apparatus cabin air filtration system is cleaned quarterly	Yes/No Comments:	Yes/No Comments:
60	A regular apparatus interior cleaning schedule is established and followed.	Yes/No Comments:	Yes/No Comments:
61	Shower facilities with soap and water are available at the fire hall, or where no showers are available, facilities to wash potentially exposed skin (neck, face, wrists, hands) are available	Yes/No Comments:	N/A

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
62	Shower or washing occurs as soon as possible upon return to fire hall	Yes/No Comments:	Yes/No Comments:
63	Dirty areas versus clean areas of the fire hall are indicated	Yes/No Comments:	N/A
64	"No Bunker Gear Beyond This Point" signage posted	Yes/No Comments:	N/A

Number	Work practice	Does this work practice take place at the fire hall?	Is there a SOP[1]?
65	Dirty areas have surfaces that are easy to clean (not carpet)	Yes/No Comments:	N/A

[1] *Standard operating procedure*

Part D: inspection of PPE

Personal protective equipment (PPE) protects workers from contaminants. PPE needs to be maintained in good condition in order to provide protection. Regular inspection of the various PPE elements should be conducted to ensure they are in good condition. Where PPE is found to require repair or cleaning, it should be removed from service and clearly identified as being out of service.

Refer to CAN/CSA-Z94.4-19, Selection, use, and care of respirators for guidance on respirator inspections.

Refer to NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting for guidance on inspecting these items.

The table below provides details on personal protective equipment inspections.

Number	PPE item	Does routine inspection occur after each use?	Does advanced inspection occur annually?	Is there a SOP[1] on inspection?
66	Respirator – SCBA[2]	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:
67	Respirator – PAPR[3]	Yes/No Comments:	N/A	Yes/No Comments:

Number	PPE item	Does routine inspection occur after each use?	Does advanced inspection occur annually?	Is there a SOP[1] on inspection?
68	Respirator – APR[4]	Yes/No Comments:	N/A	Yes/No Comments:
69	Mask flow test equipment (ie. PosiChek)	N/A	Yes/No Comments:	Yes/No Comments:
70	Helmet	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:

Number	PPE item	Does routine inspection occur after each use?	Does advanced inspection occur annually?	Is there a SOP[1] on inspection?
71	Boots	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:
72	Bunker coats: outer shell	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:
73	Bunker coats: inner lining	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:

Number	PPE item	Does routine inspection occur after each use?	Does advanced inspection occur annually?	Is there a SOP[1] on inspection?
74	Bunker pants: outer shell	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:
75	Bunker pants: inner lining	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:
76	Balaclava/hood	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:

Number	PPE item	Does routine inspection occur after each use?	Does advanced inspection occur annually?	Is there a SOP[1] on inspection?
77	Gloves	Yes/No Comments:	Yes/No Comments:	Yes/No Comments:

[1] Standard operating procedure
[2] Self-contained breathing apparatus
[3] Powered air-purifying respirator
[4] Air-purifying respirator

The table below discusses PPE training.

Number	PPE practice	Is this element included in your program?
78	Workers receive training in use, removal, disposal, cleaning, inspection and limitations of PPE	Yes/No Comments:

Part E: use of PPE during decontamination activities

Proper PPE should be worn to protect workers from contaminants while they are handling soiled equipment or decontaminating surfaces.

When in the laundry room area, soiled bunker gear must be handled while wearing appropriate PPE such as disposable coveralls, safety glasses, rubber gloves, and N95 masks to prevent exposure via inhalation and skin absorption during laundering activities.

After laundering soiled gear, appropriate PPE should be worn while decontaminating the surfaces of the laundry room/area and extractor.

Some examples of PPE that could be used for various tasks are included in the checklist below – this list is not exhaustive and there may be other tasks in your fire hall that require PPE.

The table below outlines PPE use during decontamination activities.

Number	**Activity**	**During this activity, do workers wear:** • **N95 respirator[1]** • **safety glasses** • **rubber gloves** • **coveralls?**	**Is there a SOP[2]?**
79	Handling/ decontamination of soiled soft/hard gear	Yes/No Comments:	Yes/No Comments:

Number	Activity	During this activity, do workers wear: • **N95 respirator**[1] • **safety glasses** • **rubber gloves** • **coveralls?**	Is there a SOP[2]?
80	Decontamination of laundry area/room	Yes/No Comments:	Yes/No Comments:
81	Decontamination of shower facilities	Yes/No Comments:	Yes/No Comments:
82	Decontamination of apparatus - crew compartment and exterior	Yes/No Comments:	Yes/No Comments:

Number	Activity	During this activity, do workers wear: • **N95 respirator**[1] • **safety glasses** • **rubber gloves** • **coveralls?**	Is there a SOP[2]?
83	Decontamination of hose at station	Yes/No Comments:	Yes/No Comments:

[1] *Eelastomeric or filtering facepiece*
[2] *Standard operating procedure*

Further information

Purchasing equipment

When purchasing new apparatus, hose or other equipment, consider ease of cleaning. For example, non-porous crew compartment seats are easier to clean than fabric.

Cancer prevention resources

Visit Ontario's Ministry of Health website for more cancer prevention information and resources.

Related

Read WSIB Document Number 23-02-01 Cancers in Firefighters and Fire Investigators, effective July 4, 2018 to learn about the prescribed cancers and the circumstances under which they will be presumed to be work-related occupational diseases, as set out in *O. Reg. 253/07 Firefighters*, under the Workplace Safety and Insurance Act, 1997, S.O. 1997, c. 16, Sched. A.

Read Regulation 833 – Control of Exposure to Biological or Chemical Agents for respiratory protection program requirements and respirator use and selection.

Read O. Reg. 714/94 – Firefighters - Protective Equipment for structural firefighting protective garment requirements.

Read CSA Z180.1-19 Compressed breathing air and systems for guidance on the purity of compressed breathing air supplied to service outlets and for breathing air systems required to produce, store and distribute such air.

Read NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting for guidance on the selection, care, and maintenance of fire fighting protective ensembles to reduce health and safety risks associated with improper maintenance, contamination, or damage.

Read NFPA 1500 Standard on Fire Department Occupational Safety, Health and Wellness Program for guidance on occupational safety and health programs for fire departments.

Read about how and when to report an occupational illness to the Ministry of Labour, Training and Skills Development.

Connect with the Firefighter Cancer Support Network.

Firefighter guidance notes

Best practices for protecting the health and safety of fire service workers in Ontario.

Overview

These firefighter's guidance notes help fire service workers understand potential health and safety issues in their workplace. The notes also help employers identify hazards that are unique to fire services and determine how to prevent injury and illness to their workers.

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.

Guidance notes out for comment

Visit the Ontario Association of Fire Chiefs website to view and comment on guidance notes under development (https://www.oafc.on.ca/about/fire-service-resources/section-21/guidance-notes-out-comment) .

Fire section 21 committee

We would like to acknowledge the employer and worker members appointed to the Ontario Fire Service Health and Safety Advisory Committee, formed under section 21 of the *Occupational Health and Safety Act*. Their contributions and cooperation were instrumental in the development of these guidance notes.

Section 1: Apparatus and equipment

1-1 Fire apparatus occupant safety

Background

Collisions or sudden stops involving fire apparatus may result in injury or death to firefighters.

Concerns/hazards

Any activity that requires firefighters to leave their seated and belted position while riding in a moving vehicle, such as dressing in protective clothing, can result in a serious injury or death if the vehicle makes a sudden stop or is involved in a collision. Similarly, loose objects can also result in serious injury or death if the vehicle makes a sudden stop or is involved in a collision.

Actions for employers

Employers must:

- ensure that firefighters are seated in the cab of fire apparatus traveling more than 8 km/h
- ensure that there are sufficient seats equipped with seat belts in the cab of fire apparatus

Using seat belts

While there may be certain exemptions from wearing seatbelts for firefighters seated in the cab of a fire apparatus, it is a good health and safety practice to remain seated, with the seat belt on, until the vehicle comes to a complete stop.

Similarly, while there may be certain exemptions from wearing seatbelts for persons being transported in the patient compartment of an ambulance, firefighters assisting Emergency Medical Services personnel in an ambulance should wear a seat belt while the vehicle is moving.

Putting on PPE in vehicles

When fire apparatus is moving and firefighters need to put on personal protective equipment (PPE), the apparatus should pull over safely to the side of the road and stop. Personnel should refasten seat belts before the apparatus continues.

Secure loose items

All items in the cab of a fire apparatus must be secured. Any loose item can become a projectile in a collision or sudden stop. Unrestrained self-contained breathing apparatus (SCBA) can cause serious injury.

Employers should:

- relocate any non-essential equipment out of fire apparatus cabs
- follow the manufacturer's instructions for securing seat-mounted SCBA
- ensure the cylinder restraint device used to secure the SCBA in the cab is not released until the apparatus has come to a complete stop

Applicable regulations and acts

Read:

- *O. Reg. 714/94 - Firefighters – Protective Equipment* *(https://www.ontario.ca/laws/regulation/940714)*

- section 7.1 for seat belt requirements in the cab of fire trucks
- section 7(4) for securing items in the cab of the fire truck
- subsection 7(2) and section 8 for seating in the cab of a fire truck

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
- *Highway Traffic Act* *(https://www.ontario.ca/laws/statute/90h08)* for seat belt requirements and exemptions for vehicle occupants

1-2 Apparatus inspections and maintenance program

Background

Appropriate inspections and maintenance help keep apparatus and occupants safe.

Concerns/hazards

Fire service apparatus must be maintained in good condition to ensure it is safe and will not jeopardize the safety of other road users or the occupants.

Actions for employers

Employers should:

- train firefighters on conducting apparatus inspections
- establish procedures for the inspections to be conducted on all fire service apparatus
- consult with the Joint Health and Safety Committee or Health and Safety Representative when developing procedures

Commercial vehicle inspections

Read more about the Ministry of Transportation information on commercial vehicle safety requirements (http://www.mto.gov.on.ca/english/trucks/commercial-vehicle-safety-requirements.shtml) .

For more information on the Motor Vehicle Inspection Program contact your local Ministry of Transportation Enforcement Office (http://www.mto.gov.on.ca/english/about/mto-offices.shtml) .

Driver inspections

Firefighters should:

- conduct and document vehicle inspections
- monitor the apparatus for any defects

Firefighters must report defects which may endanger the health and safety of workers to the employer or supervisor.

Apparatus preventative maintenance program

Employers should:

- develop a preventative maintenance program
- inspect apparatus at regular intervals to ensure they are safe
- keep inspection records including the date, odometer reading, the nature of the inspection and any repairs
- make inspection and repair records available to apparatus drivers

Apparatus weight

Apparatus should have a safe overall weight and weight distribution. Employers should consider how equipment distribution affects the overall balance and weight of the apparatus.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(1)(b) for maintaining equipment in good condition
  - clause 25(2)(a) for providing information and instruction to workers
  - clause 28(1)(c) for reporting equipment defects
- *Regulation 714/94 – Firefighters – Protective Equipment* (https://www.ontario.ca/laws/regulation/940714)
  - section 6 for inspection, testing and service record requirements for chassis mounted aerial devices
- *Highway Traffic Act* (https://www.ontario.ca/laws/statute/90h08) for commercial vehicle safety requirements

Applicable standards

Read NFPA 1911 Standard for the Inspection, Maintenance, Testing, and Retirement of In-Service Automotive Fire Apparatus (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1911)

1-3 Backing fire apparatus

Background

The following guidelines are for backing fire apparatus into stations and for backing up required during the performance of firefighting duties. Priority must be given to the safety of citizens and firefighters in any backing up operation.

Concerns/hazards

Backing up fire apparatus can be dangerous as the driver may not be able to see the hazards or people behind the apparatus.

Actions for employers

Employers should ensure that firefighters follow safe procedures for backing up fire apparatus.

Backing into a fire station

The apparatus should come to a **full stop** in front of the station with the headlights, emergency lights and 4-way flashers turned on. This allows firefighters to dismount safely and assist the driver while backing up.

Firefighters posted on either side of the apparatus, **but not on the roadway**, should assist the driver in determining when it is safe to proceed. Flashlights and high visibility safety apparel can be used in low visibility. The duty of firefighters assisting in backing up is to control pedestrian traffic and to assist the driver in backing the apparatus onto the ramp and into the station using agreed upon hand signals. Firefighters must stay in a safe position in full view of the driver. If the driver loses sight of a guiding firefighter, the apparatus should stop immediately.

If the driver of a vehicle does not have a full view of the vehicle's intended path of travel, regulation requires that the driver must only move the vehicle as directed by a signaller who is a competent person and who is stationed:

- in full view of the driver
- with a full view of the intended path of travel of the vehicle
- clear of the intended path of travel of the vehicle

Where there are insufficient members of a crew available to assist the driver to back into a station, additional firefighters at the station should be asked to provide the necessary assistance.

Stopping traffic should be avoided. See Guidance note 6-10: Highway traffic control (https://www.ontario.ca/document/firefighter-guidance-notes/6-10-traffic-safety-and-control) if it is necessary to stop traffic.

Backing at other locations

Drivers should:

- avoid backing up whenever possible
- plan ahead when parking, so backing up is not necessary
- have firefighters assist them, as outlined above, if backing up is unavoidable
- if firefighters are unavailable, dismount and walk completely around the apparatus before backing up to ensure there are no unseen obstacles behind the apparatus

Employers may wish to refer to Guidance note 6-10: Highway traffic control (https://www.ontario.ca/document/firefighter-guidance-notes/6-10-traffic-safety-and-control) , if applicable.

Backing of tankers

Backing of tankers during water shuttle operations is often unavoidable and should be done as carefully as possible to avoid accidents and injury.

Firefighters should:

- position dump chutes for dumping prior to the final backing to the Port-a-tank
- consider the remote control of the dump valve from the side of the truck or from the cab so firefighters do not have to operate from the back of the vehicle
- ensure a Water Supply Officer (http://www.nfpa.org/assets/gallery/firewise/operationWater/index3.htm) is assigned to control the movement of tankers and keep firefighters clear of tankers when backing up
- wear high visibility safety apparel when assigned to direct tankers and/or operate filling or dumping operations

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
- *Regulation 851 – Industrial Establishments* *(https://www.ontario.ca/laws/regulation/900851#BK12)*
  - section 56 for directing a vehicle with a signaller

Applicable standards

CSA High-visibility safety apparel standard (Z96-15) (http://shop.csa.ca/en/canada/high-visibility-apparel/z96-15/invt/27016522015) for guidance on colours and reflective striping for traffic vests

1-5 Life safety rope and equipment

Background

Fire departments that use life safety ropes and equipment should make sure they are safe for use.

Concerns/hazards

Inadequate life safety ropes can be hazardous when used in life safety activities.

Actions for employers

Employers should:

- have a comprehensive inspection and replacement program
- establish life safety rope and equipment retirement policies in accordance with manufacturer’s service life recommendations

- keep records that include a complete history of the use of all life safety ropes and related equipment

Reusing life safety rope

Manufacturers of life safety rope provide information to consider prior to reusing life safety rope. Manufacturer's directions should be followed when inspecting, testing and maintaining all life safety ropes and related equipment.

At a minimum, the following criteria should be met before reusing life safety rope:

- no damage can be observed when visually inspecting the life safety rope
- has not been exposed to heat, direct flame impingement, or abrasion
- has not been subjected to any impact load
- has not been exposed to liquids, solids, gases, mists or vapours of any chemical or other material that can deteriorate rope
- passes inspection when inspected by a qualified person following the manufacturer's inspection procedures both before and after each use

If any life safety rope does not meet all of the above conditions, or there is any doubt about serviceability, it should be immediately removed from service as a life safety rope.

Acquiring new life safety ropes and related equipment

When acquiring new life safety ropes or related equipment, employers should ensure that the equipment has been properly tested and certified for life safety purposes by a qualified agency in accordance with relevant standards. Examples of these standards can be found below.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(1)(b) for maintaining equipment in good condition

Applicable standards

For guidance on acquiring and maintaining new life safety ropes or related equipment, read NFPA 1983 – Standard on Life Safety Rope and Equipment for Emergency Services (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1983&tab=about) and NFPA 1858 - Standard on Selection, Care, and Maintenance of Life Safety Rope and Equipment for Emergency Services (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1858)

For guidance on acquiring new life safety ropes or related equipment, read ULC. S555 – Standard for fire and emergency service technical rescue ropes and water rescue throw ropes and associated equipment (http://www.shopulstandards.com/ProductDetail.aspx?UniqueKey=25293)

1-6 Inspection of chains, webbing, wire rope and extrication tools

Background

Extrication tools, such as spreaders, cutters, rams, chains, webbing and wire rope, must be kept in good working condition for the safety of firefighters.

Concerns/hazards

If chains, webbing, wire rope or other extrication tools break during a rescue, the results can be catastrophic both to rescuers and the person being rescued.

Actions for employers

Employers must ensure that all extrication equipment is maintained in good condition.

Employers should:

- ensure that regular checks of tools, chains, webbing and wire ropes are made in accordance with the manufacturer's recommendations so that they are:
  - free of rust and/or other oxidation
  - clean and properly lubricated
  - free of fraying
- ensure that chains are hung
- ensure extrication tools are inspected regularly
- ensure that equipment is used for intended purposes

During use of tools, chains, webbing and wire rope

When using chains, webbing or wire rope:

- use pads around sharp edges
- stop use immediately if stretching of the chain, webbing, wire rope or hooks is observed
- position users away from the whip of a broken tensioned chain, webbing or wire rope

Excessive temperatures can affect both the strength and work characteristics of chains, wire rope or webbing.

Do not use chains, webbing or wire rope to lift objects unless they are rated for lifting loads.

After use of tools, chains, webbing and wire rope

After each use, clean and inspect tools, chains, webbing and wire rope for:

- excessive wear points
- nicks or gouges
- elongation of, distortion of or damaged links, couplings or attachments
- twists
- spread at throat openings of hooks on chains, webbing or wire rope
- hydraulic line damage
- damage to motor, handles or hydraulic tools

Measure spreading at throat openings of hooks on chains, webbing or rope against measurements taken at the time of purchase or manufacturer's specifications.

Non-destructive testing of extrication tools

Extrication tools, including chains, should be inspected by a competent person using non-destructive testing methods, if the following conditions are detected by routine inspection or use:

- signs of wear, elongation, distortion or excessive heat
- tools or chains have been subjected to severe blows or impact loading

Hydraulic powered and electro hydraulic hybrid extrication tools

Hydraulic powered extrication tools should be inspected by a competent person at least annually, using the manufacturer's specified test methods.

Maintenance or repairs on hydraulic powered extrication tools should be performed by a competent person.

Employers should develop a guideline for routine checks and inspections that follow the manufacturer's specifications and should ensure that:

- hydraulic lines, valves, couplings and connections have no leaks, kinks or visible wear
- quick connect coupling devices perform as intended with locking devices
- protective caps are in place and in good repair
- tips, shears and other contact points as well as connective devices such as pins show no signs of visible damage
- the "deadman" switch returns the control handle on the tool to the neutral position when released
- lubrication oil in the power head crankcase is at a level that meets manufacturer's specifications
- hydraulic fluid in the power head is at a level that meets manufacturer's specifications
- wires and cable that power an electrical hydraulic pump are free of visible damage
- carrying handles, if equipped, are in good repair

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(1)(b) for maintaining equipment in good condition

Applicable standards

For additional information on hydraulic powered and electro hydraulic hybrid extrication tools, read NFPA 1936 Standard on powered rescue tools (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1936&tab=editions) , 2015 Edition

1-7 Electrical equipment and cords

Background

Firefighters must work with electrical generators, tools and cords.

Concerns/hazards

The majority of incidents of shocks, burns or electrocution have occurred from improperly maintained tools and electrical cords.

Actions for employers

Employers must:

- inform workers of hazards
- provide information and instruction to workers to keep them safe
- ensure that provided equipment is maintained in good condition

Employers should make sure that:

- tools, lights and cords are repaired by a competent person and maintained to manufacturer's specifications
- electrical cords with breaks, splits, cuts or cracks in the outer casing are repaired by a competent person or removed from service
- electrical cords with damage to inner casings or wire are replaced
- tools, lights, and cords are cleaned and inspected after each use

- portable electrical lights have a protective screen over the bulb/glass area
- new electrical cords are compliant with the *Ontario Electrical Safety Code* *(https://www.ontario.ca/laws/regulation/990164)* , Table 11 (Canadian Standards Association STW[1] Type Designation) for extra-hard usage in wet environments
- twist connections and overlapping insulated rubber connections are used
- only three-wire or double insulated tools, equipment or cords are used

Extension cords

When choosing an extension cord, consider the use, size, current and wattage rating of the cord. Consider the gauge of the cord and the length of the cord, when determining if it is adequate for the wattage of the equipment.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(1)(b) for maintaining equipment in good condition
  - 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

Applicable standards

For requirements for electrical work in Ontario, read Ontario Electrical Safety Code (https://www.esasafe.com/contractors/the-ontario-electrical-safety-code)

For information on determining an appropriate extension cord, read the Electrical Safety Authority's Flash bulletin on Hazards due to misuse of extension cords (https://www.esasafe.com/assets/files/esasafe/pdf/Flash_Notices/10-02-FL.pdf)

For determining the gauge of wire appropriate for the length of the extension cord, read ASTM B258-14, Standard specification for standard nominal diameters and cross-sectional areas of awg sizes of solid round wires used as electrical conductors (https://www.astm.org/Standards/B258.htm)

Related

For additional information about electrical safety, read Electrical safety handbook for emergency responders – Best practices for coping with electrical hazards in rescue and fire situations (https://www.pshsa.ca/product/electrical-safety-handbook-for-emergency-responders/) (PDF), Hydro One Networks Inc., Electrical Safety Authority, Office of the Fire Marshal, and Public Services Health and Safety Association, revised 5th Edition, 2013

1-8 Safety considerations for new fire apparatus

Background

Fire apparatus are important and expensive purchases for any fire department. Transportation and operational safety may be adversely affected without appropriate design, construction and purchasing standards.

Concerns/hazards

If appropriate design and construction techniques aren't followed, there is a potential of injury to the firefighters operating the apparatus.

Some examples of potential hazards include:

- refurbished fire apparatus may not meet appropriate safety standards

- water tanks without baffles allow water movement which affects the handling of the tanker during braking or cornering
- cabs that aren't designed for the fire service may not have safety features such as proper seating for firefighters, a mechanical means of latching equipment or airbag or crash enhancements
- repurposed apparatus frames may not be engineered to safely withstand imposed stresses

Actions for employers

Employers should:

- reference an applicable standard, when designing and building fire apparatus, such as:
  - CAN/ULC S515 Standard for automobile fire fighting apparatus (https://canada.ul.com/ulcstandards/salesofulcstandardsmaterials/)
  - NFPA 1901 Standard for automobile fire apparatus (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1901)
  - NFPA 1906 Standard for wildland fire apparatus (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1906)
  - NFPA 414 Standard for aircraft rescue and fire-fighting vehicles (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=414)
- consult with their joint health and safety committee or health and safety representative for the workplace when designing or purchasing fire apparatus

Importing apparatus into Canada

Read section 12 of the *Motor Vehicle Safety Regulations (https://www.tc.gc.ca/eng/acts-regulations/regulations-crc-c1038.htm)* for information about standards for vehicles imported into Canada. Failing to comply may put firefighters at risk in a collision.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(h) for taking every precaution reasonable to protect workers
- *O. Reg. 714/94 - Firefighters – Protective Equipment Regulation (https://www.ontario.ca/laws/regulation/940714)*
  - subsection 7(2) for requirements about fire truck cab enclosure and seat numbers
  - subsection 7(3) for handle-hold requirements
  - subsection 7(4) for the storage of SCBA compressed air cylinders in the cab of a fire truck
  - section 7.1 for seat and seatbelt requirements in the cabs of trucks

Applicable standards

For standards on the design, performance, and acceptance criteria for aircraft rescue and fire-fighting (ARFF) vehicles, read NFPA 414 Standard for aircraft rescue and fire-fighting vehicles (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=414)

For standards on new automotive fire apparatus and trailers, read NFPA 1901 Standard for automotive fire apparatus (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1901) or CAN/ULC S515 Standard for automobile fire fighting apparatus (https://canada.ul.com/ulcstandards/salesofulcstandardsmaterials/)

For standards on new automotive fire apparatus designed primarily to support wildland fire suppression operations, read NFPA 1906 Standard for wildland fire apparatus (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1906)

Related

Read firefighter guidance note 1-2 Apparatus inspections and maintenance program (https://www.ontario.ca/document/firefighter-guidance-notes/1-2-apparatus-inspections-and-maintenance-program) .

1-9 SCBA air cylinder handling

Background

A clean breathable air supply is a firefighter's most vital lifeline during emergency operations in the field, making self-contained breathing apparatus (SCBAs) compressed air cylinders a critical piece of personal protective equipment.

Concerns/hazards

(SCBAs) compressed air cylinders, if damaged, can fail catastrophically at the valve or the cylinder body when under pressure or when being filled. Catastrophic failures can result in serious injury to firefighters due to the cylinder becoming a projectile. There may also be a sound pressure wave that can damage hearing or internal organs. Such failures have been known to damage or demolish fire service vehicles, buildings or fill-stations.

Actions for employers

Employers should:

- conduct a risk assessment of their (SCBAs) compressed air cylinder handling and storage procedures in consultation with the joint health and safety committee or health and safety representative
- develop procedures to prevent damage to (SCBAs) compressed air cylinders during normal job functions

Safety during transport

(SCBAs) carried in the cab of the fire apparatus must be secured in place by positive mechanical means or stored in closed compartments with positive latching doors.

(SCBAs), whether empty or full, should be secured to prevent cylinder chaffing, unwanted movement and damaging impact, or contact with chemicals (such as corrosive acids and hydroxides).

Storage in the station or on fire apparatus parked in the station

(SCBAs) must:

- have a valve connection that prevents an inadvertent connection which would result in a hazardous mixture of gases
- be secured in position during transportation, storage or use
- have the valve protection cap in position when the cylinder is not in use
- be protected from physical damage

Protection from physical damage may include the prevention of a fall to a hard surface, damaging contact with other equipment or vehicle doors, or contact with chemicals that may cause physical damage.

Protection from chemical contamination

Certain chemicals that can be found in the fire station (such as strong alkaline solutions) are extremely corrosive to the composite materials used to make (SCBAs) compressed air cylinders. Chemical contact with the cylinder can lead to its catastrophic failure.

(SCBAs) should be:

- protected against chemical damage and kept as clean as possible
- properly handled, inspected and cleaned after use to prevent chemical contamination

Valve protection

The valve protection cap will prevent contaminants from entering the open connection and potentially contaminating the air supply or damaging the (SCBAs) regulator. The valve protection cap should be left in place whenever the cylinder is not in use.

Air cylinder fill stations

Fill stations should:

- be capable of containing a catastrophic failure during refill of the cylinder
- be used only as instructed by the manufacturer

Visual inspection

(SCBAs) compressed air cylinders should be:

- visually inspected before they are filled and after every use to determine if there is visible damage to the cylinder or valve assembly
- immediately removed from service and sent for inspection and testing if there is damage noted that exceeds the manufacturer's recommendations as acceptable
- used on a rotational basis such that all of them are used on a regular basis
- emptied and refilled with compressed breathable air when unused for 12 months

Other requirements

Consider other legislation which may apply to (SCBAs) compressed air cylinders, such as the Federal Transportation of Dangerous Goods Regulations (TDGR), under the *Transportation of Dangerous Goods Act* (http://laws-lois.justice.gc.ca/eng/acts/T-19.01/) .

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(1)(b) for maintaining equipment in good condition
  - 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 851 - Industrial Establishments* (https://www.ontario.ca/laws/regulation/900851)
  - section 49 for compressed gas cylinder requirements
- *Reg. 714/94 - Firefighters – Protective Equipment* (https://www.ontario.ca/laws/regulation/940714)
  - subsection 7(4) for the storage of (SCBAs) compressed air cylinders in the cab of a fire truck
- Transportation of Dangerous Goods Regulations (http://laws-lois.justice.gc.ca/eng/regulations/sor-2001-286/) made under the *Transportation of Dangerous Goods Act* (https://www.tc.gc.ca/eng/acts-regulations/acts-1992c34.htm) , for the transportation of (SCBAs)s

Applicable standards

For standards on the purity of compressed breathing air and for breathing air systems required to produce, store and distribute such air, read CSA Z180.1- Compressed breathing air and systems (http://shop.csa.ca/en/canada/respiratory-protection/z1801-13/invt/27010552013/)

For standards on the handling and filling of cylinders, read CSA B340 - Selection and use of cylinders, spheres, tubes, and other containers for the transportation of dangerous goods, class 2 (http://shop.csa.ca/en/canada/transportation/b340-14/invt/27016482014)

Related

Read firefighters guidance note Guidance note 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)

Section 2: Communications

2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)

2-2 Crew integrity (https://www.ontario.ca/document/firefighter-guidance-notes/2-2-crew-integrity)

2-3 Radio communications (https://www.ontario.ca/document/firefighter-guidance-notes/2-3-radio-communications)

2-4 Incident safety officer (https://www.ontario.ca/document/firefighter-guidance-notes/2-4-incident-safety-officer)

2-5 Archived

2-6 Archived

2-7 Reporting exposures to biological, chemical and physical agents (https://www.ontario.ca/document/firefighter-guidance-notes/2-7-reporting-exposures-biological-chemical-and-physical-agents)

2-1 Incident command

Background

Successful emergency scene operations require the application of an effective command system.

An effective incident command system has a dramatic effect on efficiency, effectiveness of response and firefighter safety in all situations.

Concerns/hazards

The lack of a strong, clear and identifiable incident command system may adversely affect the outcome of emergency scene operations and place firefighters in needless danger.

Actions for employers

Employers should:

- train all personnel in incident command
- develop and implement an incident command system supported by operational guidelines, training, post incident analyses and regular review and revision
- implement the key concepts of crew accountability, safety officers, sectoring and crew rotation to increase firefighter safety
- require use of an incident command system during all incidents

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
    - clause 25(2)(a) for providing information and instruction to a worker
    - clause 25(2)(h) for taking every precaution reasonable to protect workers

2-2 Crew integrity

Background

Firefighters working in hazardous or dangerous areas should maintain crew integrity — an arrangement in which two or more individuals enter, operate and exit together so there is help available in the event of an emergency.

Concerns/hazards

Firefighters may need assistance during emergency response situations, if they become injured, trapped, or unconscious.

Actions for employers

Employers should:

- ensure crew integrity is maintained throughout the emergency
- develop operational procedures containing entry and exit principles
- train firefighters on the procedures

Crew integrity

The purpose of crew integrity is to ensure that if firefighters become injured, trapped, separated or unconscious, a team member will be available to assist or call for help.

Firefighters working in any hazardous or dangerous areas should enter, operate and exit in teams. Crew integrity must be maintained while doing any of these activities so no member of the team is left behind or works alone.

When working in hazardous areas, it is important for team members to be in constant communication with each other and incident command, in order to coordinate their activities. This could be established through visual, audible or physical means such as a safety guide rope.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable to protect workers

Related

Read firefighters guidance notes:

- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 5-1 Firefighter accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)

2-3 Radio communications

Background

Effective communication devices and procedures are a critical component in emergency operations.

Concerns/hazards

Firefighters should have a method of two-way communication suitable for the circumstances so that they can send and receive the information they need to do their jobs safely, particularly in environments which are immediately dangerous to life or health (IDLH).

Actions for employers

Employers must provide training on radio equipment to firefighters. Training should include how to use portable radios while wearing full personal protective equipment (PPE).

Employers should also:

- determine those circumstances where each firefighter should be provided their own radio
- make sure that communication devices and procedures are used in conjunction with entry control and incident command systems (guidance note 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command) and guidance note 5-1 Firefighter accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control))
- develop procedures to address radio communications congestion
- make sure that plain language is used when communicating
- identify dead zones within response areas and plan accordingly
- put in place a reliable maintenance and repair program
- develop procedures/ operating guidelines for the regular testing of all radios and radio features, including any emergency buttons or electronic radio identification codes that may exist
- consult with planning and building officials during new building construction to understand how it may impact the fire radio network
- consult with the joint health and safety committee or health and safety representative, when considering new or upgraded radio communication devices and determining procedures for their use

Considerations for radio communications devices

When considering new or upgraded radio communications devices, consider the following:

- whether the device can be operated without removing the face piece of self-contained breathing apparatus
- ease of operation in full PPE – especially gloved hands
- the need for intrinsically safe radio ensembles
- features that may safeguard against accidental shut off or accidental channel changes
- durability and resistance to damage from water, chemicals, extreme temperatures and rough handling
- the need for radio interoperability with other emergency response agencies
- multiple channel capabilities that enable effective fire ground communications
- in-building radio coverage and the potential need for in-building or mobile repeater solutions
- the need for talk around or simplex functionality in addition to main radio channels
- the need for hands-free operation

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment in good condition
  - clause 25(2)(a) for providing information and instruction to a worker

Related

Read firefighter guidance notes:

- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 5-1 Firefighter accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)

- 6-11 Rapid intervention teams (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)

Read the IAFC position on Assignment of Portable Radios/Two-Way Communications Devices to Every Firefighter on the Fireground (https://www.IAFC.org/about-IAFC/positions/position/IAFC-position-assignment-of-portable-radios-two-way-communications-devices-to-every-firefighter-on-the-fireground)

2-4 Incident safety officer

Background

The Incident Commander (IC) has overall responsibility for incident management. To aid the IC, incident safety officers (ISO) may be appointed to monitor incident operations and advise the IC on all matters relating to operational safety, including the health and safety of emergency responder personnel.

Concerns/hazards

Given the complex nature of fire-fighting activities, there may be incidents where the IC is unable to adequately supervise, communicate with and manage all resources under their control. In these situations, the IC should consider establishing a safety sector and appointing one or more Incident Safety Officers.

Actions for employers

Employers should develop operational guidelines which outline:

- when a safety sector should be established
- how the ISO is to be identified at the scene
- the roles and responsibilities of an ISO
- the training a worker must receive prior to being assigned as an ISO
- who should be appointed ISO
- when and under what authority the ISO can unilaterally alter, suspend or terminate dangerous or life threatening operations
- that the presence of an on scene ISO in no way diminishes the responsibility of individual officers and the IC for the safety of workers under their direction
- how the ISO will integrate with the communication system being used

Incident safety officer

An ISO should be a competent person who is qualified because of knowledge, training and experience.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable to protect workers

Applicable standards

For standards regarding the job performance requirements of an incident safety officer, read NFPA 1521 Standard for fire department safety officer professional qualifications (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1521)

Related

Read firefighters guidance notes 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)

2-7 Reporting exposures to biological, chemical and physical agents

Background

Firefighters often work in environments where there is a potential to be exposed to biological, chemical or physical agents. These exposures may occur, despite taking every precaution reasonable in the circumstances to protect firefighters' health and safety.

Concerns/hazards

Firefighters may experience many such exposures over their careers that could result in an illness or disease. Due to latency periods, illness or disease may occur long after the time of the exposure.

Actions for employers

Employers should:

- establish a procedure for recording exposures, whether confirmed or suspected
- establish a procedure for reviewing incidents which resulted in exposure, to prevent a similar reoccurrence
- consult with their joint health and safety committee or health and safety representative in the development of these procedures

Exposure report contents

An exposure report should include information regarding:

- the incident and details of the exposure
- personal protective equipment worn or used
- hazardous agent(s) potentially exposed to
- additional details regarding how the exposure occurred

A copy should be provided to the joint health and safety committee or health and safety representative.

Prevention of reoccurrence

Exposure reports should be reviewed after incidents, to determine what measures should be taken to prevent a reoccurrence.

Consider the following:

- updates to current operating procedures or guidelines
- adequacy of personal protective equipment
- worker training

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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 in the circumstances to protect workers
- *Regulation 833 – Control of Exposure to Biological or Chemical Agents* (https://www.ontario.ca/laws/regulation/900833)
- *Regulation 851 – Industrial Establishments* (https://www.ontario.ca/laws/regulation/900851)
  - section 130 for training requirements for workers who may be exposed to biological, chemical or physical agents

Section 3: Environment

3-1 Controlling exposure to diesel exhaust

Background

Exhaust produced by diesel engines is a complex mixture of gases, vapours and particulates. The gas portion of diesel exhaust is mostly carbon dioxide, carbon monoxide, nitric oxide, nitrogen dioxide and sulfur oxides.

Vapours include hydrocarbons, such as Polycyclic Aromatic Hydrocarbons (PAHs). The particulate portion of diesel exhaust is made up of particles such as carbon, organic materials (including PAHs), and traces of metallic compounds.

Concerns/hazards

The International Agency for Research on Cancer, part of the World Health Organization, has classified diesel engine exhaust as carcinogenic to humans. It found that diesel exhaust is a cause of lung cancer and noted a positive association with an increased risk of bladder cancer.

Actions for employers

Employers must:

- make sure the fire station is adequately ventilated by either natural or mechanical means so that the atmosphere does not endanger the health and safety of workers
- take all measures reasonably necessary in the circumstances to protect workers from exposure to diesel exhaust components, including:
  - substitution of the hazardous biological or chemical agent
  - engineering controls
  - administrative controls, including work practices
  - hygiene facilities and practices
  - where applicable, personal protective equipment

Hierarchy of controls

Consider the hierarchy of controls to reduce exposure to diesel exhaust gases, vapours and particulate.

Substitution

- Remove diesel powered engines from service and replace with electric engines.

Engineering controls

Ventilation

- Install direct capture (tailpipe) exhaust system extractors, which are considered to be the most effective engineering control.
- Other ventilation controls that may supplement direct capture include:
  - install and maintain demand-control gas sensor systems (CO, NO_2) that are interlocked to activate ventilation
  - provide general (dilution) mechanical ventilation to supplement local exhaust ventilation systems
  - provide sufficient makeup fresh air to replace air exhausted
  - ensure that the discharge of air from any exhaust system prevents the return of contaminants to the workplace
  - adjust ventilation systems to maintain a negative pressure on the apparatus floor relative to adjacent areas

Building

- Isolate living quarters, laundry rooms and office areas from the apparatus floor by ensuring doors are self-closing and have adequate door seals.
- Protect pole holes with covers or enclose them in vestibules with appropriate doors.

Truck

- Modify existing engines to reduce emissions.
- Use low emission engines.
- Use pressurized, filtered air truck cabs.

Administrative controls

Written procedures

- Prepare written standard operating procedures for the station, including ventilation system operation/maintenance and truck operation/maintenance.

Truck and equipment operation

- Implement a no-idle policy inside the truck bay.
- Move apparatus outdoors as soon as possible after start-up, after the low-pressure warning devices deactivate on apparatus equipped with air brakes.
- Keep doors closed when engines are idling outdoors in the immediate vicinity of the fire station.
- Store PPE off apparatus floor.

Choice of fuel

- Use low sulphur diesel fuel.
- Use diesel fuel additive to improve combustion.

Air monitoring

- Monitor workplace for diesel exhaust emissions, such as CO and NO_2, to ensure exposure is as low as possible.
- Install CO monitors in station living quarters and training rooms.

Maintenance and testing

- Regularly maintain all mechanical ventilation systems to ensure they are operating as designed.

- Perform regular preventive maintenance of diesel-powered engines and equipment to minimize hazardous emissions.
- Conduct engine emission testing at idle and load settings.
- Use on-board emission control system diagnostics check.

Housekeeping

- Open windows and doors to provide natural ventilation if it will not interfere with other controls in place.
- Regularly wash clothing, blankets, bedding, drapes and other surfaces which may become contaminated with particulates and other products of combustion.

Educating workers

- Educate workers on the hazards of exposure to diesel exhaust and control measures in place.
- Educate workers on the symptoms of engine combustion problems, such as exhaust smoke colour or engine performance.
- Perform all tasks in a manner to minimize exposure to exhaust gases.

Personal protective equipment

As a last line of defense, consider the use of respiratory protection, coveralls or other PPE as appropriate to reduce exposure to diesel exhaust gases, vapours and particulates.

Note that generally, employers must protect workers from exposure to a hazardous biological or chemical agent without requiring them to wear and use a respirator. Where exposure to these hazards cannot be avoided or effectively controlled, employers must provide a respirator appropriate in the circumstances to protect the workers from exposure.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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 851 - Industrial Establishments* *(https://www.ontario.ca/laws/regulation/900851)*
  - section 127 for adequate ventilation
- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* *(https://www.ontario.ca/laws/regulation/900833)*
  - for occupational exposure limits

Related

For more tips on reducing exposure to carcinogens, read the Firefighter's Cancer Prevention Checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)

For further information about research on diesel engine exhaust, read International Agency for Research on Cancer: Diesel engine exhaust carcinogenic (https://www.iarc.fr/en/media-centre/pr/2012/pdfs/pr213_E.pdf)

NFPA 1500 Standard on Fire Department Occupational Safety, Health and Wellness Program (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1500)

3-2 Asbestos

Background

Asbestos is a generic term for a group of naturally occurring mineral fibres known for their strength, flame and heat resistance.

For buildings constructed prior to 1992, assume that asbestos may be present. Prior to 1992, asbestos was used in buildings in a variety of ways, including:

- boiler and pipe insulation
- curtains
- plasters
- floor tiles
- wall coverings
- electrical insulation
- fire proofing of structural members and even in homes in roofing materials
- wallboard
- refrigerators
- paints
- insulation

Concerns/hazards

Airborne asbestos is hazardous if inhaled and can cause occupational diseases, including respiratory problems, mesothelioma and lung cancer. An incident involving an older structure may disturb asbestos fibres and present a hazard to firefighters. These small fibres may be carried on the wind for long distances.

Actions for employers

Employers must:

- inform firefighters about the hazard of asbestos
- take all measures reasonably necessary in the circumstances to protect workers from exposure to asbestos, including:
  - substitution of the hazardous biological or chemical agent
  - engineering controls
  - administrative controls, including work practices
  - hygiene facilities and practices
- where applicable, provide appropriate personal protective equipment (PPE) to protect firefighters from exposure to asbestos
- train firefighters on the proper use, handling and disposal of the PPE
- train firefighters on appropriate personal hygiene and work practices (including decontamination)

Employers should:

- inform firefighters about any buildings known to contain asbestos in their response area
- train firefighters to recognize buildings and areas of buildings that are likely to contain asbestos
- make firefighters aware of potential sources of information relating to asbestos, such as asbestos management plans and building owner consultations
- provide standard operating procedures/operating guidelines (SOPs/OGs) to protect firefighters from the hazard of asbestos

Reducing airborne exposure

Firefighters must:

- wear and use the personal protective equipment the worker's employer requires to be worn or used, to protect from the hazard of asbestos

During emergency operations, the use of positive-pressure self-contained breathing apparatus (SCBA) and structural firefighting bunker gear prevents exposure to airborne asbestos.

SCBA or other appropriate respiratory protection should be worn by all personnel working within the hazard zone, from the commencement of emergency operations on scene until the completion of the origin and cause investigation activities.

Wetting down areas that may contain asbestos will significantly reduce the risk of airborne exposure.

Post-incident clean-up

It is recommended that following emergency operations and/or origin and cause investigation, the on-site clean-up of personnel and equipment should be conducted while using appropriate respiratory protection, as follows:

- brush off debris from PPE, tools and equipment
- gently rinse off the equipment with low pressure water or clean with a damp cloth, or use a vacuum equipped with a high efficiency particulate aerosol (HEPA) filter, if available
- identify any waste, such as cleaning cloths, as possible asbestos containing material

Upon returning to the fire station, personnel should shower and ensure that any contaminated equipment, clothing and PPE is decontaminated in accordance with manufacturer's recommendations.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(1)(a) for providing PPE
  - 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 851 – Industrial Establishments* *(https://www.ontario.ca/laws/regulation/900851)*
  - section 130 for training requirements for workers who may be exposed to biological, chemical or physical agents
- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* *(https://www.ontario.ca/laws/regulation/900833)*
  - for controlling asbestos exposure on emergency scenes
  - for respiratory protection program requirements
- *O. Reg. 278/05 - Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations* (https://www.ontario.ca/laws/regulation/050278)
  - for protecting firefighters from asbestos in training structures and fire stations

Related

In developing guidelines relating to emergency operations that may involve buildings containing asbestos, read firefighter guidance notes:

- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)
- 4-13 Personal protection during fire investigation operations (https://www.ontario.ca/document/firefighter-guidance-notes/4-13-personal-protection-during-fire-investigation-operations)
- 6-1 Hygiene and decontamination (https://www.ontario.ca/document/firefighter-guidance-notes/6-40-working-heights)
- 6-23 Safety during salvage and overhaul (https://www.ontario.ca/document/firefighter-guidance-notes/6-23-safety-during-salvage-and-

overhaul)

- 7-5 Live fire training considerations for acquired structures

3-3 Heat and cold stress

Background

During emergency response, training exercises or other outdoor duties, firefighters may be exposed to extreme heat and cold.

Concerns/hazards

Firefighters may suffer serious injury or death due to heat stress or over-exposure to cold.

Over-exposure to cold may occur when firefighters are exposed to low temperatures, wind and/or moisture for significant periods of time.

Actions for employers

Employers should:

- develop training programs that assist firefighters and supervisors in recognizing signs of heat and cold stress
- develop operating guidelines to assist firefighters in alleviating heat and cold stress

Heat stress

Personnel should know how to recognize heat stress, which may include:

- heat stroke
- heat exhaustion
- heat cramps

Consider these methods to assist in alleviating and managing heat related stress:

- fluid intake
- work rotation, especially to cooler areas in the shade or air-conditioning
- removing layers of clothing
- rest
- reschedule non-emergency activities
- report heat related stress symptoms to a supervisor

Cold stress

Personnel should know how to recognize the signs of cold related stress, which may include:

- frostbite
- hypothermia

Consider these methods to manage cold stress:

- work rotation and rehabilitation where a heat source is available, protected from wind, rain and snow
- wear multiple layers of loose fitting clothing
- protection of hands, feet, face and head
- report cold related stress symptoms to a supervisor
- reschedule non-emergency activities

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable to protect workers

Related

Read firefighter guidance note 6-12 Rehabilitation during emergency operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-12-rehabilitation-during-emergency-operations)

Heat stress guideline (https://www.labour.gov.on.ca/english/hs/pubs/gl_heat.php)

3-4 Radiofrequency awareness

Background

Firefighters may work on rooftops, where radiofrequency (RF) radiation emitting antennae are found.

Concerns/hazards

Firefighters may be exposed to non-ionizing radiation, such as radiofrequency (RF) radiation, as a result of directional and omni-directional antennae found on rooftops. Rooftops can present areas of high RF radiation exposure because:

- personnel may be on the same horizontal plane as the antenna, where the signal is the strongest
- rooftops may have many different types of antennae, all transmitting at different power and frequencies
- the signal strength of each antenna combines, creating a higher cumulative RF strength
- a damaged coaxial cable may leak a concentrated RF signal

Actions for employers

Employers should:

- make workers aware of the potential sources and hazards of RF radiation

Health hazards

The primary health concern is overheating and burns.

Recommended exposure limits and more information on health hazards can be found in the Ministry of Labour health and safety guideline Radiofrequency and microwave radiation in the workplace (https://www.labour.gov.on.ca/english/hs/pubs/radiation/index.php) .

Common types of RF antennae

Directional antennae

These antennae send and receive RF radiation out in front of them. There is no RF energy behind them. **Avoid walking or working in front of these.**

Figure 1: Directional antennae on a tower.

Figure 2: Directional antennae on the roof of a building.

Omni-directional antennae

These antennae transmit a 360 degree signal. **Avoid walking or working on the same plane as these.**

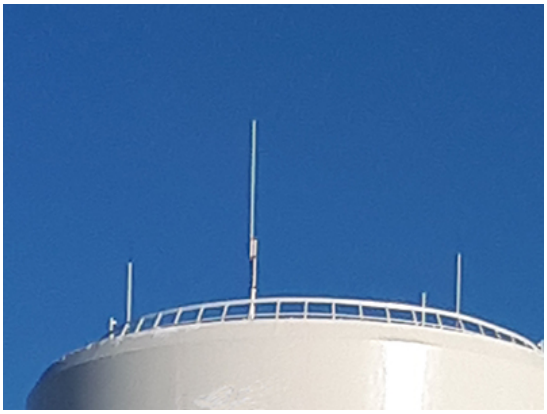

Figure 3: Omni-directional antennae on a water tower.

Working safely around RF antennae

Consider the following:

- conduct pre-planning activities to identify antenna locations, their type and power sources, safe distances, lock out procedures, and site contacts
- identify radiation warning signs and follow any written precautions
- assume antennae are live unless locked out

- consider site conditions when setting up ladders or aerial devices, to avoid placing the ladder into or through the beam of RF transmission
- ungrounded conductors such as ladders in the beam may present a shock hazard
- do not look into the ends of open coaxial cable or remain close to visibly damaged cables, as there may be harmful concentrated RF signals
- antennae may be found:
  - on urban rooftops
  - mounted on elevator penthouses
  - at the edge or over the side of building walls
  - disguised as or located within other objects such as flagpoles, steeples, trees or signs

Studies have shown that RF levels on the ground are thousands of times less than the Health Canada limits for safe exposure. In order to be exposed to levels at or above RF exposure limits, a worker would have to remain in the main transmitting beam at the height of the antenna and within a few feet from the antenna.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable to protect workers

Related

For more information about radiation protection for workers, please call the Ministry of Labour Radiation Protection Service at 416-235-5922.

For more information about radiofrequency safety, read the Ministry of Labour Health and Safety Guideline: Radiofrequency and Microwave Radiation in the Workplace (https://www.labour.gov.on.ca/english/hs/pubs/radiation/index.php) .

Read firefighter guidance notes

- 6-16 Machinery/electrical lockout during emergency response (https://www.ontario.ca/document/firefighter-guidance-notes/6-16-machineryelectrical-lockout-during-emergency-response)
- 6-14 Safe roof operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-14-safe-roof-operations)
- 6-8 Firefighter safety during lightning storms (https://www.ontario.ca/document/firefighter-guidance-notes/6-8-firefighter-safety-during-lightning-storms)

3-5 Exposure to noxious weeds

Background

Firefighters may come into contact with noxious weeds. Noxious weeds colonize in a wide range of habitats but prefer rich, damp soil found along railroad right-of-ways, roadside ditches, stream banks or other moist areas.

Concerns/hazards

Noxious weeds contain toxic compounds found in the sap of plant stems, leaves and flowers. These toxic compounds may become absorbed by your skin and energized when exposed to ultraviolet light from the sun on both sunny and cloudy days.

You can be exposed through inhalation (breathing), skin contact, eye contact or ingestion (swallowing).

Exposure to these compounds can cause serious rashes, burns or blisters to your skin. Contact with eyes may lead to temporary or permanent blindness. Your airway could swell closed from mucus membrane exposure.

When exposed to fire these plants can be an inhalation hazard as the smoke/fumes emitted can blister your airways and lungs.

Actions for employers

Employers should:

- assess the potential risk of occupational exposure to noxious weeds
- do pre-planning by contacting municipal parks and recreation for any known locations of noxious weeds
- put in place practices to prevent or reduce the risk of exposure at the scene and/or upon return to the station

Some examples of noxious weeds in Ontario

Some common noxious weeds include:

- wild parsnip
- giant hogweed
- poison ivy
- poison sumac
- stinging nettle

You can find a complete list of Ontario's noxious weeds (http://www.omafra.gov.on.ca/english/crops/facts/noxious_weeds.htm) on the Ministry of Agriculture, Food and Rural Affairs website.

Preventing exposure to noxious weeds

Personal protective equipment (PPE) can protect you from exposure to noxious weeds. PPE may include:

- hand protection
- eye protection
- respiratory protection
- skin protection

You should consider these safety precautions to prevent exposure:

- wear your full PPE
- use proper doffing procedures for contaminated gear and equipment
- bag contaminated PPE and equipment on scene and have it transported outside of the vehicle cab to the station for cleaning
- wash any exposed skin with soap and **cold** water as soon as possible
- seek medical attention if you are exposed to or have any questions about the noxious weeds

Applicable regulations and acts

Read:

- Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)
  - 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

Related

Learn about noxious weeds in Ontario (http://www.omafra.gov.on.ca/english/crops/facts/noxious_weeds.htm) and how to protect workers from them (https://www.ontario.ca/page/working-outdoors#section-4) .

Read firefighters guidance notes:

- 4-1 Firefighters protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-1-firefighters-protective-equipment)
- 4-2 Eye protection (https://www.ontario.ca/document/firefighter-guidance-notes/4-2-eye-protection)
- 4-7 Wildland fire fighting, protective clothing and equipment for municipal fire departments (https://www.ontario.ca/document/firefighter-guidance-notes/4-7-wildland-fire-fighting-and-personal-protective-equipment)
- 4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-8-care-maintenance-inspection-and-replacement-structural-fire-fighting-personal-protective)
- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)

3-6 Polyfluorinated alkyl substances (PFAS) awareness

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 these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

Background

Developed in the 1930's, the fluorinated family of chemical compounds can repel water and grease. These properties led to their use in aqueous film forming foam (AFFF) and bunker gear. Nicknamed "forever chemicals", fluorinated substances do not break down within the environment or when absorbed into the body. There are thousands of fluorinated chemicals in use today.

The most common trade names found in firefighting products are:

- PFOS (perfluorooctane sulfonate or C-8)
- PFOA (perfluorooctanoic acid)
- fluorinated surfactant

These chemicals belong to the larger class of fluorochemicals referred to as per- and polyfluorinated alkyl substances (PFASs) which contain carbon atoms that are completely saturated by fluorine.

Concerns/hazards

According to the National Institute for Occupational Safety and Health (NIOSH) (https://www.cdc.gov/niosh/topics/pfas/default.html) , research suggests exposure to some PFAS might result in harmful health outcomes, including:

- cancer
- increased cholesterol levels
- immune system effects

The International Agency on Research for Cancer (IARC) monograph on PFOA (https://publications.iarc.fr/547) concludes that "Perfluorooctanoic acid (PFOA) is possibly carcinogenic to humans (Group 2B)."

Research is ongoing.

Actions for employers

Employers must provide information, instruction and supervision to a worker to protect the health or safety of the worker.

Employers should use a risk/benefit analysis and the hierarchy of controls to determine if products containing PFAS can either be:

- substituted
- eliminated
- have their use reduced

Considerations

Aqueous film-forming foam (AFFF)

Consider the following, with respect to AFFF:

- transition to PFAS free foams where appropriate
- use appropriate PPE (such as eye protection, gloves and respiratory protection) when handling foam containing PFAS, per safety data sheets and manufacturer's recommendations
- evaluate the situation before applying fluorinated foams, and minimize exposure of personnel

Bunker gear

PFAS is found in materials used to make water repellent layers of bunker gear. To reduce potential exposure, consider the following precautions:

- transition to PFAS-free products as they become available
- limit bunker gear use to situations where it is required to be worn as PPE (for example, do not use bunker gear during public education activities and consider whether bunker gear is necessary during routine medical calls or physical fitness activities)
- appropriately dispose of bunker gear to prevent the repurposing of bunker gear for personal products (for example: bags)
- store bunker gear appropriately as per the firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)
- routinely clean bunker gear storage and cleaning areas as per the firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)
- use appropriate PPE (such as N95 respirator and rubber gloves) when handling contaminated bunker gear

Applicable regulations and acts

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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

Relevant standards

Read NFPA 1971 Standard on Protective Ensembles for Structural Fire Fighting and Proximity (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1971) Fire Fighting for information on minimum levels of protection from thermal, physical, environmental, and bloodborne pathogen hazards encountered during structural and proximity fire fighting operations.

Read NFPA 1851 Standard on Selection, Care, and Maintenance of Protective Ensembles for Structural Fire Fighting and Proximity Fire Fighting (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1851) for information on the selection, care, and maintenance of fire fighting protective ensembles to reduce health and safety risks associated with improper maintenance, contamination, or damage.

Related

Firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)

Read about Aqueous film-forming foam and the Prohibition of Certain Toxic Substances Regulations (https://www.canada.ca/en/environment-climate-change/services/management-toxic-substances/list-canadian-environmental-protection-act/perfluorooctane-sulfonate/film-forming-foam-prohibition-toxic-substances.html) on the Government of Canada website.

Read Toxic substances list: PFOS (https://www.canada.ca/en/environment-climate-change/services/management-toxic-substances/list-canadian-environmental-protection-act/perfluorooctane-sulfonate.html) to find out about the Government of Canada's work related to PFOS.

Section 4: Personal protective equipment

4-1 Firefighters protective equipment

Background

Firefighters are provided with structural firefighting protective garments for use during interior structural fire suppression duties.

Concerns/hazards

Firefighters are exposed to hazards during the course of their work and require appropriate personal protective equipment (PPE).

Actions for employers

Employers should:

- evaluate the appropriateness of using bunker gear as PPE for certain activities, particularly during the summer months
- consult with their joint health and safety committees or health and safety representatives on alternative protection and guidelines for use
- ensure that PPE is appropriately sized to provide effective protection

Bunker gear

The common term 'bunker gear' refers to the coat, trousers and coverall elements of the protective ensemble. Other parts of the ensemble include the helmet, hood, boots and gloves.

Bunker gear may not be appropriate PPE for all incidents, considering the potential for heat stress, reduced mobility and added weight.

Protective headwear

Firefighters exposed to the hazards of head injury must wear appropriate PPE, which may include helmets and protective hoods.

Fire helmets

A fire helmet is not designed to protect personnel from all conditions or hazards. It provides limited protection to the head when worn during structural firefighting activities. Other types of emergency calls, such as water rescue, may require head protection designed for that activity.

Fire helmets are not designed for crash protection and should not be worn when riding in the enclosed cab and crew area of fire service vehicles. The helmet may interfere with head clearance and put personnel at a greater risk of neck or back injury should there be a vehicle rollover or other motor vehicle incident.

Protective hoods

Protective hoods should be worn whenever there is a risk of injury from heat and/or flame to exposed skin. Helmet liners should be used in addition to protective hoods.

Boots and gloves

Firefighters exposed to the hazard of foot or hand injury must wear protective boots or gloves appropriate in the circumstances.

Applicable regulations andacts and standards

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment in good condition
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *O. Reg. 714/94 - Firefighters – Protective Equipment Regulation* *(https://www.ontario.ca/laws/regulation/940714)*
  - section 4 for wearing head protective equipment
  - section 5 for structural firefighting protective garment requirements

Applicable standards

For requirements for structural firefighting protective garments manufactured on or after March 1, 2007, read NFPA 1971, Standard on protective ensembles for structural fire fighting and proximity fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1971&tab=about)

Related

Read firefighter guidance notes:

- 4-2 Eye protection (https://www.ontario.ca/document/firefighter-guidance-notes/4-2-eye-protection)
- 4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-8-care-maintenance-inspection-and-replacement-structural-fire-fighting-personal-protective)

4-2 Eye protection

Background

Depending on the circumstances, appropriate eye protection may be provided by different pieces of equipment.

Concerns/hazards

Firefighters may be exposed to the hazard of eye injury during the course of their work. Eye protection appropriate in the circumstance should be worn.

Actions for employers

Employers should:

- conduct a risk assessment of potential eye hazards and determine the appropriate eye protection in the circumstances
- provide appropriate eye protection
- train workers on the use of eye protection equipment
- ensure workers wear eye protection appropriate in the circumstances

Eye protection

Goggles and safety glasses are considered eye protection.

The self-contained breathing apparatus face piece may be appropriate eye protection if there is no direct path from the outside to the facial area if the regulator is removed.

Helmet shields alone do not provide adequate eye protection during the normal course of activities undertaken in the fire service.

When to use eye protection

Workers should conduct a situational risk assessment to determine if eye protection is required. Some examples of activities that may put a worker at risk of eye injury include:

- auto extrication activities involving the use of cutting tools, hydraulic tools or breaking glass
- typical shop/maintenance activities like cutting or grinding
- fire-overhaul activities
- encounters with chemical hazards
- refueling vehicles or equipment
- pressurized containers
- potential splashing of blood or other bodily fluids
- specialized operations such as water rescue, building collapse, high angle rescue, trench rescue, confined space rescue, or wild land fire fighting

Other considerations

Consider the use of eyewear with sun protection during prolonged or acute exposure to sunlight.

Clean eye protection after each use, following the manufacturer's directions.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment in good condition
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance note 4-1 Firefighters protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-1-firefighters-protective-equipment) .

For more information on eye protection, including the use of prescription eyewear as eye protection, read:

- CSA Z94.3 Eye and face protectors (https://www.csagroup.org/store/product/CSA%20Z94.3%3A20/?gclid=Cj0KCQjwi7yCBhDJARIsAMWFScNaZNfSBiFBrOIgBzwyesPOhGBvifSZDMPdDh-LE2qiVW7ga9Y-bHcaApdJEALw_wcB)
- ANSI Z87.1 American national standard for occupational and educational personal eye and face protection devices (https://webstore.ansi.org/Standards/ISEA/ANSIISEAZ872020?gclid=Cj0KCQjwi7yCBhDJARIsAMWFScPhwiJN4VGBw-_taDvvb4XsYYkHw-hfHOUBEiT48tHnTbBDXAbM3TEaAgx4EALw_wcB)

4-4 Personal alert safety systems (PASS)

Background

Firefighters work in conditions with low visibilty and high heat.

Concerns/hazards

Firefighters may become disoriented and separated from their team when there is low visibility due to smoke. They may become injured, trapped or lose consciousness. Prompt rescue is essential to prevent serious injury or death.

Actions for employers

Employers should:

- develop operating procedures that specify when PASS devices are to be worn in:
  - structural fires
  - confined spaces
  - hazardous materials incidents
  - other hazardous environments
- ensure every firefighter performing structural fire fighting has a PASS attached to their self-contained breathing apparatus
- ensure PASS is used in conjunction with entry control procedures

PASS devices

Consider the following features when purchasing new PASS devices:

- compliance with the latest edition of the NFPA 1982 Standard on Personal Alert Safety Systems
- a piercing sound when the fire fighter is motionless or when manually activated

- a separate high temperature alarm circuit and signal
- durability and resistance to water, chemicals, temperature extremes and rough handling
- ease of operation of controls with gloved hands
- on/off indicator light, low battery indicator, pre-alert signal
- a reliable maintenance and repair program

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment in good condition
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Related standards

For guidance on the reliable performance of personal alert safety systems, read NFPA 1982 Standard on personal alert safety systems (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1982) .

4-7 Wildland fire fighting and personal protective equipment

Background

Firefighters may be involved in wildland fire fighting. Wildland fire fighting is the activities of fire suppression and property conservation in woodlands, forests, grasslands, brush, prairies and other such vegetation, or any combination of vegetation that is involved in a fire situation but is not within buildings or structures.

Concerns/hazards

Heat stress is a major cause of injury during wildland fire fighting.

Firefighters need personal protective equipment (PPE) that is appropriate for this specialized task.

Actions for employers

Employers should:

- consult with their joint health and safety committee or worker representative when determining appropriate PPE for wildland fire fighting
- develop operational procedures to limit exposure to wildfire smoke

Wildland fire fighting PPE considerations

Outerwear

Outerwear should be flame resistant and provide protection to the legs, torso and arms to meet the NFPA 1977 Standard on protective clothing and equipment for wildland fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1977) . When worn as an ensemble with gloves and boots, the pant cuff and wrist design should prevent skin exposure.

Helmets

Structural fire fighting helmets provide protection but can add to fatigue in these circumstances. Consider other head protection that can be properly secured to the head with a chin strip.

Boots

Rubber fire fighting boots provide protection, but they can add to fatigue if worn for a long period of time or to travel long distances on uneven terrain. Consider alternative protective footwear where this potential exists.

Gloves

Consider the use of gloves that meet the NFPA 1977 (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1977) .

Respiratory protection

Wear respiratory protection that is appropriate for the task and hazards. See 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program) for more information.

Eye protection

Consider the task being done when determining appropriate eye protection.

Hearing protection

Hearing protection is recommended when working around portable pumps, chainsaws or other loud equipment. There are specific requirements about noise protection in the noise regulation (https://www.ontario.ca/laws/regulation/150381) .

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers
- *O. Reg. 381/15 - Noise* *(https://www.ontario.ca/laws/regulation/150381)* for protecting workers from hazardous sound levels

Applicable standards

For guidance on helmets, boots, gloves and outerwear, read NFPA 1977 Standard on protective clothing and equipment for wildland fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1977)

For guidance on helmets, read CSA Z94.1 Industrial protective headwear — Performance, selection, care, and use (http://shop.csa.ca/en/canada/industrial-head-protection/z941-15/invt/27000582015)

For guidance on boots, read CSA Z195 Protective footwear (http://shop.csa.ca/en/canada/protective-footwear/z195-14/invt/27015092014)

For guidance on eye protection, read CSA Z94.3 Eye and face protectors (https://www.csagroup.org/store/product/CSA%20Z94.3%3A20/)

Related

For information about protecting workers from heat related illness, read the Ministry of Labour heat stress guideline (https://www.ontario.ca/page/managing-heat-stress-work)

Firefighter guidance note 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)

4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment

Background

Personal protective equipment (PPE) protects firefighters from hazards. Elements of PPE include: boots, gloves, helmet, turnout coat and pants (bunker gear) and protective hoods.

Concerns/hazards

Contaminated PPE may expose firefighters to hazardous biological and chemical contaminants and reduce the effectiveness of the protection it is intended to provide.

Actions for employers

Employers must:

- ensure that protective equipment provided by the employer is maintained in good condition

Employers should:

- establish field decontamination procedures and provide proper facilities to decontaminate PPE
- develop a program for the care, maintenance, inspection and replacement of all PPE elements
- consult the manufacturers' instructions and equipment labels for the care, use, and limitations of the equipment

Handling contaminated PPE

Contaminated PPE and clothing should be decontaminated.

Soiled or contaminated PPE should not be transported inside the cabs of fire apparatus or in a personal vehicle. It should not be taken into the living quarters of a fire station, public building or into a personal residence.

Only clean bunker gear should be put in a gear bag.

Consider keeping contaminated PPE in closed bags or containers and take it back to the fire station, ideally on the fire apparatus for decontamination.

Follow manufacturer's recommendations for washing the bunker gear ensemble.

Inspect PPE only after it has been cleaned.

PPE program

A PPE program should address the following:

- inspection of PPE elements after use and on a regular basis
- assessment of PPE to determine whether it needs to be repaired or replaced
- requirements for cleaning and decontamination and advanced cleaning
- advanced inspection and testing
- repairs
- storage
- records
- retirement of PPE
- training workers on the use, care and limitations of PPE
- regular program evaluation and improvement

Life expectancy of PPE

Life expectancy of PPE depends on factors such as:

- type of use
- amount of use
- length of time since it was manufactured

Consider the NFPA 1851 Standard on selection, care and maintenance of protective ensembles for structural fire fighting and proximity fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1851) which indicates no longer than a 10-year life cycle.

Some ensemble components that have been removed from emergency service operations may be suitable for use for activities that do not involve the risk of exposure to thermal hazards, such as certain training activities. Clearly mark retired bunker gear as being for non-live fire training only.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment in good condition
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *O. Reg. 714/94 – Firefighters – Protective Equipment Regulation* *(https://www.ontario.ca/laws/regulation/940714)*
  - section 5 for the minimum design, performance, testing, and certification requirements of structural firefighting protective garments

Applicable standards

For guidance on the selection, care, and maintenance of fire fighting protective ensembles to reduce health and safety risks associated with improper maintenance, contamination, or damage read NFPA 1851 Standard on selection, care and maintenance of protective ensembles for structural fire fighting and proximity fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1851)

For requirements for structural firefighting protective garments manufactured on or after March 1, 2007, read NFPA 1971, Standard on protective ensembles for structural fire fighting and proximity fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1971)

Related

Read the Firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)

Read firefighter guidance note 4-1 Firefighters protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-1-firefighters-protective-equipment)

4-9 Respiratory protection program

Background

Firefighters, as a condition of their work, may be exposed to airborne hazards such as particulates (smoke, dusts, mists or fumes), gases, vapours and oxygen-deficient atmospheres.

Concerns/hazards

Where respiratory hazards cannot be avoided or effectively controlled, firefighters may be at risk of exposure to these hazards.

Actions for employers

Generally, employers must protect workers from exposure to a hazardous biological or chemical agent without requiring them to wear and use a respirator. Where exposure to these hazards cannot be avoided or effectively controlled, employers must provide a respirator appropriate in the circumstances to protect the workers from exposure.

Employers who provide a respirator must comply with the respiratory protection requirements in Regulation 833 (https://www.ontario.ca/laws/regulation/900833) , including, but not limited to:

- establishing written measures and procedures regarding the selection, care and use of respirators
- providing training and instruction to workers in the care and use of the respirator before the worker first uses the respirator

Employers must also ensure that respirators provided are maintained in good condition.

Employers should appoint a respiratory protection program administrator.

Respirator training

Workers must be trained on:

- care and use of a respirator before using it for the first time
- limitations of the respirator
- inspection and maintenance of the respirator
- proper fitting of the respirator
- cleaning and disinfecting the respirator

Respirator fit

Tight-fitting respirators must be tested for fit by either a qualitative or quantitative fit test.

Prior to each use of a tight-fitting elastomeric respirator, a worker must conduct positive and negative pressure user seal checks.

A tight-fitting respirator must not be used by a worker with facial hair that comes between the sealing surface of the facepiece and the face or that interferes with the functioning of the respirator.

Respiratory protection program

In addition to the requirements in Regulation 833 (https://www.ontario.ca/laws/regulation/900833) , a respiratory protection program should address the following:

- program administration, documentation and evaluation
- program administrator training
- training of persons administering fit testing
- proper use of Rapid Intervention/Universal Air Connections and other emergency procedures
- fit testing for all respirators every 2 years (quantitative fit testing for SCBA)
- air quality testing prior to filter change and following major service work, modifications or extensive repairs
- under what conditions respiratory hazards arise, such as:
  - an unknown atmosphere that is suspected of being hazardous
  - a hazardous atmosphere, such as overhaul
  - an atmosphere that may rapidly become hazardous, such as wind change
  - working below ground level or inside a confined space (unless the safety of the atmosphere can be established by testing and continuous monitoring)
  - potential exposure to biological hazards

- potential use of longer duration SCBA cylinders based on risk assessment of larger and/or complex structures

The program should be developed in consultation with the joint health and safety committee or health and safety representative.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment and protective devices in good condition
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *Regulation 833 – Control of Exposure to Biological or Chemical Agents* *(https://www.ontario.ca/laws/regulation/900833)* for occupational exposure limits and respiratory protection requirements
- O. Reg. 490/09 – Designated Substances (https://www.ontario.ca/laws/regulation/090490) for respiratory protection requirements for designated substances

Applicable standards

For information about the required quality of compressed air used in SCBA cylinders, read CSA Standard Z180.1 Compressed breathing air and systems (https://store.csagroup.org/ccrz__ProductDetails?viewState=DetailView&cartID=&portalUser=&store=&cclcl=en_US&sku=CSA%20Z180.1%3A19)

For information on the requirements for qualitative and quantitative fit testing, read Annexes B and C of CSA Standard Z94.4 Selection, use and care of respirators (http://shop.csa.ca/en/canada/respiratory-protection/cancsa-z944-11-r2016/invt/27016392011)

For guidance on the administration of an effective respiratory protection program and training requirements, read CSA Standard Z94.4 Selection, use and care of respirators (http://shop.csa.ca/en/canada/respiratory-protection/cancsa-z944-11-r2016/invt/27016392011)

For information on levels of respiratory protection and functional requirements for SCBA used in fire fighting, read NFPA 1981 Standard on Open-Circuit Self-Contained Breathing Apparatus (SCBA) for Emergency Services (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1981)

4-10 Hearing protection

Background

O. Reg. 381/15 - Noise (https://www.ontario.ca/laws/regulation/150381) , made under the *Occupational Health and Safety Act*, applies to all workplaces in Ontario including fire services. The intent of the regulation is to ensure that workplace exposures to noise above a certain sound level are eliminated or properly controlled to protect workers from noise-induced hearing loss.

Concerns/hazards

Firefighters may be exposed to high noise levels in certain situations such as operating power tools or operating or riding in fire service apparatus.

Actions for employers

Employers must comply with the Noise Regulation (https://www.ontario.ca/laws/regulation/150381) , which applies to fire services.

Employers must:

- take all measures reasonably necessary in the circumstances to protect workers from exposure to hazardous sound levels. This includes ensuring that no worker is exposed to a sound level greater than a time-weighted average exposure limit of 85 dBA measured over an 8-hour work day

- post warning signs in the workplace where the sound level regularly exceeds 85 dBA, where reasonably possible
- provide workers with adequate training and instruction on the care and use of hearing protection devices (HPDs) provided by the employer

Employers should:

- develop a hearing protection program
- identify when hearing protection should be used during emergency operations

Hierarchy of controls

When the prescribed exposure limit would be exceeded, employers are required to put in place protective measures to proactively reduce workers' noise exposure. These measures include:

- engineering controls to reduce noise at the source or along the path of transmission
- work practices such as equipment maintenance (to keep it quieter) or scheduling to limit a worker's exposure time
- personal protective equipment in the form of HPDs, subject to the restrictions stated in the regulation

The preferred and most effective way to control noise exposure is through the use of engineering controls. The regulation sets out the conditions under which HPDs may be used for worker protection. Employers who provide workers with HPDs must provide them with adequate training and instruction on their care and use. HPDs must be used and maintained in accordance with the manufacturer's instructions.

Reducing noise exposure

Consider the following to identify and reduce noise exposure:

- conduct noise level testing of fire service vehicles, warning devices and equipment
- reduce or eliminate potentially harmful sources of noise in the work environment by using:
  - engineering controls
  - personal protective devices where reduction or elimination strategies do not achieve the required exposure reduction

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers
- *O. Reg. 381/15 - Noise* *(https://www.ontario.ca/laws/regulation/150381)* for protection of workers from exposure to hazardous sound levels

Applicable standards

For information on occupational health and safety programs read the NFPA 1500 Standard on fire department occupational safety, health, and wellness program (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1500)

Related

For information and assistance in complying with the Noise regulation, read A guide to the noise regulation under the *Occupational Health and Safety Act* (https://www.labour.gov.on.ca/english/hs/pubs/noise/index.php)

- see appendix B for the table of equivalent noise exposures (https://www.labour.gov.on.ca/english/hs/pubs/noise/gl_noise_4.php)

4-11 Fall protection from elevating devices

Background

Firefighters work at heights using aerial ladders, aerial platforms and other similar elevating devices.

Concerns/hazards

Firefighters are at risk of falling when working at heights.

Actions for employers

Employers should:

- conduct a risk assessment of fall hazards
- develop appropriate measures and procedures for minimizing and controlling the risks

Guardrail systems

A guardrail system should completely enclose the open sides of an elevated work surface to protect workers from falling. These systems may consist of a top-rail, a mid-rail (or equivalent) and a toeboard. As a best practice, the top-rail should resist a point load of 675 Newtons (N) laterally and 450 N vertically, the mid-rail 450 N laterally and vertically, and the toe-board 225 N laterally.

Guardrail systems may not enclose the entire perimeter of the aerial platform and turntable due to access needs from the ladder and openings for access gates. Handrails on aerial ladders are positioned on the sides of the ladder. Additional safety measures may be required to ensure the protection of firefighters.

Travel-restraint systems

A travel-restraint system consists of:

- a full-body harness or belt
- an anchor point
- a short lanyard
- an attachment hook or carabineer as appropriate to the situation

Travel-restraint systems limit firefighters from approaching the danger zone where they may fall from the apparatus, by keeping them within a protected area, such as the confines of the guardrail of an aerial platform.

Travel-restraint systems may be appropriate for use on aerial platforms and are intended to prevent firefighters from falling by limiting mobility while “clipped in”. Firefighters may use an adequate lanyard as appropriate to permit movement within the confines of the guardrail. However, the lanyard should not be longer than necessary for that purpose.

Travel-restraint systems are **not** suitable for use on an aerial ladder where firefighters must be more restricted to prevent a fall. A ladder belt with a closely attached ladder hook should be used; this is called a work positioning device.

Anchor points should be adequately engineered and properly located by the manufacturer for the purpose in which it is being used. Anchor points for travel-restraint systems should be capable of supporting a static force of at least 2 kilonewtons.

Fall-restricting systems

A fall-restricting system consists of:

- a full-body harness
- an anchor point
- a short lanyard
- an attachment hook or carabineer as appropriate to the situation

Fall restricting systems are intended to limit a fall to 0.6 metres or less.

Fall-restricting systems might be appropriate for use on aerial ladders and aerial platforms by limiting the fall distance.

Anchor points should be adequately engineered and properly located by the manufacturer, for the purpose in which it is being used. Anchor points for fall-restricting systems should be capable of supporting a static force of at least 8 kilonewtons.

The aerial design should be capable of absorbing the dynamic forces of stopping a falling firefighter, which will be several times that of the anchor point's required static strength.

Since aerial apparatus are not normally designed to resist the loads imposed by a fall-restricting system, employers should consider the use of a properly engineered travel-restraint system to safeguard firefighters from a fall.

Fall-arrest systems

A fall-arrest system consists of:

- a full-body harness
- an anchor point
- a lanyard equipped with a shock absorbing device
- an attachment hook or carabineer as appropriate to the situation

A fall-arrest system should not allow impact with the ground or any other object. It should not impose more than a 8 kilonewton arresting force.

Fall-arrest systems may be appropriate for use on aerial ladders and aerial platforms.

Anchor points should be adequately engineered and properly located by the manufacturer, for the purpose in which it is being used. Anchor points for fall-arrest systems described here should be capable of supporting a static force of at least 8 kilonewtons.

The aerial design should be capable of absorbing the dynamic forces of stopping a falling firefighter, which will be several times that of the anchor point's required static strength.

Since firefighting aerial apparatus are not normally designed to resist the loads imposed by a fall-arrest system, employers should consider the use of a properly engineered travel-restraint system to safeguard firefighters from a fall.

Where fall arrest systems are used, consider developing procedures for rescuing the worker after his or her fall has been arrested.

Fall protection system compatibility

Employers should give consideration to aerial device load requirements during the specification, design and approval stages of the procurement process, especially as it applies to fall protection. Employers should ensure that fall protection requirements are fully understood by the aerial manufacturer and that the manufacturer provides clear information on the acceptable load ratings of the aerial device, the fall protection anchor points, and the fall protection system type that the apparatus has been designed for.

Employers should:

- ensure that engineered anchor points on all aerial apparatus are suitable for the purpose
- clearly identify the use of the anchor points, for travel-restraint, fall-restricting or fall-arrest
- provide fall protection system equipment that is consistent with the intended use of the aerial device anchor points

Employers should evaluate existing aerial devices to determine if they are compliant with the design requirements for the fall protection system in use. This evaluation should include:

- the identification of engineered anchor points
- the adequate design of those anchor points
- the ability of the aerial device to resist loads imposed by the fall protection system being used

Employers should consult with their aerial apparatus manufacturer or a qualified engineer to determine the adequacy of anchor points and aerial design for fall protection.

Employers should ensure that the selected life safety harness or ladder belt does not adversely interfere with the use or operation of personal protective equipment such as self-contained breathing apparatus or bunker gear being used by the firefighter on the aerial device.

All components of the fall arrest system must be compatible with each other. Combining components that are not compatible may affect the adequacy of the system, which could result in life threatening injuries.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Applicable standards

For standards on life safety rope and associated equipment used to support emergency services personnel during rescue, fire fighting, other emergency operations, or training, read NFPA Standard 1983 Standard on life safety rope and equipment for emergency services (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1983)

For standards about new fire apparatus, read NFPA Standard 1901 Standard for automotive fire apparatus (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1901)

For performance standards for aerial devices, read CAN/ULC-S515 Standard for automobile fire fighting apparatus (https://www.scc.ca/en/standardsdb/standards/26989)

Related

Read firefighter guidance notes:

- 1-5 Life safety rope and equipment (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment)
- 6-14 Safe roof operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-14-safe-roof-operations)

4-13 Personal protection during fire investigation operations

Background

Following extinguishment of a fire, workers may enter the area for overhaul and fire cause and determination.

Concerns/hazards

Products of combustion create a hazardous atmosphere, putting workers at risk of exposure to these contaminants.

Actions for employers

Employers must:

- take all measures reasonably necessary in the circumstances to protect workers from exposure to a hazardous biological or chemical agent, including,
  - substitution of the hazardous biological or chemical agent
  - engineering controls

- administrative controls, including work practices
- hygiene facilities and practices
- where applicable, personal protective equipment

Note that generally, employers must protect workers from exposure to a hazardous biological or chemical agent without requiring them to use a respirator. Where exposure to these hazards cannot be avoided or effectively controlled, employers must provide a respirator appropriate in the circumstances to protect the workers from exposure and should provide appropriate training on the safe and effective use of the respiratory protection equipment.

Reducing exposure to contaminants and other hazards

Consider the following actions, to reduce exposure to contaminants:

- delay investigations until all phases of fire have been fully extinguished
- put in place adequate and effective ventilation throughout the investigation
- before respiratory protection is removed, conduct gross decontamination
- understand the operation and limitations of air monitoring devices in use as some contaminants and carcinogens may not be detected

Ensure that either the immediate vicinity or the entire area is de-energized and that the natural gas, propane or other fuel sources are isolated, disconnected, or shut off.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers
- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* *(https://www.ontario.ca/laws/regulation/900833)* for occupational exposure limits and respiratory protection program requirements

Applicable standards

For guidance on the administration of an effective respiratory protection program, fit testing protocols and training requirements, read CSA Standard Z94.4 Selection, use and care of respirators (http://shop.csa.ca/en/canada/respiratory-protection/cancsa-z944-11-r2016/invt/27016392011)

Related

Firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)

Read firefighter guidance notes:

- 4-1 Firefighters protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-1-firefighters-protective-equipment)
- 4-2 Eye protection (https://www.ontario.ca/document/firefighter-guidance-notes/4-2-eye-protection)
- 4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-8-care-maintenance-inspection-and-replacement-structural-fire-fighting-personal-protective)
- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)
- 5-2: Working alone (https://www.ontario.ca/document/firefighter-guidance-notes/5-2-considerations-working-alone)
- 6-1 Hygiene and Decontamination (https://www.ontario.ca/document/firefighter-guidance-notes/6-1-hygiene-and-decontamination)

- 6-23 Safety during salvage and overhaul (https://www.ontario.ca/document/firefighter-guidance-notes/6-23-safety-during-salvage-and-overhaul)

4-14 Infection prevention and exposure control practices

Background

Firefighters, in the course of their work, may be exposed to blood, bodily fluids, secretions, excretions, mucous membranes, non-intact skin, sharps, medical waste or soiled items.

Concerns/hazards

Firefighters are at risk of contracting communicable diseases from infectious persons. It is sometimes difficult to identify infectious persons as they may not display symptoms.

Actions for employers

Employers should:

- assess the risk of occupational exposure to communicable diseases in the workplace
- apply a standard of routine practices to prevent or reduce the risk of transmission at the scene and upon return to the station
- train workers on routine practices so that the worker is able to perform a “point of care” risk assessment and evaluate the general risk of each encounter with persons and determine the best course of action
- provide training and education on selection, use and limitations of personal protective equipment (PPE)
- provide education on infectious diseases and methods of spread/exposure
- develop protocols which limit exposure
- ensure adequate stock of PPE and develop an inventory control program to ensure stock is not out-of-date
- consult local public health for most recent direction on protection, vaccinations, contact management, post exposure management and designated officer role

Routine practices

Routine practices include an ongoing or “point of care” risk assessment, hand hygiene, barrier equipment, environmental controls and education. A “point of care” risk assessment is used to determine the potential for exposure to blood and bodily fluids or contaminated equipment.

Firefighters should use routine practices for infection prevention and exposure control with persons during care at all times, including in station operations. This includes:

- proper hand washing
- cleaning and disinfection practices
- appropriate use of PPE

When the ongoing or “point of care” risk assessment indicates a potential for transmission, firefighters should use appropriate PPE. When used properly, PPE provides a barrier to prevent transmission from person to worker and worker to person. Barrier equipment includes:

- hand protection
- eye protection
- respiratory protection
- skin protection

Employers should consult with infection control experts, to determine the appropriate PPE for use in each of the categories listed above. Experts may include:

- local, provincial and federal health officials
- the Medical Officer of Health
- emergency medical services
- health and safety associations (http://healthandsafetyontario.ca/HSO/Home)

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers
- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* (https://www.ontario.ca/laws/regulation/900833) for respiratory protection program requirements

Related

For information on immunizations to reduce your risk of contracting communicable diseases, read National Advisory Committee on Immunization (NACI) Canadian Immunization Guide (Public Health Agency of Canada) (http://healthycanadians.gc.ca/healthy-living-vie-saine/immunization-immunisation/canadian-immunization-guide-canadien-immunisation/index-eng.php) .

Read the Ontario Public Health Standards (http://www.health.gov.on.ca/en/pro/programs/publichealth/oph_standards/default.aspx) administered by the Ministry of Health and Long-Term Care under the *Health Protection and Promotion Act* *(https://www.ontario.ca/laws/statute/90h07)* .

For information about routine practices to protect workers in pre-hospital settings, read Routine Practices and Additional Precautions (http://www.publichealthontario.ca/en/eRepository/RPAP_All_HealthCare_Settings_Eng2012.pdf) from the Provincial Infectious Diseases Advisory Committee.

Read an overview of a Designated Officer Program (https://www.pshsa.ca/resources/designated-officer-program-overview) .

Use this self-assessment tool for a Designated Officer Program Assessment (https://www.pshsa.ca/resources/designated-officer-program-assessment) .

Read firefighter guidance notes:

- 4-1 Firefighters protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-1-firefighters-protective-equipment)
- 4-2 Eye protection (https://www.ontario.ca/document/firefighter-guidance-notes/4-2-eye-protection)
- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)

Section 5: Personal accountability

5-1 Firefighter accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)

5-2 Considerations for working alone (https://www.ontario.ca/document/firefighter-guidance-notes/5-2-considerations-working-alone)

5-1 Firefighter accountability and entry control

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 and enforce these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

Background

Firefighters, in the course of their work, should be accounted for at all times. Accountability and entry control systems effectively account for firefighters at an incident and track their location, crew integrity and time on air supply. These systems are especially important when firefighters are operating in environments which are Immediately Dangerous to Life and Health (IDLH).

Concerns/hazards

Firefighters may enter dangerous and unstable environments to perform their duties. They may operate in limited visibility and move from one area to another. A firefighter may experience an emergency (such as an injury, structural collapse, becoming lost, SCBA emergency) at any time and in any location. In order to effectively manage a firefighter rescue, the firefighter's identity, last known location, status and time on air supply must be known.

Actions for employers

Employers should:

- develop an accountability system that accounts for firefighters in attendance at emergency incidents
- develop an entry control system that accounts for firefighter location, movement, status, crew integrity and time on air in a controlled area
- establish written policies and procedures for personnel accountability and entry control
- train firefighters on the use of the accountability and entry control systems
- review the functionality and effectiveness of these systems on a regular basis

Key principles of accountability systems

An accountability system should incorporate these key principles:

- accounts for the location and function of firefighters at an incident
- recognizes when a firefighter is unaccounted for
- provides a notification system for the emergency removal of firefighters from the interior of a hazard zone when conditions present an immediate life hazard
- establishes a written protocol for when and under what conditions personnel are assigned as accountability / control officers
- prevents firefighters from performing work without being accounted for (commonly known as freelancing)

Entry control systems

An entry control system is more comprehensive than an accountability system, and should track the following information about each firefighter:

- identity
- task
- alias
- location
- time of entry
- movement within an IDLH atmosphere
- changes in task
- length of time using air supply (SCBA) and/or remaining air supply level
- length of time performing a task

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information, instruction and supervision to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Applicable standards

Read NFPA 1561 Standard on Emergency Services Incident Management System and Command Safety (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1561) for the structure and operations of an incident management system and the principles of command safety.

Related

Read firefighter guidance notes:

- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 5-2 Working alone or in isolation (https://www.ontario.ca/document/firefighter-guidance-notes/5-2-working-alone-or-in-isolation)

5-2 Working alone or in isolation

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 and enforce these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

Background

Fire personnel may work alone during non-emergency response work.

Concerns/hazards

Firefighters may require medical, police or employer assistance, due to injury, accident or assault, for example.

Actions for employers

Employers should:

- develop and implement procedures for working alone, including procedures as part of their workplace violence program (see the guide to the law on workplace violence and harassment (https://www.ontario.ca/page/understand-law-workplace-violence-and-harassment))
- consider alternatives to workers working alone, such as pairing workers together in potentially high risk situations

Working alone procedures

Employers should consider the following in their procedures:

- determining situations in which workers must not work alone
- a reliable method for knowing the location of their workers at all times, for example, a check-in/check-out procedure for workers, by cell phone or radio, to a supervisor or dispatch centre, and preparing a daily work plan
- a predetermined response to distress calls from workers
- training for workers on how to recognize and avoid potentially violent situations
- training for workers on conflict resolution and mediation

- procedures to follow if an assault takes place
- providing information on high risk geographical areas to workers
- limiting the time of day visits can be made to high risk areas/clients
- keeping client records and informing workers of clients known to be aggressive, hostile or potentially violent

Safe practices for field activities

When you are carrying out field calls, such as serving official documents or conducting enforcement activities, you should:

- access all available information about a client before meeting with them
- arrange to meet clients in a 'safe' environment where other people are around, such as a restaurant, hotel lobby, or their office/workplace if at all possible
- wear comfortable, professional clothing and practical shoes which will enable a quick exit, if necessary
- wear or carry your identification badge, to show that you are acting in an official capacity and doing your job
- carry only what is necessary, avoiding large or numerous bags or cases
- always take a cell phone or radio, if provided, and keep it in an accessible location
- be alert and make mental notes of the surroundings when arriving at a new place
- know where the exits are at all times
- direct the client’s movements, if necessary, to avoid allowing the client to come between you and the exit
- maintain a 'reactionary gap' between yourself and the client, out of reach of the average person’s kicking distance
- sit across the table from the client to increase the gap, if possible.
- bring two copies of any written material, so that you can sit across from the client and avoid sitting beside them
- ask a colleague to come with you if something makes you feel uneasy
- discuss any feelings of discomfort or apprehension about an up-coming meeting with your supervisor
- keep records and indicate if the client is known to be aggressive, hostile or potentially violent, and include incidents that made you feel apprehensive

You should **not**:

- enter any situation or location where you feel threatened or unsafe
- remain in any situation or location that you feel has become or has the potential to become threatening or unsafe
- carry weapons of any type, including pepper spray, as weapons are dangerous and can be easily used against you
- post or announce your official schedule on social media
- hesitate to call for police assistance

Safe practices for fire investigation activities

When you are conducting fire investigation activities you should:

- follow all safety procedures established by the employer, such as wearing of personal protective equipment, accountability and electrical safety

High risk activities to avoid when working alone

You should avoid these high risk activities when working alone:

- working at heights or in elevator shafts
- working with electricity or with de-energized or locked out/tagged out equipment

- hazardous substances or materials
- hazardous equipment such as chainsaws
- materials at great pressure
- working with the public, where there is a potential for violence

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable to protect workers
  - sections 32.01 to 32.08 for protecting workers from violence and harassment
  - subsection 51(1) for reporting requirements if a worker is critically injured or killed

Related

Learn more about how to stay safe when working alone (http://www.ccohs.ca/oshanswers/hsprograms/workingalone.html) .

Learn more about workplace violence and harassment (https://www.ontario.ca/page/preventing-workplace-violence-and-workplace-harassment) , including legal rights and responsibilities.

Read firefighters guidance note 2-2 Crew integrity (https://www.ontario.ca/document/firefighter-guidance-notes/2-2-crew-integrity) .

Read tips on protecting workers who work alone (https://www.pshsa.ca/resources/protecting-workers-who-work-alone) .

Section 6: Procedures

6-1 Hygiene and decontamination (https://www.ontario.ca/document/firefighter-guidance-notes/6-1-hygiene-and-decontamination)

6-2 Fire fighting near water (https://www.ontario.ca/document/firefighter-guidance-notes/6-2-fire-fighting-near-water)

6-3 Water or ice related emergencies and training (https://www.ontario.ca/document/firefighter-guidance-notes/6-3-water-or-ice-related-emergencies-and-training)

6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)

6-5 Confined space rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-5-confined-space-rescue)

6-6 Rapid fire progression (https://www.ontario.ca/document/firefighter-guidance-notes/6-6-rapid-fire-progression)

6-7 Driving skills for emergency apparatus response (https://www.ontario.ca/document/firefighter-guidance-notes/6-7-driving-skills-emergency-apparatus-response)

6-8 Firefighter safety during lightning storms (https://www.ontario.ca/document/firefighter-guidance-notes/6-8-firefighter-safety-during-lightning-storms)

6-9 Hazardous materials/CBRNE response (https://www.ontario.ca/document/firefighter-guidance-notes/6-9-hazardous-materialscbrne-response)

6-10 Traffic safety and control (https://www.ontario.ca/document/firefighter-guidance-notes/6-10-traffic-safety-and-control)

6-11 Rapid intervention teams (rescue) (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)

6-12 Rehabilitation during emergency operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-12-rehabilitation-during-emergency-operations)

6-13 Archived

6-14 Safe roof operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-14-safe-roof-operations)

6-15 Medication and drug exposure (https://www.ontario.ca/document/firefighter-guidance-notes/6-15-medication-and-drug-exposure)

6-16 Machinery/electrical lockout during emergency response (https://www.ontario.ca/document/firefighter-guidance-notes/6-16-machineryelectrical-lockout-during-emergency-response)

6-17 Clandestine drug labs (https://www.ontario.ca/document/firefighter-guidance-notes/6-17-clandestine-drug-labs)

6-18 Unprotected lightweight building construction (https://www.ontario.ca/document/firefighter-guidance-notes/6-18-unprotected-lightweight-building-construction)

6-19 Hybrid/electric and electrical vehicle safety (https://www.ontario.ca/document/firefighter-guidance-notes/6-19-hybridelectric-and-electrical-vehicle-safety)

6-20 Electrical hazards in rescue and fire situations (https://www.ontario.ca/document/firefighter-guidance-notes/6-20-electrical-hazards-rescue-and-fire-situations)

6-21 Aircraft fire fighting hazards (https://www.ontario.ca/document/firefighter-guidance-notes/6-21-aircraft-fire-fighting-hazards)

6-22 Ventilation saws (https://www.ontario.ca/document/firefighter-guidance-notes/6-22-ventilation-saws)

6-23 Safety during salvage and overhaul (https://www.ontario.ca/document/firefighter-guidance-notes/6-23-safety-during-salvage-and-overhaul)

6-24 Building collapse during fire situations (https://www.ontario.ca/document/firefighter-guidance-notes/6-24-building-collapse-during-fire-situations)

6-25 Safety considerations for fire department tankers (https://www.ontario.ca/document/firefighter-guidance-notes/6-25-safety-considerations-fire-department-tankers)

6-26 Structural fire fighting — fire streams and ventilation (https://www.ontario.ca/document/firefighter-guidance-notes/6-26-structural-fire-fighting-fire-streams-and-ventilation)

6-27 Fires in industrial dust collectors, hoppers and bins (https://www.ontario.ca/document/firefighter-guidance-notes/6-27-fires-industrial-dust-collectors-hoppers-and-bins)

6-28 Rescue from a collapsed trench (https://www.ontario.ca/document/firefighter-guidance-notes/6-28-rescue-collapsed-trench)

6-29 Prevention of falls from fire apparatus (https://www.ontario.ca/document/firefighter-guidance-notes/6-29-prevention-falls-fire-apparatus)

6-30 Pesticide storage fires (https://www.ontario.ca/document/firefighter-guidance-notes/6-30-pesticide-storage-fires)

6-31 Agricultural silos (https://www.ontario.ca/document/firefighter-guidance-notes/6-31-agricultural-silos)

6-32 Elevator rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-32-elevator-rescue)

6-33 Hazards created by abandoned buildings (https://www.ontario.ca/document/firefighter-guidance-notes/6-33-hazards-created-abandoned-buildings)

6-34 Solar photovoltaic systems (https://www.ontario.ca/document/firefighter-guidance-notes/6-34-solar-photovoltaic-systems)

6-35 Wind turbines (https://www.ontario.ca/document/firefighter-guidance-notes/6-35-wind-turbines)

6-36 Limiting exposure to fire gases (https://www.ontario.ca/document/firefighter-guidance-notes/6-36-limiting-exposure-fire-gases)

6-37 Active attacker events (https://www.ontario.ca/document/firefighter-guidance-notes/6-37-active-attacker-events)

6-1 Hygiene and decontamination

Background

Firefighters, in the course of their duties, may be exposed to contaminants during training exercises or emergencies.

Concerns/hazards

Firefighters' protective clothing and equipment become contaminated by contact with hazardous substances or the products of combustion and decomposition at the fire scene. When handling these items, airborne exposure to these contaminants can result, as well as exposure through contact with the skin. Engineering controls (ventilation), decontamination procedures, personal protective equipment (respiratory protection devices, gloves) and hygiene practices need to be implemented.

Actions for employers

Employers should:

- develop a program of decontamination, which includes engineering controls (ventilation), decontamination procedures, personal protective equipment (respiratory protection devices, gloves) and hygiene practices, in consultation with the joint health and safety committee

Handling soiled or contaminated equipment

Proper instruction, training and decontamination procedures can reduce illness among fire personnel.

Decontaminate all equipment used at a fire scene. This includes associated equipment (such as fire hoses and pumps), bunker gear and personal protective equipment (such as respiratory protection devices, gloves and boots).

Carrying these items in the cabs of fire department apparatus or in personal vehicles may be hazardous due to the off gassing and presence of toxins and carcinogens.

Soiled or contaminated equipment should **not** be:

- transported inside the cabs of fire department vehicles
- transported inside a personal vehicle

- taken into the living quarters of a fire station
- taken into the firefighter's home

Clean equipment and wash personal clothing after training or responding to an incident where equipment has been contaminated. Follow field decontamination procedures.

Appropriate facilities and equipment should be readily available to quickly clean and decontaminate firefighting equipment.

Hygiene and decontamination program

The following elements should be part of your hygiene and decontamination program:

- procedures for dealing with contaminated personal protective equipment, self-contained breathing apparatus and any other firefighting equipment at a training centre or emergency scene
- steps for initial decontamination of fire personnel at a training centre or emergency scene
- safety precautions and protective equipment to be worn when cleaning equipment or vehicles
- procedures for showering and changing clothes once personnel return to the station
- establish areas within the fire station that contaminated equipment should not enter
- review the manufacturer's procedures and instructions for the use of extractors and washing machines for all personal protective equipment (PPE)
- designate an area to store clean bunker gear, PPE and fire equipment

Applicable regulations, acts and standards

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
    - clause 25(1)(b) for maintaining equipment in good condition
    - 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)(e) for consulting with the Joint Health and Safety Committee or Health and Safety Representative
    - clause 25(2)(h) for taking every precaution reasonable to protect workers
- *Regulation 833 – Control of Exposure to Biological or Chemical Agents* (https://www.ontario.ca/laws/regulation/900833)
- *O. Reg. 278/05 – Designated Substance - Asbestos on Construction Projects and in Buildings and Repair Operations* (https://www.ontario.ca/laws/regulation/050278)
- *O. Reg. 490/09 – Designated Substances* (https://www.ontario.ca/laws/regulation/090490)

Related standards

For requirements for structural firefighting protective garments manufactured on or after March 1, 2007, read NFPA 1971, Standard on protective ensembles for structural fire fighting and proximity fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1971)

For guidance on the selection, care, and maintenance of firefighting protective ensembles to reduce health and safety risks associated with improper maintenance, contamination, or damage, read NFPA 1851 Standard on selection, care and maintenance of protective ensembles for structural fire fighting and proximity fire fighting (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1851)

Related

Read firefighters guidance note 4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-8-care-maintenance-inspection-and-replacement-structural-fire-fighting-

personal-protective) .

6-2 Fire fighting near water

Background

Firefighters, in the course of their duties, may work near open water, such as fire fighting activities from shorelines, around wharfs and on docked boats.

Concerns/hazards

Firefighters may be exposed to the hazard of falling into water, resulting in injury or drowning.

Actions for employers

Employers should:

- develop and implement procedures for working safely around water
- provide training in the unique aspects of combating boat fires, including vessel type, construction and stability, entry and extrication, dewatering strategy, command, suppression, ventilation, hypothermia, hot steel surfaces, personal protective equipment, and other equipment and resources required

Precautions

Consider the following precautions, where firefighters are exposed to the hazard of falling into open water:

- a personal flotation device (PFD) should be worn by rescue personnel who may be near water or where there is an exposure to the hazard of falling into water
- a PFD should be worn while performing tasks such as line handling, particularly where the shoreline is slippery or steep, or where firefighters are engaged in work where they may be pulled into the water
- a life jacket or PFD should be approved by Transport Canada, the Canadian Coast Guard or Fisheries and Oceans Canada
- PFDs should not be worn at the expense of wearing full protective clothing and a self contained breathing apparatus
- safe working perimeters should be established to protect firefighters from the hazards of working close to the water without having the required PFD
- provide adequate access and egress for firefighters by providing additional gangways, ladders, or other devices
- provide for locating and rescuing firefighters who may fall into the water

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Related

Read the information from Transport Canada on Lifejackets and personal floatation devices (https://www.tc.gc.ca/en/services/marine/getting-started-safe-boating/choosing-lifejackets-personal-flotation-devices.html) .

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 and enforce these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

6-3 Water or ice related emergencies and training

Background

Firefighters may respond to water or ice related emergencies, or train in similar conditions.

Concerns/hazards

Firefighters are at risk of drowning and hypothermia.

Actions for employers

Employers must:

- provide information, instruction and supervision to workers to protect their health and safety when working in or around water or on ice

Employers should:

- develop and implement procedures for the emergency situations which may reasonably be expected to occur in the response area
- select training locations that present the lowest risk while still providing value in training
- provide separate training for ice rescue, cold water rescue and swift water rescue, to allow workers to develop skills in lower risk conditions where the hazards are not combined

Training courses

Employers should consider the following before training takes place in water or on ice:

- set out clear course curricula, using NFPA 1006 – Standard for Technical Rescuer Professional Qualifications (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1006) as a template
- establish the roles and responsibilities of each person, including those of any instructor, incident commander, accountability officer, safety officer, rapid intervention team (RIT) or trainee
- ensure each person is competent to perform their role
- ensure that a competent person conducts a safety assessment and produces a written training plan setting out the training location, including moving water conditions, characteristics, and features and mechanisms of entrapment
- provide the training plan to all participants
- establish and communicate a written safety plan

Considerations for pre-planning

Employers should consider the following when pre-planning for water or ice related emergency situations:

- document the locations or situations that may occur
- determine protocols for mutual aid, automatic aid or assistance from outside agencies, such as other fire services, police services, emergency medical services, or Canadian or US Coast Guard
- establish communication protocols with mutual aid, automatic aid or outside agencies and review the need for a marine radio communications protocol
- test firefighters on their ability to respond to those emergencies quickly, safely, competently and effectively
- determine the self-survival techniques, self–survival equipment and procedures that should be included in training
- select, acquire and have readily available the appropriate rescue equipment to safely perform the operations that may be expected. Any equipment that is provided by employers must be maintained in good condition.

Considerations for safety

When responding to water or ice related emergency situations or during training evolutions employers should ensure that:

- an Incident Command System is established
- an Accountability System is established
- an incident safety officer is appointed
- a Rapid Intervention Team(s) (RIT) wearing appropriate PPE is established and ready to deploy
- rescuers work in teams
- rescuers wear PPE or immersion suits as appropriate to the circumstances
- rescue personnel who may be near water, or where there is an exposure to the hazard of falling into water, wear an appropriate personal flotation device (PFD)
- a rehab sector is established taking into consideration the weather conditions, time of year, decontamination of rescuers and equipment, and any rescuer's medical needs
- a post operation review is completed after all water or ice related emergencies or training evolutions

Ice rescue

Rescue personnel who may be exposed to water immersion should wear appropriate personal flotation devices, immersion suits, and clothing to reduce the risk of hypothermia.

Water rescue

All rescuers who enter the water should maintain controlled contact with the shore or boat using a safety line, hand contact or similar method, when appropriate.

In some rescue situations, such as swift water, rescuers may not be able to be safely connected to a rope. In these situations, appropriate safety measures should be taken to ensure the safety of rescue personnel. Fire departments that may need to perform rescues in swift water must ensure that specific training is provided to address the unique hazards of swift water rescue.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information, instruction and supervision to a worker
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Applicable standards

For guidance on minimum job performance requirements for fire service personnel who perform technical rescue operations, read NFPA 1006 – Standard for Technical Rescuer Professional Qualifications (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1006)

For levels of functional capability for efficiently and effectively conducting operations at technical search and rescue incidents, read NFPA 1670 - Standard on Operations and Training for Technical Search and Rescue Incidents (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1670)

Related

Ministry of Community Safety and Correctional Services

- Public Fire Safety Guidelines for Selecting a Water/Ice Rescue Capability (http://www.mcscs.jus.gov.on.ca/english/firemarshal/fireserviceresources/publicfiresafetyguidelines/04-83-01.html) to guide and assist municipalities in developing the level of water and ice rescue responses provided to the public

Transport Canada

- Vessel radio communications requirements (https://www.tc.gc.ca/eng/marinesafety/oep-navigation-radiocomms-menu-1121.htm) for commercial vessels
- Small Vessels (http://www.tc.gc.ca/eng/marinesafety/vessels-small-1485.htm) for vessel registration and operator licensing requirements
- Wearing and Using Flotation Devices (http://www.tc.gc.ca/eng/marinesafety/bulletins-2012-06-eng.htm) for requirements for small non-pleasure or commercial vessels

Firefighter guidance notes

- 1-5 Life safety rope (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment)
- 2-2 The buddy system (https://www.ontario.ca/document/firefighter-guidance-notes/2-2-buddy-system)
- 2-3 Radio communications (https://www.ontario.ca/document/firefighter-guidance-notes/2-3-radio-communications)
- 2-4 Incident safety officer (https://www.ontario.ca/document/firefighter-guidance-notes/2-4-incident-safety-officer)
- 3-3 Heat and cold stress (https://www.ontario.ca/document/firefighter-guidance-notes/3-3-heat-and-cold-stress)
- 5-1 Accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)
- 6-2 Fire fighting near water (https://www.ontario.ca/document/firefighter-guidance-notes/6-2-fire-fighting-near-water)
- 6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)
- 6-11 Rapid intervention teams (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)
- 6-12 Rehabilitation during emergency operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-12-rehabilitation-during-emergency-operations)

6-4 Rope rescue

Background

Rope rescue is a highly specialized function performed by some fire departments. It involves the use of special equipment and training to complete rescues from areas such as structures, rough terrain, confined spaces and water.

Concerns/hazards

Rope rescue may occur infrequently and long after initial training has taken place. Over time there may be a reduction in the skills and knowledge necessary to perform these tasks safely and competently.

Actions for employers

Employers should:

- develop training manuals and standard operating procedures in support of the rope rescue service being provided
- ensure workers receive regular and ongoing training and practice to maintain the skills and knowledge necessary to perform these tasks safely and competently, particularly if the frequency of these emergencies will be low

Rope rescue program

Consider the following, as part of a rope rescue program:

- training is conducted by competent instructors who are qualified to instruct in rope rescue disciplines on the basis of knowledge, training and experience
- equipment and training is provided in accordance with the rope rescue service that will be provided
- equipment and trained personnel are available to provide adequate backup and support for primary rescuers during a rope rescue

- formal processes and protocols are established and maintained for the acquisition, inspection, testing and replacement of all rope rescue equipment

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable to protect workers

Applicable standards

Read Chapter 5 Rope Rescue of NFPA 1670 Standard on operations and training for technical search and rescue incidents, 2017 (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1670) , for information on levels of service – awareness level, operations level and technician level.

Related

Read firefighter guidance note 1-5 Life safety rope and equipment (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment) .

6-5 Confined space rescue

Background

Firefighters, in the course of their work, may enter a confined space.

A confined space is a fully or partially enclosed space, that is not designed and constructed for continuous human occupancy, and in which atmospheric hazards may occur because of its construction, location or contents or because of work that is done in it.

Concerns/hazards

Hazards in confined spaces may include toxic substances, lack of oxygen, moving equipment, electricity, corrosive or toxic liquids, "quick-sand" type material and falling objects.

Confined space rescues require special preparation to ensure that firefighters safely carry out their duties.

Actions for employers

While many of the requirements in *O. Reg. 632/05 - Confined Spaces* *(https://www.ontario.ca/laws/regulation/050632)* , do not apply to emergency work performed by firefighters there are certain requirements that do apply.

Employers must:

- provide training to firefighters on safe work practices for working in confined spaces and for performing related work including the recognition of hazards associated with confined spaces
- maintain records of the training
- appoint a person with adequate knowledge, training and experience to conduct the training
- develop and review the training in consultation with the joint health and safety committee or the health and safety representative, if any
- review the training whenever there is a change in circumstances that may affect worker safety and at least once a year
- provide personal protective equipment, clothing and devices for the adequate protection of the firefighter
- develop written procedures and other measures for the adequate protection of the firefighter

Precautions for confined space entry

Consider these precautions for working in confined spaces:

- inspect and calibrate gas detection devices
- ensure that established lock-out procedures for equipment and other hazards have been implemented and followed
- test the atmosphere before entry and continuously while crews are inside (Note: many toxic gases are odourless)
- ventilate flammable atmospheres below the lower explosive limit before entering and ventilate the confined space continuously while crews are inside
- where a flammable or combustible material presents a fire hazard, station a fire crew in full protective gear with a backup hose-line at the entrance to the confined space

Firefighters entering a confined space should:

- be able to communicate with the back-up rescue team using the appropriate communications devices
- wear a full-body class III rescue harness securely attached to a rope with the free end fastened to a stationary object outside the confined space
- consider using a mechanical retrieval device which may be more effective than manual retrieval
- be supported by an appropriately equipped back-up rescue team located at the entrance to the confined space
- establish traffic control to prevent injury to rescuers

Providing contracted confined space on-site rescue

There may be situations where fire departments make contractual arrangements to provide confined space “on-site rescue” to private industry. In these pre-planned, non-emergency situations, all requirements of *O. Reg. 632/05 - Confined Spaces (https://www.ontario.ca/laws/regulation/050632)* apply. Some examples of requirements in the regulation include:

- workers must receive appropriate plan-specific training to perform the confined space rescue
- workers must be capable of immediately implementing the relevant plan and the written on-site rescue procedures that apply to the confined space

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *O. Reg. 632/05 - Confined Space (https://www.ontario.ca/laws/regulation/050632#BK2) s* for confined space requirements

Applicable standards

For levels of functional capability for efficiently and effectively conducting operations at technical search and rescue incidents, read NFPA 1670 - Standard on operations and training for technical search and rescue incidents (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1670)

For minimum job performance requirements for fire service personnel who perform technical rescue operations, read NFPA 1006 – Standard for technical rescuer professional qualifications (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1006)

For acquiring new life safety ropes or related equipment, read NFPA 1983 – Standard on life safety rope and equipment for emergency services (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=1983&tab=about)

For a set of standards that covers program management; system design; training; qualification and testing; equipment, component and system specifications for the processes used to protect workers at height in a managed fall protection program, read ANSI Z359.1 The fall

protection code (https://webstore.ansi.org/RecordDetail.aspx?sku=ANSI%2fASSE+Z359.1-2016)

For design, testing, marking, and information requirements for use of full body harnesses, read CSA Z259.10 Full body harnesses (http://shop.csa.ca/en/canada/fall-protection/cancsa-z25910-12-r2016/invt/27001402012)

Related

For assistance in understanding the requirements of *O. Reg. 632/05 - Confined Spaces* *(https://www.ontario.ca/laws/regulation/050632)* , read the Ministry of Labour Confined spaces guideline (https://www.labour.gov.on.ca/english/hs/pubs/confined/index.php) .

Read firefighter guidance notes:

- 1-5 Life safety rope and equipment (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment)
- 6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)

6-6 Rapid fire progression

Background

Firefighters, during fire suppression activities, may be exposed to rapid fire progression phenomena, such as backdraft and flashover.

Concerns/hazards

Rapid fire progression events are extremely dangerous and can quickly lead to life-threatening situations. Firefighters must be able to recognize these types of events so that they can respond appropriately to the hazard.

Actions for employers

Employers should:

- provide theoretical and practical fire dynamics training for suppression personnel
- review and update training regularly in light of current knowledge and best practices

Fire dynamics (fire science) training

The following statement was made by Daniel Madrzykowski, Fire Protection Engineer, National Institute of Standards and Technology:

> "Fire dynamics can provide a fire officer or a firefighter with means to understand how a fire will grow and spread within a structure and how best to control that growth."

Consider the following topics, as part of fire dynamics training:

- combustibility of modern contents and how they can impact compartment fire behavior and rapid fire progression events
- identifying ventilation flow paths and understanding how fire suppression activities can influence a flow path that could result in rapid fire progression
- critical differences between fuel-limited and ventilation-limited fires, and correspondingly, different hazards
- the greatest hazard to fire suppression personnel is present during ventilation-limited compartment fires, which could lead to roll-over, flash over, back draft or any rapid fire progression event
- theoretical (in class) and practical (experiential/hands-on) training components

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

For a research paper on the science behind fire, read Fire dynamics: The science of fire fighting (https://www.ifsta.org/sites/default/files/fire-dynamics-madrzykowski-2012.pdf) by Daniel Madrzykowski, Fire Protection Engineer, National Institute of Standards and Technology, 2012

Firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)

Guidance note 7-4 Firefighter survival and self-rescue training (https://www.ontario.ca/document/firefighter-guidance-notes/7-4-firefighter-survival-and-self-rescue-training)

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6-7 Driving skills for emergency apparatus response

Background

Firefighters drive a variety of fire department apparatus under both routine and emergency response conditions. These apparatus can range from off-road vehicles such as all-terrain vehicles (ATVs), utility vehicles (UTVs) and snowmobiles to automobiles and heavy trucks.

Concerns/hazards

Each apparatus has different control and handling characteristics. Unsafe operation can result in injury or death to workers.

Actions for employers

Employers must:

- provide information, instruction and supervision to a worker to protect the health and safety of the worker

Employers should:

- provide drivers with both theoretical and practical training in defensive driving skills for each type of apparatus
- allow sufficient time when scheduling the practical driving skills portion of the course to enable drivers to develop their defensive driving skills
- consider a graduated program for drivers of heavier-than-normal apparatus or specialized apparatus to allow for appropriate specific training

Considerations for training

Theoretical training should include:

- the effect of weight and speed on braking and stopping distances
- the effects of centrifugal force on apparatus during turning
- the effects of slope on roll over for off-road apparatus

- fire department limitations on terrain to be traversed for off-road apparatus
- the effect of inertia and weight distribution related to changing the heading or direction of apparatus
- the effect of tire friction related to driving traction, braking traction and cornering traction
- the effect of various weather conditions on the braking, steering control and stopping distances, and the ability of workers to recognize and adapt to these conditions

Practical training should include the following skills:

- a serpentine exercise with change of direction
- an evasive exercise for steering around an object
- controlled braking exercise
- backing exercise
- off-road vehicles should be driven on terrain conditions that may be encountered in emergency situations
- skid control
- off-road recovery exercise
- emergency response driving

Additional training should be provided for aerial devices and tankers due to their size and weight.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance notes:

- 1-1 Fire apparatus occupant safety (https://www.ontario.ca/document/firefighter-guidance-notes/1-1-fire-apparatus-occupant-safety)
- 6-25 Safety considerations for fire department tankers (https://www.ontario.ca/document/firefighter-guidance-notes/6-25-safety-considerations-fire-department-tankers)

6-8 Firefighter safety during lightning storms

Background

Firefighters may be required to work during lightning storms.

Concerns/hazards

Workers and apparatus may be struck by lightning, which can cause serious injury or death.

Actions for employers

Employers should develop procedures that address fire operation safety for current or imminent lightning storms.

Safety considerations

Consider the following when developing procedures:

- when to raise or lower aerial apparatus, lighting masts and ground ladders
- when to begin or cease roof operations
- moving pump operators off the ground onto the pump operator step or to the inside of the apparatus
- staging the rapid intervention team inside an apparatus or a building
- staging all personnel not on active assignment inside an apparatus or a building and committing the minimum number of personnel to complete outside assignments
- providing information to the incident commander of actual or potential lighting strikes in the vicinity of an incident, to assist in risk management analysis on scene

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Relevant standards

For information on the application of occupational health and safety management systems to plans for work performed under heightened-risk conditions read CSA Z1010-18 - Management of work in extreme conditions (http://shop.csa.ca/en/canada/occupational-health-and-safety-management/z1010-18/invt/27043892018)

Related

For information on areas at greatest risk of being struck by lightning in the next 10 minutes, view the Canadian lightning danger map - Ontario (http://www.weather.gc.ca/lightning/index_e.html?id=ONT#mapTop)

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We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

6-9 Hazardous materials/CBRNE response

Background

Some firefighters may provide hazardous materials response or chemical, biological, radiological, nuclear or explosive (CBRNE) terrorism response.

Concerns/hazards

Exposure to chemical, biological, radiological, nuclear or explosive agents can result in injury, illness or death.

Actions for employers

Employers should:

- evaluate their hazardous materials response capability
- ensure that firefighters are adequately trained and equipped to perform the hazardous materials response
- document both the theoretical and practical training provided

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Applicable standards

For information on response levels to emergencies involving hazardous materials/weapons of mass destruction, read NFPA 472, Standard for competence of responders to hazardous materials/weapons of mass destruction incidents (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards?mode=code&code=472) , 2013 edition.

6-10 Traffic safety and control

Background

Firefighters, in the course of their duties, may be exposed to the dangers of moving traffic while working on roadways.

Concerns/hazards

It is important that all incident scenes on roadways be protected and contained in order to provide a safe work area for firefighters while minimizing the chance of secondary traffic incidents.

Actions for employers

Employers should:

- identify the hazards to which firefighters are exposed at these unplanned events
- implement a traffic safety and control program with appropriate health and safety measures and procedures to protect workers
- consult the joint health and safety committee or health and safety representative when developing measures and procedures
- consult other emergency services and the road authority responsible for the serviced area when developing measures and procedures

Traffic safety and control program

A traffic safety and control program should include:

- training
- response protocols which ensure that appropriate apparatus are dispatched to provide a safe work environment
- personal protective equipment requirements
- fire apparatus visibility requirements

Training

Training should include:

- awareness of the dangers of working near moving traffic
- the proper use of personal protective equipment (PPE)
- the proper use of traffic safety equipment such as cones, flares, and traffic triangles
- the proper use of traffic control equipment such as signs, if firefighters are directed to control traffic
- vehicle blocking methods to create safe work areas
- familiarity with response protocols

Personal protective equipment

High visibility safety apparel should be worn by all firefighters who are:

- working near moving traffic
- controlling traffic by the use of traffic control stop or slow signs
- working outside of the area which is protected by apparatus and traffic safety equipment

PPE should meet the high visibility reflective requirements outlined in Canadian Standards Association (CSA) Standard Z96-15 High-visibility safety apparel (http://shop.csa.ca/en/canada/high-visibility-apparel/z96-15/invt/27016522015) .

Note: Bunker gear does not meet the reflectivity performance requirements of the standard.

Procedures

Employers should develop, maintain and communicate procedures regarding traffic safety and control.

These procedures should include:

- the requirement to conduct a scene assessment and determine the potential hazards and level of risk
- the requirement for the incident commander to initiate traffic safety and control procedures for incidents near live traffic
- PPE use
- establishment of a traffic control zone to provide initial scene safety
- establishment of safe work areas in coordination with the police when possible, as only police are permitted to close a highway
- a deployment plan for responding fire apparatus
- use of traffic safety and control equipment to establish and maintain safe work areas
- use of the local roads authority to provide blocking equipment for prolonged incidents

Fire departments should reference Ministry of Transportation Book 7 (http://www.mto.gov.on.ca/english/publications/mto-research-library-online-catalogue.shtml) requirements for unplanned events.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Applicable standards

For advice on selection, use, and care of high-visibility safety material and recommendations for hazard assessments, read CSA Standard Z96-15 High-visibility safety apparel (http://shop.csa.ca/en/canada/high-visibility-apparel/z96-15/invt/27016522015)

For standards for new fire apparatus, read NFPA 1901 Standard for automotive fire apparatus (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1901)

Related

For information and guidance on traffic control for unplanned events, read appendix 1 of the Ontario traffic manual book 7 temporary traffic control for unplanned events (http://www.mto.gov.on.ca/english/publications/mto-research-library-online-catalogue.shtml) from the ministry of transportation.

6-11 Rapid intervention teams (rescue)

Background

Firefighters may work or train in hazardous and high risk situations, such as interior structural fires, confined space rescues, high angle rescues, hazardous materials incidents or swift and ice water rescues.

Concerns/hazards

There may be situations where a firefighter's life is in jeopardy as the firefighter is lost or trapped at the incident and needs to be quickly rescued.

Actions for employers

Employers should provide written operational procedures for establishing rapid intervention teams of at least two firefighters.

Rapid intervention teams

Rapid intervention teams (RIT) may be:

- on-scene firefighters designated and dedicated to RIT
- on-scene firefighters performing other functions, but ready to deploy as RIT if necessary

Consider the following, for personnel designated as RIT:

- **inform them** that they have been designated as RIT
- **restrict them** from performing functions that require the use of their **air supply** so that air can be preserved for use as RIT
- restrict the **incident commander or other sector officers** from being designated as RIT so that they can remain safely in command positions

Considerations for operational procedures

Consider the following key elements when developing operational procedures:

- RITs should be implemented as part of the incident command and accountability systems, to ensure firefighters have rescue available
- provide RIT teams with appropriate personal protective equipment, self-contained breathing apparatus, portable radios and any specialized equipment needed for the specific operation
- when emergency rescue activities are necessary before a full RIT has assembled:
  - **initial RIT** should be designated before a crew enters a controlled area
  - report the circumstances in writing to the Fire Chief and provide a copy to the local joint health and safety committee or health and safety representative for review
- if a firefighter becomes lost or is missing, conduct a personnel accountability report immediately and alert the RIT
- once a RIT is deployed, implement another RIT team for their protection if resources allow
- a RIT is not required for every pair/crew making entry into a hazardous area, but more than one RIT may be required depending on the size and geographical layout of the incident

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance notes:

- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 5-1 Accountability and entry (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)

6-12 Rehabilitation during emergency operations

Background

Firefighters may be exposed to extreme temperatures or excessive work activity.

Concerns/hazards

Firefighters may be at risk of heat or cold related illness, dehydration and cardiovascular stress.

Actions for employers

Employers should:

- develop procedures that provide for rehabilitation
- in preparation for an event, discuss interagency response with EMS

Rehabilitation considerations

Some typical rehabilitation considerations are:

- establish the rehabilitation sector away from the hazardous area
- appropriate decontamination of personnel prior to entering the rehab area or eating or drinking
- provide replacement fluids or food
- caffeinated drinks are not recommended
- rehydrate throughout the incident, drinking approximately 250 to 400 millilitres of replacement fluids during rehabilitation
- rehydrate with 500 millilitres of replacement fluid at the end of the incident
- rotate between lighter and heavier work, when work periods are extended
- provide medical monitoring by EMS personnel where available
    - while heart rate should not be the sole indicator for the extent of heat strain, elevated or irregular heart rate may be an indication of cardiovascular stress
- monitoring of air quality to ensure rehab sector remains outside hazardous area

For rehabilitation during extreme heat exposure, also consider:

- removing workers from direct sunlight
- providing a cooled shelter or area
- providing active cooling by methods such as misting or forearm immersion in cool water when ambient outdoor temperature is above 25 degrees Celsius
- following the first rehabilitation session, provide an additional cooling session following the use of each subsequent cylinder of air, for personnel returning to work

For rehabilitation during extreme cold exposure, also consider providing heated shelter.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*

- clause 25(2)(a) for providing information and instruction to a worker
- clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Relevant standards

For information on the application of occupational health and safety management systems to plans for work performed under heightened-risk conditions read CSA Z1010 - Management of work in extreme conditions (http://shop.csa.ca/en/canada/occupational-health-and-safety-management/z1010-18/invt/27043892018) .

For information on rehabilitation standards, read NFPA Standard on the rehabilitation process for members during emergency operations and training exercises (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1584)

Related

For more information about Heat Stress (https://www.ontario.ca/page/managing-heat-stress-work) , read the Ministry of Labour Health and Safety Guideline.

Read firefighter guidance note 3-3 Heat and cold stress (https://www.ontario.ca/document/firefighter-guidance-notes/3-3-heat-and-cold-stress) .

Read the Firefighter's cancer prevention checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist) .

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 and enforce these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

6-14 Safe roof operations

Background

Firefighters may access a roof during the course of their work.

Concerns/hazards

Firefighters are at risk of falling off or falling through a roof during emergency operations.

Actions for employers

Employers should:

- develop procedures for roof operations
- provide appropriate training to workers

Safety considerations for roof operations

Consider the following when developing procedures for working on roofs:

- conducting initial and ongoing risk assessments that determine the type of roof construction, the location of the fire and the length of time that the structure has been burning
- factors impacting building integrity should be taken into consideration when determining whether to commit personnel to, or evacuate personnel from the roof sector
- based on the risk assessment, appropriate personal protective equipment, including fall protection equipment, that should be provided to individuals assigned to the roof sector
- where fall arrest systems are implemented as a precaution for a fall hazard, a self-rescue and rapid intervention plan should be developed and implemented if needed, by trained personnel

- identifying or providing for an alternate means of emergency escape other than the initial route of access
- ensure appropriate supervision is provided and roof activities are coordinated by a roof sector officer designated under the incident management system

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Related

- 4-11 Fall protection from elevating devices (https://www.ontario.ca/document/firefighter-guidance-notes/4-11-fall-protection-elevating-devices)
- 6-11 Rapid intervention teams (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)
- 6-18 Unprotected lightweight building construction (https://www.ontario.ca/document/firefighter-guidance-notes/6-18-unprotected-lightweight-building-construction)
- 6-40 Working at Heights (https://www.ontario.ca/document/firefighter-guidance-notes/6-40-working-heights)

6-15 Medication and drug exposure

Background

Firefighters, in the course of their duties, may be exposed to medication(s) and/or drug(s) in various forms from contact with:

- persons suffering from accidental or intentional overdoses of prescription medication, non-prescription medication or illicit drugs
- equipment or being within a building used in the drug manufacturing process

Concerns/hazards

Medications and drugs that pose potential risks include, but are not limited to chemotherapy medication, opioids and methamphetamine. The risk of exposure may occur through contact with a visibly contaminated patient, direct contact with the medication/drug or contact with equipment or being within a building used in the drug manufacturing process.

Actions for employers

Employers should:

- develop processes to ensure the protection of firefighters from hazardous exposures to drugs and medications

Safety considerations for medication or drug exposure

Employers should consider the following, when developing processes to prevent firefighter exposure:

- training on recognizing and determining risks, and taking actions appropriate to manage the level of risk
- creation of standard operating guidelines to manage exposure to drugs
- direct firefighters not to handle any medications/drugs or drug paraphernalia, unless necessary to perform a rescue
- direct firefighters to treat unknown/unidentified substances as hazardous materials and follow any established departmental hazardous materials guidelines
- safety precautions and personal protective equipment to be used, as appropriate to the level of risk, when responding to high risk incidents
- decontamination process for personnel who may be exposed

- reporting protocols for exposures

Training considerations

Training should include, but not be limited to the following:

- processes addressing the considerations noted in the paragraph above
- types of medications and drugs that may be encountered and how to identify them
- the proper selection and use of personal protective equipment during emergency incidents to prevent exposure
- how to manage exposure should it occur
- reporting protocols for exposures

Proper instruction, training, use of personal protective equipment and decontamination assists in reducing the chance of exposure and better enables firefighters to manage exposures.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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* (https://www.ontario.ca/laws/regulation/900833)
  - section 3 for measures to protect workers from exposure to biological or chemical agents

Related

Read firefighters guidance note 6-17 Clandestine drug labs (https://www.ontario.ca/document/firefighter-guidance-notes/6-17-clandestine-drug-labs) .

6-16 Machinery/electrical lockout during emergency response

Background

Firefighters may need to rescue people trapped in various forms of industrial machinery or elevators.

Concerns/hazards

There are many types of potentially hazardous energy including, electrical, thermal, chemical, pneumatic, hydraulic, mechanical and gravitational energy. All such forms of energy must be locked out, blocked or released to ensure that machinery or equipment does not turn on or move while rescuing trapped people. Without adequate lockout, a sudden and uncontrolled release of energy from a system, machine or piece of equipment can occur, endangering firefighters.

Actions for employers

Employers should:

- develop and implement safe lockout procedures
- provide training in lockout procedures to those personnel who will perform rescue in any industrial machinery or energized electrical equipment

Using lockout to control energy sources

The term “lockout” refers to the methods, devices, and procedures for preventing the sudden and uncontrolled release of energy from a system, machine, or piece of equipment. Since energy is what a lockout system attempts to eliminate or control, it is important to identify all potentially active sources of energy associated with the piece of equipment involved.

Main energy sources provide power to a system, and include:

- electricity
- pneumatics
- hydraulics

Stored or secondary energy stays in the system after the main source has been turned off, and includes:

- electricity in batteries and capacitors
- volatile chemicals in piping systems
- pistons that move back and forth after the equipment’s power supply is turned off

Lockout considerations

Consider the following when performing lockout operations:

- determine if there are personnel on site who possess a greater knowledge of the machinery, who can assist in locating shut-offs and in the disassembly of the machine
- follow lockout instructions in the operator’s manual, if available
- isolate the energy supply by locating power sources and ensure that lockouts are performed
    - for energized electrical equipment, locate the main line and disconnect and perform a lockout
    - for pneumatic/hydraulic equipment, locate line shut-offs and perform a lockout
    - for flowing liquid/solid applications, ensure that block-outs are performed and valves are closed
- stored energy, such as that in capacitors, springs, elevated machine parts, rotating flywheels, hydraulic systems, and air, gas, steam, or water pressure, etc., should also be released, disconnected, or restrained by methods such as grounding, repositioning, blocking or bleeding-down
- determine if lockout is required for any equipment that operates intermittently, such as a pump, blower, fan or compressor
- if there is a possibility of re-accumulation of stored energy, such as an increase in pressure to a hazardous level, isolation of the equipment should be periodically verified until the rescue is completed, or until the possibility of such accumulation no longer exists
- if a power supply is not physically locked out, assign personnel with radio communications to stand by the power source to make sure that the power supply is not turned back on

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
    - 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 in the circumstances to protect workers

Related

For additional information about electrical safety, read Electrical Safety Handbook for Emergency Responders – Best practices for Coping with Electrical Hazards in Rescue and Fire Situations (https://www.pshsa.ca/product/electrical-safety-handbook-for-emergency-responders/) , Hydro One Networks Inc., Electrical Safety Authority, Office of the Fire Marshal, and Public Services Health and Safety Association, revised 5th Edition, 2013

Read firefighter guidances notes:

- 6-20 Electrical hazards in rescue and fire situations (https://www.ontario.ca/document/firefighter-guidance-notes/6-20-electrical-hazards-rescue-and-fire-situations)
- 6-32 Elevator rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-32-elevator-rescue)

6-17 Clandestine drug labs

Background

As a result of the number of clandestine drug labs (CDLs) in existence today, there is an increasing risk of firefighters encountering these situations during firefighting duties.

CDLs are makeshift laboratories for manufacturing controlled substances such as methamphetamine. Once identified these situations should be treated as crime scenes.

Concerns/hazards

The primary concerns for firefighters entering CDLs are:

- electrocution
- propane/natural gas/flammable liquid explosions
- structural collapse
- chemical hazards
- toxic and corrosive atmospheric hazards
- improperly contained toxic chemicals
- booby traps

Fire personnel may be at risk of injury, illness or death from hazards at CDLs. They may need to quickly evacuate for their own safety.

Actions for employers

Employers must:

- make workers aware of the hazards of CDLs
- provide information and instruction to fire personnel to protect their health or safety

Safety considerations

Consider including the following information in procedures:

- identifiers of potential CDLs, such as strong odours, exterior stains, excessive condensation on windows or enhanced security
- situations which should be identified as hazardous material incidents due to the presence of hazardous waste or chemicals such as battery acid, drain cleaner, lantern fuel, antifreeze, propane and/or anhydrous ammonia
- identify the factors that contribute to the hazards of a CDL including chemicals, booby-traps and bypassed hydro connections
- use of appropriate personal protective equipment, such as SCBA
- when a CDL is discovered during firefighting operations, exit the area as soon as it is practical to do so, and notify police, ambulance, hydro and all other appropriate agencies
- contact a hydro company to shut off power and **do not touch any equipment or attempt to shut off power** due to possible reactions and the type of operations
- exercise caution as **the power may still be on** after the hydro company disconnects the service, because the hydro may be bypassed
- **if rescue is not required, do not enter** a CDL until deemed safe by all responding emergency agencies

- stay upwind and protect exposures from a safe distance
- air quality testing prior to entry
- decontamination requirements
- coordinate and develop protocols with local police, utility companies and other agencies

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

6-18 Unprotected lightweight building construction

Background

Lightweight building construction is a common present day construction type.

Concerns/hazards

Buildings constructed using lightweight materials that are not sufficiently protected by sprinklers or effective non-combustible structural protection systems may collapse much sooner than expected. Warning signs that are commonly present in fires that involve legacy construction are not present in these situations.

Unprotected lightweight trusses, fastening systems, wooden “I” beams, lightweight steel frame construction and other engineered construction components are quickly compromised when exposed to heat and flame.

Firefighter fatalities and injuries have occurred as the result of rapid structural failure.

Actions for employers

Employers should:

- identify buildings with lightweight construction in their response area

Employers must:

- make firefighters and incident commanders aware of the hazards of lightweight construction
- make firefighters aware of any known locations of buildings with lightweight construction in their response area

Safety considerations

Incident commanders should:

- consider the type of construction, the presence of protective sprinkler systems, and to what extent the structure may have been damaged by the fire, before initiating firefighting strategy
- consider employing defensive fire attack strategies within buildings that contain unprotected lightweight construction and where no threat to human life exists
- continually evaluate the risks during operations in buildings that contain unprotected lightweight construction
- assume that unprotected lightweight construction is present, if unable to determine the type of construction in a building

Consider the following in procedures:

- the unique hazards of buildings built with unprotected lightweight construction, emphasizing firefighter safety and the likelihood of an early unpredictable collapse
- use of a thermal imaging camera to help locate fires
  - recognize that the camera cannot be relied upon to assess the strength or safety of the floor
  - firefighters should be trained on the use of thermal imaging cameras, including limitations and difficulties in detecting fire burning below floor systems
- use extreme caution when operating on or under an unprotected lightweight truss roof or floor
- evacuate as soon as it is determined that the unprotected trusses are exposed to fire
- develop emergency warning procedures for evacuating a building in danger of collapse, and practice regularly

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

6-19 Hybrid/electric and electrical vehicle safety

Background

Hybrid or electric vehicles are powered by a combination of internal combustion and electric motors. The electric motors are powered by high voltage battery packs.

Concerns/hazards

Although manufacturers build many safety features and devices into their vehicles to prevent accidental shock to the driver, the hybrid or electric vehicle's high voltage system can pose a shock hazard to firefighters in an emergency situation.

Actions for employers

Employers must:

- familiarize firefighters with the hazards of hybrid or electric vehicles

Employers should:

- train firefighters on the means provided by manufacturers to shut down high voltage vehicles
- develop a policy or standard response guideline for electric/hybrid vehicle incidents

Safety considerations

These are some important safety considerations for hybrid or electric vehicles.

Fires

Hybrid and electric cars can experience multiple classes of fires:

- Class A — Ordinary combustibles (for example, wood, fabrics and some plastics)
- Class B — Flammable liquids (for example, fuel, oil and grease)
- Class C — Live electrical equipment (for example, wiring and batteries)
- Class D — Combustible metal (for example, magnesium)

Battery fires may initially show from under the vehicle.

Quiet operation of vehicle

The hybrid or electric vehicle may still be powered on even though there may be no engine noise. This poses a risk of the vehicle accidentally moving. Electric vehicles (EVs) move silently, never assume it is powered off and it won't move.

Pre-incident planning

Consider the following, during pre-incident planning:

- there could be a combined fire, extrication and hazmat incident
- develop guidelines for when crews should have limited interaction and allow the vehicle to burn (such as, defensive tactics)
- increased time may be required to manage and control electric vehicle fires
- during call taking, have dispatch assess whether an electric vehicle is involved and whether it is near a structure (home, garage and parking garage)
- markings to indicate hybrid or electric vehicles vary
- the location of high voltage cables varies, there may be high voltage cables in the cut zones

Incident actions

Consider the following when responding to a hybrid or electric vehicle incident:

- heightened situational awareness must be maintained while working on roads for extended periods of time
- park fire apparatus uphill and upwind
- high voltage systems need to be shut down before entering damaged hybrid or electric vehicles, or before starting extrication procedures
- wear full PPE with SCBA with face-piece
- use a thermal imaging camera to assess electric vehicle hazards, such as:
  - the extent of the fire
  - if it is a compartment fire
  - if the fire includes the electric components of the vehicle
- secure the electric vehicle, where possible, by:
  - putting the vehicle in park
  - turning the vehicle off
  - chocking the wheels

The best method for managing or controlling a battery fire is with large quantities of water. Secure a large, continuous and sustainable water supply from one or more hydrants.

Secondary ignition risk

The heat from the fire may have damaged additional cells, which may require additional suppression activities. Batteries should always be treated as energized.

Following initial suppression activities, monitor for:

- heat from the battery
- possible secondary ignition

Have sufficient fire personnel and apparatus on scene for an extended operation.

Safety during overhaul

Consider the following to work safely during overhaul:

- do not make contact with any high voltage components
- a high voltage cable may run under the vehicle chassis, posing a shock hazard when cutting into, lifting or stabilizing hybrid or electric vehicles — the **high voltage cable** should not be cut, disconnected or handled due to the shock hazard
- high voltage systems need to be shut down before entering damaged hybrid or electric vehicles
- there may be residual power in other batteries or other energy sources

Removing a patient from the vehicle

Procedures for removing someone from a vehicle may vary depending on the vehicle type and design. Consider the following to work safely when removing someone from an electric vehicle after an incident.

Preparation

Consider the following when preparing to remove someone from a vehicle after an incident:

- charge a hose line and staff it with a firefighter in full PPE ready to fight fire, as there is a significant risk of a delayed fire
- shut down high voltage systems before starting extrication procedures

Stabilizing and cutting the vehicle

Consider the following when stabilizing and cutting into an electrical vehicle:

- vehicle construction and weight distribution could change standard strategies for stabilization
- for rescue struts, **do not** use any holes that may have been caused by the crash and **do not** pierce, puncture or create any purchase point in the battery case — this could cause an electrocution and/or fire hazard
- the battery compartment forms part of the structure — consider this when determining how to extricate
- remove trim to verify what is being cut before the cut is made
- **do not** cut any high-voltage cabling

Air quality

Consider the following to ensure safe air quality:

- harmful/flammable gasses may be released from batteries and may cause eye, nose or throat irritation — wear full SCBA
- using a vent fan may be appropriate to blow fresh air into the passenger compartment of the vehicle

Lifting the vehicle

Consider the following when lifting an electric vehicle:

- electric vehicles should be lifted at the rocker panel
- be certain to complete any lifts over a large surface area

After an incident

Thermal events with the battery system could continue for some time after the initial incident. To keep workers safe, consider the following:

- batteries should always be treated as energized and pose an ongoing risk
- have the fire apparatus escort the vehicle to the recovery location, if possible
- inform fire investigators of the hazards of the electric vehicle

Applicable regulations and acts

To learn more about the applicable regulations acts you can read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Firefighter's Cancer Prevention Checklist (https://www.ontario.ca/page/firefighters-cancer-prevention-checklist)

Read NFPA 921 Guide for Fire and Explosion Investigations (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=921) for safety during post-response investigation, arson investigation and vehicle investigation.

As part of the Electric Vehicle Safety Training project, the National Fire Protection Association (NFPA) (https://www.nfpa.org/) is working with vehicle manufacturers to help inform fire services and other first responders about hazards associated with electric vehicles. This information may be found in NFPA - Emergency Response Guides for Alternative Fuel Vehicles (https://www.nfpa.org/training-and-events/by-topic/alternative-fuel-vehicle-safety-training) for specific vehicle types.

First Responders | Tesla (https://www.tesla.com/firstresponders)

6-20 Electrical hazards in rescue and fire situations

Background

Firefighters are frequently exposed to electrical hazards when responding to emergencies.

Concerns/hazards

Firefighters may be exposed to the risk of injuries from electrical hazards during the following situations:

- electrical utility equipment that is damaged or has caught fire
- a vehicle collision with an electrical pole
- an electrical transformer explosion
- structural fires where fire has compromised the electrical power supply

Actions for employers

Employers must:

- familiarize firefighters with electrical hazards, to protect their health and safety
- train firefighters on working safely near electrical hazards

Employers should:

- develop procedures for working near electrical hazards

Working near electrical hazards

Consider the following when developing procedures for working near electrical hazards:

- sources of electricity
- how to isolate the electricity
- appropriate personal protective clothing and equipment

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read the Electrical safety handbook for emergency responders – Best practices for coping with electrical hazards in rescue and fire situations (https://www.pshsa.ca/product/electrical-safety-handbook-for-emergency-responders/) , Hydro One Networks Inc., Electrical Safety Authority, Office of the Fire Marshal, and Public Services Health and Safety Association, revised 5th Edition, 2013.

Read firefighter guidance note 6-16 Machinery/electrical lockout during emergency response (https://www.ontario.ca/document/firefighter-guidance-notes/6-16-machineryelectrical-lockout-during-emergency-response)

6-21 Aircraft fire fighting hazards

Background

Firefighters may respond to incidents involving aircraft and perform rescue and fire fighting operations.

Concerns/hazards

Aircraft present unique hazards, due to their composition, fuel and cargo.

Actions for employers

Employers should:

- establish procedures for responding to aircraft incidents

Employers must:

- make sure firefighters are aware of the various aircraft hazards they may encounter
- train firefighters on responding to aircraft incidents, to protect their health or safety

Crash scene hazards

Some hazards associated with crash scenes could include:

- control of access to the airport site may delay the arrival of responding apparatus, including support for the first crew on-scene
- aircraft materials:
  - simple composite, such as fiberglass
  - advanced aerospace materials such as boron/epoxy, carbon/epoxy or depleted uranium
  - radar absorbent materials used in stealth technology

  During a fire, the bonding materials in composite materials may burn away, exposing composite fibres which can contaminate living organisms.

- jet fuel:
  - the 3 basic types are known as Jet A, Jet B and Avgas
  - jet fuels are skin irritants, are heavier than air and will collect in low lying areas.

Aircraft hazards

Hazards associated with aircraft could include:

- movement of propellers or helicopter rotors
- powerful draw of jet engines
- movement of landing gear
- electromagnetic radiation from radar equipment
- hazardous cargo

You can usually find the cargo manifest on or near the cockpit door. The cargo manifest can help identify any hazardous cargo on board.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

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.

Applicable standards

For information firefighters need to effectively perform the tasks for aircraft rescue and fire fighting, read the International Fire Service Training Association (IFSTA) Aircraft Rescue and Fire Fighting (https://www.ifsta.org/shop/aircraft-rescue-and-fire-fighting-6th-edition/36780) – 6th edition

For a standard on minimum requirements for aircraft rescue and fire-fighting services at airports, read NFPA 403 Standard for Aircraft Rescue and Fire-Fighting Services at Airports (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=403)

For a standard on design, performance, and acceptance criteria for aircraft rescue and fire-fighting vehicles intended to carry personnel and equipment to the scene of an aircraft emergency to rescue occupants and conduct rescue and firefighting operations, read NFPA 414 Standard for Aircraft Rescue and Fire-Fighting Vehicles (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=414)

For a standard on the minimum job performance requirements for airport fire fighters, read NFPA 1003 Standard for Airport Fire Fighter Professional Qualifications (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1003)

6-22 Ventilation saws

Background

Ventilation is an important component of conducting safe and effective fire fighting in structures. Coordinating ventilation and fire attack streams can result in less danger to firefighters and occupants, and provide quicker fire control.

Concerns/hazards

Fire departments use various types of power saws to open structures for ventilation. The safe use of these saws requires knowledge and training on the operation of this equipment.

Actions for employers

Employers must:

- train firefighters on the safe operation of saws
- maintain saws in good condition

Employers should:

- develop procedures on ventilation saws

Types of ventilation saws

There are 2 types of ventilation saws:

- rotary or circular saws which use a variety of circular blades to cut wood, steel and concrete
- chainsaws which use different chains, blades and special attachments designed specifically for fire ventilation work

When buying new saws, consider models with improved safety and operating features.

Safety considerations

Consider including the following in procedures on ventilation saws:

- maintenance and servicing as per the manufacturer's operating manual, including fuelling, oil mixes, starting, stopping, checking chain brake, chain adjustment and cleaning
- requiring firefighters to start and run the saw briefly on the ground and then shut it off before it is sent to be used
- use of an adjustable depth gauge to minimize cutting of rafters
- follow safety procedures for working on roofs, as discussed in Firefighters guidance note #6-14: Safe roof operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-14-safe-roof-operations)
- requiring firefighters to wear full protective equipment including eye protection
- have a guide to watch where the operator is going and clear the path of obstructions
- keep all firefighters except for the operator and guide clear of the cutting operation

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(1)(b) for maintaining equipment in good condition
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *Regulation 851 - Industrial Establishments* *(https://www.ontario.ca/laws/regulation/900851)*
  - section 79 for training on the care and use of protective clothing, equipment and devices
  - section 81 for eye protection
  - section 83 for preventing entanglement

Related

Read the International Fire Service Training Association (IFSTA) Manuals (https://www.ifsta.org/shop/product-categories/firefighter/action-training-support-products) for information on:

- fire service ventilation
- forcible entry
- essentials of fire fighting

Read firefighter guidance note 6-14 Safe roof operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-14-safe-roof-operations)
.

6-23 Safety during salvage and overhaul

Background

Firefighters may be involved in salvage and overhaul operations following extinguishment of fires. Salvage and overhaul include looking for hidden sources of fire and protecting valuables from fire and water damage.

Concerns/hazards

Following the extinguishment of fires, products of combustion may create a hazardous atmosphere. During salvage and overhaul, respiratory exposure is a common risk to firefighters. Toxicity levels from the fire may be at their worst during the smoldering phase.

There are also a number of other risks to firefighters during salvage and overhaul, such as slips, trips and falls or the collapse of unstable structures.

Actions for employers

Employers must:

- make firefighters aware of the hazards of salvage and overhaul operations
- train firefighters on working safely during salvage and overhaul operations

Employers should:

- ensure that firefighters wear personal protective equipment, including appropriate respiratory protection and skin protection, during salvage and overhaul operations
- ensure that risks are continuously assessed during salvage and overhaul
- develop procedures for salvage and overhaul

Safety considerations during salvage and overhaul

Consider the following when developing procedures for salvage and overhaul operations:

- structural integrity of the building
- risk of sprains, strains and other physical injuries
- contamination through inhalation, ingestion, sharps or contact with contaminants, toxins or potential carcinogens such as asbestos
- isolating gas and electricity if possible
- ventilation should be ongoing until salvage and overhaul activities have been completed
- monitoring physical stress
- provision of rehabilitation

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
    - 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 in the circumstances to protect workers

- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* (https://www.ontario.ca/laws/regulation/900833) for occupational exposure limits and respiratory protection program requirements

Applicable standards

For guidance on the administration of an effective respiratory protection program, fit testing protocols and training requirements, read CSA Standard Z94.4 Selection, use and care of respirators (http://shop.csa.ca/en/canada/respiratory-protection/cancsa-z944-11-r2016/invt/27016392011)

Related

Read firefighter guidance notes:

- 4-9 Respiratory protection (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)
- 6-12 Rehabilitation during emergency operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-12-rehabilitation-during-emergency-operations)

6-24 Building collapse during fire situations

Background

Firefighters, as part of their work, may participate in interior fire fighting and rescue situations.

Concerns/hazards

Interior fire fighting and rescue situations are among the most dangerous operations that firefighters will work in, due to the potential for building collapse.

Actions for employers

Employers must make firefighters aware of the potential for building collapse.

Awareness of the potential for building collapse

Consider including the following topics when training firefighters on the risks of building collapse:

- building use and contents
- whether occupants are at risk and search and rescue is required
- contents-only fire versus building structure involvement
- existence and working order of fire protection systems
- length of time of fire involvement and fire load/materials burning
- voids that may provide undetected paths for fire spread such as drop ceilings, balloon construction, duct and conveyor systems, horizontal open joists, and small loft or attic areas
- impact of heat on structural elements such as unprotected steel columns, cables, joists, nail plates or gussets
- impact of content load, weight of fire fighting water, snow or other loads on building integrity
- buildings under construction/alteration or in a dilapidated or abandoned condition pose extra hazards
- indications of building weakness or pending collapse
- probable collapse sequence should it occur

Protective measures for building collapse

Consider the following protective measures:

- pre-fire plans may provide critical risk assessment and decision making information for incident commanders

- identification and maintenance of escape paths during interior operations
- establishment of collapse/safety zones
- a standardized evacuation signal
- monitoring air supply to make sure it is sufficient for the time required to enter or exit the building

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance notes:

- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 2-2 Buddy system (https://www.ontario.ca/document/firefighter-guidance-notes/2-2-buddy-system)
- 2-4 Incident safety officer (https://www.ontario.ca/document/firefighter-guidance-notes/2-4-incident-safety-officer)
- 4-4 Personal alert safety systems (https://www.ontario.ca/document/firefighter-guidance-notes/4-4-personal-alert-safety-systems-pass)
- 5-1 Accountability and entry (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)
- 6-11 Rapid intervention teams (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)
- 6-18 Unprotected lightweight building construction (https://www.ontario.ca/document/firefighter-guidance-notes/6-18-unprotected-lightweight-building-construction)

6-25 Safety considerations for fire department tankers

Background

Many fire departments throughout Ontario depend on tankers to supply water for fire suppression.

Concerns/hazards

The safe operation of tankers can be more demanding than the operation of other fire apparatus, putting the driver at an increased risk of injury due to collision or accident.

Actions for employers

Employers must:

- provide training for tanker drivers under various road conditions
- make workers aware of the hazards of driving tankers

Employers should:

- develop procedures for the safe operation of tankers

Factors contributing to tanker collisions

Workers should be made aware of these factors which can contribute to tanker collisions:

- **human error factors** such as insufficient training, lack of driver experience, excessive speed, inability to recognize danger signs, lack

of or failure to follow procedures, disobeying traffic laws, failure to yield right-of-way by civilian drivers

- **vehicle design factors** such as weight of vehicle, age, high center of gravity, improper design or modification, retro-fitting non-fire service vehicles, liquid surge, poor maintenance
- **driving surface factors** such as poor road design not intended to support the weight or stress of fire service vehicles, severe grades, sharp curves, unimproved road surfaces, adverse weather conditions, soft road shoulders, limited weight capacity
- **emergency scene factors** such as emergency scene congestion, oncoming traffic at the scene, maneuvering at water shuttle dump and fill sites

Considerations for tanker operating procedures

To minimize the risk of accidents with tankers, procedures should include the following recommended practices:

- operate the tanker at a safe and reasonable speed, keeping in mind that partial water tank loads can shift, creating significant instability during directional changes or braking
- the cautionary speed signs that accompany road signs indicating curves in the road should be considered the maximum speed for a tanker driving on these curves
- know the weight of the tanker so stopping distance can be determined and road weight limits are not exceeded
- keep all of the wheels on the travelled road surfaces if possible, as driving on shoulders can create tanker instability
- tankers should be equipped with back-up alarms and lights that activate when reversing to illuminate the area behind the tanker
- be familiar with the roads in your response area and avoid poorly constructed or unpaved roads whenever possible
- when possible, have at least one firefighter accompany the driver of the tanker, to act as a signaler while reversing and assist with equipment operation

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Applicable standards

For a standard on minimum job performance requirements for firefighters who drive and operate fire apparatus, read NFPA 1002 Standard for fire apparatus driver/operator professional qualifications (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1002)

For a standard on requirements for a fire service vehicle operations training program, including safety procedures for those members who drive or occupy fire service vehicles, read NFPA 1451 Standard for a fire and emergency service vehicle operations training program (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1451)

Related

Read firefighter guidance notes:

- 1-3 Backing fire apparatus (https://www.ontario.ca/document/firefighter-guidance-notes/1-3-backing-fire-apparatus)
- 1-8 Safety considerations for new fire apparatus (https://www.ontario.ca/document/firefighter-guidance-notes/1-8-safety-considerations-new-fire-apparatus)
- 6-2 Fire fighting near water (https://www.ontario.ca/document/firefighter-guidance-notes/6-2-fire-fighting-near-water)
- 6-7 Driving skills for emergency response (https://www.ontario.ca/document/firefighter-guidance-notes/6-7-driving-skills-emergency-apparatus-response)

- 6-10 Traffic safety and control (https://www.ontario.ca/document/firefighter-guidance-notes/6-10-traffic-safety-and-control)

6-26 Structural fire fighting – fire streams and ventilation

Background

Structural firefighting is very dangerous work as it puts firefighters near or within fire. Extinguishing the fire quickly is the most effective way of eliminating the hazard. An adequate water supply and coordinated ventilation is essential to extinguish a fire.

Concerns/hazards

Improper or inadequate use of fire streams and ventilation may lead to worsening fire conditions, increasing the risk to firefighters. Flashover, rollover or backdraft may result. Longer fire suppression times may increase incidence of heat stress and fatigue.

Actions for employers

Employers should:

- train firefighters on the proper use of fire streams and coordinated ventilation, to reduce fire suppression times
- develop procedures for structural fire fighting which consider:
  - minimum flow rates for all occupancy types
  - minimum water supply requirements and availability

Minimum flow rates and water supply

Firefighters and officers should:

- understand critical flow rates (the minimum flow in litres or gallons per minute) required to extinguish a given size fire and the availability of the water supply
- understand the effects of nozzle stream patterns when determining the type, size and number of lines required to control the fire as quickly as possibleconsider the use of nozzles with lower reaction forces at higher flow rates to improve safety by reducing the workload and stress during the high demands of interior firefighting

Safety considerations for interior firefighting

When interior firefighting takes place, a direct attack to cool the area should be emphasized in place of indirect or combination attack, when possible.

Improper application of water during an interior attack can place firefighters in great danger. When large volumes of air are forced into the fire area an excessive amount of steam is created, and the thermal balance is upset. This can reduce visibility, cause steam burns or result in flashover.

Ventilation coordinated with fire attack is also a vital component of safe fire fighting and is an essential part of a safe interior fire attack.

Structural firefighting training

Training programs on structural firefighting should include components on:

- proper water application during interior attack and the hazards of improper water application
- pump operation and critical flow rates
- nozzle pressures and reaction forces
- the importance of coordinated ventilation practices
- proper hose deployment
- mobile water supplies

Prior to participating in live fire training and fire suppression, fire personnel should understand how to effectively use fire streams and coordinated ventilation to quickly suppress a fire and reduce the time they are exposed to the hazard.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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 in the circumstances to protect workers

Applicable standards

Read NFPA 1710 Standard for the Organization and Deployment of Fire Suppression Operations, Emergency Medical Operations, and Special Operations to the Public by Career Fire Departments (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1710) for information on flow, water supply, and handlines.

Read NFPA 1142 Standard on Water Supplies for Suburban and Rural Fire Fighting (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1142) .

Read NFPA 1002 Standard for Fire Apparatus Driver/Operator Professional Qualifications (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1002) .

Related

Read firefighter guidance note 6-22 Ventilation saws (https://www.ontario.ca/document/firefighter-guidance-notes/6-22-ventilation-saws)

6-27 Fires in industrial dust collectors, hoppers and bins

Background

Firefighters may respond to fires in industrial dust collectors, hoppers or bins containing combustible dusts.

Concerns/hazards

Explosive conditions may occur, putting firefighters at risk of injury.

Actions for employers

Employers should:

- identify locations of industrial dust collectors, hoppers and bins in their response area
- pre-plan for emergency situations
- develop procedures for responding to fires in industrial dust collectors, hoppers or bins containing combustible dusts

Combustible dusts found in dust collectors, hoppers and bins

Industrial dust collectors, hoppers and bins that are used in woodworking, furniture manufacturing, flour mills and dry food processing mills may contain combustible dusts such as:

- sawdust
- metal shavings
- paper and plastic dust
- grains and flour

- other types of milling or agricultural products

Explosive conditions in dust collectors, hoppers and bins

Explosive conditions may arise when there is:

- an ignition source and/or movement of air into the interior of the dust collector, hopper or bin
- a sudden movement of materials causing dust to be suspended in the air
- a smoldering fire in the contents
- a buildup of static electricity in equipment used to transfer, transport or move a product from one container to another
- action by first responders or firefighters attempting to clear materials to get to a source of ignition

Responding to dust collector, hopper and bin incidents

Consider the following precautions when developing procedures for responding to these incidents:

- avoid entry into the collector, hopper, or bin to extinguish fires, where possible
- identify the product, hazards and the extent and degree to which fire and heat are transferred within the container and the surrounding duct work or buildings
- use thermal imaging cameras, if available
- establish an adequate water supply before commencing any suppression operations
- consider the use of firefighting foam, depending on products involved
- exercise caution when applying hose streams, to minimize the unwanted or sudden movement of potentially explosive materials in the container
- apply only as much water or foam as is necessary to ensure the containment of the fire, to prevent structural stress or a collapse of the structure
- stand clear of all openings and any pre-set relief valves for explosion venting
- open any access point with extreme caution and as remotely as possible using aerial devices and ladders along with pike poles, ropes or other equipment, in order to minimize exposure to the individual undertaking the operation and maximize the distance from the hazard
- refrain from using any power tools to open access points, hatches or hinge pins as residual sparking and vibration may create an even greater explosive hazard
- only open lower doors of hoppers after proper ventilation practices have been completed
- slowly and systematically unload any dust collector, hopper or bin to ensure adequate soaking of any contents and safe removal
- do not consider a fire in an industrial dust collector, hopper or bin extinguished until the dust collector, hopper or bin is empty

Note: Incidents involving agricultural silos are unique and may require different tactics and approaches from those described in this Guidance Note.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance notes:

- 6-16 Machinery/electrical lockout during emergency response
- 6-31 Agricultural silos (https://www.ontario.ca/document/firefighter-guidance-notes/6-31-agricultural-silos)

6-28 Rescue from a collapsed trench

Background

Fire departments may be called upon to assist with incidents where one or more persons are trapped in a collapsed trench or excavation.

An “excavation” is the hole that is left in the ground as a result of removing material. A “trench” is an excavation where the excavation depth exceeds the excavation width.

Concerns/hazards

Trench rescue requires highly specialized training, equipment and procedures in order for the rescue to be completed safely.

Actions for employers

Employers should:

- provide training to firefighters who may respond to trench rescue situations
- ensure that appropriate personnel, tools, equipment and personal protective equipment are in place to safely perform this work

Trench rescue training and response

Employers should consider including the following content in trench rescue training:

- recognizing the need for a trench or excavation rescue
- identifying the resources necessary to conduct safe and effective trench and excavation emergency operations
- initiating site control and scene management (incident command system)
- recognizing general hazards associated with trench and excavation emergency incidents and the procedures necessary to mitigate these hazards within the general rescue area
- recognizing typical trench and excavation collapse patterns, the reasons trenches and excavations collapse, and the potential for secondary collapse
- recognizing the unique hazards associated with the weight of soil, soil conditions, stability and its associated entrapping characteristics
- initiating a rapid, non-entry extrication of non-injured or minimally injured victim(s)

Firefighters who have not been trained to safely do so should never enter a collapsed trench.

Fire departments that do not provide trench rescue services should have plans in place with other agencies or departments to provide these services in the event that they encounter a collapsed trench where rescue is required.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

For a reference guide on responding to incidents involving excavations, read the Excavation safety handbook for emergency responders (https://www.gtswca.org/uploads/1441-gtswca-excavation-safety-handbook_final_rev2_lr.pdf) , developed by the Greater Toronto Sewer & Watermain Contractors Association.

6-29 Prevention of falls from fire apparatus

Background

Firefighters may work from elevated surfaces on fire apparatus.

Concerns/hazards

Falls from fire apparatus can result in firefighters sustaining serious injuries.

Actions for employers

Employers must:

- equip apparatus with sufficient anti-slip handle-holds to allow firefighters to use the position known as the three-point contact method when entering or exiting the cab

Employers should:

- conduct a risk assessment of fire apparatus in consultation with the joint health and safety committee or health and safety representative
- develop procedures specific to each fire apparatus to prevent falls while performing normal job functions

Preventing falls from fire apparatus

Consider the following, to prevent falls:

- refer to the standards listed below for guidance with respect to walking/stepping/standing/ climbing surfaces, guards, and handrails/handholds for the particular classification of fire apparatus that are/were in effect at the time that the apparatus is/was specified, purchased, modified and/or refurbished
- do not use apparatus as observation platforms unless specifically designed for that purpose
- use ground level hose loading
- engineered design features that provide retractable railings or folding hose bed covers that fold to the outside edge to provide a barrier

Consider the following, when work is done on top of fire apparatus:

- minimize the number of personnel required on top of the apparatus to accomplish the task assigned
- when loading a hose, work from the centre of the apparatus facing the outside
- use caution where the top of the apparatus is slippery due to snow or ice, as it could result in a loss of footing
- use the three point contact method of mounting/dismounting
- be aware of fans, heaters and other potential overhead hazards when working on hose beds in the fire station

Note: When in fire stations, reference the requirements of section 85 of *Regulation 851 - Industrial Establishments (https://www.ontario.ca/laws/regulation/900851)* where workers are exposed to the hazard of falling more than three metres.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)*
    - clause 25(2)(a) for providing information and instruction to a worker

- clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

- *Regulation 851 - Industrial Establishments (https://www.ontario.ca/laws/regulation/900851)*
  - section 85 for fall protection when working at a height above 3 metres

- *O. Reg. 714/94 - Firefighters – Protective Equipment (https://www.ontario.ca/laws/regulation/940714)*
  - subsection 7(3) for anti-slip handle- holds on fire trucks

Applicable standards

For standards on new automotive fire apparatus and trailers, read NFPA 1901 Standard for automotive fire apparatus (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1901) or CAN/ULC S515 Standard for automobile fire fighting apparatus (https://canada.ul.com/ulcstandards/salesofulcstandardsmaterials/)

For standards on the refurbishing of automotive fire apparatus utilized for fire fighting and rescue operations, read NFPA 1912 Standard for fire apparatus refurbishing (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1912)

6-30 Pesticide storage fires

Background

Fire departments may encounter fires at locations with stored pesticides.

Fire departments may receive information from persons who store pesticides, including information about the name of the pesticides, where the pesticides are located within the facility, conditions of storage and the identity of the person responsible for the pesticides.

Concerns/hazards

Fire departments may encounter fires at locations with stored pesticides, which have no fire preplan.

Actions for employers

Employers must:

- provide firefighters with personal protective equipment appropriate in the circumstances to protect them from exposure to pesticide chemicals

Employers should:

- coordinate a site inspection to assist facilities with a fire safety plan, when they receive information about pesticide storage
- consider inspections of other facilities that may store pesticides such as farms, golf courses, or public utilities, so that firefighters are aware of potential hazards

Fire department pre-plans for pesticide storage fires

Fire departments should develop a fire pre-plan for each pesticide storage site, in consultation with the property owner.

Retail vendors, such as home improvement retail businesses, who are selling pesticides for domestic use will be limited in the type and quantity of pesticides on site. There may not be a need for a detailed pre-plan that would apply to the larger manufacturing or warehousing operations.

Life safety concerns

Protection of first responders is a major concern with fires involving pesticides.

The management of airborne contaminants at ground level hinges on the temperature of combustion, and the exit temperature from a structure. Where fires have been allowed to burn at high temperatures, the risk has been lowered significantly.

First responders at an incident involving pesticides must be protected with personal protective equipment appropriate in the circumstances, to protect them from exposure to airborne chemicals. Appropriate PPE should include self-contained breathing apparatus and standard turn out gear, as a best practice.

Fire control considerations

Where an incident cannot be addressed at the initial stage, and where it is possible to ventilate and let the fire burn, this approach should be considered.

If a facility is fully involved or free burning, firefighter safety is greatly enhanced by remaining outside the structure upwind of smoke and exhaust gases while the pesticide structure burns itself out.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers
- *Regulation 833 – Control of Exposure to Biological or Chemical Agents* *(https://www.ontario.ca/laws/regulation/900833)*
  - section 7.2 for protecting workers from exposure to a hazardous biological or chemical agent

Related

A Fire department pesticide storage form (https://www.ontario.ca/page/guide-pesticide-licensing#section-12) is available through the Ministry of the Environment Conservation and Parks at 1-800-461-6290 or 416-314-8001 or EAASIBGen@ontario.ca (mailto:EAASIBGen@ontario.ca) .

More information on pesticide classification (https://www.ontario.ca/page/pesticide-classification-guideline-ontario) is available from the Ministry of the Environment Conservation and Parks.

6-31 Agricultural silos

Background

Firefighters may respond to fires in or around agricultural silos.

Concerns/hazards

Rescue situations may cause safety issues for responders, due to confined spaces or the risk of explosion.

Actions for employers

Employers should:

- identify the locations and types of any agricultural silos in their response area
- develop procedures for responding to silo incidents

Types of silos

There are three types of vertical silos used in agricultural areas in Ontario. Each can pose safety concerns to the firefighters in a fire or rescue situation.

Conventional silo

These silos are made of banded concrete slabs, poured concrete or steel plates. The silos unload from the top.

Rescues may be required for farm personnel who are required to enter silos to service unloader equipment.

Oxygen-limiting silos

These silos are made of poured concrete or steel plates. These silos are unloaded from the bottom.

There is not enough oxygen to support life in these silos. Farm personnel do not need to enter the silo during unloading or when crops are in the silo. However, there have been cases where people have entered and have collapsed due to low oxygen or the gases produced by the crop preservation process.

Converted oxygen-limiting silos

These silos are oxygen-limiting silos that have been converted to a conventional silo. These silos are unloaded from the top but may still make use of bottom unloaders. These may contain similar hazards to both oxygen-limiting and conventional silos.

Responding to agricultural silo incidents

Employers should consider these potential **hazards** when developing procedures for responding to agricultural silo incidents:

- silo gases may be toxic and nitrogenous products in preserved crops give off toxic gases when burning
- deficient oxygen atmosphere
- airborne grain dust and methane from the microbial decomposition of organic products can be sources of fuel for an explosion
- explosions of both conventional and oxygen-limiting silos during fires are possible

Employers should consider these **safe practices**:

- use extreme caution when responding to these incidents
- do not enter the structure to extinguish fires or conduct a rescue unless the identified hazards and associated risks are mitigated or removed
- identify the silo type, product, hazards and the extent and degree to which fire and heat are transferred within the silo and the surrounding feed rooms or buildings
- use thermal imaging cameras, if available
- establish an adequate water supply before commencing any suppression operations
- consider using firefighting foam, depending on the products involved

In a **conventional silo**:

- apply only as much water or foam as necessary to ensure the containment of the fire
- large amounts of water in the structure may cause a collapse
- do not climb the chute or outside ladder as the system may fail due to heat damage
- a fire should not be considered extinguished until the structure is empty

In an **oxygen-limiting or a converted oxygen-limiting silo**:

- do not open any hatches or doors, nor spray water into the structure, as the introduction of water and oxygen may result in an explosion
- consult the silo manufacturer for advice on proper procedures to extinguish these fires

Rescues from agricultural silos

Rescues from agricultural silos may require rope rescue. For more information on rope rescue, refer to Guidance note 6-4: Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue) . Where the situation may involve confined spaces, refer to Guidance note 6-5: Confined space rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-5-confined-space-rescue) .

Note: Incidents involving industrial dust collectors, hoppers and bins may require different tactics and approaches from those described in this guidance note. Please refer to Guidance note 6-27: Industrial dust collectors, hoppers and bins (https://www.ontario.ca/document/firefighter-guidance-notes/6-27-fires-industrial-dust-collectors-hoppers-and-bins) .

Applicable regulations, acts and standards

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance notes:

- 6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)
- 6-5 Confined space rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-5-confined-space-rescue)
- 6-27 Fires in industrial dust collectors, hoppers and bins (https://www.ontario.ca/document/firefighter-guidance-notes/6-27-fires-industrial-dust-collectors-hoppers-and-bins)

6-32 Elevator rescue

Background

For the purposes of this guidance note, elevator rescue is considered to be the removal of occupants from inside a disabled or stalled elevator car through the elevator doors and does not include rescues from elevator shafts, hoistways or through the top of the elevator car.

Concerns/hazards

Firefighters are at risk of injury from unexpected movement of the elevator.

Actions for employers

Employers must:

- train personnel who respond to such emergencies

Employers should:

- develop procedures where there is a need to engage in elevator rescue

Elevator rescue considerations

At no time should firefighters enter the elevator shaft or hoistway during an elevator rescue. These operations, as well as the removal of occupants through the top of the elevator car, require specialized knowledge and training in various technical rescue disciplines including confined space rescue and rope rescue.

Training and information for elevator rescue personnel

Elevator rescue personnel must be made aware of the hazards associated with elevator systems during a rescue.

They should know how to:

- determine when an extraction from a stalled elevator is necessary
- isolate a power source with lock-out and tag-out procedures

- determine when a rescue attempt should be aborted
- safely open doors into stalled elevators using tools provided by fire departments
- safely immobilize different types of elevators to prevent unexpected movement during extrication

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Applicable standards

For procedures for emergency personnel to safely extricate persons trapped in stalled elevators and instructions for the use of elevator fire service systems during emergencies, read ASME A17.4 – 2015 Guide for emergency personnel (https://www.asme.org/products/codes-standards/a174-2015-guide-emergency-personnel-(1))

Related

Read firefighter guidance notes:

- 6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)
- 6-5 Confined space rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-5-confined-space-rescue)
- 6-16 Machinery/electrical lockout during emergency response (https://www.ontario.ca/document/firefighter-guidance-notes/6-16-machineryelectrical-lockout-during-emergency-response)

6-33 Hazards created by abandoned buildings

Background

For the purposes of this guidance note, an abandoned building is one that is in a state of disrepair to the point where it can pose a health and safety hazard for firefighters.

Concerns/hazards

Abandoned buildings may be deteriorated and structurally unsound. Firefighting near or in these structures may pose significant risks.

Actions for employers

Employers should develop procedures with respect to abandoned buildings.

Considerations for abandoned buildings

Consider the following when developing procedures for abandoned buildings:

- firefighters should not be committed to interior operations in well advanced fires in abandoned structures
- identify and document the location of known abandoned buildings in the response area and make the information available to fire crews
- exercise extreme caution and give due regard to fire conditions and all relevant fireground factors prior to committing firefighters to interior firefighting positions
- deploy a charged hose line for each crew if interior firefighting operations are undertaken
- use thermal imaging cameras when they are available and firefighters have been trained on their use and limitations to determine the potential for trapped occupants, the location of the fire and other hazards that are listed below

Hazards in abandoned buildings

The following conditions could exist in abandoned buildings and may create hazardous situations:

- open shafts
- pits and holes
- maze-like configurations
- limited/obstructed entry and egress
- blocked or damaged stairs
- structural degradation
- combustible contents affecting the fire load
- delay in discovery of fire
- multiple fire locations
- biological hazards
- hazardous chemicals

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read firefighter guidance notes:

- 6-11 Rapid intervention teams (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)
- 6-18 Unprotected lightweight building construction (https://www.ontario.ca/document/firefighter-guidance-notes/6-18-unprotected-lightweight-building-construction)
- 6-24 Building collapse during fire situations (https://www.ontario.ca/document/firefighter-guidance-notes/6-24-building-collapse-during-fire-situations)

6-34 Solar photovoltaic systems

Background

A photovoltaic (PV) installation typically includes:

- arrays of solar panels: since a single PV panel can only produce a limited amount of power, a typical PV system installation contains several panels connected together to form an array
- one or more inverters, which convert power from direct current generated by the array to alternating current
- interconnecting wiring

PV systems are used for either on or off grid applications.

Concerns/hazards

In the event of a fire, shutting down the electricity in a building with a PV system is more complicated than in a building without one because the system is energized from two sources – the utility and the PV system.

Actions for employers

Employers must:

- make workers aware of the hazards of a PV system

Employers should:

- develop procedures for working safely with PV systems

Disconnecting the photovoltaic system

Employers should consider the following information when developing procedures for working safely with PV systems:

The PV system can be isolated from the rest of the building's wiring system by shutting down the "Utility Disconnect" of the PV system in addition to the main electrical switch. These system disconnections are usually located near the meter, main electrical panel, PV system inverter and/or on the rooftop.

The *Ontario Electrical Safety Code* requires the clear marking and labelling of the electrical system equipment, indicating the system is fed from more than one source.

This is an example of the information that may be found on a label:

> "Photovoltaic System Utility Disconnect Switch"
>
> "Warning – Electrical shock hazard – do not touch terminals – terminals in both the line and the load sides may be energized in the off position."
>
> "Hazard of electric shock, explosion or arc flash."

The solar PV system cannot simply be switched off. Shutting down the PV's "Utility Disconnect" switch, inverter and the main electrical switch will disconnect the array from the building and/or the grid. However, the PV panels and other apparatus connected from the solar panels to the inverter will always remain energized as long as they are exposed to a source of light. **They should be treated as live electrical equipment.**

Safety concerns

Employers should consider these unique safety concerns when developing procedures for working safely with PV installations.

Electric shock

Electric shock is the primary hazard for firefighters. An array of multiple panels can produce direct current and voltages above 600 volts. Firefighters may come in contact with damaged panels or energized exposed wiring during firefighting or ventilation operations.

Battery storage areas are another potential source of electric shock.

Arcing fault

A PV system generates direct current. An arcing fault from direct current is more intense and sustained than that from alternating current. An arcing fault is a high power discharge that could result from the unexpected contact of electrical components. In addition, the value of arcing fault current may be too low for the required circuit protective devices to operate. This creates additional fire hazards unique to these systems.

Other hazards

Solar PV systems add additional weight to the roof of a building, which may pose a structural concern. This may require alternative ventilation tactics, particularly where roof joists have been compromised by fire.

Power cables and PV panels pose trip and slip hazards for roof operations.

PV panels exposed to fire can produce toxic and carcinogenic combustion products. Battery storage areas can generate corrosive/explosive gases when exposed to fire.

Fire fighting safety precautions

When developing procedures for dealing with fires in buildings with solar PV systems, employers should consider the following:

- assume the solar PV array is energized at all times
- inform the incident commander immediately upon identifying the presence of a solar PV system
- remember that securing the main electrical panel, inverter and PV's "Utility Disconnect" switch will not shut down the solar PV system —when exposed to sufficient light, electricity will continue to be generated by the PV system
- stay away from the panels and conduit
- do not cut into, remove, or walk on the solar PV system
- wear appropriate personal protective equipment including self-contained breathing apparatus
- contact the local utility provider to assist with cutting power sources
- fight the fire based on flow, pattern and distances as recommended in the Electrical safety handbook for emergency responders – Best Practices for Coping With Electrical Hazards in Rescue and Fire Situations (http://www.pshsa.ca/wp-content/uploads/2013/11/EELPWAEN0413-Electrical-Safety-Handbook_20131.pdf) , revised 5th edition, 2013

Note: At night, moonlight or apparatus-mounted scene lighting may still produce enough light to generate electricity from the arrays. Lightning strikes can also be bright enough to create an electrical surge in the system.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read the Electrical safety handbook for emergency responders – Best practices for coping with electrical hazards in rescue and fire situations (http://www.pshsa.ca/wp-content/uploads/2013/11/EELPWAEN0413-Electrical-SafetyHandbook_20131.pdf) , Hydro One Networks Inc., Electrical Safety Authority, Office of the Fire Marshal, and Public Services Health and Safety Association, revised 5th Edition, 2013.

For requirements for electrical work in Ontario, read the *Ontario Electrical Safety Code* (https://www.esasafe.com/contractors/the-ontario-electrical-safety-code)

Read firefighter guidance note 6-20 Electrical hazards in rescue and fire situations (https://www.ontario.ca/document/firefighter-guidance-notes/6-20-electrical-hazards-rescue-and-fire-situations)

6-35 Wind turbines

Background

Fires in wind turbines are rare, but pose unique challenges for fire fighters.

Concerns/hazards

Fires involving wind turbines may present a health and safety hazard to firefighters due to the electronics, flammable oils and hydraulic fluids that exist in the turbines. Due to the height of wind turbines, firefighter health and safety may be endangered during a rescue from these turbines.

Actions for employers

Employers must:

- make workers aware of the hazards of wind turbines

Employers should:

- develop procedures for wind turbine incidents

Safety precautions

Employers should consider the following, when developing procedures for responding to wind turbine incidents:

- access to sites and contact numbers for site supervisory staff
- how firefighters can safely access the nacelle to rescue trapped workers
- fires may be fuelled by up to 750 litres of hydraulic oil in the nacelle
- presence of high-voltage components and combustible materials
- power to the affected turbine should be disconnected by qualified personnel to minimize the potential of an electrical shock hazard
- safe collapse zones should be established, as there is a potential of tower collapse due to various circumstances, such as blade strikes, rotor over-speed, cyclonic winds, and poor or improper maintenance of the torque bolts
- fire personnel should maintain a safe area around a turbine fire while allowing it to burn itself out
- consider the height of the turbine, the size and weight of the components and wind conditions when determining a safe perimeter

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

Read the Electrical safety handbook for emergency responders – Best practices for coping with electrical hazards in rescue and fire situations (http://www.pshsa.ca/wp-content/uploads/2013/11/EELPWAEN0413-Electrical-SafetyHandbook_20131.pdf) , Hydro One Networks Inc., Electrical Safety Authority, Office of the Fire Marshal, and Public Services Health and Safety Association, revised 5th Edition, 2013.

For requirements for electrical work in Ontario, read the *Ontario Electrical Safety Code* (https://www.esasafe.com/contractors/the-ontario-electrical-safety-code)

Read firefighter guidance note 6-20 Electrical hazards in rescue and fire situations (https://www.ontario.ca/document/firefighter-guidance-notes/6-20-electrical-hazards-rescue-and-fire-situations) .

6-36 Limiting exposure to fire gases

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 and enforce these laws based on the facts they find in the workplace.

Background

Today's fires have the potential to give off a myriad of fire gases such as hydrogen cyanide (HCN), carbon monoxide, acrolein, formaldehyde and glutaraldehyde.

Concerns/hazards

Firefighters may be exposed to levels of gases which result in health effects and exceed occupational exposure limits.

HCN is a deadly gas that occurs as a by-product of combustion. Symptoms of HCN exposure could range from a headache or blurred vision to seizures or death. Long-term health effects could include respiratory problems, heart disease or brain damage.

Prolonged exposure to carbon monoxide can lead to brain damage. Acrolein is a suspected human carcinogen and formaldehyde is a known carcinogen. Repeated exposure to glutaraldehyde can cause asthma.

Actions for employers

Employers should:

- develop a program to reduce firefighter exposure to fire gases, in consultation with the joint health and safety committee or health and safety representative
- coordinate with local health authorities to ensure there are treatment protocols and/or antidotes for fire gas exposures

Reducing exposure to fire gases

Consider the following elements in your program to reduce firefighter exposure:

- awareness training on topics such as the properties of fire gases, recognizing potential exposure hazards, and signs and symptoms of exposure
- air monitoring (including at the rehab area) to detect fire gas levels
- protocols for respiratory protection, on-scene decontamination of equipment and personnel, personal protective equipment, transportation of contaminated equipment and post-event decontamination
- reporting and documentation of air sampling and exposure
- operating policies or guidelines

Hydrogen cyanide exposure

The greatest amounts of HCN are released during the smoldering stages of fire. HCN is immediately dangerous to life or health at 50 parts per million.

Elevated levels of HCN can be produced from fires such as a pot on a stove or other cooking fires, car fires or dumpster fires. An average small kitchen fire may produce 75 parts per million of HCN. Firefighters may also be exposed to elevated levels of HCN during overhaul operations and fire investigations.

The antidote for HCN is cyanocobalamin.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

- *Regulation 833 - Control of Exposure to Biological or Chemical Agents* *(https://www.ontario.ca/laws/regulation/900833)*
  - for occupational exposure limits and respiratory protection program requirements

Related

Read firefighter guidances notes:

- 4-8 Care, maintenance, inspection and replacement of structural fire fighting personal protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-8-care-maintenance-inspection-and-replacement-structural-fire-fighting-personal-protective)
- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)
- 6-1 Hygiene and decontamination (https://www.ontario.ca/document/firefighter-guidance-notes/6-1-hygiene-and-decontamination)
- 6-23 Salvage and overhaul (https://www.ontario.ca/document/firefighter-guidance-notes/6-23-safety-during-salvage-and-overhaul)

6-37 Active shooter hostile event response

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 and enforce these laws based on the facts they find in the workplace.

Background

Firefighters, in the course of their duties, may respond to events with an active shooter. An active shooter is an individual using a weapon and actively engaged in killing or attempting to kill people in a confined and populated area. There may be no pattern or method to their selection of victims.

Concerns/hazards

The type of emergency response to an active shooter event depends on the unique circumstances of the incident. Active shooter emergencies can be unpredictable and the situation can evolve quickly. Responding to active shooter events will generally be a tiered response. Incident command at the scene may initially be fire personnel in cases where police are not first to arrive at the scene.

Actions for employers

Employers should determine the role of fire personnel, and be familiar with the role of police and paramedics. Consideration should be given to jointly developing local protocols with police and paramedic responders to respond to active shooter events. Fire personnel should receive training consistent with the role as determined by the employer.

Safety measures

Although active shooter events are unpredictable in nature, the following safety measures should be considered:

- conduct joint fire, police and paramedic training on local protocols, including classroom and practical training sessions with practice scenarios, where possible
- familiarize personnel with local lock-down procedures for schools, hospitals and other facilities
- have the first arriving fire officer at an active shooter scene conduct a risk assessment before committing fire crews
- establish an incident management system as soon as possible to share information and action plans on scene
- establish how incident command will be unified with police as necessary upon arrival
- determine, in consultation with paramedics on scene, how to remove injured persons as areas are secured/cleared by police - where possible, cover should be used to withdraw savable victims first
- only provide tactical equipment to trained personnel
- assist paramedics on scene in providing appropriate patient care as requested (for example, extremity wounds may be treatable on

scene with tourniquets whereas more serious wounds will require hospital treatment within a reasonable time)

- maintain ambulance access and egress to the scene
- post-incident, the fire department may consider providing counselling to personnel in accordance with local Critical Incident Debriefing protocols

Applicable regulations and acts

Read:

- Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)
  - 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
  - Part III.0.1 for violence and harassment requirements

Related

An active shooter toolkit (https://www.iafc.org/topics-and-tools/large-scale-response/active-shooter-toolkit) is available to members of the International Association of Fire Chiefs.

Read NFPA 3000 Standard for an Active Shooter/Hostile Event Response (ASHER) Program (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=3000) for information on developing an integrated preparedness, response, and recovery program.

6-38 Carbon dioxide hazards

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 and enforce these laws based on the facts they find in the workplace.

Background

Firefighters may be exposed to the hazard of carbon dioxide in the course of their work.

Concerns/hazards

At high concentrations, carbon dioxide can displace oxygen in the air, depriving the body of oxygen. This can cause unconsciousness. Carbon dioxide also acts as a strong central nervous system depressant.

Actions for employers

Employers should:

- incorporate the principles set out in this guidance note into their standard operating procedures/operating guidelines
- consider consulting with their joint health and safety committee or health and safety representative when developing procedures/guidelines

Carbon dioxide

Here are some basic facts about carbon dioxide, or CO_2:

- CO_2 is a colourless and odourless gas that cannot be detected by human senses
- the main route of CO_2 exposure is through inhalation
- at high concentrations, CO_2 is considered an asphyxiant because it can displace oxygen in the air
- it is a strong central nervous system depressant

- liquid CO_2 is stored at extremely low, or cryogenic, temperatures – direct contact with the liquid or cold vapors can chill or freeze the skin

A lack of oxygen can lead to various symptoms, such as:

- rapid breathing
- rapid heart rate
- clumsiness
- emotional upset
- fatigue
- nausea and vomiting
- collapse
- convulsions
- coma
- death

Symptoms occur more quickly with physical effort due to the increased rate of inhalation.

Exposure locations

Historically, CO_2 was typically delivered in pressurized cylinders to businesses serving carbonated beverages or draft beer.

Large volumes of cryogenic liquefied gas may be contained in a Dewar - a double-walled flask of metal or silvered glass with a vacuum between the walls, used to hold liquids at well below ambient temperature. These Dewars can be located either inside or outside the building and are refilled from a delivery vehicle.

CO_2 systems can be found in commercial and industrial establishments, including brew-your-own-beer and wine establishments.

Response considerations

Occupants may report CO_2 alarms as carbon monoxide alarms. Self-contained breathing apparatus (SCBA), should be used to investigate.

When responding to a location where CO_2 is stored, be alert to the possibility that CO_2 may be leaking from the delivery systems. Wear appropriate personal protective equipment including gloves and SCBA.

Possible exposure signs to be alert for include:

- more than one victim with the symptoms listed above
- unconscious victims located in unventilated spaces
- CO_2 alarms sounding
- reports of leaking CO_2 from occupants

If a CO_2 leak is suspected, consider the following measures:

- put on SCBA and begin ventilating the building
- positive-pressure ventilation to remove CO_2, especially from below-ground areas, because of the high vapour density
- remove victims from the hazard area immediately, provide supplemental oxygen and contact emergency medical services
- if safe to do so, shut off, isolate or move the leaking cylinder or Dewar while wearing structural firefighting gear, including gloves and SCBA
- if it is not safe to shut off, isolate or move the leaking cylinder or Dewar, withdraw and treat the scene as a hazardous materials incident

- contact the supplier and the Technical Standards and Safety Authority in all cases of CO_2 leaks
- make sure the area is safe, by testing for the presence of CO_2, before permitting occupants to re-enter

Applicable regulations and acts

Read:

- Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)
  - 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
- Ontario Regulation 833 - Control of Exposure to Biological or Chemical Agents (https://www.ontario.ca/laws/regulation/900833)
  - section 4 for the short term exposure limit for CO_2 of 30,000 parts per million and the time weighted average for CO_2 of 5,000 parts per million, as set out in the 2013 ACGIH Table
  - respiratory protection program requirements

Related

Read firefighter guidance notes:

- 1-9 SCBA air cylinder handling (https://www.ontario.ca/document/firefighter-guidance-notes/1-9-scba-air-cylinder-handling)
- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)

6-39 Hydrogen sulphide chemical suicides

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 these laws based on the facts they find in the workplace.

Background

Firefighters may be called on to respond to incidents involving the mixing of chemicals to create hydrogen sulphide in an enclosed space.

Concerns/hazards

Firefighters must wear appropriate PPE to protect themselves from an elevated level of hydrogen sulphide gas, which is immediately dangerous to life and health at a level of 100 parts per million (ppm).

Actions for employers

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

- recognizing when a hydrogen sulphide solution has/may have been used in a non-fatal suicide attempt or a death by suicide
- 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 in certain circumstances
- 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

Employers must ensure firefighters wear:

- 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

Consider these additional precautions when responding to events or developing operational guidelines/procedures:

- air sampling equipment, if available, can be used to determine the presence or absence of hydrogen sulphide before entering a space
- 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:

- wear appropriate PPE
- remove and double bag the victim's clothing
- decontaminate the body as dictated per normal standard operating procedures or guidelines
- 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

Note: individuals may off-gas from their lungs after they have been dead for a significant period of time - this may pose a risk for those transporting the deceased and those performing autopsies

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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* (https://www.ontario.ca/laws/regulation/900833)
  - occupational exposure limits for hydrogen sulphide – a time-weighted average of 10 ppm and a short term exposure limit of 15 ppm

Related

Read firefighters guidance notes:

- 4-8 Care, maintenance, inspection and replacement of structural firefighting personal protective equipment (https://www.ontario.ca/document/firefighter-guidance-notes/4-8-care-maintenance-inspection-and-replacement-structural-fire-fighting-personal-protective)
- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)

6-40 Working at heights

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 and enforce these laws based on the facts they find in the workplace. We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

Background

There are circumstances where fire department personnel are working at heights at a fire station, a construction project, or other workplaces.

Concerns/hazards

Firefighters who work at heights are exposed to the hazard of falling.

Actions for employers

Employers should:

- establish procedures to protect firefighters from the hazard of falls
- develop standard operating procedures/operating guidelines that address worker training, including who needs to take the ministry's Working at Heights training program

Risks

There are times when fire personnel may be working at heights.

Examples of job functions which may involve working at heights include:

- fire prevention
- inspection
- investigation
- pre-planning
- training
- working around the fire station

Examples of situations which may involve working at heights, include:

- temporary structures/scaffolds
- unguarded openings or edges in the structure floor/roof
- unstable/unfinished work surfaces

Construction projects

If a firefighter on a construction project performing work **will be exposed to the hazard of falling and is required by regulation to use certain types of fall protection**, the firefighter must complete a working at heights training program approved by the Ministry of Labour's Chief Prevention Officer.

You can find out more about working at heights training (https://www.labour.gov.on.ca/english/hs/topics/heights.php) on the Ministry of Labour website.

Knowledge of major or unique construction projects in the community may assist firefighters in identifying unique situations that they may encounter at the project and increase their situational awareness.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - section 1 for definitions of "construction" , "project" and "industrial establishment"
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable to protect workers
- *O. Reg. 213/91 – Regulation for Construction Projects* (https://www.ontario.ca/laws/regulation/910213)
  - section 26 for hazards where fall protection must be used on a construction project
- *O. Reg. 297/13 – Occupational Health and Safety Awareness and Training Regulation* (https://www.ontario.ca/laws/regulation/130297)
  - section 6 for when working at heights training is required on construction projects when using one of these methods of fall protection - travel restraint system, fall restricting system, fall arrest system, safety net, work belt, or safety belt
  - section 7 for information on approved working at heights training programs

- *Regulation 851 – Industrial Establishments* (https://www.ontario.ca/laws/regulation/900851)
  - section 85 for where fall protection must be used at an industrial establishment

Related

Read firefighters guidance notes:

- 1-5 Life safety rope and equipment (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment)
- 4-11 Fall protection from elevating devices (https://www.ontario.ca/document/firefighter-guidance-notes/4-11-fall-protection-elevating-devices)
- 6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)
- 6-14 Safe roof operations (https://www.ontario.ca/document/firefighter-guidance-notes/6-14-safe-roof-operations)
- 6-29 Prevention of falls from fire apparatus (https://www.ontario.ca/document/firefighter-guidance-notes/6-29-prevention-falls-fire-apparatus)

6-41 Safety around helicopters

Background

Firefighters, in the course of their duties, may be required to work in close proximity to helicopters.

Concerns/hazards

The hazards associated with working around helicopters include noise, rotor contact and moving debris.

Actions for employers

Employers should:

- establish procedures for working around helicopters
- provide training to firefighters so that they understand and can manage the potential hazards associated with working around helicopters

Operating procedures

Procedures should outline:

- potential hazards associated with working around helicopters
- how to conduct a scene assessment to identify potential hazards and determine risk
- how to select and establish a landing zone
- personal protective equipment required while working around helicopters

Additional information

Information on helicopter and landing zone safety is available through ORNGE.

Fire departments should work with their local helicopter agencies to develop local procedures.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Related

For information and resources about landing zone safety, read ORNGE aircraft safety (https://www.ornge.ca/aircraft-safety)

6-42 Training with artificial smoke

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 and enforce these laws based on the facts they find in the workplace.

Background

Artificial smoke machines are frequently used for firefighter training. Common agents used to create special atmospheric effects are glycol-water mixtures and oil-based simulants.

Concerns/hazards

During training activities the smoke generated from these machines is typically **maximized** for effect. It may be used in training areas that are relatively confined. This is generally not how the machines are intended to be operated.

When artificial smoke is used in live fire training, thermal degradation can produce chemicals such as acrolein, formaldehyde, acetaldehyde, acetone, benzene and other hydrocarbons.

These chemical compounds have been linked to various diseases, including cancer.

Structural firefighting bunker gear ensembles do not provide complete absorption exposure protection from these compounds.

Actions for employers

Employers should develop and implement policies and procedures on:

- use of artificial smoke
- use of respiratory protection and personal protective equipment (PPE) during training with artificial smoke
- ventilation and decontamination following the use of artificial smoke
- limiting cross-contamination to other firefighters and equipment

Safety considerations for use of artificial smoke

Consider the following for the protection of workers:

- **elimination**: use of alternatives to artificial smoke such as covering the visor or facepiece to simulate reduced visibility
- **substitution:** use of less hazardous types of artificial smoke
- **administrative controls:** limit the amount and duration of exposure of workers
- **PPE**: use appropriate respiratory protection such as self-contained breathing apparatus (SCBA) or an aerosol type cartridge respirator until the artificial smoke is **completely** ventilated from all affected areas
- read the Safety Data Sheet for the product to be used and follow the manufacturer's instructions

After using artificial smoke

Following artificial smoke use, consider these measures:

- ventilate the area to reduce airborne levels of chemicals below the occupational exposure limits set out in *Regulation 833* (https://www.ontario.ca/laws/regulation/900833)
- while wearing appropriate gloves and any other appropriate PPE, wipe down all equipment with a mild solution of soap and water or as per manufacturer's instructions
- clean bunker gear

- launder all clothes which were worn under bunker gear during training
- shower as soon as possible after training

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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* *(https://www.ontario.ca/laws/regulation/900833)* for occupational exposure limits and respiratory protection program requirements
- *Regulation 851 – Industrial Establishments* *(https://www.ontario.ca/laws/regulation/900851)*
  - section 130 for training requirements for workers who may be exposed to biological, chemical or physical agents

Related

Read firefighters guidance note about:

- 4-9 Respiratory protection program (https://www.ontario.ca/document/firefighter-guidance-notes/4-9-respiratory-protection-program)
- 6-1 Hygiene and decontamination (https://www.ontario.ca/document/firefighter-guidance-notes/6-1-hygiene-and-decontamination)

Read NFPA 1403 Standard on Live Fire Training Evolutions (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1403) for conducting live fire training in safe facilities and a safe manner for participants.

6-43 SCBA air management and work cycles

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 and enforce these laws based on the facts they find in the workplace.

Background

Air management is an individual's awareness of their personal air consumption while wearing respiratory protection equipment in a controlled area.

Work cycles can rotate personnel through various tasks to ensure an adequate air supply when in an IDLH (immediately dangerous to life and health) atmosphere.

Concerns/hazards

Interior crews working in an IDLH atmosphere until their low-air alarm activates reduce their time allotment for emergency escape, putting themselves and others at increased risk.

Actions for employers

Employers should:

- train incident commanders and all firefighters on factors affecting air supply duration
- ensure firefighters are aware of their individual air consumption rates in various working conditions
- develop and implement procedures for work cycles

Air consumption rate

The air consumption rate will be different for each individual. Some factors include:

- physical fitness and condition
- size and weight
- work being performed
- environment where the work is being performed
- other stressors (such as people trapped, difficult access or outside temperatures)
- type of protective clothing used
- training

Air supply duration

In addition to individual air consumption rates, consider the following when determining air supply duration:

- operational duration of air filters and cartridges
- particulate buildup on air filters and cartridges
- travel distance and time to the IDLH atmosphere
- amount of air when entering the IDLH atmosphere
- travel distance and time in the IDLH atmosphere
- coordination of team activities in the IDLH atmosphere
- travel distance and time to a safe zone after working in the IDLH atmosphere
- time to complete field decontamination

Air supply duration should be considered at a strategic, tactical and task level.

Work cycles

Consider the following information when developing procedures for work cycles.

One example of a work cycle rotation is as follows:

1. Within a sector, assign three crews per task. One crew is deployed, the second is standing by and ready for assignment, and the third is available at sector rehab.
2. Crews rotate through these three positions within their sector, until two cylinders are depleted.
3. All three crews are then assigned to incident rehab.

During operations where tasks cannot be interrupted, such as fire attack, there are advantages for implementing a work cycle while in a controlled area to meet the needs of performing tasks in an IDLH atmosphere and maintaining firefighter safety.

Some advantages include:

- having personnel ready for immediate deployment to replace crews
- having personnel provide immediate resources for a mayday or RIT
- reduced time travelling from sector to sector

Challenges of a work cycle system include:

- getting adequate personnel in place to support the work cycle
- setting up air supply
- accountability

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information, instruction and supervision to a worker
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Relevant standards

NFPA 1404 Standard for Fire Service Respiratory Protection Training (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1404)

Related

Read a scientific paper about air management and physiological responses during simulated firefighting tasks in a high-rise structure, by Williams-Bell, F.M., et al., *Applied Ergonomics* (2009) (http://www.firecompanies.com/MFC/public/userfiles/file/OntarioFireTraining/Air%20Management%20and%20Physiological%20Responses.pdf) .

Read firefighter guidance note 6-1 Hygiene and decontamination (https://www.ontario.ca/document/firefighter-guidance-notes/6-1-hygiene-and-decontamination) .

6-44 Hoarding conditions

Background

Hoarding may result in large quantities of objects that cover all areas of a residence or other structure.

Concerns/hazards

Hoarding may create hazardous conditions for firefighters. Exits may be blocked and fire loads may be excessive due to the amount of combustible material.

Actions for employers

Employers must:

- make fire personnel aware of the potential hazards of hoarding
- provide information, instruction and supervision to firefighters to protect their health and safety when working in hoarding conditions

Employers should:

- develop a system to report hoarding locations and situations through pre-planning exercises
- develop procedures for the safety of firefighters when responding to fires in hoarding locations and train fire personnel on procedures
- consult with their joint health and safety committee or health and safety representative in the development of procedures and training

Considerations

When developing procedures for responding to fires in hoarding locations, consider the following:

- appropriate PPE selection depending on the circumstance
- the additional weight of materials could compromise the structural integrity of the building and in a fire may result in premature collapse
- fires may be complex due to an increased fuel load and require a change in fire fighting strategy and tactics
- responders may not be able to stay in contact with walls

- responders may have difficulty accessing the source of the fire and/or occupants
- access or egress routes may be blocked
- falling items may block the exit point or path of travel

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) for providing information, instruction and supervision to a worker
  - clause 25(2)(d) for making workers aware of hazards
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Related

Learn more about hoarding disorder from the International Obsessive Compulsive Disorder Foundation (https://hoarding.iocdf.org/) and view Clutter Image Ratings (http://www.hoardingconnectioncc.org/Hoarding_cir.pdf) .

6-45 Pre-incident planning

Background

Structural firefighting is very dangerous work. Firefighters respond to buildings of all shapes, sizes and uses. It is beneficial to firefighter health and safety to have familiarity with the buildings in which they may operate.

Concerns/hazards

Building use may change, which may alter their configuration and fire protection systems. Building configurations may differ from how they appear on the exterior.

Firefighters operate in limited visibility. The risk increases in unfamiliar buildings — especially large commercial, industrial and institutional buildings. Building familiarity is especially important as it relates to building construction and susceptibility to early structural collapse.

Actions for employers

Employers should:

- develop a pre-incident planning program that compiles building information
- keep building information updated with information gained during fire prevention activities or from other allied agencies
- provide known building information to responding firefighters
- familiarize firefighters with building configurations and functions
- coordinate building familiarization tours for firefighters
- train firefighters on how to conduct pre-incident planning and how to use the information to protect their health and safety

Considerations

The information that should be gathered as part of a pre-incident planning program should include, but not be limited to:

- address, building name and access information
- building size, type, occupancy and construction
- primary and secondary entrances
- location of key box

- location of fire safety plan
- location of utility controls
- location of fire alarm system panel(s)
- location and operation of fire protection systems (sprinklers, standpipes etc.)
- location, type and function of elevators
- storage of hazardous materials or pesticides
- building contact/key holder information
- water supply and hydrant locations
- calculation of critical flow rates
- any other applicable hazard or health or safety information
- any information obtained from allied municipal agencies, such as the local building department

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - 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 in the circumstances to protect workers

Applicable standards

For information on the knowledge and skills required by fire officers to conduct pre-incident planning, read NFPA 1021 – Standard for Fire Officer Professional Qualifications (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1021)

For information on the knowledge and skills required by firefighters to conduct pre-incident planning, read NFPA 1001 – Standard for Firefighter Professional Qualifications (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1001)

Related

Read firefighter guidance note 6-44: Hoarding (https://www.ontario.ca/document/firefighter-guidance-notes/6-44-hoarding-conditions)

6-46 Structural collapse response

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 and enforce these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

Background

Firefighters may respond to incidents where a structure has partially or completely collapsed, in the course of their work.

These are rare but dangerous occurrences that threaten the lives of civilians, other assisting agencies and emergency responders.

Structural collapse may occur due to:

- explosions

- severe weather occurrences
- structural degradation
- vehicle collisions with structures
- other causes

These structural collapses may occur during either:

- construction
- normal occupancy
- demolition

While some fire departments provide structural collapse responses at the operations and technician level — which allow for entry into the collapsed structure, typically known as Urban Search & Rescue (USAR) or Heavy Urban Search & Rescue (HUSAR) — this level of service is rare and typically limited to a few large urban fire departments. Most fire departments operate at the awareness level only.

Concerns/hazards

A collapsed structure is hazardous because of:

- unstable building materials
- falling objects
- confined spaces
- risk of fire, electrical hazard and gas hazards

Employers should provide special training, equipment and preparation to ensure that firefighters safely carry out structural collapse rescues.

Actions for employers

Employers must:

- provide information, instruction and supervision to protect the health and safety of the worker

Employers should:

- maintain records of the training
- appoint a person with adequate knowledge, training and experience to conduct the training
- develop written procedures and other measures for the protection of the firefighter
- provide the equipment necessary to respond to the emergency safely and effectively
- ensure provided equipment, materials and protective devices are maintained in accordance with manufacturer's recommendations
- develop protocols for requesting assistance from other agencies (USAR, HUSAR, etc.) who can initiate hot zone entry and search and rescue

Considerations for training

Employers should provide training to firefighters that is consistent with the department's level of response (awareness, operations or technician).

Employers should include the following in structural collapse training:

- scene size-up and hazard recognition
- utility control
- incident isolation and evacuation procedures

- safe work practices for working around structural collapses
- gas detection
- fire protection and control

Training should be developed and reviewed in consultation with the joint health and safety committee or the health and safety representative, if any.

Training should be reviewed whenever there is a change in circumstances that may affect worker safety and at least once a year.

Departments that perform structural collapse rescue above the awareness level, must ensure the training, equipment and written procedures reflect the level of service.

Applicable regulations and acts

Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)

- clause 25(2)(a) for providing information and instruction to a worker
- clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Relevant standards

For minimum job performance requirements for fire service personnel who perform technical rescue operations, read NFPA 1006 – Standard for technical rescuer professional qualifications (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1006) .

For levels of functional capability for efficiently and effectively conducting operations at technical search and rescue incidents, read NFPA 1670 - Standard on operations and training for technical search and rescue incidents (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1670) .

Related

Read firefighter guidance notes:

- 1-5 Life safety rope and equipment (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment)
- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 5-1 Firefighter accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)
- 6-4 Rope rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-4-rope-rescue)
- 6-5 Confined space rescue (https://www.ontario.ca/document/firefighter-guidance-notes/6-5-confined-space-rescue)

6-47 Fire fighting hazards during liquified petroleum gas and/or liquified natural gas tank fires

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 and enforce these laws based on the facts they find in the workplace.

We have included links to other websites, but this does not mean that we endorse their information as compliant with the OHSA or the regulations.

Background

During liquified petroleum gas (LPG) tank fires — such as propane — the potential exists for an explosion known as boiling liquid expanding vapor explosion (BLEVE).

The liquified natural gas (LNG) market has evolved significantly in the past decade and the potential also exists for a BLEVE when dealing with LNG tank fires.

Concerns/hazards

If the pressurized vessel containing liquid ruptures, the pressure which prevents the liquid from boiling is lost. This causes a portion of the liquid to "instantaneously" boil, which in turn causes an extremely rapid expansion. The expansion may be so rapid as to be an explosion, with the potential for severe damage and injury or death to firefighters. A BLEVE is an extremely high-risk event for first responders.

Recommended actions

To reduce the risk of BLEVE, firefighters and fire departments should follow the recommendations below.

Incident commanders

Incident commanders should:

- complete a 360-degree size-up
- develop an incident action plan including the securing of an adequate water supply
- implement a strong Incident Command/Management system

Firefighters

Firefighters should:

- fight fire from the maximum distance possible or use unattended hose holders or monitor nozzles
- be aware of the differences between LPG and LNG tanks:
  - cool LPG tanks by flooding the outside of the tank (side walls) with large quantities of water to reduce the risk of a BLEVE occurring
  - applying water to LNG tanks or liquid spills may increase the hazard by warming up the cryogenically cooled LNG
- not direct water at the source of leak or at safety devices (for example. valves or vents, generally located at the top of the tanks); icing may occur which would prevent venting and increase the risk of BLEVE
- leave the area immediately if there is a rising sound from venting safety devices or discoloration of the tank
- be aware that when a BLEVE occurs, sections of the tank can fly in any direction

Employers

Employers must:

- provide information, instruction and supervision to firefighters to protect the health and safety of the firefighter
- make firefighters aware of the hazard associated with LPG and LNG fires, including BLEVE

Employers should:

- incorporate these procedures into fire department standard operating procedures and guidelines
- ensure that fire department code and standard enforcement personnel adhere to the applicable Acts, Codes and Standard for the installation, maintenance, and inspection of LPG and LNG installations

Considerations

Fire departments should consider the following actions to further reduce the risk of BLEVE:

- familiarize themselves and conduct risk assessments of LPG and LNG installations within their jurisdictions and pre-plan accordingly
- become familiar with the location(s) of LPG tank installations for home heating purposes
- have the emergency contact information for the LPG suppliers and service contractors within their jurisdiction

Further considerations to reduce the risk of BLEVE include:

- for pre-planning and training, consideration should be given to including supplier and contractor representatives
- the LPG 420 tank, which is a common residential upright tank, can pose a significant risk, as these tanks are often ganged or combined with additional tanks and are quite often directly adjacent to structures

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(a) (https://www.ontario.ca/laws/statute/90o01#BK49) for providing information and instruction to a worker
  - clause 25(2)(d) (https://www.ontario.ca/laws/statute/90o01#BK49) for making workers aware of hazards
  - clause 25(2)(h) (https://www.ontario.ca/laws/statute/90o01#BK49) for taking every precaution reasonable in the circumstances to protect workers

Applicable standards

Read the CAN/CSA-B149.2-05 Propane storage and handling Code (https://www.csagroup.org/store/product/CSA_B149.2%3A20_OT/) guidance on how to safely handle and store natural gas and propane, and the safe and effective installation of related appliances and equipment, and more.

Read the CAN/CSA Z276-01 LNG production, storage and handling standard (https://www.csagroup.org/store/product/CSA Z276%3A22/) for information on liquified natural gas.

Related

Read Transport Canada's Hazardous Goods Emergency Response Guidebook (https://tc.canada.ca/en/dangerous-goods/canutec/2020-emergency-response-guidebook) which helps first responders identify hazards based on the material involved in a transportation incident and protect themselves and the public during the initial response to an incident.

Read the requirements for propane storage and handling (https://www.ontario.ca/laws/regulation/010211) under the *Technical Standards and Safety Act* (https://www.ontario.ca/laws/statute/00t16) .

Section 7: Training

7-1 Safe training

Background

Firefighter training includes simulations of dangerous scenarios — rope rescue, live fire and ice rescue are a few examples.

In order for firefighters to learn how to do their jobs effectively, training must resemble real conditions.

Concerns/hazards

During training, firefighters are exposed to real hazards and there is a potential for injuries or fatalities to occur.

Actions for employers

Employers must:

- take every precaution reasonable in the circumstances for the protection of firefighters involved in training sessions

Employers should:

- develop written **lesson plans** and **training safety plans** for all training

Precautions

Consider the following precautions to keep firefighters safe during training:

- develop a **lesson plan** for each training session that outlines the learning objectives and how they will be achieved
- develop a **training safety plan** for each training session that anticipates what may go wrong, the measures that would be taken and the resources and equipment needed
- in the training safety plan, identify:
  - circumstances in which training will be stopped
  - how training will be stopped, such as by using a code like NO DUFF, to differentiate between a training scenario and a real emergency
- ensure all training participants understand the lesson plan and the training safety plan prior to training — consider holding a briefing at the start of the exercise
- ensure all training participants are aware of the hazards of the training area
- ensure that all resources and equipment identified in the training safety plan are in place prior to training
- allow for the graduated acquisition of skills – so that learners are competent in a set of skills before exposure to more difficult tasks and higher hazards
- teach learners how to identify potential hazards and what to do to mitigate them
- ensure the trainer is competent to deliver the training
- consult with the joint health and safety committee or health and safety representative when developing the lesson plan and the training safety plan
- consider a post-training debrief to review what went well and lessons learned

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

Related

Contact the Ontario Fire College (http://www.mcscs.jus.gov.on.ca/english/FireMarshal/FireCollege/OFM_OFC_main.html) for a copy of a sample training safety plan.

7-3 Training plans

Background

Fire departments deliver various training to workers to protect their health and safety. Training is delivered to fire personnel at various times and locations, in-person and online. It may be delivered by the employer or through an outside organization.

Concerns/hazards

Firefighter training is on-going throughout their career — there are a lot of training sessions to keep track of. Workers may miss scheduled training sessions for a variety of reasons — such as vacation, illness, or a change in schedule or assigned station. Employers must ensure that workers have received the training they need for the protection of their health and safety.

Actions for employers

Employers should develop a training plan which identifies:

- each training course and the subjects covered
- lesson plans for the safe and consistent delivery of the training
- workers who are required to receive training
- workers who have successfully completed the training
- when refresher training should be completed

Employers should review the training plan periodically to identify workers who are missing training. If workers are missing training, employers should:

- identify any limits to worker activities
- take steps to deliver the training

Worker training

Workers who identify hazards for which they have not received training to protect their health and safety, should bring their concerns to their supervisor or the joint health and safety committee or health and safety representative.

Training records

Employers should also create and maintain training records such that:

- documentation is complete and accurate, including names of participants
- they are completed promptly after training is conducted
- the learning outcomes of the training program are documented
- the training date(s) are recorded
- electronic files are reliably backed up

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
    - clause 25(2)(a) for providing information and instruction to protect the health or safety of a worker

Applicable standards

Read about keeping training records in NFPA 1500 Standard on Fire Department Occupational Safety, Health, and Wellness Program (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1500) or in NFPA 1401 Recommended Practice for Fire Service Training Reports and Records (https://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1401)

7-4 Firefighter survival and self-rescue training

Background

Firefighters may encounter emergency situations that require self-rescue.
Self-rescue occurs when a firefighter uses specific techniques to get out of an emergency situation such as when they are trapped or entangled.

Concerns/hazards

Self-rescue is a low frequency, high-risk event that requires practice and training. Over time, without practice, skills may diminish, so regular refresher training is important.

Actions for employers

Employers should:

- provide training programs that introduce firefighters to self-rescue techniques
- include practical evolutions combined with any classroom theory in training
- develop training in consultation with their joint health and safety committee or health and safety representative
- provide regular refresher training

Self-rescue training programs

These basic elements are recommended in a program:

- history of the causes of firefighter injuries/fatalities in structural firefighting
- mayday recognition and response
- self-contained breathing apparatus familiarization, emergency procedures and air management
- review of building construction features which can cause firefighter entrapment
- review of related departmental operational procedures, such as Mayday, Urgent and Evacuate

Consider these additional elements when developing a practical program:

- rescue and escape procedures, such as hose line/rope escape or other techniques
- wall breach
- emergency exit procedures from narrow or small spaces, using full personal protective equipment and self-contained breathing apparatus
- entanglement prevention and emergency disentanglement procedures
- emergency exit procedures
- emergency radio communications with incident command
- calling of a **mayday**

Instructors should be familiar with the self-rescue techniques recognized by their department and have the knowledge, training and experience needed to conduct the training, and be aware of potential hazards which firefighters may encounter.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(a) for providing information and instruction to a worker
  - clause 25(2)(h) for taking every precaution reasonable in the circumstances to protect workers

7-5 Live fire training considerations for acquired structures

Background

An acquired structure is a building or structure acquired for use by the fire department for the purpose of conducting live fire training evolutions.

Live fire training provides important practical learning for firefighters.

Live fire is any unconfined open flame or device that can propagate fire to a structure or other combustible materials.

From a safety perspective, a live fire training evolution should be treated as if it is a real fire emergency.

Concerns/hazards

Acquired structures have previously been used for other purposes, such as farm buildings, homes or industrial buildings. The structures were not originally designed for firefighter training purposes and may present a variety of hazards.

If pre-planning and safe operations are not followed, this type of training has great potential for injuries or deaths to firefighters.

Actions for employers

Employers should:

- identify and eliminate or mitigate any hazards in the acquired structure before it is used for live fire training purposes
- develop training in consultation with the joint health and safety committee or health and safety representative

Before training begins

Consider the following before the training begins:

- where a firefighter will be working in or on the building, have a building inspector or engineer confirm that the building is structurally sound for the purpose of live fire training
- remove hazardous materials such as asbestos and other designated substances
- remove heavy objects on upper floors, roofs or chimneys, to prevent them from falling onto firefighters below
- repair hazardous conditions, such as covering holes in floors or making stairs safe
- disconnect utilities as they pose a life safety risk
- conduct a pre-burn briefing including a building walk-through with specific assignments given to all participants and instructors outlining the training exercise expectations
- establish an incident command system
- ensure that one or more competent instructors and a designated incident safety officer are present during the evolution
- the incident safety officer should continually monitor the safety conditions and has the authority to stop the exercise at any time
- have on site the minimum number of participants and instructors to meet all tasks at hand, including rapid intervention teams
- make sure participants have the appropriate equipment, knowledge and practical training prior to participating in the evolution – such as safety, fire behaviour, portable extinguishers, personal protective equipment, ladders, fire hose, appliances and streams, overhaul, water supply, ventilation and forcible entry

- put into place a universal warning that safety is compromised and the evacuation of all personnel is required – for example, three blasts of an air horn
- appropriate personal protective equipment, including an activated personal alert safety system, should be worn
- remove unnecessary combustibles
- use fuels that have known burning characteristics, such as wood and paper
- use only the amount of fuel necessary to create the desired fire size
- do not use flammable or combustible liquids, furnishings with foam padding, or foam insulation, as they create dangerous amounts of heat and smoke
- never allow participants to act as "victims" for search and rescue – only use rescue mannequins or figures, which are not to be dressed in bunker gear, so they are not mistaken for participants
- identify access and egress points that are free of debris and obstructions, to all participants
- ensure that a water supply is on site - a minimum of 50 percent more than calculated should be available to handle exposure protection or unforeseen situations
- consider that hose line sizes, types of nozzles, and fire streams that are to be used will all impact water requirements
- use separate fire apparatus to supply attack lines and backup lines to ensure a reliable water supply
- consider fire spread, duration of burn, and void spaces during the planning process - these can lead to premature weakening of the structure and can cut off exit routes

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* *(https://www.ontario.ca/laws/statute/90o01)*
  - 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 in the circumstances to protect workers

Applicable standards

For information about conducting live fire training evolutions, read NFPA 1403 Standard on live rire training evolutions (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards) , 2012 edition.

Related

Read firefighter guidance notes:

- 2-1 Incident command (https://www.ontario.ca/document/firefighter-guidance-notes/2-1-incident-command)
- 2-4 Incident safety officer (https://www.ontario.ca/document/firefighter-guidance-notes/2-4-incident-safety-officer)
- 5-1 Firefighter accountability and entry control (https://www.ontario.ca/document/firefighter-guidance-notes/5-1-firefighter-accountability-and-entry-control)
- 6-11 Rapid intervention teams (https://www.ontario.ca/document/firefighter-guidance-notes/6-11-rapid-intervention-teams-rescue)
- 6-24 Structural firefighting - fire streams and ventilation (https://www.ontario.ca/document/firefighter-guidance-notes/6-24-building-collapse-during-fire-situations)
- 7-4 Firefighter survival and self-rescue training (https://www.ontario.ca/document/firefighter-guidance-notes/7-4-firefighter-survival-and-self-rescue-training)

7-6 Training centres

Background

Fire service training centres are used for training firefighters in skills such as fire suppression techniques, search and rescue, confined space and high angle rescue.

Concerns/hazards

Training centres may expose firefighters to hazards if they are not designed for their intended use.

Floors may collapse if they are not constructed to withstand the weight of the personnel, equipment and water that will be used to extinguish the fires. The structure must be able to withstand the repeated heat and flames of the fires that will be burning inside the structure.

Control rooms, where workers control the propane which runs the operation, should be located away from any hazards such as smoke or flames.

Confined space training areas may accumulate water from fire suppression and expose workers to the risk of drowning.

High angle rescue training areas may expose workers to the hazard of falls. Adequate anchor points and guardrails may be needed.

Actions for employers

Employers should:

- consult National Fire Protection Association (NFPA) 1402 Guide to Building Fire Service Training Centers, 2012 Edition, as the standard for the design and construction of the facility

NFPA 1402

NFPA 1402 provides guidance for the planning and construction of fire service training centres, including administration and support facilities, drill towers, burn buildings, smoke buildings, and facilities for outside simulations.

Note: Listing every item that might be included in a training centre or every type of specialty training facility that might be constructed is impractical and beyond the scope of this guidance note.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act (https://www.ontario.ca/laws/statute/90o01)*
  - clause 25(2)(h) for taking every precaution reasonable to protect workers
  - clause 25(1)(e) a building, structure, or any part thereof, or any other part of a workplace, whether temporary or permanent, is capable of supporting any loads that may be applied to it
- *Regulation 632/05 – Confined Spaces (https://www.ontario.ca/laws/regulation/050632)*
- *Regulation 297/13 – Working at Heights Training (https://www.ontario.ca/laws/regulation/r13297)*

Applicable standards

For the design and construction of the facility, read National fire protection sssociation (NFPA) 1402 guide to building fire service training centers, 2012 edition (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1402)

Related

Read firefighter guidance note 7-5 live fire training considerations for acquired structures (https://www.ontario.ca/document/firefighter-guidance-notes/7-5-live-fire-training-considerations-acquired-structures)

7-7 Ground ladder training

Background

Firefighters may be involved in ground ladder training.

Concerns/hazards

Firefighters, in the course of ground ladder training, may be exposed to hazards similar to those in actual emergency rescue/recovery operations, such as working at heights or poor visibility.

Actions for employers

Employers should:

- make sure that ground ladder training is taught progressively to minimize the risk of injury for fire fighters
- incorporate a risk analysis into all training plans

Progressive training

The goal of training is to develop a level of proficiency of a task in a **safe** environment.

Employees should not be placed in a situation where their experience does not adequately prepare them to perform their assigned task, even if that assigned task arises during a training session.

Ground ladder training should be taught progressively to minimize the risk of injury for inexperienced fire fighters. Progressive training requires recruits to gradually move through practice evolutions which simulate real life emergency scenarios with increasing degrees of difficulty or complexity.

Progressive training may also require recruits to practice under conditions with different levels of safeguards to simulate real life scenarios. Recruits may initially require belay roping systems during ladder training to prevent falls. For example, since there are no belay roping systems for real life rescues off ladders, progressive training requires this evolution to be eventually practiced without the use of a rope system.

Applicable regulations and acts

Read:

- *Occupational Health and Safety Act* (https://www.ontario.ca/laws/statute/90o01)
    - clause 25(2)(a) for providing information and instruction to a worker
    - clause 25(2)(h) for taking every precaution reasonable to protect workers

Applicable standards

Read NFPA 1001 Standard for fire fighter professional qualifications (http://www.nfpa.org/codes-and-standards/all-codes-and-standards/list-of-codes-and-standards/detail?code=1001) .

Related

Read firefighters guidance note 1-5 Life safety rope (https://www.ontario.ca/document/firefighter-guidance-notes/1-5-life-safety-rope-and-equipment) .

Ontario

Ministry of the Solicitor General

Fire Protection Grant
(2024-25)

Application Instructions and Guidelines

Contents

INTRODUCTION

The ***Fire Protection (FP) Grant*** program was announced in the government's 2024 Budget and is designed to support cancer prevention efforts by municipal fire departments across Ontario. The FP Grant will assist fire departments in acquiring critical equipment to enhance firefighter health and safety, and minor infrastructure at the local level.

Only projects whose objectives align with at least one of the objectives in the list below will be eligible for funding.

(1) Cancer Prevention – Equipment and Supplies
(2) Cancer Prevention – Personal Protective Equipment (PPE)
(3) Cancer Prevention – Minor Infrastructure
(4) Minor Infrastructure Modernization – Enhanced Broadband and Internet Connectivity

The FP Grant is available to municipalities that have established a fire department in accordance with clause 2(2)(b) of the *Fire Protection and Prevention Act, 1997* (FPPA). The FP Grant is not available to Northern Fire Protection Program (NFPP) fire departments. NFPP departments seeking information to support cancer prevention related equipment should contact Acting Assistant Deputy Fire Marshal Tim Beebe (tim.beebe@ontario.ca).

The FP Grant will be awarded over three years, with a total of $10M available each year. The types of projects eligible for grant funding will be revisited annually to ensure that the FP Grant continues to meet local and provincial priorities. As such, calls for applications will take place annually. Each application cycle will require fire departments to complete outlined projects and demonstrate the success of the initiatives.

CONTEXT

The Government of Ontario is committed to protecting the health and safety of Ontario's firefighters. Ensuring public safety is a key priority for the Ministry of the Solicitor General (ministry) which is committed to working with municipal fire departments to provide them with the tools and resources they need to keep Ontario's firefighters and communities safe. The ministry acknowledges the challenges that fire departments face in addressing firefighter cancer prevention.

Firefighters die of cancer at a rate up to four times higher than the general population. On average, 50 to 60 firefighters die of cancer yearly in Canada, and half of those are from Ontario. Contaminated PPE may expose firefighters to hazardous biological and chemical contaminants and reduce the effectiveness of the protection it is intended to provide. The FP Grant is designed to provide funding to support firefighter cancer prevention programs.

The ministry is launching a call for applications under the FP Grant for fiscal year 2024-25 to continue to support firefighters and the important role that they play in the safety and wellbeing of their communities.

ELIGIBILITY CRITERIA

Who is eligible?

- The FP Grant is available to municipalities that have established a fire department in accordance with clause 2(2)(b) of the FPPA. The FP Grant is not available to NFPP fire departments.

What is eligible?

- New **and** existing initiatives that focus on addressing firefighter cancer prevention (equipment, PPE and minor infrastructure improvements) and minor infrastructure modernization.
- Installation costs for the minor infrastructure (if applicable) are also eligible for funding within this grant.

Examples of initiatives eligible for funding include (but are not limited to):

Cancer Prevention – Equipment and Supplies[1]

- Field decontamination kits (hoses, nozzles, brushes, buckets, decontamination wipes)
- Respiratory protection programs (e.g., fit test equipment)

Cancer Prevention – PPE

- Bunker gear extractors
- Personal Protective Equipment
    - Bunker gear (second set or increasing spare supply)
    - Additional self-contained breathing apparatus (SCBA)
    - Personal SCBA facepieces
    - Gloves or flash hoods (second set or increasing spare supply)
- Testing and inspection programs for PPE (including third party contracting)

Cancer Prevention – Minor Infrastructure

- Shower/decontamination facilities
- Diesel exhaust extractors
- Bunker gear storage areas

Minor Infrastructure Modernization – Enhanced Broadband and Internet Connectivity

- Broadband or Wi-Fi enhancements

[1] Items in this category do not require installation. For items that require installation or renovation (e.g., bunker gear extractors) please use the Cancer Prevention – Minor Infrastructure category.

Please refer to the Firefighter's Cancer Prevention Checklist to help prioritize your municipality's needs.

Fire departments can combine initiatives across multiple themes. For example, an application could include multiple projects:

- ❖ Field decontamination kits (Cancer Prevention – Equipment and Supplies)
- ❖ Personal SCBA facepieces (Cancer Prevention – PPE)
- ❖ Broadband enhancements (Minor Infrastructure Modernization – Enhanced Broadband and Internet Connectivity)

What is not eligible?

- Increasing staff complements
- Staffing related expenses (including salaries, benefits and overtime)
- Direct medical costs (e.g., cancer screening and medical monitoring)
- Direct training costs (including textbooks, course fees, third party training providers)
- External consultant fees
- Firefighting equipment not aligned with the criteria of the FP Grant
- Funds that cannot be committed by March 31, 2025

THINGS TO CONSIDER

Allocation by Fire Station

The Ontario fire service is very large and unique in its composition. There are nearly 400 municipal fire departments in Ontario, with approximately 32,000 firefighters. Within each municipality there are unique circumstances which dictate the number of full-time, part-time and volunteer firefighters. Two fire departments with very similar demographics may have a significantly different staffing model to meet their local needs.

Year 1 of the FP Grant will be allocated proportionate to the number of active fire stations in a municipality. With a focus on cancer prevention and minor infrastructure modernization, the government believes that every fire station in Ontario has basic cancer prevention and technology upgrades that need to be addressed. It is for this reason that allocation based on the number of active fire stations provides a fair, transparent, and consistent approach to the allocation of funds in Year 1.

There are approximately 1,200 municipal fire stations across Ontario (based on self-reported Office of the Fire Marshal [OFM] Fire Department Profile data). Depending on the number of actual applications received and subsequently approved, fire departments can expect to receive between $8,000 and $10,000 per active fire station. Final allocations will vary depending on the total number of applications received and approved.

Fire chiefs should ensure scalability in their application. For example, they may request various quantities of cancer prevention equipment and PPE that exceeds their expected allotments; however, when the final allotment is determined, the fire chief may purchase the quantities that best fit the funds available to maximize their allotment.

Regionalized and Shared Services Initiatives

Collaboration between neighbouring fire departments allows for increased efficiency, reduced costs and provides increased capacity. Aid agreements (mutual and automatic) and shared training initiatives are all vital to the success of many fire departments. This collaboration enhances community safety and makes Ontario a safer place to live, work and visit.

Proposals that leverage collaboration and/or shared services/equipment with neighbouring fire departments are encouraged and will be considered during the application review process. This collaboration is not a requirement of any application, but it may allow partner municipalities to leverage a larger pool of initial funding from the FP Grant.

Adjacent communities may work together to pool their funding allocation to share an initiative. In these scenarios, only one municipality will be responsible for submitting a FP Grant application. However, the application does require partners who form part of a project to be identified. The total number of fire stations amongst the partners will determine the total FP grant allotment and the OFM will confirm with each listed partner that they support the shared allocation. Municipalities collaborating on a shared application should not submit individual applications for the same projects identified in the shared application.

Note: A municipality should only submit one application. Therefore, in Year 1, if the decision is made to submit a joint application for a project, any individual projects will have to be considered for future years of the grant program, if applicable.

There are over 150 fire departments in Ontario with a single fire station. To leverage funds available, two or more nearby fire departments may consolidate their funds to share some initiatives.

For example, fire department A and B (both with single stations) apply together to purchase a bunker gear extractor and dryer. This would allow both items to be purchased this year and installed in either fire department A or B and the usage shared between the two fire departments. There would be insufficient funds in this year's allotment to permit both fire departments to individually purchase a bunker gear extractor and dryer this year.

Fire Department Operating and Capital Budget
All applicants will be required to report their (approved) operating and capital budgets for the past three fiscal years. While all applications will be considered, assessment of the application will weigh the approved operating and capital budgets for the fire department over the past three years. In the FP Grant application, fire chiefs are encouraged to identify if they have requested funding for the initiatives being applied for and what level of funding they received (full, partial or none) or not approved.

Installations Costs
Any installation costs associated with identified projects are eligible for funding. Please ensure you include installation costs where appropriate.

REPORT BACK REQUIREMENTS

Successful applicants will be required to complete a report back identifying the outcomes of the approved project. Failure to provide the required report back information will negatively impact future applications for the FP Grant. Details of the report back timing will be provided to successful applicants through the Transfer Payment Agreement.

Please note that funds are required to be formally committed through a signed letter of intent, and executed Transfer Payment Agreement by March 31st, 2025.

LENGTH OF APPLICATION FORM

Application forms have character limits in each section. Please adhere to these limits.

Attachments may be included with your application if they support the initiatives being requested. Examples of attachments could include quotations (for products and installation costs) or other product pricing information.

APPLICATION REVIEW

Applications that qualify under the Eligibility Criteria will be reviewed by a FP Grant Review Committee (review committee). The review committee's primary mandate will be to evaluate applications based on eligibility and assessment criteria and make recommendations for funding to the Solicitor General of Ontario.

OFM staff will work with municipalities and their fire chief to meet the FP Grant requirements and objectives. Please ensure all application sections are completed appropriately and accurately. During the review phase, OFM staff reviewing individual applications may contact the applicants (and listed partners) and conduct research to ensure the accuracy of the information provided.

Applications will be submitted to the Solicitor General's office for final review and approval.

CONTRACTUAL AGREEMENT

As part of the terms of funding, the ministry will enter into contractual agreements with municipalities approved for FP Grant funding. Agreements will end on March 31, 2025.

Funds will be released to the municipality after all of the required documentation has been submitted and the contractual agreement has been signed by all parties. The funds must be used for the purposes described in the application and according to the terms of the contractual agreement. As part of the contractual agreement, recipients will be required to complete and submit a report back to the ministry according to the terms of the contractual agreement.

The contractual agreement will outline:

- purposes for which the grant funding will be used;
- commitments to be undertaken or specific activities to support the application;
- reporting dates; and
- the funding disbursement schedule.

APPLICATION SUBMISSION

The FP Grant will be administered through the Transfer Payment Ontario (TPON) system, including the call-for-applications process (see TPON Instructions for Application Submission below).

While applications will be submitted and processed through the TPON portal, please also provide confirmation of your submission including a copy of the completed application form and any attachments via email to OFMGrants@ontario.ca

APPLICATION DEADLINE

Completed application forms must be received by **5:00 p.m. (Eastern Standard Time) on September 5, 2024.**

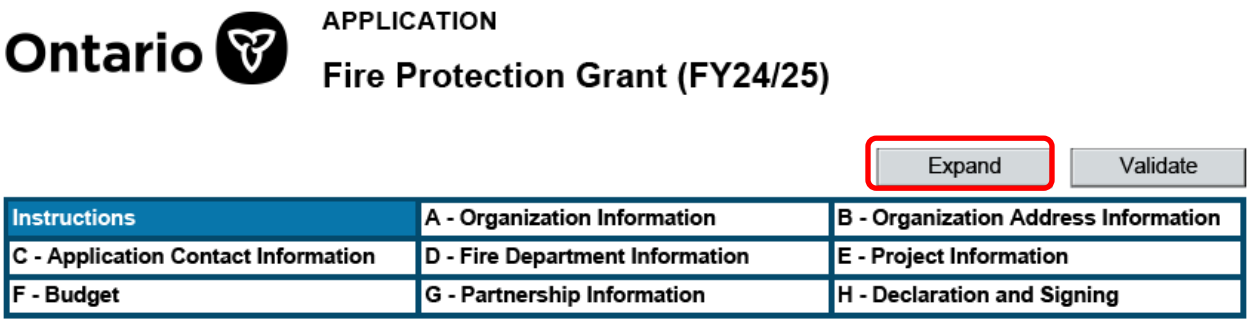
ASSISTANCE

For questions about the FP Grant or application process please contact your Fire Protection Adviser or email OFMGrants@ontario.ca.

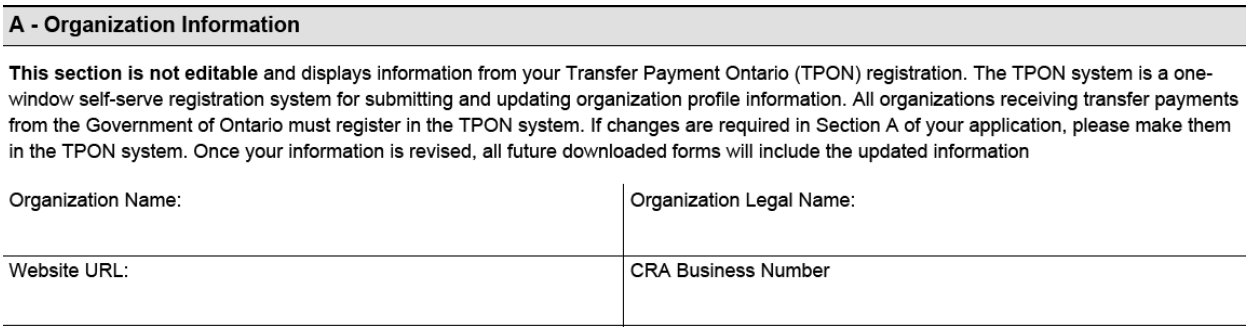
If you have any questions or are experiencing technical difficulties with the TPON system, please contact TPON Customer Service at (416) 325-6691 or 1-855-216-3090, Monday to Friday from 8:30 a.m. to 5:00 p.m. Eastern Standard Time, or by email at TponCC@Ontario.ca

HOW TO FILL OUT THE DOWNLOADED APPLICATION FORM

1. Once opened, the FP Grant Application Form will appear as per below. Click the "Expand" button to show all sections of the application and complete all mandatory fields. Alternatively, you can select each section individually; however, please ensure all sections are completed.



2. **Section A – Organization Information.** Please ensure all fields in the Organization Information section are completed. The information in this section cannot be edited as it is automatically populated from your municipal TPON account. If changes to this section are required, please contact your TPON administrator.



A - Organization Information

This section is not editable and displays information from your Transfer Payment Ontario (TPON) registration. The TPON system is a one-window self-serve registration system for submitting and updating organization profile information. All organizations receiving transfer payments from the Government of Ontario must register in the TPON system. If changes are required in Section A of your application, please make them in the TPON system. Once your information is revised, all future downloaded forms will include the updated information

Organization Name:	Organization Legal Name:
Website URL:	CRA Business Number

3. **Section B – Organization Address Information.** Please ensure all fields in the Organization Address Information section is completed. The information in this section cannot be edited as it is automatically populated from your municipal TPON account. If changes to this section are required, please contact your TPON administrator.

B - Organization Address Information

This section is not editable and displays information from your Transfer Payment Ontario (TPON) registration. The TPON system is a one-window self-serve registration system for submitting and updating organization profile information. All organizations receiving transfer payments from the Government of Ontario must register in the TPON system. If changes are required in Section B of your application, please make them in the TPON system. Once your information is revised, all future downloaded forms will include the updated information.

Business Address	
Unit Number:	Street Address 1:
Street Address 2:	City/Town:
Province:	Postal Code:
Country:	

Mailing Address	
Unit Number:	Street Address 1
Street Address 2	City/ Town
Province	Postal Code
Country	

4. **Section C – Application Contact Information.** The first person added to this section should be the municipal signing authority for the TPON system. Additional contacts can be added by selecting the "Add" button. Please list the fire chief (or fire department designate) as an additional contact (if they are not the municipal signing authority).

C - Application Contact Information

Please provide contacts for this application, including whether or not they have signing authority. Contacts with the Applicant role will receive email notifications regarding case submission, reports due, and payments. Contacts with the Payee role will receive notifications regarding payments.

Contacts with signing authority will be prompted to digitally sign this form in Section H.

Add | Remove

Salutation:	First Name: *	Last Name: *
Primary:	Role: *	Email Address: *
Title:	Department:	Phone Number (Work): *
Phone Number (Mobile):	Fax Number:	Signing Authority

5. **Section D – Fire Department Information.** This section is unique to this application and must be completed by the applicant. Information about active fire stations, and the number of firefighters will be validated against OFM Fire Department profile information. Please ensure that fire station count is for active fire stations as of the date of the application. For the number of firefighters, please include the full council approved complement (not current firefighters).

   Operating and capital budget information is being collected to support the project initiative and objectives.

D - Fire Department Information

Please complete the information below based on the current active fire stations and active full-time or volunteer firefighters as of the date of this application.

Please enter zero for the appropriate section below if you have no full-time or volunteer firefighters respectively.

Active Fire Stations *	No. of Full-Time Firefighters: *	No. of Volunteer Firefighters: *

Fire Department Annual Budget

Please complete the table below with year 1 being the most recent approved budget

Fiscal Year	Operating Budget *	Capital Budget *
1 (most recent)		
2		
3		

Information provided above will be validated against OFM Fire Department profile information.

6. **Section E – Project Information.** This section is where you will provide the details of your project including project name, start and end dates, requested dollar amount (and total cost of the project).

   As multiple grant priority areas can be applied for, please ensure that the application clearly notes which priorities your project is aligned with (select all that apply).

   Ensure that the Project Summary, Description and Objectives are filled out in detail to clearly identify the fire department needs and initiatives.

   Note: Cancer Prevention – Equipment and Supplies should only include items that do not have an installation cost. Any item requiring installation costs should be listed under Cancer Prevention - Minor Infrastructure or Minor Infrastructure Modernization – Enhanced Broadband and Internet Connectivity, as appropriate.

E - Project Information

Project Name (maximum 250 characters) *

Project Start Date (mm/dd/yyyy) *	Project End Date (mm/dd/yyyy) *
Requested Amount: *	Total Cost of the Project: *

Identify applicable FP Grant Priorities (Select all that apply) *

- (1) Cancer Prevention - Equipment and Supplies
- (2) Cancer Prevention – PPE
- (3) Cancer Prevention – Minor Infrastructure
- (4) Minor Infrastructure Modernization – Enhanced Broadband and Internet Connectivity

Project Summary: *

Project Description: *

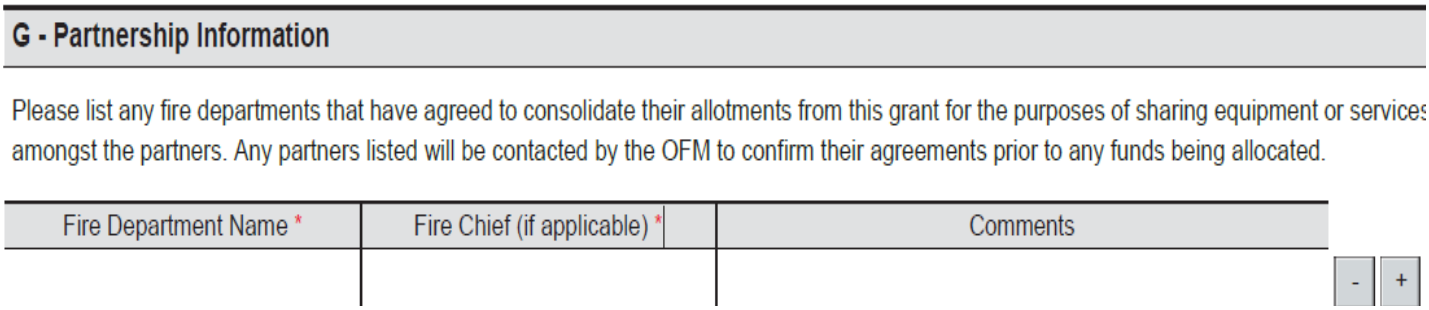
7. **Section F – Budget.** This section should summarize the items requested with their associated costs (in the description section) and total amount for the objective (in the amount section).

F - Budget

Please attach an itemized list along with the anticipated costs (not including taxes), categorized using the categories below to outline the individual equipment and installation costs included in this initiative.

Item	Description	Amount
Anticipated Costs of Project components		
Cancer Prevention – Equipment and Supplies		
Cancer Prevention – PPE		
Cancer Prevention – Minor Infrastructure		
Installation Costs – Cancer Prevention - Minor Infrastructure		
Minor Infrastructure Modernization – Enhanced Broadband and Internet		
Installation Costs Minor Infrastructure Modernization – Enhanced Broadband and		
Other (specify)		
Total Expenditures		0.00

8. **Section G – Partnership Information.** Municipal fire departments may partner to leverage funding under shared projects. Only one fire department should apply and list each partner fire department in this section. Each fire department listed will be contacted by the OFM to confirm their intention to pool their grant allocation.



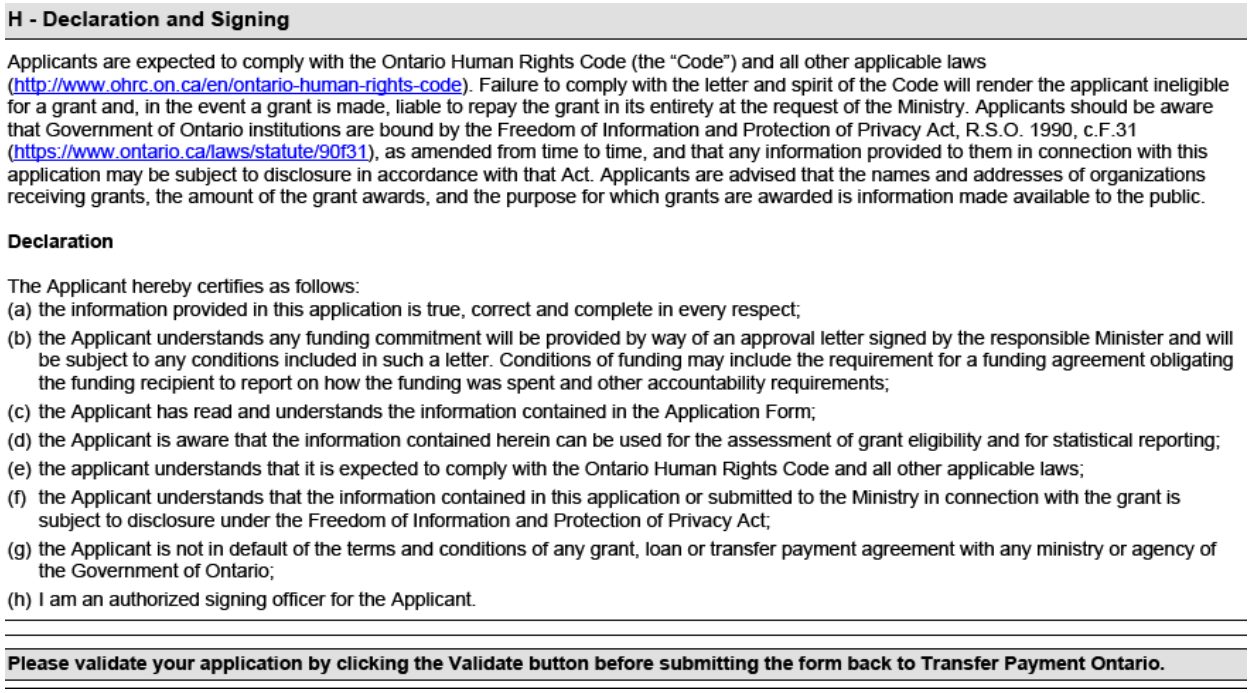
G - Partnership Information

Please list any fire departments that have agreed to consolidate their allotments from this grant for the purposes of sharing equipment or services amongst the partners. Any partners listed will be contacted by the OFM to confirm their agreements prior to any funds being allocated.

Fire Department Name *	Fire Chief (if applicable) *	Comments

- +

9. **Section H – Declaration and Signing.** This section will require the signature of the municipal signing authority.



H - Declaration and Signing

Applicants are expected to comply with the Ontario Human Rights Code (the "Code") and all other applicable laws (http://www.ohrc.on.ca/en/ontario-human-rights-code). Failure to comply with the letter and spirit of the Code will render the applicant ineligible for a grant and, in the event a grant is made, liable to repay the grant in its entirety at the request of the Ministry. Applicants should be aware that Government of Ontario institutions are bound by the Freedom of Information and Protection of Privacy Act, R.S.O. 1990, c.F.31 (https://www.ontario.ca/laws/statute/90f31), as amended from time to time, and that any information provided to them in connection with this application may be subject to disclosure in accordance with that Act. Applicants are advised that the names and addresses of organizations receiving grants, the amount of the grant awards, and the purpose for which grants are awarded is information made available to the public.

Declaration

The Applicant hereby certifies as follows:

(a) the information provided in this application is true, correct and complete in every respect;

(b) the Applicant understands any funding commitment will be provided by way of an approval letter signed by the responsible Minister and will be subject to any conditions included in such a letter. Conditions of funding may include the requirement for a funding agreement obligating the funding recipient to report on how the funding was spent and other accountability requirements;

(c) the Applicant has read and understands the information contained in the Application Form;

(d) the Applicant is aware that the information contained herein can be used for the assessment of grant eligibility and for statistical reporting;

(e) the applicant understands that it is expected to comply with the Ontario Human Rights Code and all other applicable laws;

(f) the Applicant understands that the information contained in this application or submitted to the Ministry in connection with the grant is subject to disclosure under the Freedom of Information and Protection of Privacy Act;

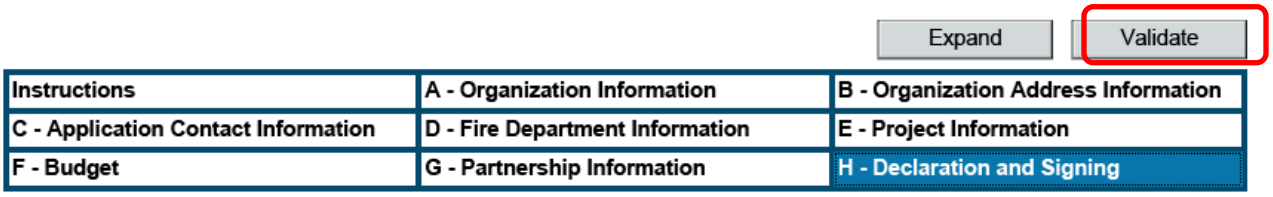
(g) the Applicant is not in default of the terms and conditions of any grant, loan or transfer payment agreement with any ministry or agency of the Government of Ontario;

(h) I am an authorized signing officer for the Applicant.

Please validate your application by clicking the Validate button before submitting the form back to Transfer Payment Ontario.

VALIDATING THE COMPLETED APPLICATION

Once the application is completed, reviewed, and signed by the municipal signing authority, please select the "Validate" button so that the applicant can ensure there is no missing information and all **required** fields have been completed.



SUPPLEMENTARY DOCUMENTATION

Every applicant can provide supplementary documentation that may support their application. This can include estimates or quotations for project initiatives or other supporting materials. Although not required, this additional information will assist the FP Grant Review Committee when assessing the applications.

Allocation as Percentage of 2025 Total Properties

(As provided in Renfrew OPP Detachment Board 2025 Draft Budget Preamble)

MUNICIPALITY	2025 PROPERTIES	2025 PERCENT OF TOTAL HOUSEHOLDS	2025 PSB COST ALLOCATED BY PERCENTAGE	2026 PSB COST ALLOCATED EQUALLY	DELTA
ADMASTON BROMLEY	1,495	6.58%	$ 7,543	$ 16,377.71	$ 8,834
ARNPRIOR	5,062	22.28%	$ 25,541	$ 16,377.71	-$ 9,164
GREATER MADAWASKA	2,946	12.97%	$ 14,865	$ 16,377.71	$ 1,513
HORTON	1,607	7.07%	$ 8,108	$ 16,377.71	$ 8,269
MCNAB BRAESIDE	3,423	15.07%	$ 17,272	$ 16,377.71	-$ 894
RENFREW	4,330	19.06%	$ 21,848	$ 16,377.71	-$ 5,470
WHITEWATER REGION	3,858	16.98%	$ 19,466	$ 16,377.71	-$ 3,089
TOTAL	**22,721**		**$ 114,644**	**$ 114,644**	

Allocation as Percentage of 2023 Total OPP Contracts

(All data extracted from 2023 FIR, except MB which has not filed yet. MB data is extracted from 2025 billing statement)

MUNICIPALITY	2023 MUNICIPAL COST	2023 PERCENT OF TOTAL MUNIC. COST	2025 PSB COST ALLOCATED BY PERCENTAGE	2026 PSB COST ALLOCATED EQUALLY	DELTA
ADMASTON BROMLEY	$ 390,977	5.55%	$ 6,362	$ 16,377.71	$ 10,016
ARNPRIOR	$ 1,665,181	23.63%	$ 27,096	$ 16,377.71	-$ 10,718
GREATER MADAWASKA	$ 706,311	10.02%	$ 11,493	$ 16,377.71	$ 4,885
HORTON	$ 421,411	5.98%	$ 6,857	$ 16,377.71	$ 9,521
MCNAB BRAESIDE	$ 915,780	13.00%	$ 14,901	$ 16,377.71	$ 1,476
RENFREW	$ 1,943,853	27.59%	$ 31,630	$ 16,377.71	-$ 15,252
WHITEWATER REGION	$ 1,002,046	14.22%	$ 16,305	$ 16,377.71	$ 73
TOTAL	**$ 7,045,559**		**$ 114,644**	**$ 114,644**	

Allocation as Percentage of 2022 Total Assessment

(All data extracted from 2022 FIR as MB has not yet filed 2023)

MUNICIPALITY	2022 ASSESSMENT	2022 PERCENT OF TOTAL ASSESSMENT	2025 PSB COST ALLOCATED BY PERCENTAGE	2026 PSB COST ALLOCATED EQUALLY	DELTA
ADMASTON BROMLEY	$ 467,104,300	8.40%	$ 9,631	$ 16,377.71	$ 6,747
ARNPRIOR	$ 1,027,289,300	18.47%	$ 21,180	$ 16,377.71	-$ 4,803
GREATER MADAWASKA	$ 829,231,800	14.91%	$ 17,097	$ 16,377.71	-$ 719
HORTON	$ 456,970,800	8.22%	$ 9,422	$ 16,377.71	$ 6,956
MCNAB BRAESIDE	$ 1,017,454,100	18.30%	$ 20,978	$ 16,377.71	-$ 4,600
RENFREW	$ 734,897,300	13.22%	$ 15,152	$ 16,377.71	$ 1,226
WHITEWATER REGION	$ 1,027,533,100	18.48%	$ 21,185	$ 16,377.71	-$ 4,808
TOTAL	**$ 5,560,480,700**		**$ 114,644**	**$ 114,644**	

Allocation on Per Capita Basis

(2021 Census - Statistics Canada)

MUNICIPALITY	2021 POPULATION	2025 PSB COST ALLOCATED BY PERCENTAGE	2025 PSB COST PER CAPITA	2025 PSB COST ALLOCATED EQUALLY	2025 PSB COST PER CAPITA	DELTA PER CAPITA	POPULATION TO HOUSEHOLD RATIO
ADMASTON BROMLEY	2,995	$ 7,690.87	$ 2.57	$ 16,377.71	$ 5.47	$ 2.90	2.003
ARNPRIOR	9,629	$ 24,726.33	$ 2.57	$ 16,377.71	$ 1.70	-$ 0.87	1.902
GREATER MADAWASKA	5,833	$ 14,978.57	$ 2.57	$ 16,377.71	$ 2.81	$ 0.24	1.980
HORTON	3,182	$ 8,171.07	$ 2.57	$ 16,377.71	$ 5.15	$ 2.58	1.980
MCNAB BRAESIDE	7,591	$ 19,492.95	$ 2.57	$ 16,377.71	$ 2.16	-$ 0.41	2.218
RENFREW	8,190	$ 21,031.12	$ 2.57	$ 16,377.71	$ 2.00	-$ 0.57	1.891
WHITEWATER REGION	7,225	$ 18,553.09	$ 2.57	$ 16,377.71	$ 2.27	-$ 0.30	1.873
TOTAL	**44,645**	**$ 114,644**		**$ 114,644**			

(GM actual population of 2,864 adjusted to 5,833 for a population to household ratio of 1.98, the mean of other 6 municipalities, up from actual ratio of 0.97

OPP Policing Cost Per Capita by Municipality

(2021 Census - Statistics Canada)

MUNICIPALITY	2023 MUNICIPAL OPP POLICING COST	2021 POPULATION	2025 PSB COST PER CAPITA
ADMASTON BROMLEY	$ 390,977	2,995	$ 130.54
ARNPRIOR	$ 1,665,181	9,629	$ 172.93
GREATER MADAWASKA	$ 706,311	5,800	$ 121.78
HORTON	$ 421,411	3,182	$ 132.44
MCNAB BRAESIDE	$ 915,780	7,591	$ 120.64
RENFREW	$ 1,943,853	8,190	$ 237.34
WHITEWATER REGION	$ 1,002,046	7,225	$ 138.69
TOTAL	**$ 7,045,559**		

OPP Police Governance as Percentage of Service Cost

(2021 Census - Statistics Canada)

MUNICIPALITY	2023 MUNICIPAL OPP POLICING COST	2026 PSB COST ALLOCATED EQUALLY	GOVERNANCE AS PERCENTAGE OF SERVICE
ADMASTON BROMLEY	$ 390,977	$ 16,377.71	4.19%
ARNPRIOR	$ 1,665,181	$ 16,377.71	0.98%
GREATER MADAWASKA	$ 706,311	$ 16,377.71	2.32%
HORTON	$ 421,411	$ 16,377.71	3.89%
MCNAB BRAESIDE	$ 915,780	$ 16,377.71	1.79%
RENFREW	$ 1,943,853	$ 16,377.71	0.84%
WHITEWATER REGION	$ 1,002,046	$ 16,377.71	1.63%
TOTAL	**$ 7,045,559**	**$ 114,644**	

Township of Admaston Bromley
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613-432-4052 Fax
613-432-3175 Stone Road Garage
613-646-7918 Cobden Road Garage

REPORT

Date: November 18, 2024
To: Protective Services Committee
From: Fire Chief McHale
RE: Call Alert/Call Dispatch

Background:

Since the inception of the 911 system in Renfrew County and the beginning of the Central Ambulance Communication Centre (CACC), the Douglas Fire Department has only used the CACC as a call alert system. The CACC also offers a dispatch service which staff feel it is time that the Douglas Fire Department (DFD) moves towards taking advantage of the services available.

Discussion:

Currently, the 911 call comes into the CACC and a dispatcher from the CACC then sends out our frequency tones with a civic address, and whatever information the caller can relay to that dispatcher. Other than a call from a personal phone to acknowledge the page, from this point on DFD is no longer in communication with the CACC. All other departments within the County receive call alert and call dispatch from the CACC. In this scenario, the dispatcher once again sends outs the departments tones, takes as much information as they can from the caller and alerts the responding agency. From here, each Fire Department apparatus has a four-digit number assigned by the County and from their truck radio, they would respond to dispatch that the page has been confirmed and a unit is responding. Example…"Douglas Fire unit 9658 to Renfrew dispatch, Douglas 9658 responding to car fire at 303 Lynch Road in Admaston Bromley Township. Renfrew dispatch confirm, Douglas 9658 on route. Douglas 9658 update on car fire at 303 Lynch Road, the car is fully involved and very close proximity to the house."
The dispatch system allows an open channel to the dispatcher for updates on route, will give us more freedom while on a fire scene, as myself or my personnel will no longer be marking times or making calls for allied agencies. The CACC will benchmark important times during an emergency and has the ability to send all the transcripts to the Chief at the end of the call.
There will no doubt be some growing pains, but only on our end as CACC preforms this service for all other departments on a daily basis.
On our recent visit to the CACC, it was brought to my attention that even though Douglas Fire does not utilize the dispatch service, our trucks have all been assigned numbers through the County.
Douglas 1…..9568
Douglas 3……9659
Douglas 4…..9735

Finance:

The current cost for call alert is $22.63/call
The current costing for call alert and dispatch $29.61/call
If we were to receive 50 calls in a calendar year:
50x$22.63= $1131.50
50x$29.61= $1480.50
A difference of $349.00

People Consulted:

Ashely St. Marie, Manager Central Ambulance Communication Centre
Jennifer Charkavi, CAO/Clerk
Pat Donohue, Deputy Fire Chief
All Captains, Douglas Fire Department

Recommendation to Committee:

BE IT RESOLVED THAT the Protective Services Committee recommends to Admaston Bromley Council to move to the call alerting and dispatch system with the Central Ambulance Communication Centre (CACC) effective January 1, 2025.

AND BE IT RESOLVED THAT the Protective Services Committee directs staff to incorporate this funding model into the 2025 budget once approved by Council.