Basic Fundamentals for Inspections

FIPI

LAFC TRAINING PROGRAM

March 2014

Participant's Handbook

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INSPECTIONS

1.0 OBJECTIVES

Course Objectives

- At the end of this module, you will be able to:
  - state the potential reasons for inspections
  - describe the Inspection Process
  - identify FSA/LAFC inspection responsibilities
  - describe any required skills
  - conduct an inspection

2.0 GENERAL INFORMATION

Inspections vs. Compliance Inspections

What is an Inspection?

What is a Compliance Inspection?

2.1 INSPECTIONS VS. COMPLIANCE INSPECTIONS

An **Inspection** is defined as:

1. the act of inspecting or viewing, especially carefully or critically.

2. formal or official viewing or examination

A **Compliance Inspection** is:

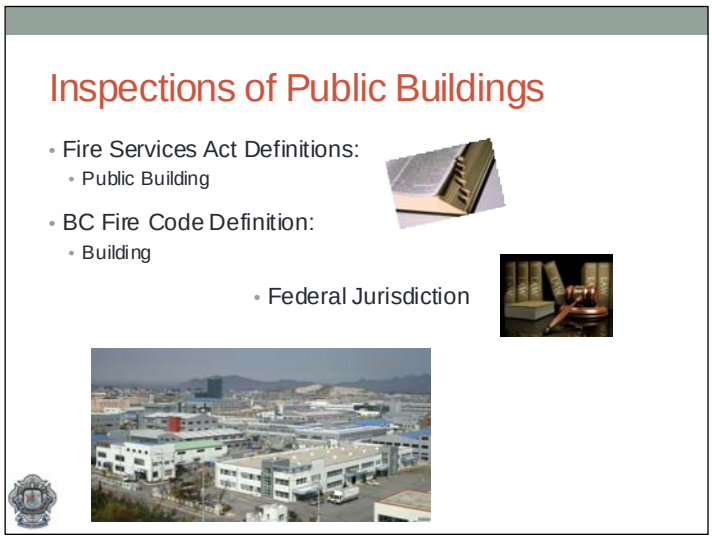
An inspection which intends to assure compliance and fire safety for all buildings in British Columbia.

The inspection observations are usually compared against some regulatory criteria – a provincial statute (e.g., the *Fire Services Act*), a provincial regulation (e.g., the *BC Fire Code Regulation* and *BC Fire Code*) and referenced standards (e.g., NFPA).

Within the BC Fire Services community, inspections may be referred differently yet meaning the same thing:

- Fire safety inspections
- Fire prevention inspections
- Life Safety inspections

In this module, we will refer to them as Fire Prevention Inspections.



2.2 INSPECTION OF PUBLIC BUILDINGS

Fire Services Act – **Public Building**: includes a factory, a warehouse, store, mill, school, hospital, theatre, public hall, office building and any building other than a private house.

BC Fire Code – **Building**: means any structure used or intended for supporting or sheltering any use or occupancy.

Federal Jurisdiction - The Federal Government has retained jurisdiction over some Crown properties. Some examples are:

National Railroads; Canada Post and other Federal Crown Corporations; airports under Federal Control; and First Nations Properties

Facilities on these properties are exempt from provincial requirements.

2.3 WHAT IS A FIRE PREVENTION INSPECTION?

A Fire Prevention Inspection will include one or more of the following:

1. Document review – e.g., previous inspections reports, fire safety plan, building and equipment inspection / monitoring / maintenance records, floor plans – for the site, maintained by the building owner or the AHJ.
2. Visual inspection – e.g., property, building (inside & outside), production equipment & processes, fire prevention & suppression equipment

The inspection process is completed by the preparation, distribution, and filing of a comprehensive report of findings and recommendations.

These inspections should be conducted by a competent individual – LAFC, Municipal Fire Prevention Officer, contracted independent fire inspector.

Inspections are conducted to ensure compliance with regulations and statutes in order to achieve 3 objectives:

Fire Prevention (to be discussed in more detail later).
Life Safety (to be discussed in more detail later).
Fire Control and Extinguishment (to be discussed in more detail later).

Inspections allow us to monitor and address:

Uncontrolled or inadequately controlled fire hazards (Fire Prevention).
Potentially unsafe practices such as overcrowding, obstruction to egress (Life Safety).
Inspection, maintenance and testing of Fire Protection Equipment (Fire Control and Extinguishment).

Types of Fire Prevention Inspections

Type	Description	Responsibility
Regular System of Inspection	Normal, planned inspection.	Local government / Local Building Official Inspector
Special Event Permits – Local Government	E.g., circus, pyrotechnic events, etc.	Local government / Local Building Official Inspector.
Response to Complaint or Request for Inspection	Someone calls in a complaint regarding a potential fire hazard or requests an inspection.	LAFC
Eminent Hazard	E.g., special event decorations	LAFC
Change in Occupancy	E.g., part of a mall converted to an office or church	Local government / Local Building Official Inspector.

2.3.1 TYPES OF FIRE PREVENTION INSPECTIONS

The table on this slide shows the types of inspections that need to be conducted as well as who is responsible for them.

Regular System of Inspection:

"Annual" or as recommended by the local government and by the frequency of the inspection policy.

Eminent Hazard:

Stop the inspection.
Address the hazard (see the Fire Services Act – Section 25) and act immediately.
Continue the inspection.

If the inspection is not a normal, planned inspection, then the inspector has the choice to restrict the inspection to issue/event that initiated the inspection or take advantage of site visit to conduct a full fire prevention inspection.

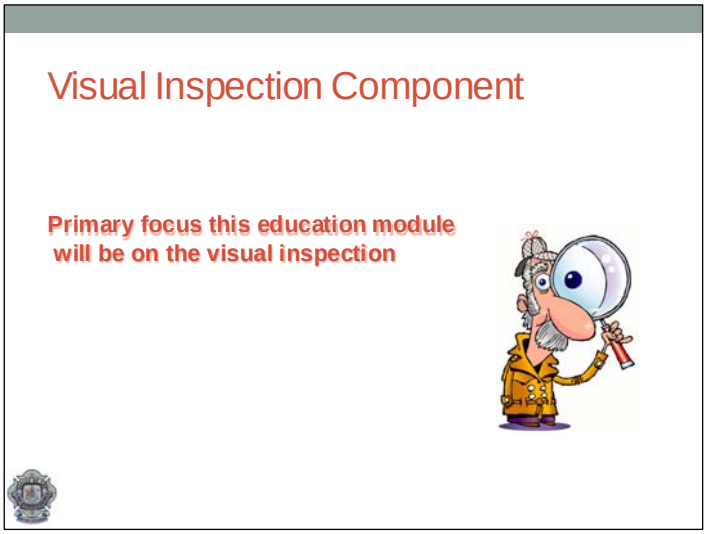
Outcomes of Fire Prevention Inspections

- Improved Life Safety
- Reduced Risk of Fires
- Procedures for the safe and efficient control and extinguishment of fires
  - Saves Time and Expenses for our Resources
- Reduce Loss to Property
- Shift in Thinking
  - Proactive **NOT** Reactive!

2.3.2 OUTCOMES OF FIRE PREVENTION INSPECTIONS

The fundamental reason for conducting fire inspections is to reduce the risk of life and property losses from fire, by identifying and ensuring the correction of conditions which contribute to the occurrence and spread of fire.
The end result of a fire prevention inspection should:

- provide a record of the findings and actions required as a result of the inspections;
- produce a property that is safer because the inspection was conducted; and,
- inspire an improved attitude towards fire prevention by management and employees.



2.3.3 VISUAL INSPECTION COMPONENT

This module will focus on the visual inspection where the LAFC can determine if the BC Fire Code is being complied with "on the shop floor" through the implementation of properly prepared Fire Safety Plan to meet the Code's 3 objectives.

Later in the presentation, we will discuss the preparation for a visual inspection by conducting a document review including reviewing the Fire Safety Plan. Reviewing the Fire Safety Plan is the subject of another education module.

2.4 GOAL OF THE LAFC

The goal of the LAFC is to ensure there is a "reasonable level of life and fire safety" provided in all public buildings within their respective jurisdictions.

Fire inspections are part of an overall fire prevention program that includes:

- Public education;
- Fire safety plans for new construction, occupied premises and demolition sites;
- Code enforcement;
- Upgrading of existing non-conforming buildings;
- Investigation of fires.

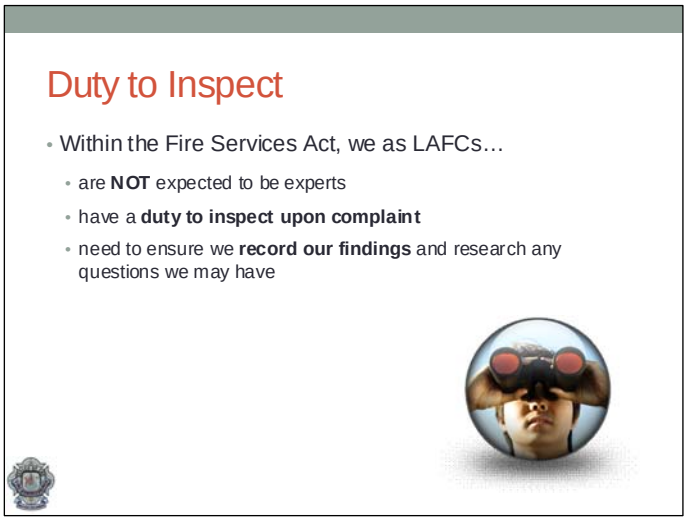
There is no obligation for local government to provide fire suppression. The level of service for fire suppression is decided by the local government and the citizens. It is usually in response to local demand and is accordingly administered and funded at the local level for a specified area.

Non municipal areas such as regional districts, improvement districts and specified areas are not required by the *Fire Services Act* to provide a regular system of inspections.

The *Fire Services Act* is a provincial statute and applies to the entire province. It consists of the following divisions:

Part 1 Investigation, Prevention and Suppression of Fires
Part 2 Escape from Fire
Part 3 General Provisions

Section 26, Fire Services Act, requires every municipal council to provide for a regular system of inspections of hotels and public buildings within the municipality. Areas outside municipal boundaries are exempt but may choose to conduct inspections.



2.4.1 DUTY TO INSPECT

No one is expecting LAFCs to be experts. The focus is on conducting thorough inspections and taking detailed notes to be able to leave the inspection and research any questions unanswered during the inspection.

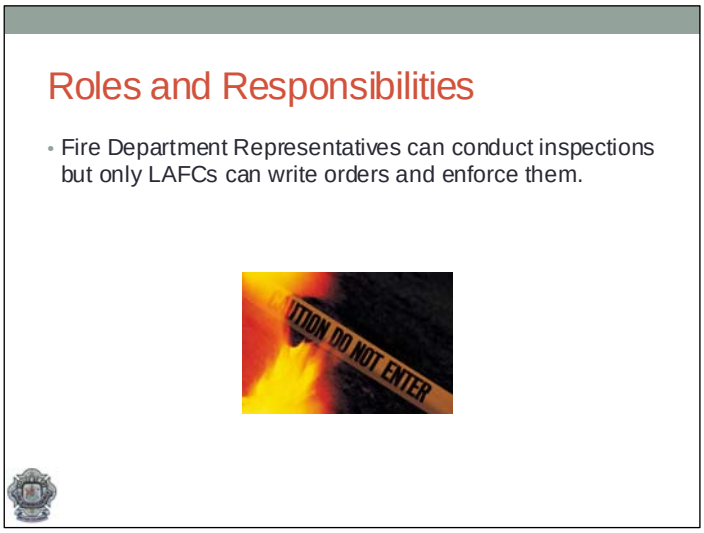
When conducting an inspection, make sure that you record all of your findings (feel free to use the checklists provided in this training or create your own). If you are unsure of something, take pictures onsite and jot down as much information as you can. When you get back to your office, you can research online within the BCFC, FSA, BCBC, etc. If you still have questions, you can contact an experienced LAFC or the Office of the Fire Commissioner (see our Research Process Diagram).

There is a difference between a complaint, which is responded to by an LAFC, and a request for inspection, which is responded to by a fire prevention officer.

Handout:

- Inspection Procedure Guide (Tab 9)
- Fire Prevention Inspection Report (sample) (AHJ may have its preferred format) (tab 1)

The Municipality has the responsibility to perform regulatory inspections by a delegated officer. These may or may not be conducted by an LAFC.



2.4.2 ROLES AND RESPONSIBILITIES

Fire Department Representatives can conduct inspections but only LAFCs can inspect on complaint and write Provincial orders and enforce them.

The *Fire Services Act* requires municipalities to provide for a regular system of inspection.

Either a LAFC or other persons authorized by a municipal council (e.g. Fire Department Representative, contracted/independent fire inspector) under the relevant sections of the *Fire Services Act* may carry out these inspections.

The Local Assistant is also responsible for the application and enforcement of the *British Columbia Fire Code* made pursuant to the *Fire Services Act*.

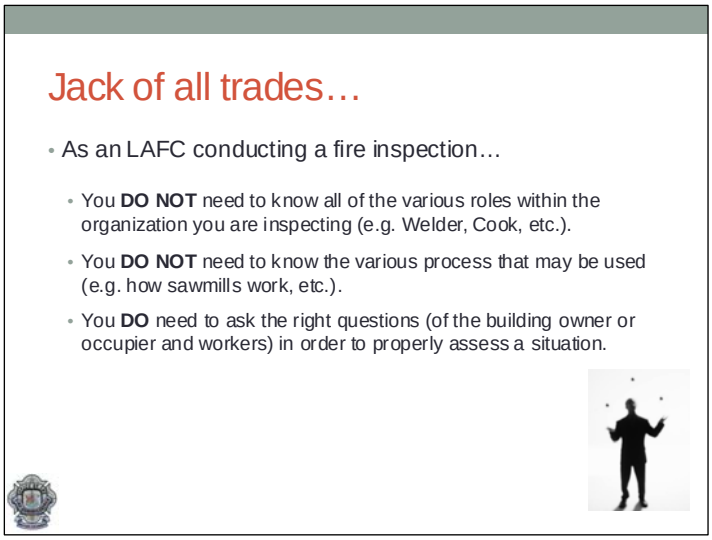
LAFCs have Peace Officer status and under Provincial Authority LAFCs are accountable to the Fire Commissioner, **NOT** to local government.

Depending on the AHJ, Fire Prevention Officers can document infractions using:

1. The Municipal Ticket Information (MTI), or
2. The Bylaw Notice Dispute Adjudication System (BNAP)

2.4.2.1 ABILITY TO READ AND USE BC FIRE CODE

The BC Fire Code (BC FC) contains a set of minimum technical requirements designed to provide an acceptable level of fire safety in buildings and within the community at large. It applies the core concepts of the National Fire Code, combined with elements specific to BC's unique needs. Its primary purpose is the promotion of public safety through the application of uniform fire safety standards throughout British Columbia.



2.4.2.2 JACK OF ALL TRADES…

As an LAFC conducting a fire inspection…

You **DO NOT** need to know all of the various roles within the organization you are inspecting (e.g. Welder, Cook, etc.).
You **DO NOT** need to know the various process that may be used (e.g. how sawmills work, etc.).
You **DO** need to ask the right questions (of the building owner or occupier and workers) in order to properly assess a situation.

For example:

Has anything changed since the last inspection?
What do you do / produce here?
Can I see your MSDS sheets? (e.g., to learn if there are any special fire hazards associated with the controlled product)
Can I review your Fire Safety Plan?

During the site visit, you can ask workers a few simple questions to gauge their knowledge of the fire safety plan, such as:

- What fire hazards may be present in your work area?
- How do you protect yourself from those hazards?
- Where do you go for more information?
- What do you do in an emergency or fire?

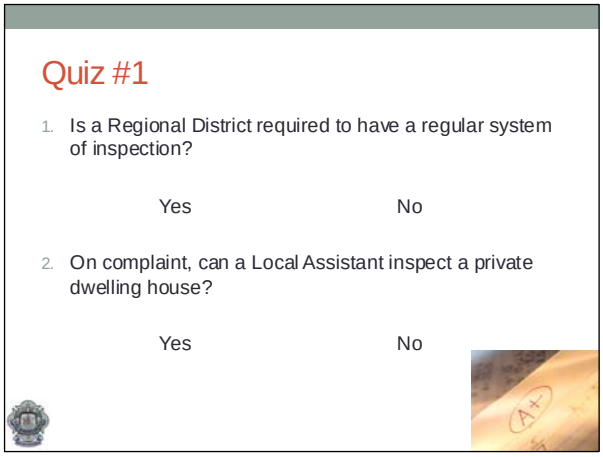
2.4.2.2LAFCS HAVE MANY ROLES

LAFCs may:

- conduct fire prevention inspections;
- issue orders to remedy fire hazards that endanger life or property;
- accept alternatives or equivalencies set out by regulation;
- enter onto a property to investigate a fire anytime;
- exclude persons from a fire scene; and/or,
- request information from persons residing or employed at a fire scene.

Please see the online LAFC course for more details regarding our duties and responsibilities.

QUIZ #1



1. Is a Regional District required to have a regular system of inspection?

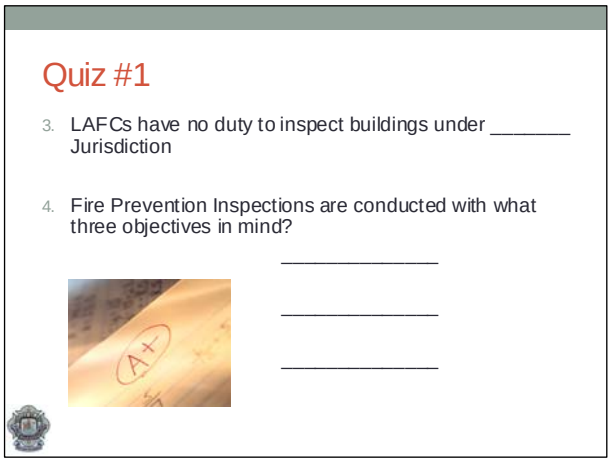
2. On complaint, can a Local Assistant inspect a private dwelling house?

Additional Notes on private dwellings:

I. Home based businesses can only be inspected if they fall under the definition of factories.

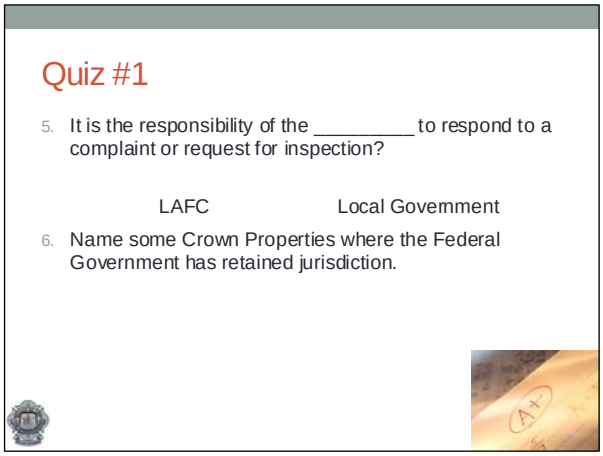
II. Other in-house inspections may be possible by a Municipal Inspector (e.g., business license inspection) but you can only inspect as LAFC in a private dwelling if owner provides consent.

III. In-House Child Care – LAFC should confer with Office of Fire Commissioner before attempting an inspection.



3. LAFCs have no duty to inspect buildings under Federal Jurisdiction.

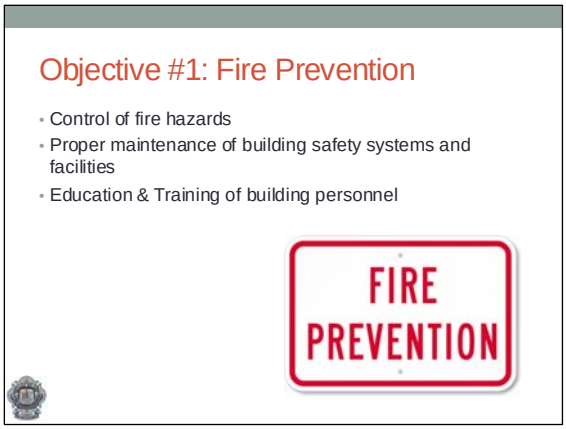
4. Fire Prevention Inspections are conducted with what three objectives in mind:



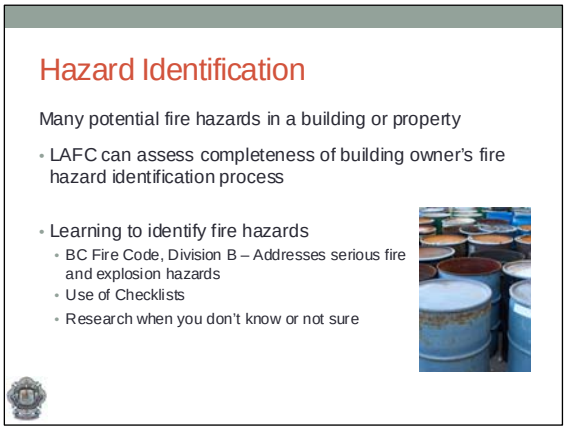
5. It is the responsibility of the _____ to respond to a complaint or request for inspection?

6. Name some Crown Properties where the Federal Government has retained jurisdiction.

3.0 OBJECTIVE #1: FIRE PREVENTION



Fire Prevention – to prevent the occurrence of fire through the control of fire hazards, the proper maintenance of the building safety systems and facilities, and the training of building personnel.



3.1 HAZARD IDENTIFICATION

There are many potential hazards that can exist on in building or on a property.

LAFC, during an inspection, can assess completeness of building owner's or occupier's fire hazard identification process in their building(s)/property.

BC Fire Code is a good place to learn what the serious fire hazards are – if the Fire Code felt a fire hazard was serious enough to prescribe a control solution then LAFCs should know to look for those fire and explosion hazards.

Checklists, e.g., Tab 3, Fire Hazard Identification Checklist, are another tool to assist identification of fire hazards during inspection.

LAFCs don't need to remember or be experts at everything! Owners are responsible for complying with the Code. LAFCs just need to be able to advise if necessary by researching information or reaching out to a colleague. This is why it is so important to take notes and photos if you are uncertain with a particular situation or site.

3.1.1 FIRE HAZARDS

Handout:

- Fire Hazard Identification Checklist (Tab 3)
- NFPA Standards – definition of hazard depends on the perspective of the specific document's purpose (Refer to NFPA Journal article by Chip Carson, page 4 of handout)

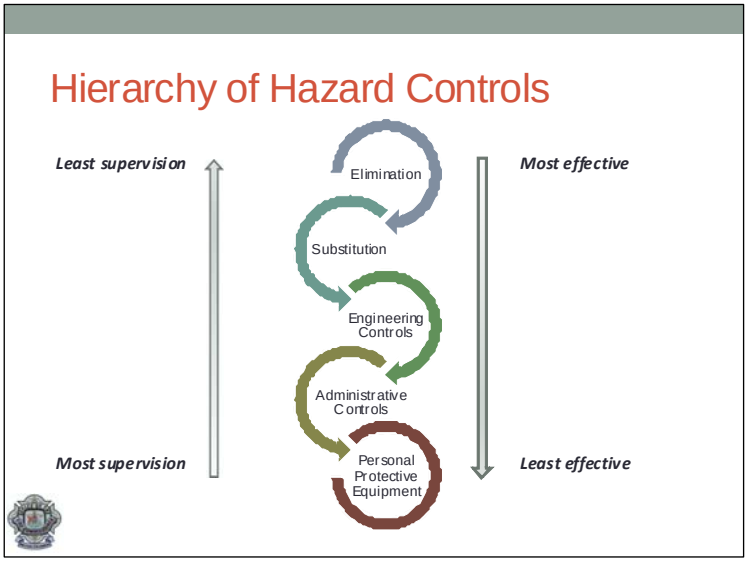
A very common major fire hazard in all types of occupancies: the accumulation of combustible waste products.

Waste materials that do accumulate in unacceptable quantities or

locations can be dealt with by the Local Assistant under the provisions of the *Fire Services Act* or the British Columbia Fire Code. The *Fire Services Act* addresses this issue in a general way under a section dealing with fire hazards. This allows the Local Assistant to write orders to the owner or occupant to remove or take precautions against the hazard.

The BC Fire Code is more specific as it prohibits storage or accumulation of combustibles in locations that will constitute a fire hazard. The Fire Code also addresses other waste and storage issues such as the storage of oily rags, the disposal of ashes, garbage receptacles and storage rooms.

The accumulation of a certain amount of waste material in and around buildings may be necessary for day-to-day operations. If the basics of good housekeeping are present the combustibles may not constitute an undue fire hazard. Local assistants must exercise good judgement and consider each circumstance on its own when applying the BC Fire Code or *Fire Services Act* to the storage of combustible materials.



3.1.2 HIERARCHY OF HAZARD CONTROLS

All identified hazards, including fire and explosion hazards, need to be assessed and the best practicable control option selected to protect workers, occupants, equipment and property.

The control method for many fire hazards are identified in the BC Fire Code Division B – Acceptable Solutions, and the NFPA Standards, which means someone has already done the hazard assessment and determined the control method prescribed is practicable and effective. Notwithstanding, it helps to understand the process that determines the most practicable and effective control method.

When assessing the best control option, there is a hierarchy that must be followed, in which you can only move to a lower level if the higher level is not practical and/or insufficient to provide adequate protection.

Elimination to PPE:

1. Most effective to least effective
2. Least supervision to most supervision

Examples of Each Step in the Hierarchy of Hazard Controls

1. Elimination

The best way to control a hazard is to eliminate it and remove the danger. This can be done by changing a work process in a way that will get rid of a hazard; in this case, we can (1) remove the fuel (e.g., the combustible material, flammables), (2) remove the ignition source (e.g., wait until hot tools, equipment, etc., cool down before beginning the work), or (3) remove the oxygen (e.g., add an inert gas (e.g., nitrogen, carbon dioxide) in the enclosure to replace the oxygen).

2. Substitution

The second best way to control a hazard is to substitute something else in its place that would be non-hazardous or less hazardous to workers. For example, substitute a solvent-based paint with water based paint.

3. Engineering Controls (Safeguarding Technology)

If a hazard cannot be eliminated or a safer substitute cannot be found, the next best approach is to use engineering controls to keep the hazard from reaching the worker. This could include building design & construction material, flammable cabinets, dust

collection systems, bonding and grounding, explosion proof equipment, intrinsically safe electrical.

4. Administrative Controls (Training and Procedures)

If engineering controls cannot be implemented, or cannot be implemented right away, administrative controls should be considered. Administrative controls involve changes in workplace policies and procedures.

They can include such things as:

Hot Work Permit system
Housekeeping
Training
Labelling containers and storage spaces for flammable/combustible materials

However, warning signs used *instead* of correcting a hazard that can and should be corrected are *not* acceptable forms of hazard control. For example, it is neither effective nor acceptable to post warning signs, by open containers of flammable liquids, cautioning workers to work carefully and not create ignition sources.

5. Personal Protective Equipment

The use of personal protective equipment (PPE) is a way of controlling hazards by placing protective equipment directly on workers' bodies. Examples of personal protective equipment include: respirators, gloves, protective clothing, hard hats, goggles, and ear plugs.

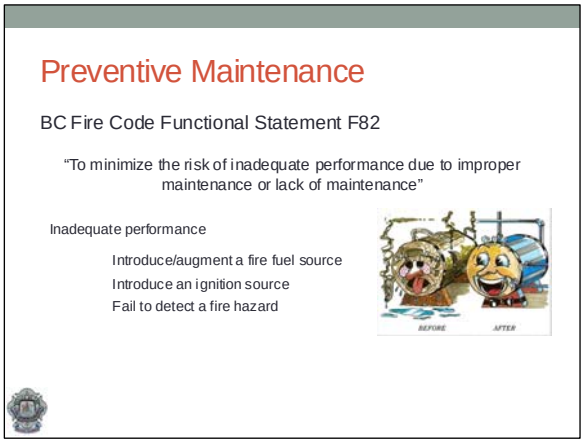
Personal protective equipment is the *least* effective method for protecting workers from hazards. PPE should be used only while other more effective controls are being developed or installed, or if there are no other more effective ways to control the hazard. This is because:

The hazard is not eliminated or changed.
If the equipment is inadequate or fails, the worker is not protected.
No personal protective equipment is fool-proof (for example, fire-resistant clothing).
Personal protective equipment is often uncomfortable and can place an additional physical burden on a worker.
Personal protective equipment can actually create hazards. For example, the use of respirators for long periods of time can put a strain on the heart and lungs.

While there are some jobs, such as firefighters fighting fires, where wearing adequate personal protective equipment (e.g., SCBA) is absolutely essential, there are many jobs where employers hand out personal protective equipment when in fact they should be using more effective hazard control methods.

Note: When planning for hazard controls, remember that the control selected must not eliminate one hazard while creating another. Hazard control measures should eliminate or reduce hazards for all who are potentially exposed to them.

A consultant with regulatory accreditation (e.g. Engineer) can document with a Letter of Assurance that a building or its storage, fire system, etc. are safe. That is adequate for LAFC purposes.



3.2 PREVENTIVE MAINTENANCE

BC Fire Code, Division A – Part 3 states " The objectives of this code are achieved by measures, such as those described in the acceptable solutions in Division B, that are intended to allow the building or facility or its elements to perform the following functions …"

BC Fire Code Functional Statement F82 states "To minimize the risk of inadequate performance due to improper maintenance or lack of maintenance."

An online search of the BC Fire Code provides 70 instances of "maintenance" in the code.

For example, BC Fire Code Sentence 3.1.3.1(1) states "… the designation, use, maintenance and operation of industrial trucks shall conform to NFPA 505 …."

The building' Fire Safety plan requires the inclusion of "Inspection and maintenance of building facilities provided for the safety of occupants." Refer to BC Fire Code 2.8.2.1.(1)(g).

Much of the equipment used in production, fire hazard control, fire suppression, all related monitoring equipment and alarms require preventive maintenance to continue to operate effectively over time.

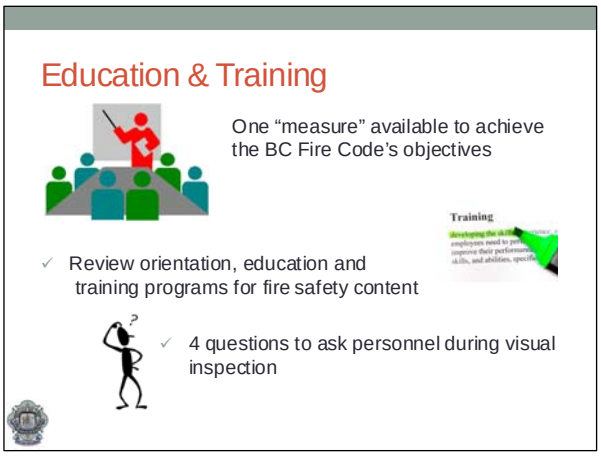
Inadequate performance of equipment can:

1. Introduce or increase the supply of fuel should a fire start
2. Introduce an ignition source in the presence of a fuel source and start a fire
3. Fail to detect a fire hazard (e.g., spark, overheated part, fire) or fail to activate an alarm

LAFCs do not need to be knowledgeable in preventive maintenance. However, when an LAFC observe any kind of equipment, that could contribute to or prevent a fire or explosion, in a poor state of repair, then further inquiries are required into the facility's preventive maintenance program to be sure there is compliance with the BC Fire Code.

Simple questions to ask include:

- Is a formal preventive maintenance program in place?
- Is the program predictive (i.e., inspect/adjust on a frequency likely to maintain good state of repair) or reactionary (i.e., fix something when it breaks?
- Is a method in place to log and track items requiring repair or that have been repaired?
- Are the manufacturer's instructions for inspections and/or standards, such as NFPA, the basis for their preventive maintenance program?



3.3 EDUCATION AND TRAINING OF BUILDING PERSONNEL

BC Fire Code, Division A – Part 3 states “ The objectives of this code are achieved by measures, such as those described in the acceptable solutions in Division B, that are intended to allow the building or facility or its elements to perform the following functions …”

One “measure” that can assist to achieve the Fire Code’s objectives is education and training of supervisory staff and personnel. An online search of the BC Fire Code provides 33 instances of “training” in the code.

For example, BC Fire Code Sentence 3.2.1.15(3) states “All employees involved in the storage and handling of dangerous goods shall be trained in the safe handling procedures and correct responses to an emergency situation.”

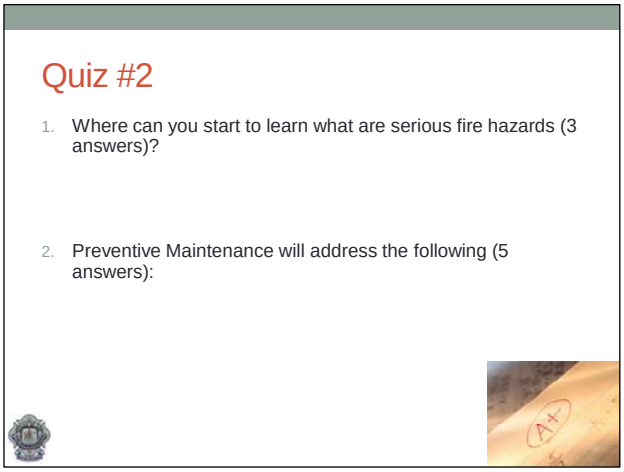
The building’ Fire Safety plan requires the inclusion of “the training of supervisory staff and other occupants in their responsibilities for fire safety.” Refer to BC Fire Code 2.8.2.1.(1)(c).

Do the orientation, education and training programs for employees include the risks and hazards associated with fire and explosions? Are the assigned supervisory staffs trained in their duties? Refer to the Fire Safety Plan Review Checklist (Tab 2), Section 4 for more questions that can be asked.

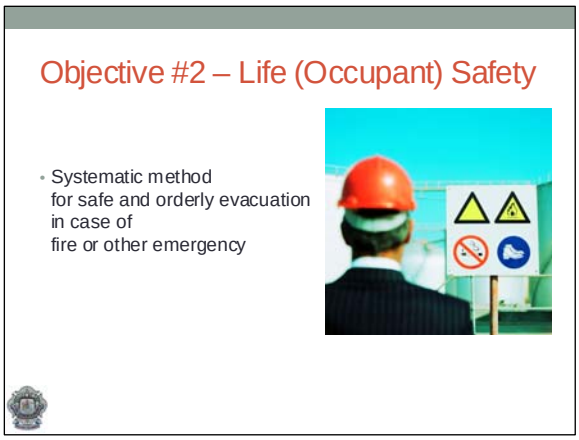
Also, during the site visit, you can ask workers a few simple questions to gauge their knowledge of the fire safety plan, such as:

- What fire hazards may be present in your work area?
- How do you protect yourself from those hazards?
- Where do you go for more information?
- What do you do in an emergency or fire?

QUIZ #2



1. Where can you start to learn what are serious fire hazards (3 answers)?
2. Preventive Maintenance will address the following (5 answers):

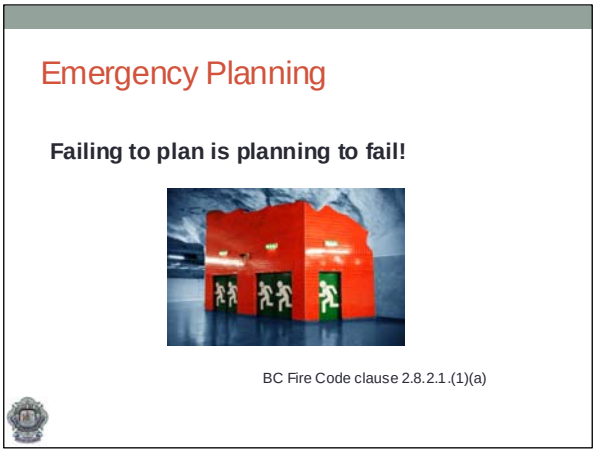


4.0 OBJECTIVE #2 – LIFE (OCCUPANT) SAFETY

Life (Occupant) Safety – to establish a systematic method for safe and orderly evacuation of the building in case of fire or other emergency.

This means addressing:

- Emergency Planning
- Fire Drills
- Means of egress
- Exit signs and emergency lighting



4.1 EMERGENCY PLANNING

There is an old saying: "Failing to plan is planning to fail." Experience has shown that proper preparation can result in the correct response when a fire does occur. Fire drills in schools are a good example. Children have practised fire drills over and over and react automatically when the alarm sounds.

The requirements for emergency planning and fire safety planning are contained in the BC Fire Code, Section 2.8 – Emergency Planning.

Generally speaking every building containing a Group A or B occupancy, all buildings that are equipped with a fire alarm system, construction and demolition sites and storage areas containing flammable and combustible liquids or hazardous materials require a fire safety plan. Refer to BC Fire Code 2.8.1.1.

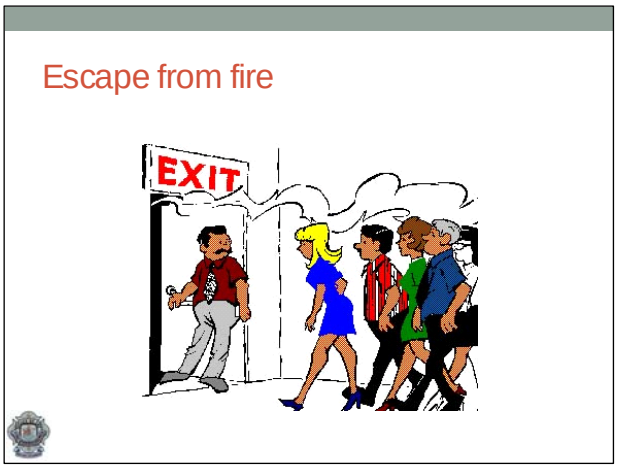
Fire safety plans should be prepared by the building owner or occupant in cooperation with the fire department. They should include:

- sounding the alarm
- notifying the fire department
- instructing occupants on procedures to be followed when the alarm sounds
- evacuating endangered occupants
- confining, controlling and extinguishing fires.

Fire safety plans require the appointment of supervisory staff to insure that specific functions are performed, which will assist the fire department.

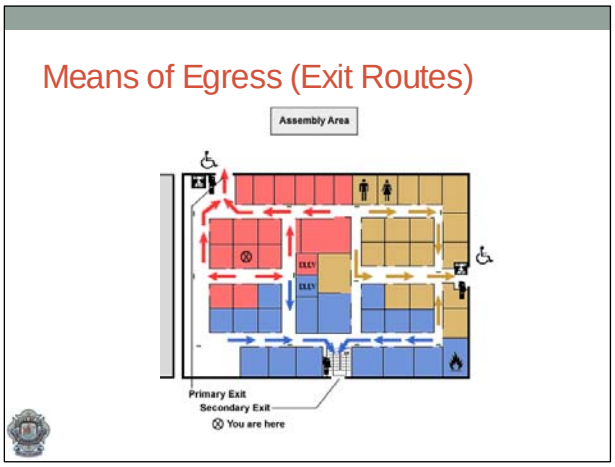
The BC Fire Code also deals with the maintenance of fire safety plans, their distribution, and the posting of emergency procedures in certain occupancies. There are instructions to notify the fire department in the event of alarm activation when the fire alarm system does not do this automatically.

Refer to BC Fire Code 2.8.2.1 – Measures in a Fire Safety Plan.



4.2 ESCAPE FROM FIRE

In this next section we will look at the ability of building occupants to escape from fire.



4.2.1 MEANS OF EGRESS (EXIT ROUTES)

BC Fire Code defines “Means of Egress’ as a continuous path of travel for the escape of persons from any point in a building or contained open space to a separate building, an open public thoroughfare, or an exterior open space protected from fire exposure from the building and having access to an open public thoroughfare. Means of egress includes exits and access to exits.

There are requirements for the aisles leading to the egress doorways (to be discussed during the table top exercise) and each floor is required to have more than one egress doorway.

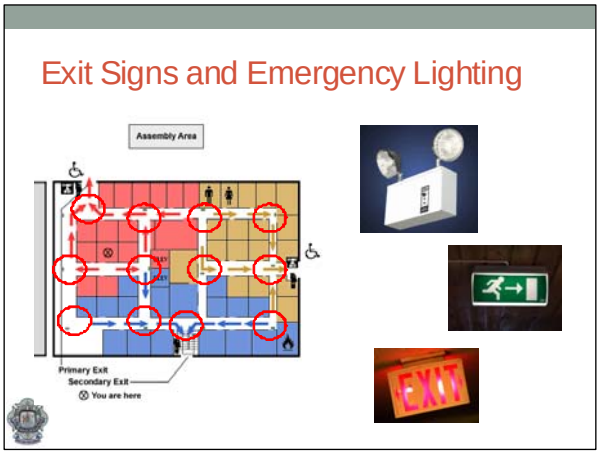
Refer to BC Fire Code subsection 2.7.1, Means of Egress, for more information.

4.2.2 EXIT DOORS

- Outward swinging doors
- No obstructions to impede egress
- Exit doors are to be equipped with latching hardware that will release when a force of not more than 90 Newtons is applied to the latching hardware.
- All exit doors are to be such that the door can be opened from the inside without the use of keys or any specialized knowledge of the door opening device.

The following British Columbia legislation pertains to exit doors:

- The British Columbia Building Code
- The *Fire Services Act*
- The British Columbia Fire Code (Subsection 2.7.2)



4.2.3 EXIT SIGNS AND EMERGENCY LIGHTING

Exit signs and emergency lighting are an integral part of the fire protection system that assists with the evacuation of building occupants in the event of fire. The type of occupancy affects the need for exit signs and emergency lighting. In places of assembly such as hotels, licensed beverage establishments, department stores and other buildings where people may be unfamiliar with the exit facilities the need for signs increases. Without exit signs and emergency lighting, people can become disoriented and trapped inside the building.

The following British Columbia legislation pertains to exit signs and emergency lighting:

- The British Columbia Building Code
- The *Fire Services Act*
- The British Columbia Fire Code

The new exit sign symbol is the "Running Man" as per BC Building Code 2012 (BCBC 3.4.5.1 – Exit Signs and BCBC 9.9.11 – Signs. It is a recognized international symbol. There are other versions of the symbol than the one illustrated on the slide, e.g., green man with direction arrow.

The BC Building Code regulates the installation of exit signs and emergency lighting and the requirements can be found in either Part 3 or Part 9 depending on which part applies to the building. The *Fire Services Act* and BC Fire Code regulate the maintenance, inspection and testing of exit signs and emergency lighting in buildings in use. The Local Assistant must determine the current requirements by reviewing the code of the day.

EXIT SIGNS

Generally speaking, exit signs are required over or adjacent to every exit door to a room or building where the exit serves:

a) a building exceeding 2 storeys in building height
b) a building having an occupant load greater than 150, or
c) a room or floor area that has a fire escape as part of a required means of egress.

Every exit sign must:

a) be visible from the exit approach, and
b) be illuminated continuously while the building is occupied.

Refer to BCBC 3.4.5.1 – Exit Signs and BCBC 9.9.11 -Signs

A number of manufacturers have recently introduced exit signs that utilise phosphorescent chemicals that glow in the dark. These signs should be treated as externally illuminated exit signs and be equipped with emergency lighting which shines on them in the event of a power failure.

Where illumination of an exit sign is provided from an electrical circuit, that circuit shall:

a) serve no equipment other than emergency equipment, and
b) be connected to an emergency power supply.

When necessary, signs must be provided to indicate the direction of egress in public corridors and passageways with a suitable arrow or pointer indicating the direction of egress.

In buildings over 2 storeys in building height, any part of an exit ramp or stair that continues past an exterior exit door down to a basement must be clearly marked by a sign indicating that it does not lead to an exit. This will help reduce the possibility of occupants being trapped in dead-end spaces.

Exit signs should be located as to be readily visible from any location within the floor area. An exception to this would be for rack storage like that found in libraries. In this case the exit sign should be visible from the cross aisle or main aisle.

EMERGENCY LIGHTING

The BC Building Code outlines the requirements for lighting and emergency power systems and specifies where acceptable levels of illumination shall be provided. Emergency lighting shall be provided to average levels of at least 10 lx (lux)* at floor/tread level in:

a) exits;
b) principal routes providing access to exit in an open floor area;
c) corridors used by the public;
d) corridors serving patients' sleeping rooms;
e) corridors serving classrooms;
f) underground walkways;
g) public corridors; and
h) floor areas or parts thereof where the public may congregate:
   i. Group A, Division 1 occupancies, or
   ii. Group A, Division 2 and 3 occupancies having an *occupant load* of 60 persons, or more

***Lux** is a metric unit of illumination equal to 1 lumen per square metre (abbr.lx). To convert to foot candles, multiply by 0.09290.*

A practical indicator of approximately 10 lx at floor level is where a person is able to see their feet while exiting the building under emergency lighting illumination.

It is the responsibility of the building owner or agent to ensure that the minimum average emergency lighting levels are provided.

4.2.3.3 SELF-CONTAINED UNITS

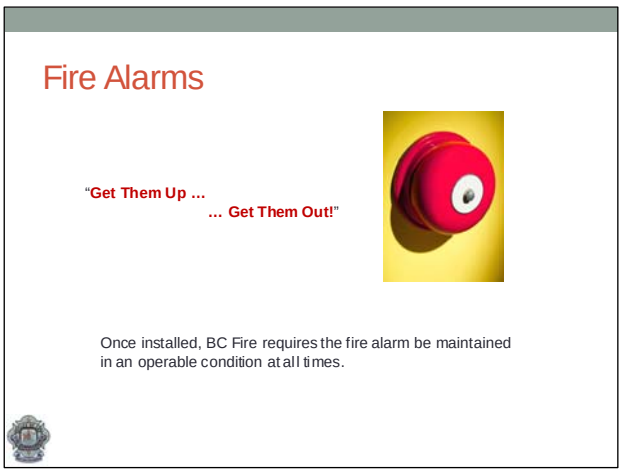
If self-contained emergency lighting units are used, they must conform to CSA Standard C22.2 No. 141 *Unit Equipment for Emergency Lighting.* These units are to be marked with the name of the manufacturer, style or model number and the required electrical supply and output capabilities. These details are required to be readily visible after installation and should indicate that the unit conforms to the standard.

The Fire Code specifies the inspection requirements for self-contained emergency lighting units as follows:

1. Self-contained emergency lighting unit equipment shall be inspected monthly to ensure that:
    a) pilot lights (test lights) are functioning and not obviously damaged or obstructed;
    b) the terminal connections are clean, free of corrosion and lubricated when necessary;
    c) the terminal clamps are clean and tight as per manufacturer's specifications; and
    d) the battery surface is kept clean and dry.
2. Self-contained emergency lighting unit equipment shall be tested:
    a) monthly to ensure that the emergency lights will function upon failure of the primary power supply, and
    b) Annually to ensure that the unit will provide emergency lighting for duration equal to the design criterion under simulated power failure conditions.

After completion of the test, the charging conditions for voltage and current and the recovery period shall be tested to ensure that the charging system is functioning in accordance with the manufacturer's specifications.

The building owner or agent is responsible for the maintenance and testing of emergency lighting equipment. The Local Assistant has the responsibility of ensuring that the building owner or agent has met the inspection requirements.



4.2.4 FIRE ALARMS

The early detection of fires and early warning to building occupants in order that they may evacuate safely is a major contributing factor towards the reduction of loss of life and damage to property caused by fire.

The importance of correct installation and maintenance of fire alarm and detection systems is emphasized by the reduction in loss of life that has occurred in public buildings through the enforcement of fire safety regulations.

British Columbia legislation that pertains to fire alarm and detection systems includes:

- The Building Regulations of British Columbia
- The *Fire Services Act*
- The British Columbia Fire Code

The following information is a summary of the general requirements and intent of the BC legislation. For specific information the Local Assistant must refer to the current edition of the legislation that is in effect at the time. This text will also include

general information about fire alarm system components.

Part 3 of the BC Building Code determines when a fire alarm system is required to be installed based on the use of a building and its occupant load. A fire alarm system is required when the occupant load is exceeded, and in buildings containing:

a) an automatic sprinkler system;
b) a contained use area;
c) an impeded egress zone;
d) more than 3 storeys, including storeys below grade;
e) a total occupant load of more than 300, other than in open air seating areas;
f) an occupant load of more than 150 above or below the first storey, other than in open air seating areas; or
g) a school, college or a child care facility, including a day care facility, with an *occupant load* of more than 40;
h) licensed beverage establishment and restaurants with an occupant load greater than 150;
i) an occupant load more than 300 below an open air seating area;
j) a residential occupancy with sleeping accommodation for more than 10 persons;
k) a high hazard industrial occupancy with an occupant load more than 25 persons;
l) a low or medium hazard industrial occupancy with an occupant load more than 75 above or below a first storey.

Part 9 makes similar requirements for fire alarm systems for buildings classified as Housing and Small Buildings.

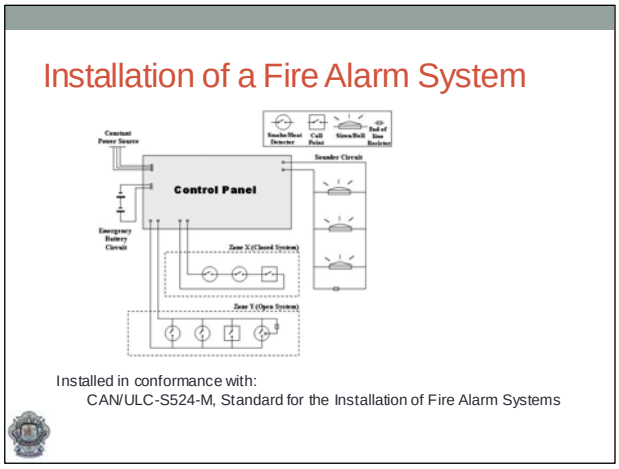
A fire alarm system is not required in:

a) apartment buildings where not more than four dwelling units share a common means of egress, or in buildings three *storeys* or less in building height where each dwelling unit is served by an exterior exit facility to ground level;
b) hotels or motels three storeys or less in building height where each suite is served by an exterior exit facility leading to ground level.

The building code dictates the continuity of the system, type of system to be installed, annunciator and zone requirements, electrical supervision and when sprinklers can be used in lieu of heat detectors. It is important for inspectors to familiarize themselves with the code requirements for a fire alarm system. It is equally important to remember that the building inspector is the authority having jurisdiction for the installation of new systems unless the building is being upgraded.

Once installed, the BC Fire Code requires that fire alarm systems be maintained in an operable condition at all times.

A fire alarm system required in any portion of a building is normally required to be installed throughout the building.



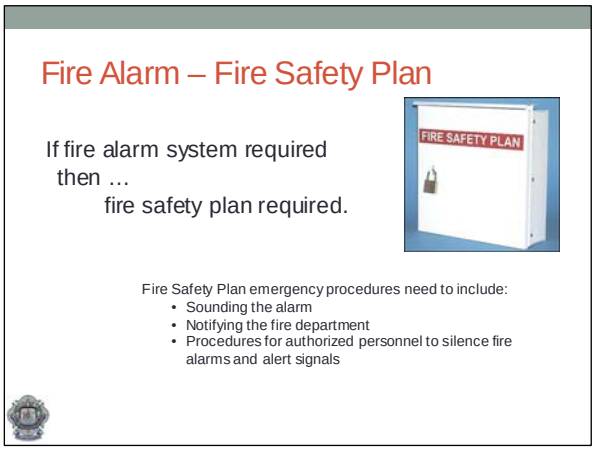
INSTALLATION OF A FIRE ALARM SYSTEM

When a fire alarm system is required by the Building Code, it should be installed in conformance with CAN/ULC-S524-M *Standard for the Installation of Fire Alarm Systems*. Copies of the standard can be purchased from ULC and their address can be found in Part 1 of the BC Fire Code.

VERIFICATION OF A FIRE ALARM SYSTEM – DOCUMENTATION

After installation, the system should be tested in conformance with CAN/ULC-S537-M *Standard for the Verification of Fire Alarm Systems*.

This standard contains a sample Fire Alarm System Verification Report that should be completed by a qualified person acceptable to the Authority Having Jurisdiction who is independent of the installation company.



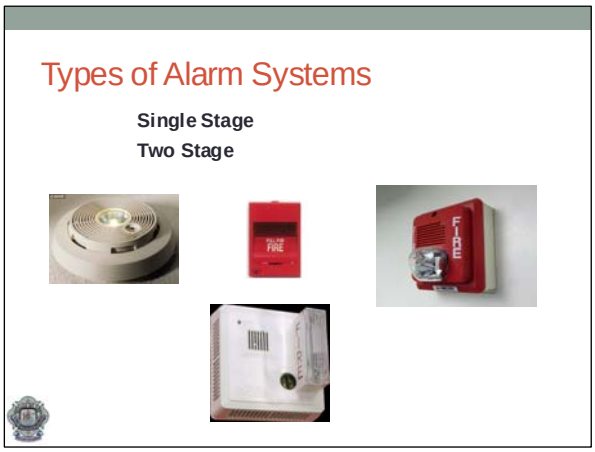
FIRE ALARM - FIRE SAFETY PLAN

Every building that is equipped with a fire alarm system is required by the BC Fire Code to have a Fire Safety Plan. The activation of the fire alarm system should also initiate implementation of the fire safety plan. The emergency procedures used in the case of fire include:

sounding the alarm,
notifying the fire department,
evacuating occupants,
confining, controlling and extinguishing the fire,
the appointment and training of staff to carry out specific duties.

These procedures should also include instructions to authorized personnel for silencing fire alarms and alert signals under specified conditions.

The fire department may request that an owner identify, within the fire safety plan, persons or agencies responsible for the fire alarm system. This may be the building manager and in his/her absence, a local security organization.



TYPES OF ALARM SYSTEMS

The building code dictates the type of alarm system that will be installed in buildings. It will require either a single or two stage systems. In a single stage system activation of any detection device or manual pull station will result in an audible alarm sounding throughout the protected area. Group F Division 1 High Hazard Industrial Occupancies that are required to have a fire alarm system must install single stage systems.

In two stage system activation, a detection device or pull station causes an audible alert signal notifying supervisory staff of a problem. If the alert signal is not acknowledge within a given time frame, usually five minutes, the system will go into a general alarm. The two stage systems are required in most Group B Institutional Occupancies where evacuation of occupants may be difficult to achieve.

SYSTEM COMPONENTS
CONTROL PANEL

All fire alarm systems are equipped with a control panel. The function of the control panel is to monitor the activities of the components that make up the fire alarm system. The components that make up the system determine the complexity of the control panel. For purposes of this introductory material we will examine a simple panel which includes an alarm light indicator that will illuminate when an alarm initiating device has activated, a trouble light which indicates that the system has malfunctioned and a test switch to test the control panel.

The alarm control panel should be clearly labeled and readily accessible to responding fire fighters. Location should be on the FSP.

ANNUNCIATOR AND ZONE INDICATION

The BC Building Code requires many fire alarm systems to be divided into zones for easy identification of the problem area. Each zone is identified on an annunciator panel. The annunciator panel should be located in close proximity to the building entrance that faces the access route used by the fire department. An annunciator need not be provided for a fire alarm system when not more than one zone indicator is required. Should be located on the FSP.

ALARM INITIATING DEVICES

Alarm initiating devices are designed to send a signal to the control panel in the event of a fire. They can be operated either automatically or manually.

The simplest device is the manual pull station like the one seen in figure.....which is activated when the fire is detected by occupants of the building. This device is a switch not unlike a light switch that allows electric current to flow to the control panel. Manual pull stations are required to be installed on every floor area near every exit and near the principal entrance. An alert signal or alarm signal must commence within 10 seconds of the activation of the pull station.

AUTOMATIC ALARM INITIATING DEVICES

Automatic alarm initiating devices utilise the products of combustion to activate a signal to the control panel. These include heat, smoke and fire detectors and a water flow detection device when the building has a sprinkler system.

4.2.5 HEAT DETECTORS

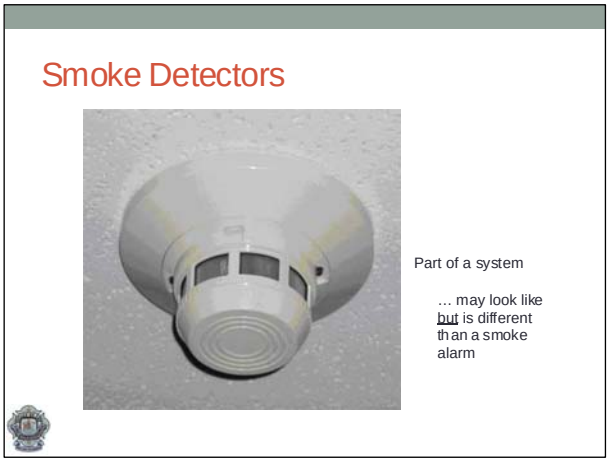
Heat detectors respond to increased temperatures caused by a fire. These include fixed temperature devices, bimetallic strips, materials that melt and rate-of-rise detectors.

Fixed temperature devices activate at a predetermined temperature. When the temperature rises above a predetermined level a signal is sent to the control panel initiating the alarm.

Heat detectors that can be used over and over often employ bimetal bars containing two different metals with different expansion rates. When heated the bar flexes towards the metal that has the lower expansion rate. This movement caused an electrical circuit to be completed which sends a signal to the control panel.

Where a fire alarm system is required, heat detectors shall be installed in:

every suite and room not located within a suite in buildings classified as Group C, (residential) major occupancy.



4.2.6 SMOKE DETECTORS

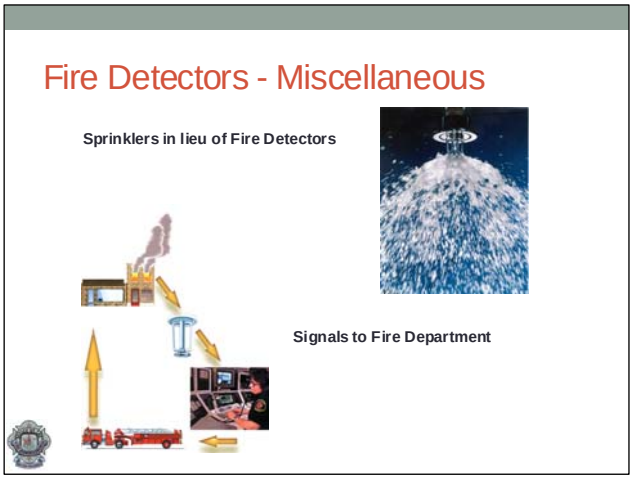
BC Building Code 3.2.3.12

Smoke detectors utilise visible products of combustion to initiate an alarm. They do this in two ways, obscuration (photoelectric) and ionization. The most common type of obscuration detector incorporates a light beam within the detector. A smoke detector only has a built-in sensor, meaning no sounding audible device. When the light beam or photoelectric cell is interrupted by smoke particles a signal is sent to the control panel and an alarm signal is initiated.

A smoke alarm on the other hand is a stand-alone device with a built-in audible sounder, control component such as a power supply and a sensor. A smoke alarm is not connected to a fire alarm control panel. It can be interconnected to other smoke alarms in a building.

Where a fire alarm system is required, smoke detectors shall be installed in:

every sleeping room and every corridor serving as part of a means of egress from sleeping rooms in portions of buildings classified as Group B major occupancy;
every room in a contained use area and corridors serving those rooms;
every corridor in portions of buildings classified as Group A, Division 1 major occupancy;
every public corridor in portions of buildings classified as Group C major occupancy;
every exit stair shaft;
the vicinity of draft stops required by the Building Code.

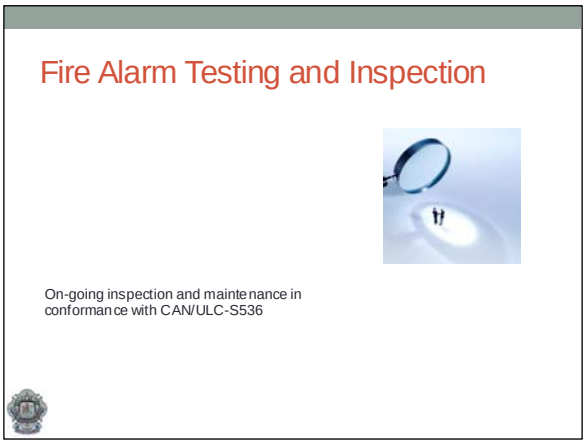


4.2.7 FIRE DETECTORS - MISCELLANEOUS

It is permissible to use an automatic sprinkler system in lieu of fire detectors. The sprinkler system must conform to NFPA 13 and the system's water flow detection devices are required to be indicated separately on the annunciator panel.

SIGNALS TO FIRE DEPARTMENT

a) a single stage fire alarm system installed in a building of assembly occupancy that has an occupant load more than 300;
b) an automatic sprinkler system shall be designed to notify the fire department that a water flow switch has been actuated;
c) a two stage fire alarm system shall be designed to notify the fire department that an alert signal has been initiated.



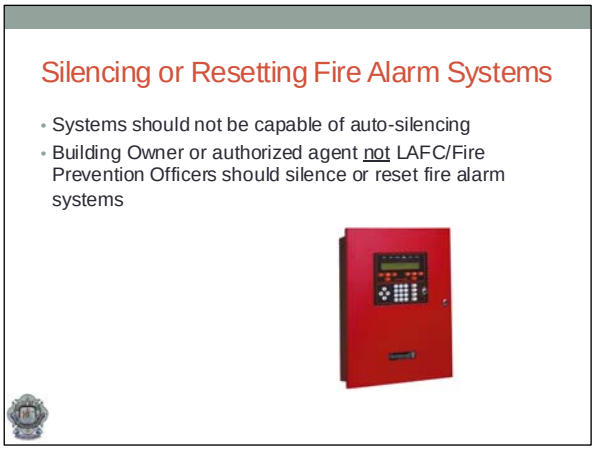
4.2.8 FIRE ALARM TESTING AND INSPECTION

Like all fire protection equipment, fire alarm systems require ongoing inspection and maintenance, in conformance with CAN/ULC-S536, because of their sensitivity and complexity. It is the building owners responsibility to ensure this is done.

Daily and monthly checks shall be conducted by the person responsible for the proper operation of the fire alarm system. Each day the control and/or annunciator panels should be checked for trouble indication lights and to ensure the AC power supply light is functioning.

Each month, one manual alarm initiating device (pull station) is to be activated. At that time all audible alarm signal devices should be operating and the annunciator panel should register the correct location of the initiating device. In addition, the emergency power batteries should be checked to ensure the terminals are clean, clamps are tight and electrolyte level is in conformance with the manufacturer=s instructions.

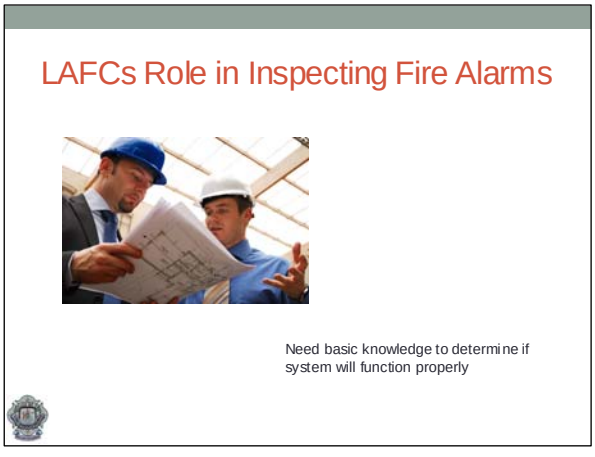
Yearly tests should be conducted by a person acceptable to the authority having jurisdiction. Every reasonable effort should be made to test all the components of the system.



4.2.9 SILENCING OR RESETTING FIRE ALARM SYSTEMS

Required fire alarm systems should be designed so that they cannot automatically be silenced.

Due to liability concerns, it is a recommendation of the Office of the Fire Commissioner that fire department personnel DO NOT silence or reset fire alarm systems. Responsibility for this should be placed on the owner by means of a fire safety plan.



4.2.10 LOCAL ASSISTANT ROLE

Local Assistants must have a basic knowledge of fire alarm and detection systems to determine if the system will function properly. They may be also asked questions about the system by building owners and managers.

Local Assistants are not responsible to perform system tests; however, they should ensure effective maintenance by qualified personnel is being carried out. The first step is to review the maintenance records to ensure work is in conformance with the BC Fire Code.

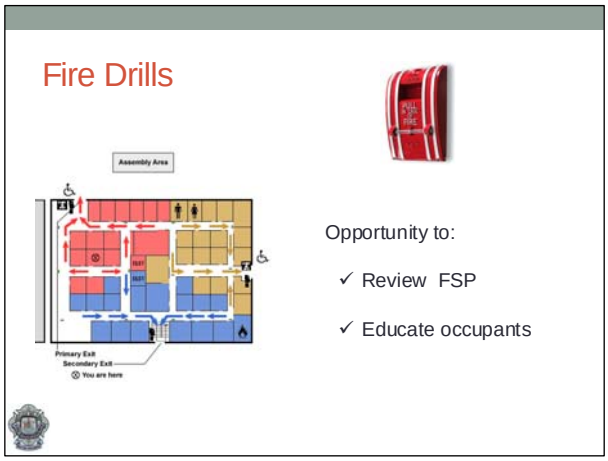
The next logical step may be to review the fire safety plan for the building. This plan should document the procedures to be used for sounding the alarm, notifying the fire department and silencing the alarm. If special keys are required to operate the alarm system they should be readily available to supervisory staff.

If the fire safety plan identifies that the fire alarm system does not automatically notify the fire department, the inspector should ensure signs are posted at each pull station.

A visual inspection can then be performed on the system. Check to see if the control panel is operational and the AC light is functioning. If the building is equipped with an annunciator panel, check to see if it has clearly marked zones. Control panels and annunciators should not be used as storage cabinets for other than required materials.

Local Assistants should also be able to recognize factors that could negatively affect the operation of the system. They should ensure that all manual and automatic initiating devices are kept clean and free of paint. They should check components visually for signs of damage from corrosion and impact. Sounding equipment like gongs and buzzers should be in place and free from obstruction.

Fire alarm systems that are properly maintained in operating condition can save lives and property. A well trained, observant Local Assistant can help ensure the system will work as designed.

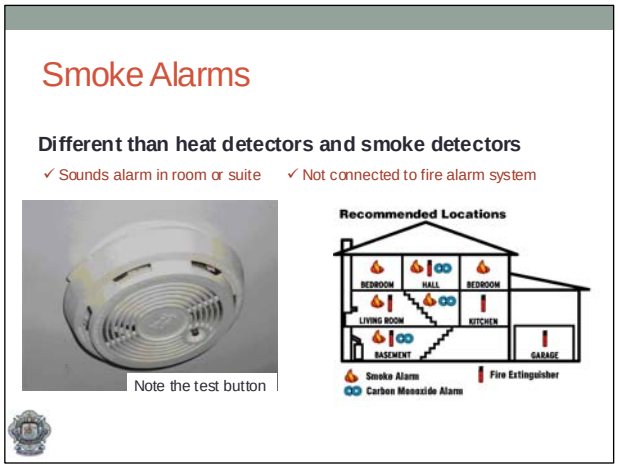


4.11 FIRE DRILLS

Every building required to have a fire safety plan must perform fire drills. A fire safety plan is of little value unless it is reviewed periodically so that staff remains familiar with their duties. Fire drills provide an opportunity to review the fire safety plan and educate occupants about safe evacuation.

Fire drills are an integral part of the fire safety plan and must be conducted at least once a year. In daycares and Group B occupancies fire drills must be held monthly. In schools attended by children, at least 3 fire drills must be held in each of the fall and spring school terms. High buildings require fire drills every two months.

The OFC publishes a Guideline entitled, Fire *Drills for Schools,* that is available on request. Fire drill procedures should be determined through consultation between the fire department and the building owner or occupant.



4.2.12 SMOKE ALARMS

There is sometimes confusion regarding the difference between heat detectors, smoke detectors and smoke alarms. A heat or smoke detector is a device that detects a fire condition and automatically causes the building fire alarm to sound, thereby notifying the entire building occupants of a potential fire condition. A smoke alarm is a device designed to sound an alarm within the room or suite in which it is located. A smoke alarm is not connected to the fire alarm system.

The Building Code requires smoke alarms conforming to CAN/ULC-S531-M to be installed in each dwelling unit and except for institutional occupancies required to have a fire alarm system in every sleeping room not within a dwelling unit.

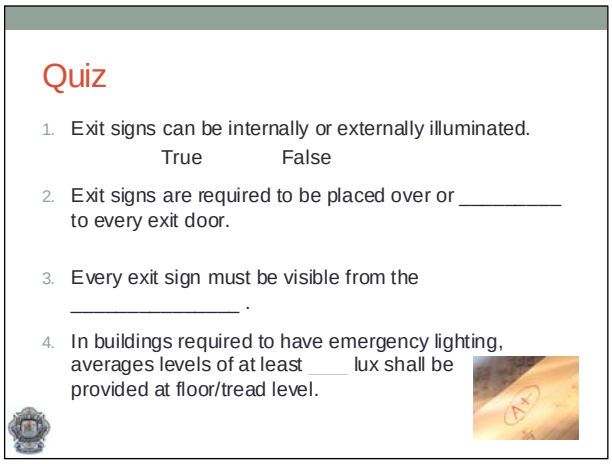
Smoke alarms must also be:

- installed on or near the ceiling;
- located between each sleeping area and the remainder of the dwelling unit, and where the sleeping areas are served by hallways, the smoke alarms shall be installed in the hallway;
- installed on each storey of a dwelling unit;
- permanently connected to an electrical circuit;
- Have no disconnect switches in their circuits.

Where more than one smoke alarm is required in a dwelling unit, they shall be wired so that activation of one alarm will cause all alarms within the dwelling unit to sound.

Certain requirements are also specified in the Building Code for warning systems to be connected to smoke alarms in occupancies for disabled persons.

QUIZ #3

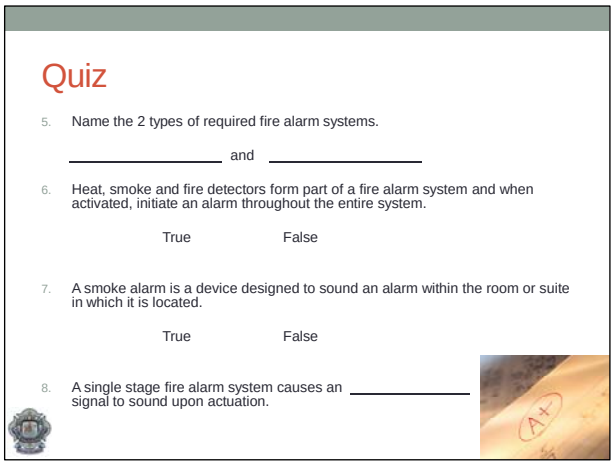


1. Exit signs can be internally or externally illuminated.

2. Exit signs are required to be placed over or _____ to every exit door.

3. Every exit sign must be visible from the _____.

4. In buildings required to have emergency lighting, averages levels of at least _____ lux shall be provided at floor/tread level.



5. Name the 2 types of required fire alarm systems.

_____and _____

6. Heat, smoke and fire detectors form part of a fire alarm system and when activated, initiate an alarm throughout the entire system.

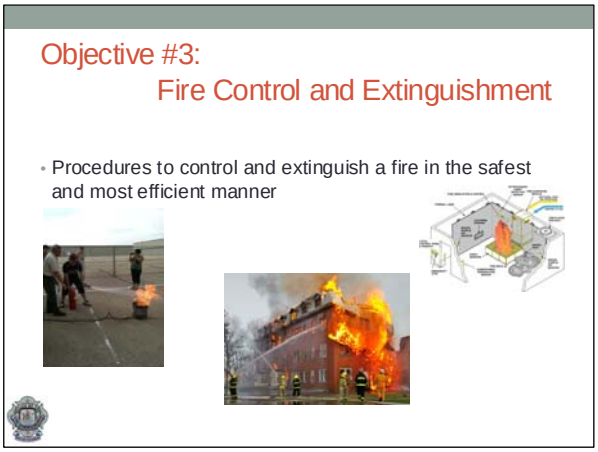
_____

7. A smoke alarm is a device designed to sound an alarm within the room or suite in which it is located.

_____

8. A single stage fire alarm system causes an _____ signal to sound upon actuation.

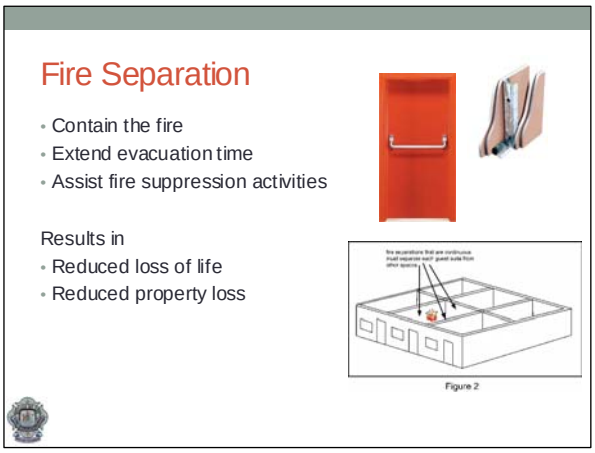
5.0 OBJECTIVE #3: FIRE CONTROL AND EXTINGUISHMENT



Fire Control and Extinguishment – to establish procedures that will maximize the probability of controlling and extinguishing a fire in the safest and most efficient manner.

This unit will focus on the installation and maintenance requirements for building features, sprinkler systems, standpipes and hoses, and fire alarm systems.

Note: The position of the Office of the Fire Commissioner on voluntarily installed fire protection equipment is that it must be maintained in operating condition in accordance with relevant standards.



5.1 FIRE SEPARATION

Fire separation is one of the most important building design features that can reduce the loss of life and property from fire.

The BC Building Code defines "**fire separation**" as "a construction assembly that acts as a barrier against the spread of fire." An expanded definition of fire separation is *any wall, partition or floor assembly designed and built to prevent the spread of fire by restraining the passage of smoke, heat, gases and flame between fire compartments (e.g. hole in wall).*

Effective fire separations can:

- contain the fire
- extend evacuation time
- assist fire suppression activities

⇒

Which leads to:

- reduced loss of life
- reduced property loss

Fire separations may be built of combustible or non-combustible materials, or a combination of the two, depending on the fire resistance rating requirements and the type of construction required for the building. A fire separation may or may not require a fire resistance rating.

The British Columbia Fire Code details the maintenance requirements for fire separations. It further identifies that fire separations should be installed in conformance with the BC Building Code. Part 5 of the Fire Code covers special separation requirements for hazardous processes that are unique and not covered by the Building Code.

Fire Wall (definition BCBC and different than fire separation) – means a type of fire separation of noncombustible construction that subdivides a building or separates adjoining buildings to resist the spread of fire and that has a fire resistance rating as prescribed in this Code and has a structural stability to remain intact under fire conditions for the required fire-rated time.

5.1.1 OPENINGS IN FIRE SEPARATIONS

In many cases openings are required in fire separations to allow for the passage of personnel and goods within a structure. Openings are required to be protected by *closures* that also require a fire resistance rating. Closures include windows, doors, shutters, hardware, frames and closing devices.

The British Columbia Fire Code addresses closures in a number of ways. It stipulates that service rooms, shafts, exit corridors and other spaces be separated where "practicable," in conformance with the BC Building Code. The term *practicable* is used because in many cases existing structures cannot be upgraded to the current code requirements so alternatives may have to be considered.

The BC Fire Code also provides for the routine inspection and maintenance of fire separations.

Some common conditions that adversely affect fire separations include:

- fire separation doors wedged open
- missing fire separations due to renovations
- work completed without a building permit (may be brought to the attention of the building department)
- damaged fire separations from vandalism and/or carelessness
- incomplete fire separations
- voids created by contractors repairing building services
- rated ceiling tiles missing or damaged
- water damage to fire separations
- dry rot in the support structure of rated partitions
- holes in fire separations covered with grills for air movement with no fire dampers
- closures and hardware damaged
- fire separations installed in visible areas only.

Local assistants must have a general understanding of fire separations if they are to participate in an effective fire inspection program.

5.1.2 FLAME SPREAD RATINGS (INTERIOR FINISHING, FURNISHINGS AND DECORATIONS)

The BC Fire Code also deals with requirements specific to flame spread in existing buildings. For example, the fire code restricts the amount of combustible art work and/or teaching aids that can be placed in classrooms of schools to 20% of the surface area.

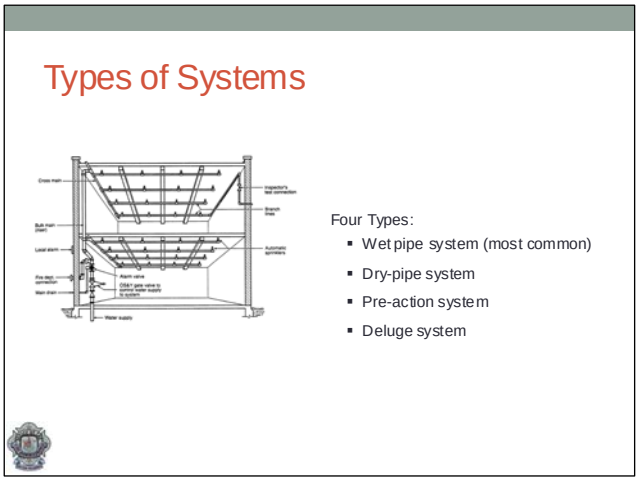
The BC Fire Code also deals with the maintenance of flame retardant treatments of decorative materials such as draperies.

5.2 AUTOMATIC SPRINKLER SYSTEMS

5.2.1 INTRODUCTION

It is essential as a Local Assistant that you are familiar with the types of sprinkler systems in your jurisdiction. A Local Assistant is not expected to know the design and installation details of any particular system, but to be familiar with the maintenance requirements of the various types of automatic sprinkler systems that are available, be familiar with what they look like and how they operate.

Sprinkler protection is especially crucial for life safety in high rise occupancies. They can delay or prevent the spread of fire within a floor area and between floors allowing for the safe evacuation of occupants.



5.2.2 TYPES OF SYSTEMS

There are four types of systems that the Local Assistant may encounter. These are the wet-pipe system, the dry-pipe system, pre-action system and deluge system.

The wet-pipe system is the most common. The sprinkler system is charged with water at all times. When a sprinkler head is exposed to enough heat it activates, releasing the water which will flow until the system is shut off. The wet pipe system is comprised of a check valve and a water flow alarm device.

The dry-pipe system is most often utilized in areas that are subject to freezing. Instead of water, the piping system contains air under pressure. The air pressure holds a dry-pipe valve closed, which prevents water from flowing into the system. The system air pressure is considerably less than the water supply pressure, due to the area of the surface of the clapper in relation to the orifice size at the base of the valve.

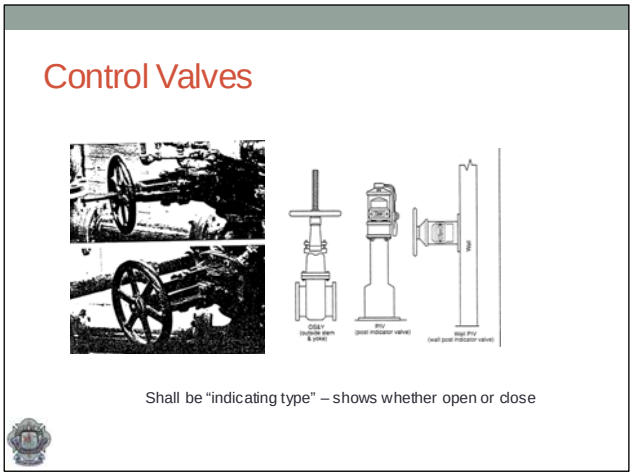
When a sprinkler head operates, air escapes from the system allowing the dry-pipe valve to open and water to flow. A dry-pipe system is slower to react to a fire than a wet-pipe system. It can be speeded up however, by using air exhausters or accelerators that remove the compressed air faster than would occur through the sprinkler head alone.

The pre-action system is similar to the dry-pipe system but is considered slightly more efficient. This system utilizes heat or smoke detectors to activate an automatic control valve that allows water to flow into the system where it will remain until a sprinkler head operates. This type of system is used where notification prior to the flow of water is desired and where it is important to prevent the accidental discharge of the system.

If a sprinkler head or pipe is broken, water will not flow unless the heat or smoke detector initiates a signal which will open the automatic control valve.

The deluge system operates in much the same way as the pre-action system. In the deluge system all the sprinkler heads are open and do not require a heat source to operate. Upon activation of the deluge valve (automatic control valve) by fire detection devices, water will flow and all sprinkler heads will activate. This system is used in high hazard occupancies where the immediate application of large volumes of water is desired. An example would be between the terminal building and the tarmac at most airports.

This text will concentrate on the wet-pipe system as it is the most common type of installation in use. The components of a typical wet-pipe automatic sprinkler system are shown in this diagram.



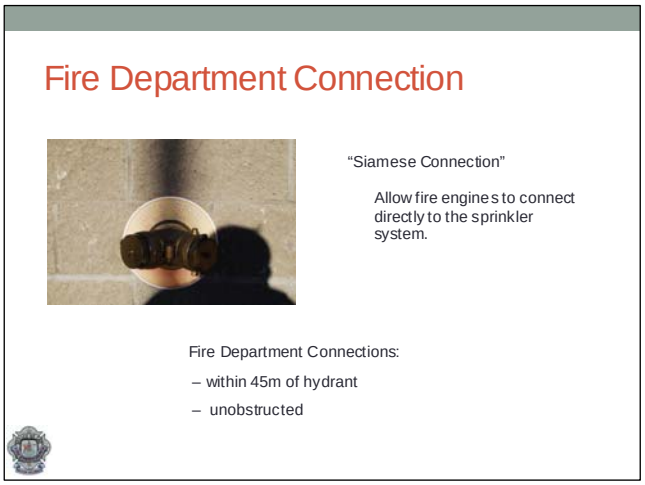
5.2.3 CONTROL VALVES

Every sprinkler system is equipped with a main control valve which is used to shut off the water supply for repair or maintenance purposes. These valves should be identified in the pre-fire plan but can be found between the water source and the sprinkler system. The main control valve should always be returned to the open position after maintenance or repairs are made and should be secured in the open position. When a control valve is closed it should be tagged in an acceptable manner that clearly indicates to the fire department that all or part of the sprinkler system is out of service.

The main control valves should be the indicating type that show at a glance whether they are open or closed. There are several common types of indicator valves.

The OS&Y Valve (outside screw and yoke) has a yoke on the outside with a threaded stem. When the threaded portion of the stem is out of the yoke the valve is in the open position. If the threads are inside the yoke the valve is closed. The PIV (post indicator valve) has the words "open" or "closed" visible for inspection as can be seen in figure 3.

A variation of the PIV is the WPIV (wall post indicator valve) which extends through the wall with the valve operating mechanism on the outside of the wall.

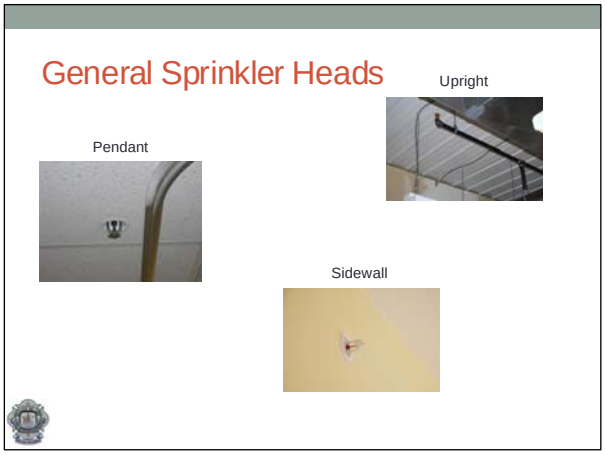


5.2.4 FIRE DEPARTMENT CONNECTION

The fire department connection or Siamese connection allows fire engines to connect directly to the sprinkler system to increase the pressure and/or volume of water in the sprinkler system.

Fire department connections must be located on the street side of the building and located so that hose lines can be attached without interference from nearby objects. The connection must be identified by a sign stating "Standpipe" having raised letters at least one inch in size. If the fire department connection also serves the sprinkler system a sign reading "Autospkr and Standpipe" may be used.

Fire department connections for standpipe and hose systems must be within 45m of a hydrant and be unobstructed.



5.2.5 GENERAL SPRINKLER HEADS

There are three general types of sprinkler heads: upright, pendant and sidewall. They all discharge water in the same umbrella-shaped patterns but they are not interchangeable. An upright sprinkler head sits on top of the branch line pipe. The water stream flows upward against a deflector which directs the water out and downward in an umbrella-like pattern. Upright heads are commonly used where it does not matter if the heads are visible.

Pendant sprinkler heads are often used where it is desirable to hide the piping system from view. Pendant heads are installed on the undersides of the branch line, often through a suspended ceiling with only the actual sprinkler head visible. The water stream flows down against a deflector and over the fire.

Sidewall heads extend from the side of the pipe and are often found in small rooms where the branch line runs along the wall. They are equipped with a special deflector that creates a horizontal fan-shaped pattern of water.

Sprinkler heads are equipped with several different kinds of thermo-reactive assemblies that sense heat from a fire and activate the flow of water. The most common assembly is the fusible link. It consists of three pieces of metal soldered together. When exposed to sufficient heat the solder melts releasing two arms holding a cap. Water pressure lifts off the cap and water begins to flow.

Another thermo-reactive assembly is the frangible bulb. The small bulb, usually of glass, contains a liquid that does not completely fill the bulb, leaving a small air bubble trapped in it. As heat expands the liquid, the bubble is compressed and finally absorbed by the liquid. Once the bubble disappears, the pressure rises substantially and the bulb shatters, releasing the valve cap, allowing the flow of water from the head. This allows the flow of water from the head. The exact operating temperature is regulated by adjusting the amount of liquid and the size of the bubble when the bulb is sealed.

A storage cabinet for housing spare sprinkler heads and a sprinkler wrench should be readily accessible preferably near the main sprinkler valve.

5.2.6 SPRINKLER INSTALLATION

The BC Building Code determines when a sprinkler system is required based on the size and intended use of the building. When a sprinkler system is required, it must be designed, constructed and installed in conformance with NFPA 13 "*Installation of Sprinkler Systems.*"

Before a sprinkler system is installed or altered, plans showing full details of the proposed sprinkler system and essential details of the building in which it is to be installed must be submitted to the authority having jurisdiction which in most cases is the building inspector.

Inspection, Testing and Maintenance of Systems

Required to ensures sprinkler system will operate as designed during a fire.

5.2.7 INSPECTION, TESTING AND MAINTENANCE OF SYSTEMS

NFPA 25, "Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems," provides the daily/weekly/monthly/annual, etc. Maintenance requirements.

As is the case with all fire protection equipment, regular inspection, testing and maintenance is required to ensure a sprinkler system will operate as designed during a fire. The requirements for inspection, testing and maintenance are identified in the BC Fire Code.

Maintaining the sprinkler system in conformance with the BC Fire Code and documents referenced therein, is the responsibility of the building owner. The owner is also required to keep records of all test and operations of the system for review by the authority having jurisdiction.

It is very important to check the records of the above noted fire protection equipment to ensure satisfactory operation, and that proper testing and maintenance has been performed as required.

It is advisable to inform the building owner or the owner's representative that you wish to review these records when you make an appointment to inspect the premise.

It is important to understand that there is a difference between inspections, tests and maintenance. The definition of each as stated in NFPA 25 is as follows:

INSPECTION

A visual examination of a water based fire protection system or portion thereof to verify that it appears to be in operating condition and is free of physical damage.

TESTING

A procedure used to determine the status of a system as intended by conducting period physical checks on water-based fire protection systems such as water flow tests, fire pump tests, alarm tests, and trip tests of dry pipe, deluge, or pre-action valves. These tests follow up on the original acceptance tests at intervals specified in the standard.

MAINTENANCE

Work performed to keep equipment operable or to make repairs.

It must be remembered that inspections, tests and maintenance is the owner's responsibility. Prior to testing, notification is required to be given to all parties who may be affected by an alarm. Any device in a sprinkler system that does not operate properly on test must be repaired or replaced.

It is important that the building owner replace damaged sprinkler heads immediately. The temperature rating, orifice size, and type of head should be checked to ensure the replacement is the correct sprinkler for the area being protected.

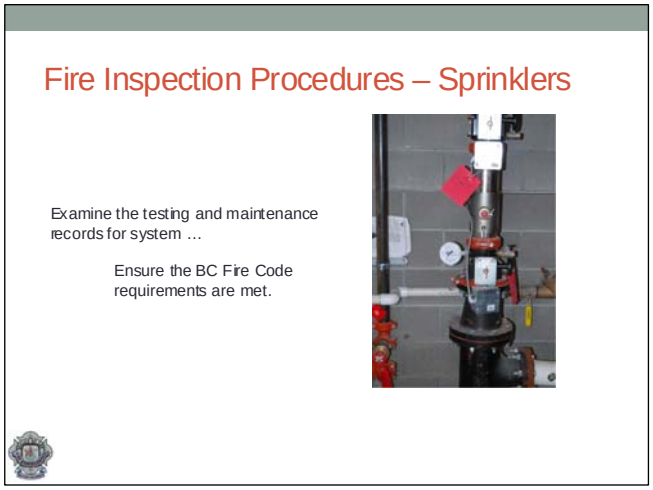
The Local Assistant should never operate, adjust, physically manipulate or alter any sprinkler system components except in emergency situations.

Automatic sprinkler systems are extremely reliable when properly maintained. Reports indicate that system failures are rare but are usually the result of a lack of water not a failure of the actual sprinklers. The primary causes of sprinkler system failures

include:

lack of water due to the supply being shut off or a blockage in the supply line,
interruption of the municipal water supply,
damaged or painted sprinkler heads,
frozen or broken pipes,
blockage due to debris or sediment in the pipes.

Most of these failures can be avoided by the owner through proper maintenance, inspection and testing of the systems. For this reason the Local Assistant should have at least a fundamental understanding of how sprinkler systems operate and be knowledgeable in identifying deficiencies.



5.2.7 FIRE INSPECTION PROCEDURES – SPRINKLERS

Prior to the on-site visit, the inspector should review the building file with attention to the approved plans and previous inspection reports. Note the type of system as well as the area to be protected. In many cases drawings of the installation will be available and should be reviewed. This may help the inspector identify changes to the building or system that may affect sprinkler operation.

The Local Assistant should examine the testing and maintenance records for the system to ensure that the requirements of the BC Fire Code have been met. Most sprinkler service companies provide a complete record of the work they have performed. In some cases they even send a copy to the fire department. NFPA 25 provides sample inspection report forms the authority having jurisdiction may wish to utilize in their fire prevention program.

The visual inspection of the sprinkler system involves three main components: valves, piping and sprinklers.

Valves should be readily accessible to responding fire departments and should be kept free of obstructions.

Closed sprinkler valves should be tagged or identified so as to be apparent to the responding fire department.

Check gauges on wet pipe systems to ensure normal water pressure is maintained.

Check gauges on dry, pre-action and deluge systems to ensure that correct pressure differentials exist.

Spare sprinkler heads and a sprinkler wrench should be in a cabinet located near the control valves.

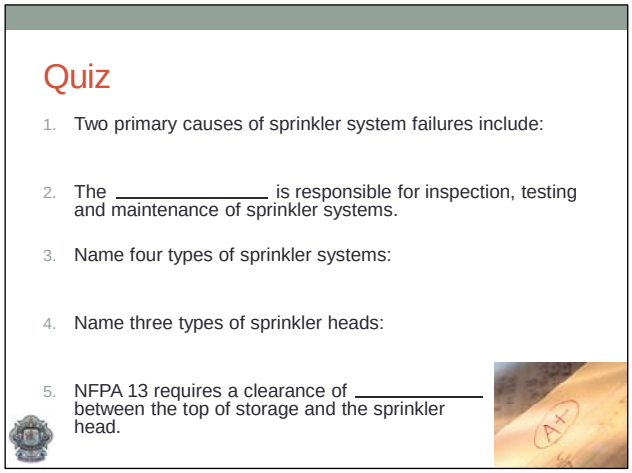
Check the fire department connection to ensure that it is visible and free from obstructions. Check to make sure the couplings are ready for use and capped.

Identify any sprinkler heads that show obvious signs of physical damage. This could include corrosion, painting and or mechanical damage. Where there is a possibility of collision or other mechanical damage to sprinkler heads they should be protected by an acceptable guard.

Look for storage that may obstruct the operation of the sprinkler head. NFPA 13 requires a clearance of 18" (generally) between the top of storage and the sprinkler.

It is important for Local Assistants to understand the operation of the sprinkler systems within their area of jurisdiction. One way to gain more information about the system is to be present during maintenance and testing of the system. Many building owners would be pleased to have you accompany their technicians so you can gain a better understanding of sprinkler system operations.

QUIZ #4



1. Two primary causes of sprinkler system failures include:

_____

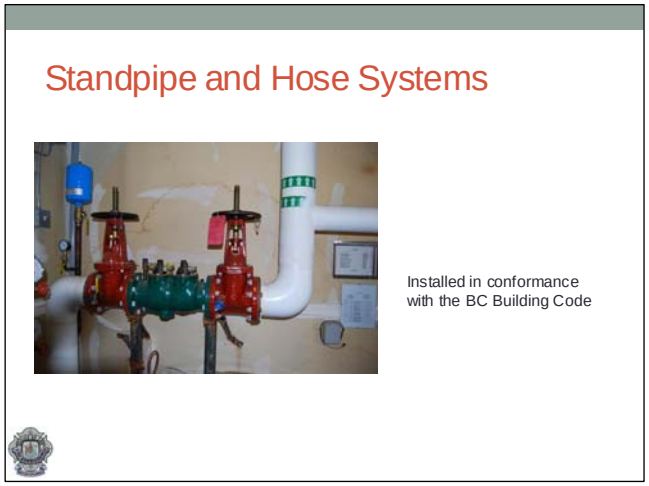
2. The _____ is responsible for inspection, testing and maintenance of sprinkler systems.
3. Name four types of sprinkler systems:

_____

4. Name three types of general sprinkler heads:

_____

5. NFPA 13 requires a clearance of _____ between the top of storage and the sprinkler head.



5.3 STANDPIPE AND HOSE SYSTEMS

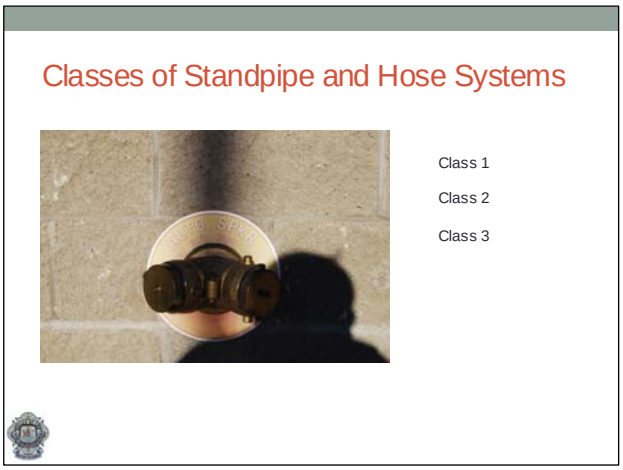
Standpipe systems provide a convenient means by which fire departments can obtain sufficient quantities of water for fire fighting for high or large buildings. They can also be used by building occupants to attack a fire in the incipient phase.

This unit will identify the legislation in British Columbia that pertains to the installation and maintenance of standpipe and hose systems. The unit will also identify the various agencies involved in the application of this legislation and outline the responsibilities and authority of a Local Assistant.

British Columbia legislation that pertains to standpipe and hose systems includes:

- The British Columbia Building Code
- The *Fire Services Act*
- The British Columbia Fire Code

The BC Fire Code requires standpipe and hose systems to be installed in conformance with the BC Building Code. It further requires standpipe and hose systems to be maintained in conformance with NFPA 14.



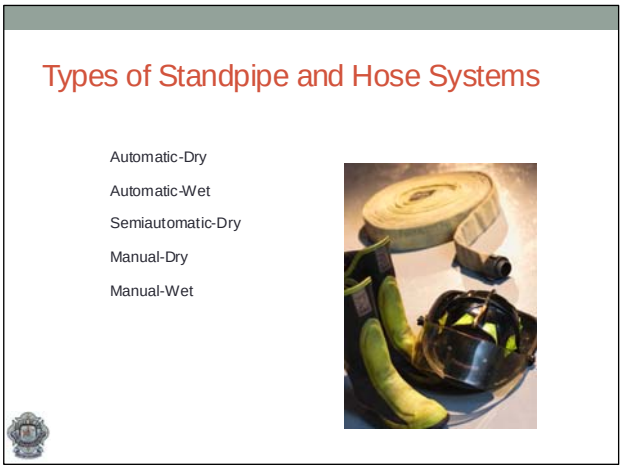
5.3.1 CLASSES OF STANDPIPE AND HOSE SYSTEMS

There are three classes of standpipe and hose systems (NFPA 14).

Class One systems are equipped with 64 mm (2½") hose connections and are designed to be used by the responding fire department.

Class Two systems are provided with 38mm (1½") hose stations which are designed for use by building occupants or initial attack by the fire department. These are only permitted when the building does not have a sprinkler system and is less than 25m in height.

Class Three systems are provided with 38mm (1½") hose stations to supply water for use by building occupants and 64mm (2½") connections to supply larger volumes of water for fire department use.



5.3.2 Types of Standpipe and Hose Systems

Automatic-Dry

An automatic dry system is not unlike a dry sprinkler system. Water is kept out of the pipe by use of a dry pipe valve that operates on air pressure. When the hose valve is opened, the air escapes allowing the dry pipe valve to move allowing water to enter the system.

Automatic-Wet

The automatic-wet system is charged with water at all times. When the hose valve is opened water is immediately available.

Semiautomatic-Dry

This is a dry standpipe system where water is admitted into the system through approved remote control manually-activated devices located at each hose station.

Manual-Dry

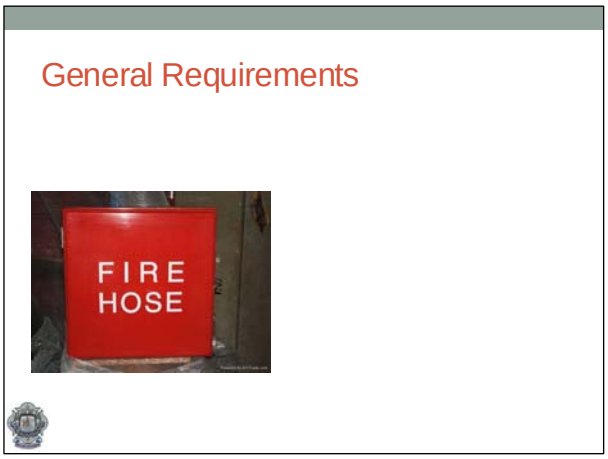
This system does not have a water supply. It relies on the water from fire apparatus, or another source, to be pumped into the system. This system will not meet the requirements of the BC Building Code but may be installed for voluntary building protection.

BCBC 3.2.5.9 (2) – A dry standpipe that is not connected to a water supply shall not be considered as fulfilling the requirements of this Article.

Manual-Wet

This system is connected to a small water supply for the purpose of maintaining water within the system. The advantage of this system over the dry system is that it can deliver water to the fire faster. It does not however, have the volume of water required for fire flows. It relies on the water from fire apparatus, or another source, to be pumped into the system.

Manual/Wet does not meet the BC Building Code Requirements as it requires a fire pump to pressurize the system.



5.3.3 GENERAL REQUIREMENTS

Hose cabinets can only be used for fire protection equipment and must be conspicuously identified. They may contain a portable fire extinguisher, fire axe and hose spanners. The maximum length of hose provided for use by building occupants is restricted to 30.5m (100 feet) and must be on an approved rack or other storage facility.

Hose stations for class 2 should be located so that all parts of the building are within 9.2m (30ft.) of a nozzle at the end of a 30.5m (100 ft) hose. Some of the other factors that govern the number and location of hose stations include:

- number of exits;
- number of exit stair enclosures;
- Horizontal exits.

The Office of the Fire Commissioner (OFC) has received numerous questions regarding requirements for the testing and maintenance of fire hose provided in building hose cabinets.

BC Fire Code Section 6.4.1.1 Water Based Fire Protection Systems – Inspection , Testing ,and Maintenance:

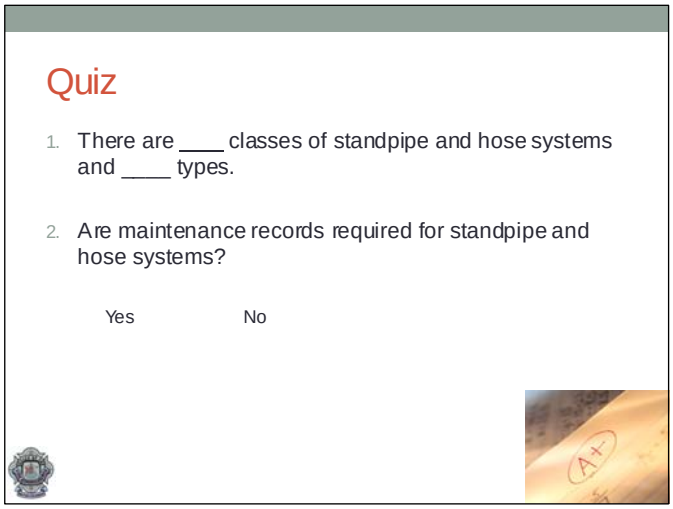
Water based fire protection systems shall be inspected, tested, and maintained in conformance with NFPA 25, which leads to NFPA 1962 that deals with hose testing and hose care.

5.3.4 INSPECTIONS OF STANDPIPE AND HOSE SYSTEMS

When performing a regular system of inspection of an existing standpipe and hose system the Local Assistant should:

Review the inspection file prior to visiting the building. Pay particular attention to deficiencies that have been noted in previous inspections so you can determine if corrective action has been taken.
Review the maintenance records for the system kept by the building owner.
Hose cabinets must be inspected monthly to ensure that the hose is in the proper position and that all equipment is in place and in operational condition.
Every five years the standpipe system must be flow-tested to ensure that the design flow can be delivered.
Check each hose cabinet to ensure the hose is in place, valves are not leaking, and the hose cabinet is used for fire protection equipment only.
Determine the dates of the last service tests and annual hose inspection.
Standpipe and hose systems that have defects must be repaired or replaced where necessary to ensure that they operate effectively.

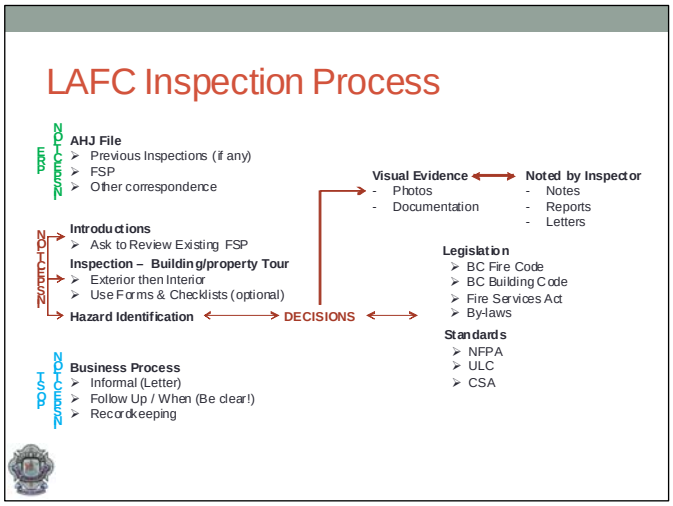
QUIZ #5



1. There are ___ classes of standpipe and hose systems and ___ types.
2. Are maintenance records required for standpipe and hose systems?

_____

6.0 LAFC INSPECTION PROCESS

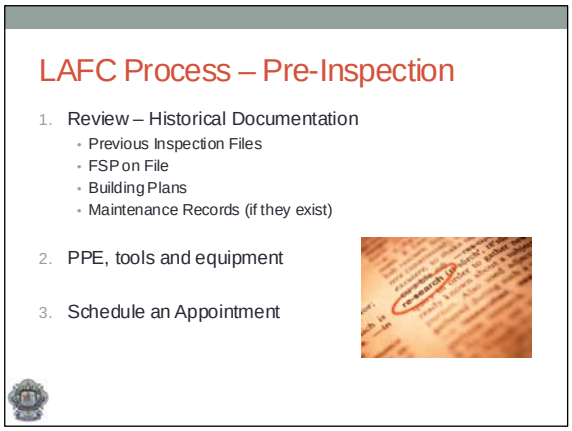


Handout:

LAFC Inspection Process (Tab 8)

This diagram shows a typical inspection process with 3 main parts: Pre-Inspection, Inspection and Post-inspection.

We will discuss each step in greater detailed in the following slides.



6.1 LAFC PROCESS – PRE-INSPECTION

Where possible, inspectors should prepare themselves for conducting an inspection by reviewing previous inspection reports, Fire Safety Plans (if on file) and building plans in order to learn more about the operation and activities carried out on the premises.

A list containing the more important points to be covered should be prepared prior to the inspection. For example: What type of occupancy is it? Are there any known hazards to be aware of? Are there any outstanding fire orders on the premises? Is there a history of fire safety deficiencies pertaining to the building? Was there something noted in the previous inspection report that was required to be corrected prior to the current inspection?

Be sure you have the appropriate personal protective equipment (PPE) for the type of occupancy and business you are inspecting, as well as other equipment and tools that can facilitate your inspection (see next two slides)

It is also important to schedule an appointment with the appropriate person prior to conducting any kind of major fire safety inspection. At the time of scheduling an appointment request that a representative accompany you on the entire inspection, and let it be known that you expect to view the premise in its entirety. It may not be necessary to make an appointment for routine inspections or company inspections, but it is imperative that appointments be made for major fire safety inspections.

6.1.1 PERSONAL PROTECTIVE EQUIPMENT (PPE)

In order to conduct a fire inspection safely and efficiently, the individual should be properly equipped and provided with some visible means of identification. The Local Assistant to the Fire Commissioner is provided with a numbered badge and identification for this purpose.

Here are some examples of the personal protective equipment that our LAFCs should bring to an inspection.

Primary PPE:

- Coveralls (e.g. Nomex) or approved uniform (use common sense depending on any potential hazards onsite).
- Hard Hat
- Gloves (depending on the hazards onsite)
- Safety Footwear
- Eye Protection
- Hearing Protection

Secondary PPE:

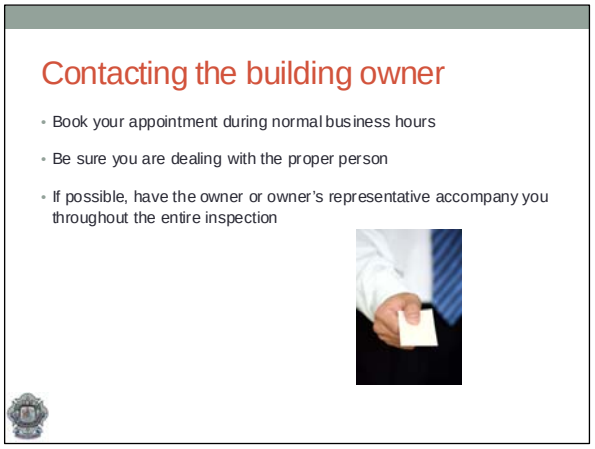
- High Visibility Vest
- N95 Disposable Dust Mask and/or other Respirator (optional)

It is imperative that our LAFCs bring the proper Personal Protection Equipment (PPE) when conducting Fire Prevention Inspections, in case there are fire hazards present.

6.1.2 TOOLS & EQUIPMENT

The following are some examples of additional tools that our LAFCs should bring to an inspection.

- Flashlight
- Notebook or Clipboard
- Pencil or Pen
- 50’ Tape Measure, or other measuring device
- Camera
- If possible, BC Fire Code or other reference



6.1.3 CONTACT

By implementing guidelines regarding Fire Prevention Inspections, we can ensure that all persons are dealt with in a fair and consistent manner.

Book your appointments during normal business hours and do your best to stick to your appointment time. If a change to the scheduled time needs to be made, ensure that the proper person is notified of the change as soon as possible.

You should ensure that you are dealing with the proper person. Introduce yourself as a Local Assistant and explain your purpose.

Whenever possible have the owner or the owner’s representative accompany you throughout the entire fire safety inspection.

The owner or the owner’s agent can help the inspector gain access to all parts of the property and obtain answers to necessary questions.

6.2 LAFC PROCESS – INSPECTION

With the preparation completed, it’s time to visit the site.

6.2.1 THE APPROACH

Always project a professional image when conducting an inspection, which means a neat clean appearance and respectful dialogue.

An inspector, who projects a professional image and appears sincere in carrying out his duties, is more likely to gain cooperation than an inspector who antagonizes or provokes the owner or occupant. A favorable impression may be made through an inspector's attitude.

Time spent with the owner or occupier to ensure that the purpose of the inspection is understood may benefit the inspector and help create a good relationship between the owner or occupier and the inspector.

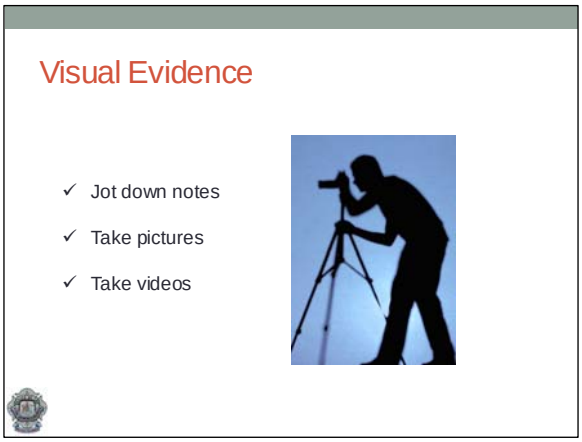
Educating the property owner as to the reason why fire regulations are necessary will generally ensure cooperation. When individuals are forced to comply with regulations they often respond with the minimum level of cooperation.

Admit when you don't know something. You gain a lot of credibility by demonstrating you want to do it right and are willing to research to be sure.

6.2.2 INSPECTION TOUR

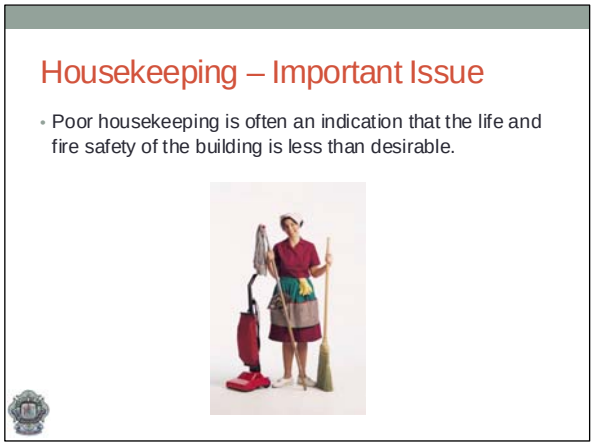
These are the main issues to keep in mind when conducting your Inspection Tour.

- Threats to occupant safety
- Control of fire hazards
- Ability to control and extinguish a fire



6.2.3 VISUAL EVIDENCE

When in doubt, take pictures and/or video. You can also jot some notes down. Then when you get back to the office you can research online or contact a colleague for assistance. Try to be as thorough as possible in your documentation.



HOUSEKEEPING – IMPORTANT ISSUE

The housekeeping practices within the premises are easily recognized. Poor housekeeping is often an indication that the life and fire safety of the building is less than desirable.

Said differently: "Research has shown that facilities that are well maintained experience fewer fires, explosions and other accident. Good Housekeeping also creates a culture of awareness and constant vigilance

It is important that trash and combustible debris be stored safely and disposed of properly and in a timely fashion, so that the fire load of the building does not increase to unacceptable levels. Trash containers should be non-combustible and not easily tipped over. There should be an adequate number of waste containers on the premises, and trash must be removed frequently enough to prevent interior waste from becoming excessive and increasing the fire load of the facility.

Ensure the maintenance of good housekeeping practices such as,

- regulating smoking,
- Controlling the use of decorative material or combustible finishing (e.g. school decorations).
- ensuring electrical hazards are controlled,
- Combustible dust (more detail will be covered in a separate module regarding combustible dust).
- controlling improper use of flammable and combustible liquids, and
- ensure the maintenance of proper fire department access to the building, and,
- Accumulation of combustible materials in and around buildings.

Containers should be available for specific types of waste such as smoking material, oily rags and highly combustible materials, so that these items can be disposed of promptly and safely. Exterior trash should also be observed to ensure accumulations do not create an undue fire hazard to the exterior of the building.

Detailed information regarding Housekeeping should also be covered included in Fire Safety Plans (where they exist).

6.2.4 DOCUMENT REVIEW - OWNER RESPONSIBILITY

Record keeping is not just a duty required of the Local Assistant. The building owner also has a responsibility to maintain records of required periodic testing of specific fire protection equipment installed in the building.

The LAFC can conduct a document review of the building owner's records before, during or after the visual site inspection.

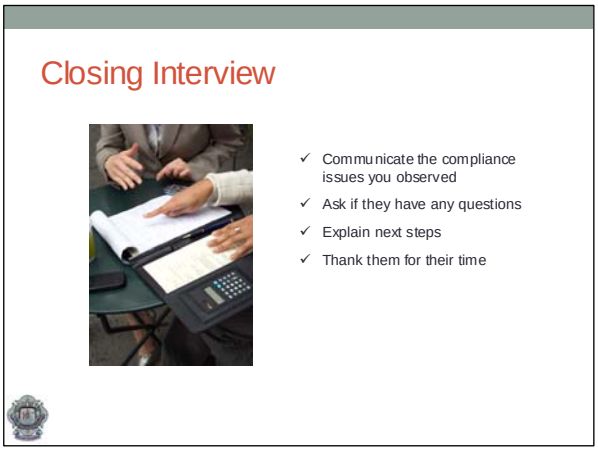
The BC Fire Code requires that when records are to be kept, they shall be retained during the required time interval between inspections, maintenance procedures or tests, or for two years, whichever is greater.

The following is an example of equipment subject to retention of records requirements:

- Exit Door

- Emergency Power Systems
- Fire Alarm Systems
- Fire Safety Plans
- Hydrants
- Fire Pumps
- Portable Fire Extinguishers
- Storage Tanks and Piping Systems
- Sprinkler Systems

For specific information, the LAFC must refer to the current edition of the applicable code or standard in effect at the time.



6.2.5 CLOSING INTERVIEW

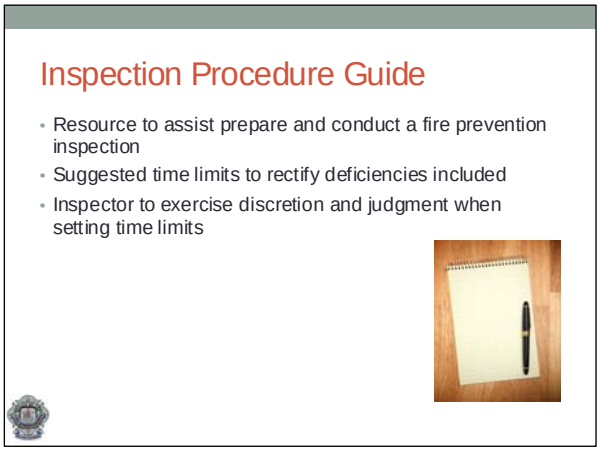
At the conclusion of the inspection, the inspector should discuss the results with the building owner or agent, and summarize recommendations for reducing hazards.

If necessary, you should let the owner know what the next steps are to correct any conditions.

The inspector may have found conditions that seriously jeopardize the safety of the occupants or the property which should be corrected immediately. The final interview also gives the inspector an opportunity to express thanks for allowing the inspection to be conducted.

If a follow-up fire safety inspection is required, it should be conducted on the date stated to maintain credibility and professionalism. This will also indicate to the building owner or owner's representative that you are sincere and reliable. Only the deficient items from the previous fire safety inspection need to be reviewed during the follow-up inspection. If the fire safety infraction has been corrected to the satisfaction of the Local Assistant, this should be recorded and no further action is required. If the problem has not been corrected, the deadline to correct the problems may be extended or Fire Commissioner orders may be considered.

Note: The inspector's viewpoint should be expressed in easy-to-understand terms, avoiding engaging in arguments or technicalities.



6.2.6 INSPECTION PROCEDURE GUIDE

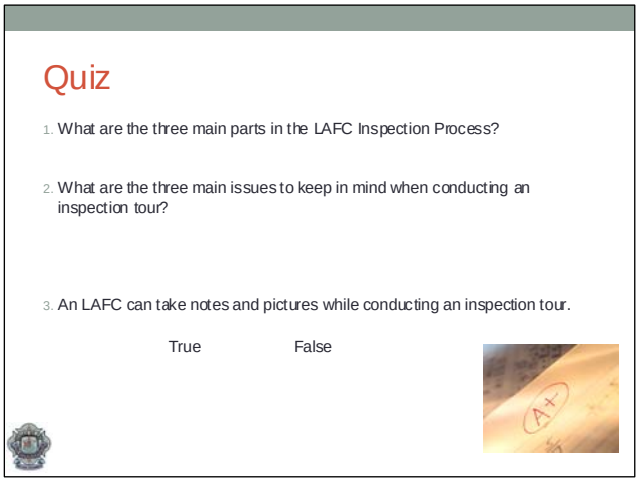
Handout: (Tab 9)

Inspection Procedure Guide

The inspection procedure guide has been compiled to act as a resource and assist you in conducting fire inspections. Time limits to rectify deficiencies have been included for your guidance and are recommendations only, as time limits for compliance are not necessarily specified in the Act or regulations.

The inspector must exercise discretion and judgement when recommending time limits and this will depend upon the severity of the hazard and the willingness of the owner to comply.

QUIZ #6



1. What are the three main parts in the LAFC Inspection process?

_____

2. What are the three main issues to keep in mind when conducting an inspection tour?

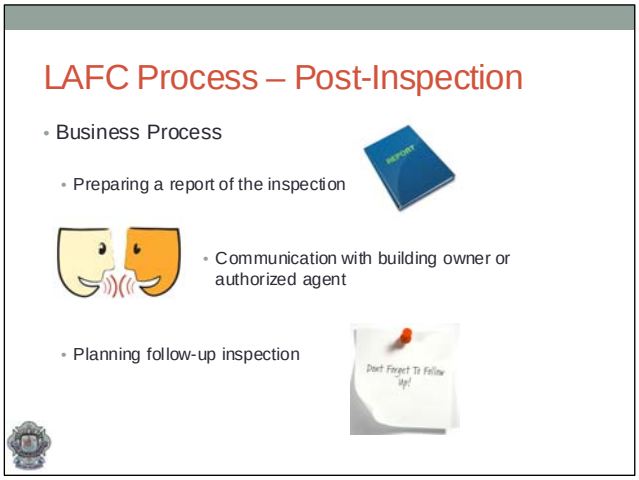
_____

_____

_____

3. A LAFC can take notes and pictures while conducting an inspection tour.

_____



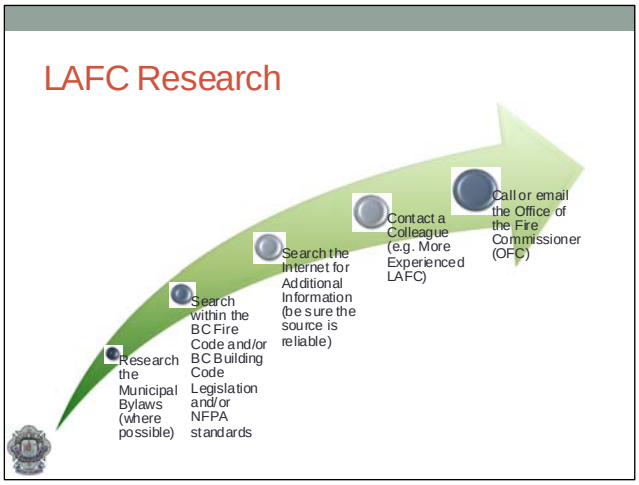
6.3 LAFC PROCESS - POST INSPECTION

Once the fire prevention inspection is completed there are a few more steps the LAFC must complete.

The suggested business process will be described in the following slides.

Three important steps in that process are:

1. Preparing a report of the inspection
2. Communication with building owner or authorized agent
3. Planning a follow-up inspection



6.3.1 LAFC RESEARCH

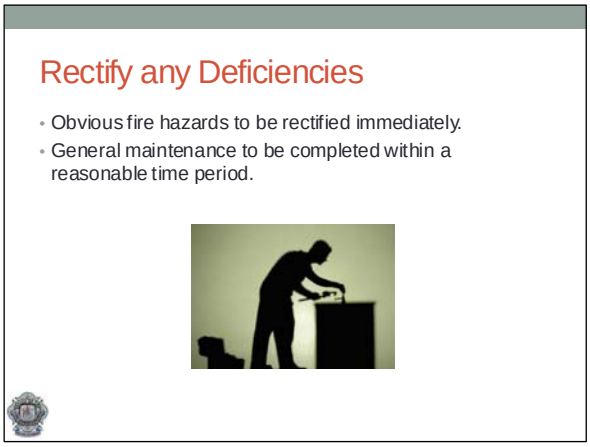
Should you need to research anything that you discover during a Fire Inspection, this slide shows the recommended steps you should take to find the necessary information.

1. Municipal by-laws (where possible)
2. BC Fire Code / BC Building Code / NFPA Standards

If you are unsure, gather your evidence (photos, reports, etc.) and come back to research the legislation.

3. Search the Internet (Be sure source is reliable)
4. Colleague (s), e.g., an Inspector or more experienced LAFC, FPOABC Forum
5. Office of the Fire Commissioner (OFC)

This would follow the “Informal” process from our Inspections Process Chart.



6.3.2 RECTIFY ANY DEFICIENCIES

As an LAFC you need to be objective and fair. We all want business owners and operators to be successful with regards to fire safety.

You can write a Warning Letter / Notice to Owner. This is an informal intermediary step between the inspection and noncompliance. If they do not comply, you can either give them additional time or write a Provincial Order to escalate the issue depending on the situation (e.g. need more time to expand their sprinkler system, etc.).

Guidelines for rectifying any deficiencies:

- Fire Hazard – rectify immediately.
- General Maintenance – within 7 days.
- Commercial Cooking Hazard – within 48 hours.

6.3.3 RECORD KEEPING

Record keeping is essential in maintaining a credible fire prevention program.

There are 3 components to good record keeping:

1. Inspection Findings
2. Reports
3. Filing format (by building)

RECORDING OUR INSPECTION FINDINGS

Inspection observations should be recorded using notes, pictures and videos during the inspection to assist LAFCs prepare their reports.

These will be used to decide whether or not there has been non-compliance and to describe the non-compliance in the report.

REPORTS

Handout (Tab 1)

A sample Fire Prevention Inspection Report is provided for your consideration.

Some form of written report should be prepared as a result of each inspection. The amount of detail required in the report will depend upon the type and purpose of the inspection.

Recommendations may be prepared as a separate document and submitted to the property owner or his / her authorized agent. A copy of the recommendations should be filed with the inspection report if they are not an integral part of the report.

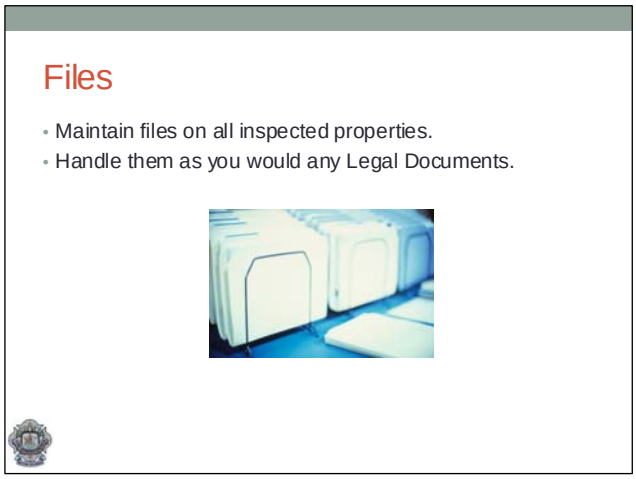
It is also recommended that Local Assistant stationary be used for written reports, especially if upgrading of the building is required.

The report should identify building deficiencies and address other fire safety concerns. Recommendations may be prepared as a separate document and submitted to the property owner or his/her authorized agent. A copy of the recommendations should be filed with the inspection report if they are not an integral part of the report.

Every order must have the ruling of law behind it!

- Include the exact number – otherwise it could be appealed.

This underscores the importance of knowing the BCFC!



FILES

Well organized and maintained inspection files and building records are crucial as a basis for enforcement actions.

Keep a file for each inspected property with copies of all of their inspection reports. It's important to maintain a complete history.

You should also include building plans, inspection records, code enforcement documents, fire reports and correspondence.

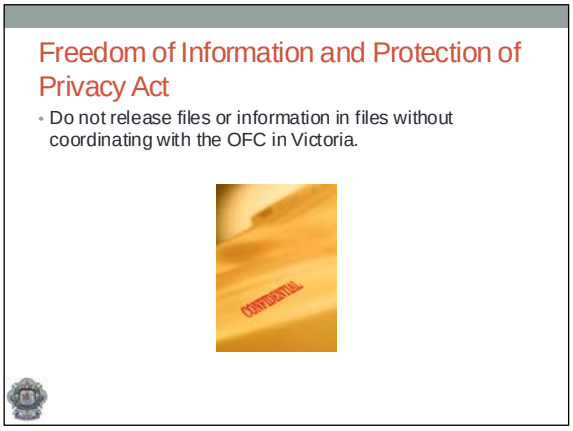
These files should be handled as legal documents.

Municipal Building Inspectors are another good source of information regarding buildings and existing records for them.

Note: LAFCs only need to send their findings to the OFC in Victoria if an Order is written or if a fire investigation was conducted. Other than that, maintain local files.

Files should also be maintained on properties with fire alarm systems, automatic sprinklers, standpipe systems and private hydrants, as these types of systems require periodic inspection, testing, and maintenance.

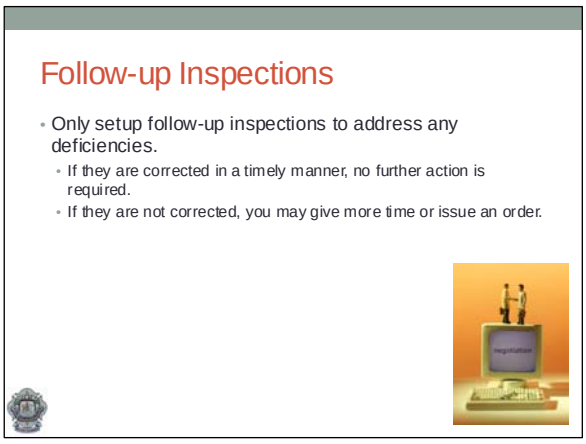
A special notation should be used to identify legally required systems or equipment. As previously stated, the position of the Office of the Fire Commissioner on voluntarily installed fire protection equipment is that it must be maintained in operating condition in accordance with relevant standards.



6.3.4 FREEDOM OF INFORMATION

Local Assistants should be aware that all records they maintain are subject to the provisions of the *Freedom of Information and Protection of Privacy Act*. Any information retained in files may be accessible to the public. As well, the Act provides protection so that personal information about an individual cannot be released.

In the event that a Local Assistant receives a request for information involving LAFC related information, release of information subject to Freedom of Information will be coordinated by the Office of the Fire Commissioner at headquarters in Victoria.



6.3.5 FOLLOW-UP INSPECTIONS

Only the deficient items from the previous fire safety inspection need to be reviewed during the follow-up inspection.

If the fire safety infraction has been corrected to the satisfaction of the Local Assistant, this should be recorded and no further action is required. If the problem has not been corrected, the deadline to correct the problems may be extended or orders may be considered.

If a follow-up fire safety inspection is required, it should be conducted on the date stated to maintain credibility and professionalism. This will also indicate to the building owner or owner's representative that you are sincere and reliable.

7.0 TABLE TOP INSPECTION

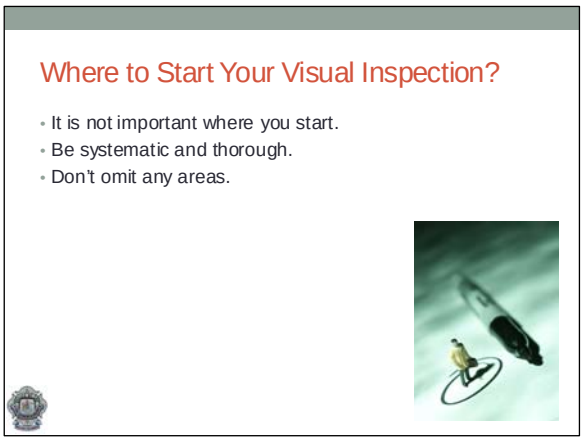
In the next series of slides, we will follow, through the use of photographs, an inspection of a large retail operation.

The goal is to practice:

1. conducting a systematic inspection of a property and building
2. using the Inspection Procedure Guide
3. identify and address fire prevention deficiencies.

Handouts:

Fire Prevention Inspection Report (Tab 1)
LAFC Fire Safety Plan Inspection Review Checklist (Tab 2)
LAFC Fire Hazards Identification Checklist (Tab 3)
Inspection Procedure Guide (Tab 9)



7.1 WHERE TO START YOUR INSPECTION?

Some observations may be made on the exterior of the property. The Local Assistant should note such items as:

- address
- names and types of occupancies
- building construction and height
- exterior housekeeping, including combustibles adjacent to the building
- conditions affecting fire department response
- location of hydrants
- exposure hazards
- utility locations on the exterior of the building
- location of principal entrance
- fire department connection
- fire department access to building.

You should ensure that you are dealing with the proper person. Introduce yourself as a Local Assistant and explain your purpose. The owner or the owner's agent can help the inspector gain access to all parts of the property and obtain answers to necessary questions.

Time spent with the owner or occupier to ensure that the purpose of the inspection is understood may benefit the inspector and help create a good relationship between the owner or occupier and the inspector. Whenever possible have the owner or the owner's representative accompany you throughout the entire fire safety inspection.

The extent of an interior fire inspection may vary according to the type and size of the occupancy. During an inspection, the inspector may examine fire protection installations and equipment, including the maintenance and test records for:

- fire alarm systems
- sprinkler systems
- emergency lighting
- commercial cooking equipment
- portable and fixed extinguishing equipment
- exit lights.

It is important to check the records of the fire protection equipment to ensure satisfactory operation, and that proper testing and maintenance has been performed as required. It is advisable to inform the building owner or the owner's representative that you wish to review these records when you make an appointment to inspect the premise.

Note the type of construction and material used in relation to:

- integrity of fire resistant walls and floor/ceiling assemblies
- fire doors, closures and maintenance thereof.

Look for control of hazards and special processes within the occupancy including:

- proper storage handling
- use
- disposal.

Look for fire hazards possibly caused by the owners or occupants such as:

- obstruction of exits
- storage in non-approved locations (stairways, corridors)
- fire doors blocked open
- careless disposal of smoking materials and/or refuse
- accumulation of combustibles in electrical or service rooms
- unapproved changes to the interior layout of the building
- general housekeeping.

It is not important where the inspection begins (whether working from the roof to the basement or the reverse), only that the inspection is done systematically and thoroughly with no area omitted.

In large or complicated buildings, the inspector may have to make more than one trip to complete the inspection. Every room, closet, attic, concealed space, basement or out-of-the-way place where a fire could start should be inspected. The inspector should ask tactfully to be accompanied into all locked rooms or closets.

7.2 INSPECTION SEQUENCE – EXTERIOR

Let's walk through an inspection together using photographs from an actual inspection that was conducted in Prince George in November, 2013.

Start with the front view of the occupancy.

Try to have verification of documentation when you start your inspection in order to make sure it's all current as we walk up to the building.

Exterior inspection

- Front view
  - Building characteristics
  - Address
  - Principle entrance
- Side views
- Rear view

Inspections Sequence – Exterior

FRONT VIEW

It is recommended that you start with the front view of the occupancy as seen in this photograph.

Items to note during the inspection of the building exterior:

- address
- names and types of occupancies
- building construction and height
- exterior housekeeping
- conditions affecting fire department response
- location of hydrants
- exposure hazards

Front View of the Occupancy (continued)

- utility locations on the exterior of the building
- location of principal entrance
- fire department connection

Is there clear access for FD vehicles?

Make sure you get photos of the entire front view of the occupancy.

Side View

SIDE VIEW

What do you notice about this side view of the occupancy?

- Power lines crossing the road.

Side View (continued)

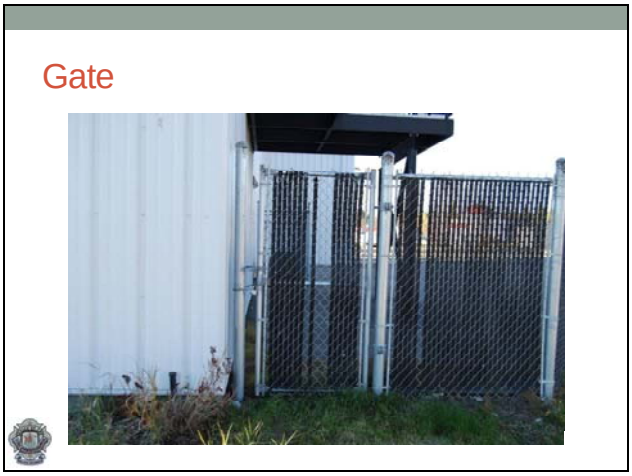
SIDE VIEW (CONTINUED)

A closer look at the power lines would have you consider that they might interfere with ladder operation. Something to keep in mind.

Side View - Rear

SIDE VIEW – REAR

Again, you can see that the power lines may restrict access to the building for firefighters, exiting off the balcony, etc.

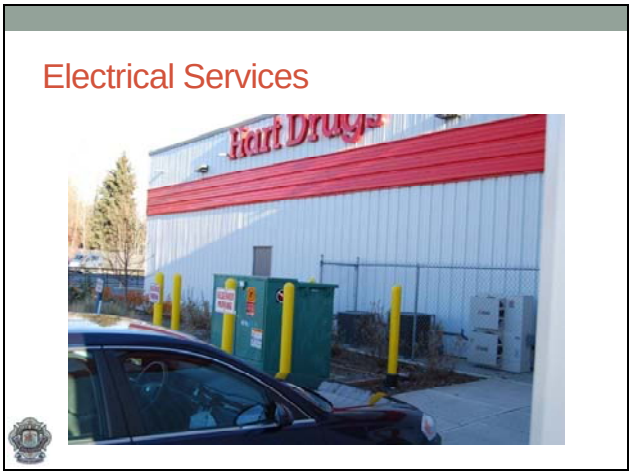


GATE

This gate is locked. Where are the keys? How do we get access if / when needed?

SIDE VIEW

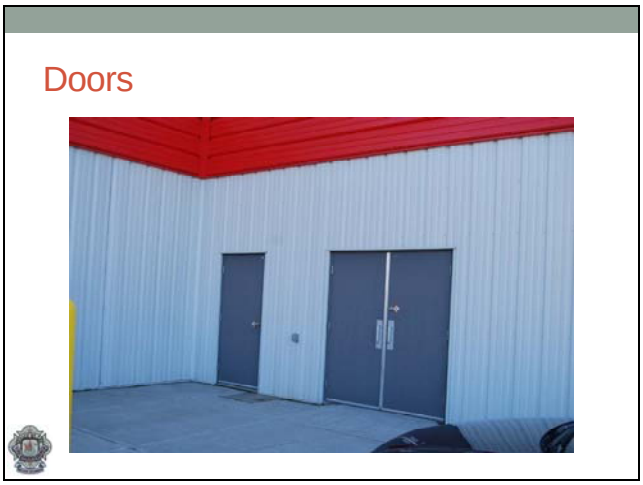
Make sure you get pictures all the way around the occupancy so that we have a record of everything.



ELECTRICAL SERVICES

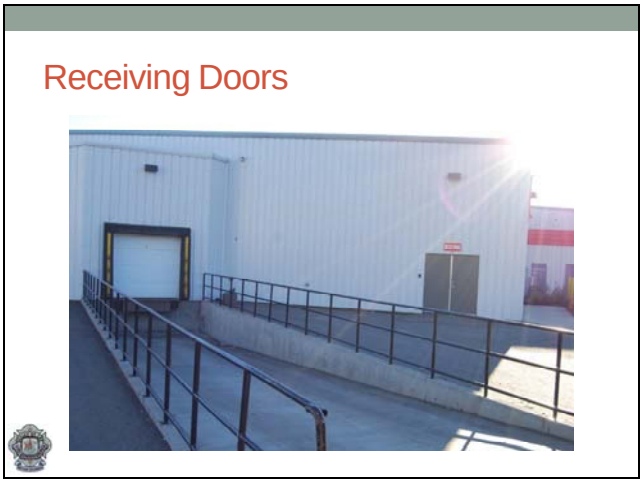
This is a photo of the electrical services to the building.

ID on site drawing within FSP?



DOORS

These doors are locked. What is behind them? The electrical services for the building? There is no signage.

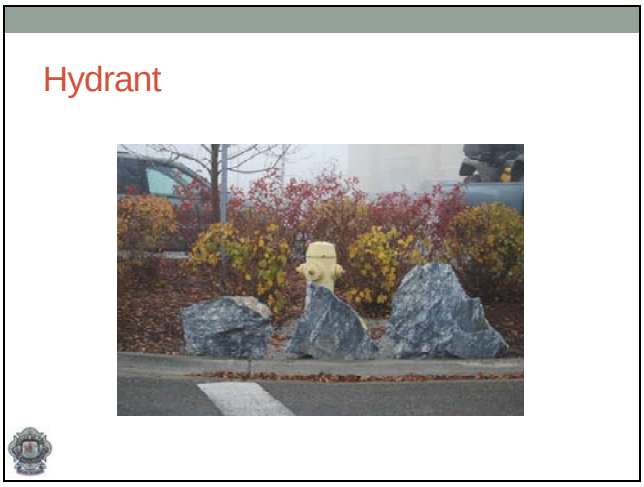


RECEIVING DOORS

These are the receiving doors for the building. One is locked and the main loading door (roll up) is protected by railings to prevent someone from falling over onto the ramp area.

REAR OF BUILDING

There appears to be no access to the ground level. The doors are locked. Where are the keys? How would we access it?



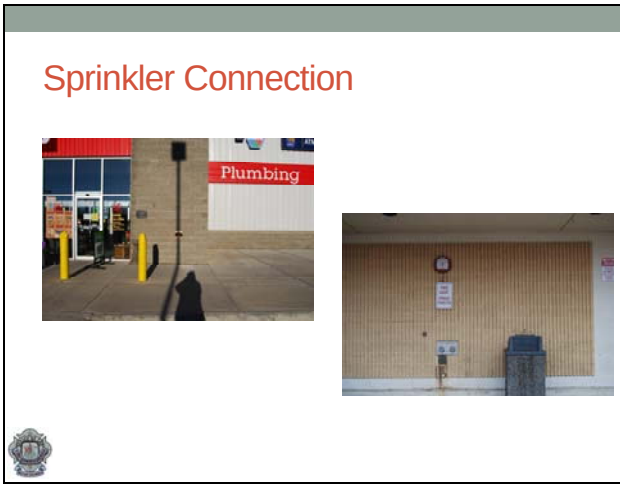
HYDRANT

This hydrant is in front of the occupancy. How close is it to the building? Would the fire department use this hydrant? Is the ID on their FSP?

"What's wrong with this picture?"

GAS UTILITY

Is it identified on their FSP?



SPRINKLER CONNECTION

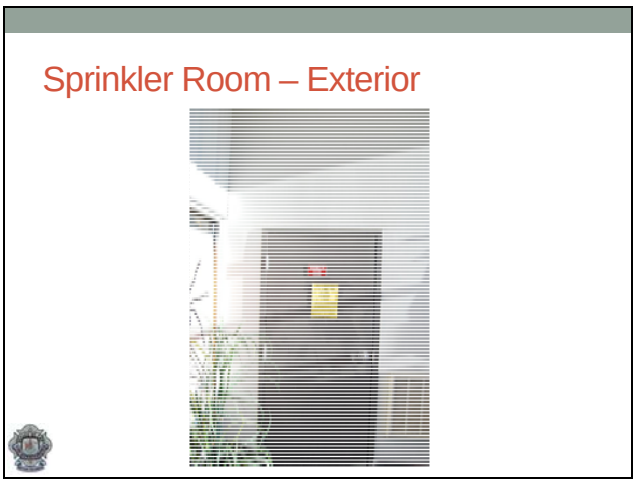
What is missing from photo on left?

There is no signage for the service. Indicating what type of connection (sprinkler or stand pipe)

Photo on right shows signage at other location.

WHAT IS THIS?

This is the Fire Department lock box (local bylaw). This example is properly identified. Often, there will be no signage on the lock box. Keep this in mind.



SPRINKLER ROOM – EXTERIOR

This sprinkler room door has signage to let us know what is behind the door. Should the door be locked?

Inspections – Interior (Fire Alarm Control Panel)

7.3 INSPECTIONS – INTERIOR (FIRE ALARM CONTROL PANEL)

This is the Fire Alarm Control Panel for the building. The Evacuation Plan is also taped to the wall on a small hand written note. What else do you notice? The flower box is in the way of our access. There is also a pull station behind the welcome banner!

Handout:

- **Inspection Testing and Maintenance of Fire Alarm System Checklist (Tab 6)**
- **Fire Alarm System Annual Test and Inspection Record – Sample (Tab 7)**

Sprinkler Room – Interior

SPRINKLER ROOM – INTERIOR

This is a sprinkler control room.

(NFPA 25) Sprinklers – Normally open valves shall be secured by means of a seal or a lock or shall be electrically supervised in accordance with the applicable NFPA standard.

Is locking the door an acceptable method to secure the valves in the open position?

Tags on Valves may indicate test date? Documentation required from owner for sprinkler system.

Inspection – Interior

INSPECTION – INTERIOR

Conduct your interior inspection in a systematic way. Why?

Examine fire protection installations and equipment, including the maintenance and test records for:

- fire alarm systems
- sprinkler systems
- emergency lighting
- commercial cooking equipment
- portable and fixed extinguishing equipment
- exit lights

Note the type of construction and material used in relation to:

- Flame spread ratings of interior finish,
- Integrity of fire resistant walls and floor / ceiling assemblies,

- Fire doors, closures and maintenance thereof.

Look for control of hazards and special processes within the occupancy including:

- Storage
- Handling
- Use
- Disposal

Look for fire hazards possibly caused by the owners or occupants such as:

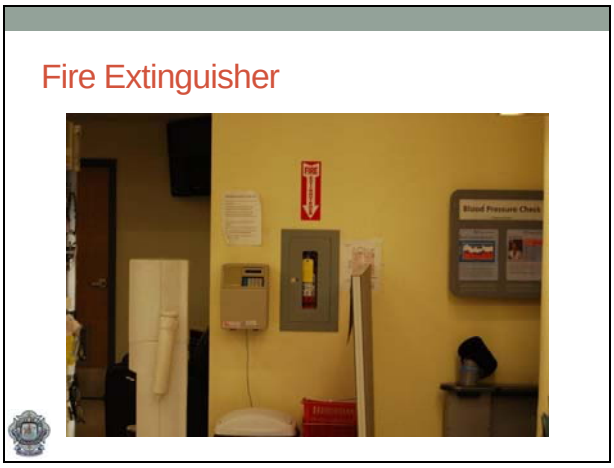
- Obstruction of exits,
- Storage in non-approved locations (stairways, corridors),
- Fire doors blocked open,
- Careless disposal of smoking materials and / or refuse,
- Accumulation of combustibles in electrical or service rooms,
- Construction alterations to the occupancy use, hazards or building design (e.g. storing flour to storing flammable liquids), and,
- General housekeeping.

CLEAR PATH

This isle way has a clear path. How wide should it be?

BC fire Code 2.7.1.2: _____ mm clear width.

For dead end corridors: _____ mm clear width.



FIRE EXTINGUISHER

This fire extinguisher has the appropriate signage. Is it blocked? How high is it?

Handout:

- **Fire Extinguisher Inspection Checklist (Tab 5)**

Flammable Gas Storage

FLAMMABLE GAS STORAGE

You can see here that there is flammable gas stored in the building. How much is being stored? Is it mentioned in their FSP?

Fire Exit

FIRE EXIT

This photo shows a fire exit and a pull station with a fire extinguisher on the wall.

Fire Exit

FIRE EXIT

This fire exit has a MAG lock. Should this be tested and documented with an alarm test?

Emergency Lighting

EMERGENCY LIGHTING

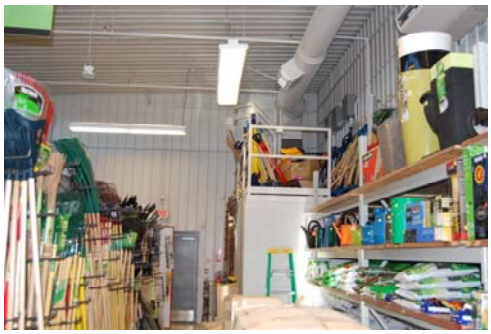
This photo shows some of the emergency lighting. Is it pointing in the right direction? Is the exit sign illuminated?

Exit signs MUST be illuminated during working hours.

Handout:

- **Emergency Lighting & Exit Sign Inspection Checklist (Tab 4)**

Storage



STORAGE

Here you can see that there are items stored on the mezzanine level. Does this pose a falling debris hazard?

Fire Pull Station

FIRE PULL STATION

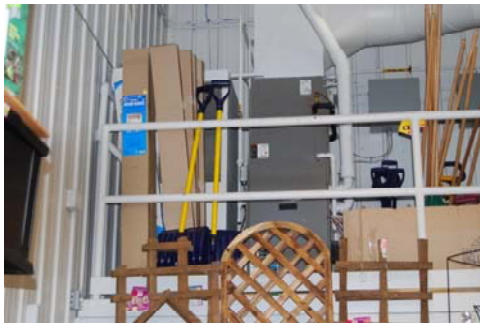
This is a photo of one of their fire pull stations near an exit. What's wrong here?

Exit Door with Mag Lock

EXIT DOOR WITH MAG LOCK

What do you notice here? The thumb lock is in the open position.

Storage



STORAGE

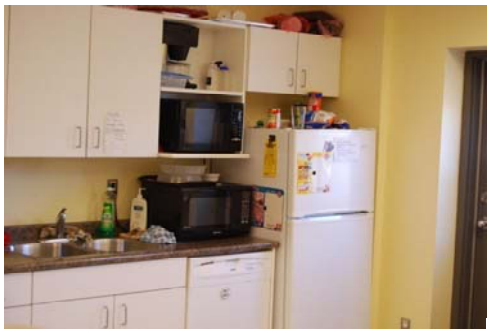
Here you can see storage right next to their furnace. Do you think there is proper clearance as per manufacturer's directions for clearances?

Paint Aisle

PAINT AISLE

There is combustible paint down this aisle. Is it identified (including quantities) in their FSP?

Kitchen Area



KITCHEN AREA

What types of things would you look at in this area? Cords, appliances, etc.

Sprinkler Head

GENERAL SPRINKLER HEAD

What should the clearance be from the combustible top of the head?

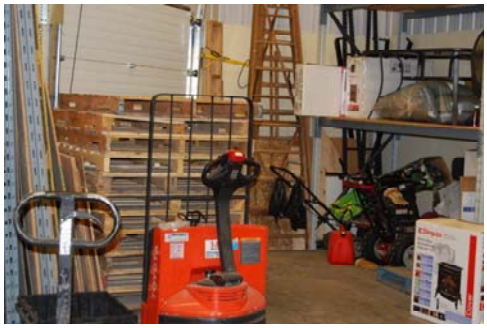
_____ inches.

Rack Storage

RACK STORAGE

Do you think there is enough clearance from the rack storage to the sprinkler heads in this area?

What do you see in this picture?



WHAT DO YOU SEE IN THIS PICTURE?

Snow Blower, Gas Can, Pallets, etc. Combustible pallets stored inside (are they allowed , yes if the building has a sprinkler system and in limited amounts).

Exit Door

EXIT DOOR

This exit door has a thumb lock and a good extinguisher with the appropriate signage placed high up on the wall where it is visible.

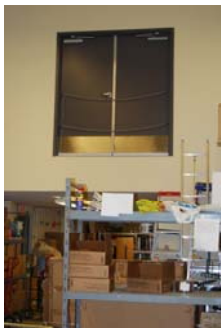
What could go wrong here?

WHAT COULD GO WRONG HERE?

There could be a major fall if the chains weren't there or if they fail and there is no signage whatsoever.

Note: The other side of these doors has no signage!

Another View



ANOTHER VIEW

This view taken further back shows how high up these doors are from the lower level.

What do you notice here?

WHAT DO YOU NOTICE HERE?

This emergency exit is completely blocked!

Is there anything wrong here?

IS THERE ANYTHING WRONG HERE?

There is a propane tank indoors. Is it empty or full? Should it be stored inside? (Check guidelines from BC Safety Authority.)

Emergency Lighting

EMERGENCY LIGHTING

This emergency lighting has a certification tag attached to it and may be included in yearly checks by the company.

Electrical Room

ELECTRICAL ROOM

This electrical room door has appropriate signage on it. Fire Code 2.6.3.2 Should be kept locked.

It is worth mentioning there is a difference between an electrical room and an electrical vault.

ELECTRICAL SERVICE ROOM means a room or space provided in a *building* to accommodate building electrical service equipment and constructed in accordance with the British Columbia Building Code.

ELECTRICAL EQUIPMENT VAULT means an isolated enclosure, either above or below ground, with fire resisting walls, ceilings and floors for the purpose of housing transformers and other electrical equipment.

Electrical Room

ELECTRICAL SERVICE ROOM

The equipment in this electrical room has a BC Safety Authority sticker on the panel and no other storage that we can see from this photo.

Electrical Room

ELECTRICAL SERVICE ROOM

By taking this photo a bit further back, we can see that there are other items being stored in their electrical room. Is this permitted? No obstructions or combustibles within 1 metre (3 feet) of the panel – BC Safety Authority.

BCFC 2.4.1.1.(2): Combustible materials other than those for which the location is designed, shall not be permitted to accumulate ...

BCFC 2.6.3.(1): Electrical equipment vaults shall not be used for storage purposes.

BCFC 2.6.3.(2): Electrical service rooms may be used for storage purposes

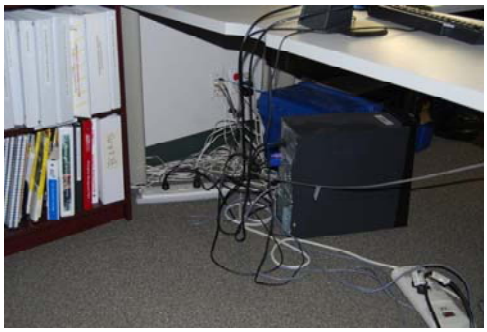
Interpretation: Very limited storage in electrical service rooms.

Furnace Room

FURNACE ROOM

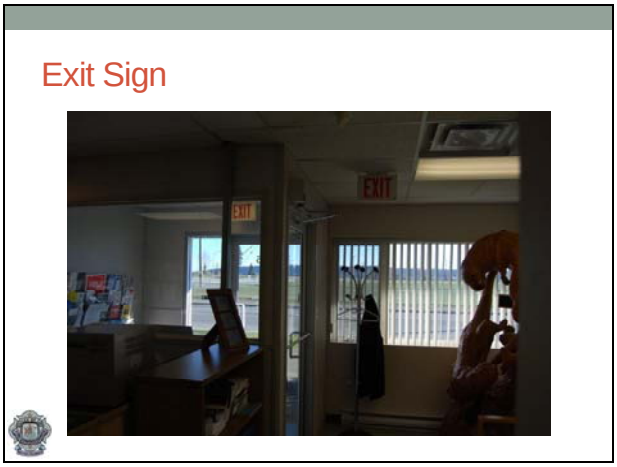
This furnace room has some items stored in it. Is this permitted? Limited to filters and other small items (e.g. brooms).

Office Area



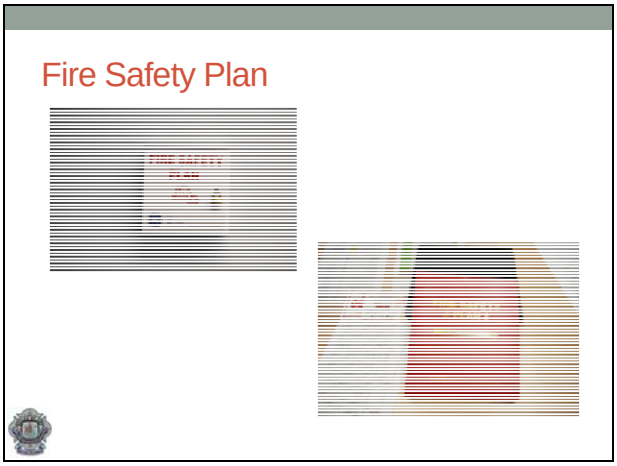
OFFICE AREA

Is this permitted? Could these power bars and extension cords be better organized? BC Fire code 2.4.7.1



EXIT SIGN

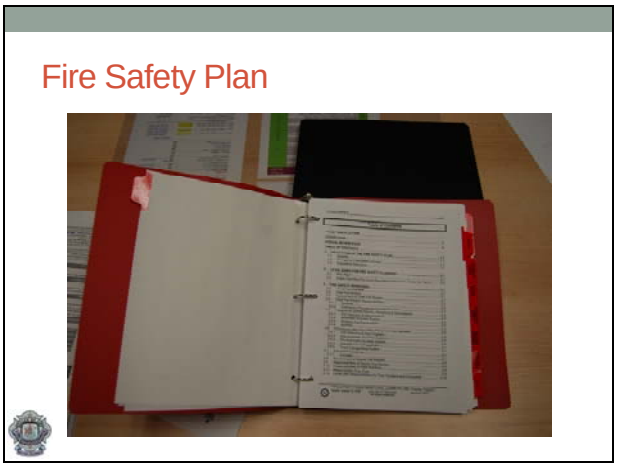
This exit sign has a burnt out bulb making it harder to notice in case of an emergency. BC Fire Code 2.7.3.1



FIRE SAFETY PLAN

Are they required? (Sprinkler system, fire alarm system, classification of occupancy B1-B2, A1, A2, etc. BC Fire Code and Building Code). BC fire code 2.8.1

Each photo shows a different colored binder containing the Fire Safety Plan information.



FIRE SAFETY PLAN

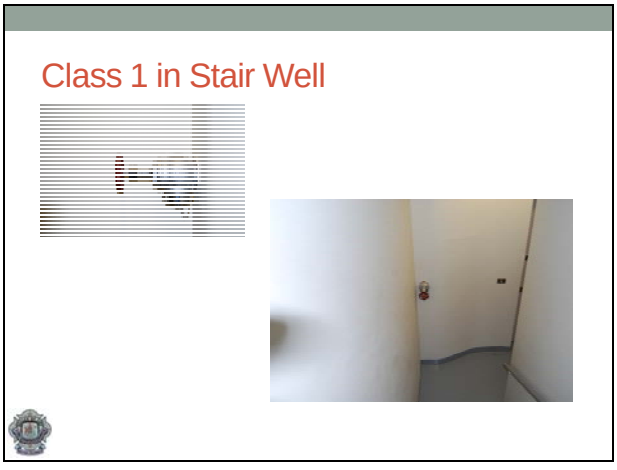
Is the Fire Safety plan current if required? Has it been reviewed?

HOSE STATION

What Class of Hose Station is this? Class 2. This is for occupants as well as Fire Fighters.

HOSE STATION

What class of Hose Station is this? Class 2. Look to see if it has inspection tag attached.



CLASS 1 IN STAIR WELL

This is a photo of a Class 1, BC building code, used only by Fire Department Personnel. This is a standpipe that is typically located in stairwells (could also be in hallways).

Is there enough room to connect a hose?

Elevator Signage

ELEVATOR SIGNAGE

Is it required? Yes, 2.8.2.7 (4) (5). The sign instructs occupants not to use the elevator in case of fire.

Inspection Procedure Guide

Table Top Exercise did not cover all sections of Guide:

- Exit Stair Shafts
- Standpipe and Hose Systems
- Boiler Rooms
- Laundry Rooms
- Refuse Chutes and Refuse Rooms
- Firefighting Vehicle Access
- Commercial Cooking Equipment

7.4 INSPECTION PROCEDURE GUIDE

The Guide is intended as a resource for LAFCs in the inspection process. For more detailed information, consult the Fire Services Act, the BC Fire Code and the BC Building Code.

Table top exercise did not cover all sections of Guide:

- Exit Stair Shafts (Page 3)
- Standpipe and Hose Systems (Page 5)
- Boiler Rooms (Page 7)
- Laundry Rooms (Page 7)
- Refuse Chutes and Refuse Rooms (Page 8)
- Firefighting Vehicle Access (Page 8)
- Commercial Cooking Equipment (Page 9)

Summary

- This concludes our LAFC Inspections Module.
- You will be able to:
  - state the potential reasons for inspections;
  - describe the Inspection Process;
  - identify LAFC inspection responsibilities;
  - describe any required skills; and,
  - conduct an inspection.

8.0 SUMMARY

This concludes our LAFC Basic Fundamentals for Inspections Module.

You will be able to:

- state the potential reasons for inspections
- describe the Inspection Process
- identify LAFC inspection responsibilities
- describe any required skills
- conduct an inspection