Workplace Safety & Prevention Services®

INFORMATION

FIRE PROTECTION

Introduction

Fire Protection is an organized approach designed to prevent fires. In the event of a fire, a fire protection program will help prevent or minimize personal injuries, losses, and harm to the environment. This guideline is designed to help you develop a fire protection program, or to identify areas in your existing program that may need improvement. The basic elements of a fire protection program are discussed below.

Workplace Assessment

Your first step is to do a **workplace assessment**. You will be evaluating your workplace for:

- Fire hazards
- Effectiveness of controls
- Emergency preparedness

Collect as much information as possible on each of the areas shown in Appendix 1. This should include hazard and control information, as well as relevant legal standards and requirements.

An inventory of hazardous materials used in your workplace will prove useful.

Follow this up with a walk-through assessment of your workplace. Using the information you have collected, develop a basic floor plan and an assessment checklist for this purpose. Use the checklist to record your observations.

The results of your workplace assessment will help you determine the need to improve or implement:

- Fire prevention and control procedures
- An emergency plan

Rate all identified hazards based on severity (high, medium or low), frequency and probability of injury. You will now be able to establish a priority for action needed to meet your needs.

Carry out a complete re-assessment whenever you make changes in your workplace, such as a change in process, work activity or materials used.

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Fire Prevention and Control

The best way to protect your employees, your property and the environment is to prevent a fire from happening. The most effective way to do this is to eliminate or minimize all fire hazards.

If a fire does occur, however, immediate steps should be taken to control it, and prevent it from spreading.

Fire prevention and control are achieved by combining engineering, work practice and administrative controls. Appendix 2 provides some examples of each of these controls.

Emergency Plan

A fire emergency plan outlines a sequence of steps to be taken when a fire strikes. Its purpose is to ensure the safety and health of employees, and to minimize the damage to property and the environment.

Your plan should provide for 'worst case' scenarios. Guidelines are provided in Appendix 3 to help you in preparing your plan.

Fire Inspections

Establish a regular schedule of fire inspections. These will help detect any deviations from, or shortcomings in, your control standards and emergency procedures. Take corrective action as soon as possible.

Appendix 4 is a sample checklist you can use to monitor your fire protection program. You will, of course, need to expand on the points provided under each general heading. The information collected during your workplace assessment, and subsequent action taken, will help you to come up with your own detailed checklist.

Review and revise this checklist whenever you have the results of any incident/accident investigations involving fires that you have conducted, and each time you do a re-assessment.

Related Legislation

Ontario Regulations for Industrial Establishments:

- Sections 120 and 123 specify that certain requirements of the *Building Code* and *Fire Code* apply to industrial establishments.

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These Regulations also contain provisions with respect to:

- Storage of flammable liquids (s.22)
- Portable containers for dispensing flammable liquids (s.23)

Ontario Fire Code (O.Reg. 213/07):

- Part 2: Fire Safety – contains provision for:
  - Fire separations (s.2.2)
  - Fire hazards (s.2.4)
  - Fire department access to buildings (s.2.5)
  - Service equipment (s.2.6)
  - Safety to life (s.2.7)
  - Emergency planning (s.2.8)
- Part 3: Fire Safety for Industrial and Commercial Uses
- Part 4: Flammable and Combustible Liquids
- Part 5: Hazardous Materials, Processes and Operations
  - Compressed gas cylinders (s.5.6)
  - Combustible dust producing processes (s.5.10)
  - Combustible fibres (s.5.11)
  - Spray application using flammable and combustible materials (s.5.12)
  - Dip tanks (s.5.13)
  - Welding and cutting (s.5.17)
  - Industrial ovens for baking and drying processes (s.5.18)
- Part 6: Fire Protection Equipment
  - Portable extinguishers (s.6.2)
  - Fire alarm and voice communication systems for life safety (s.6.3)
  - Standpipe and hose systems (s.6.4)
  - Sprinkler systems (s.6.5)
  - Water supplies for fire protection (s.6.6)

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  - Emergency power systems (s.6.7)
  - Special fire suppression (s.6.8)
- Part 7: Inspection, Testing and Maintenance of Fire Emergency Systems in High Buildings
- Part 9: Retrofit

Ontario Building Code (O.Reg. 332/12)

- Part 3: Fire Protection, Occupant Safety and Accessibility – specifies requirements for:
  - Fire alarms and detection systems (s.3.2.4)
  - Provisions for firefighting (s.3.2.5)
  - Lighting and emergency power systems (s.3.2.7)
  - Standpipe systems (s.3.2.9)
  - Requirements for exits (s.3.4)

Canadian Electrical Code Part I

- C22.1-C22.1-09

Ontario Electrical Safety Code

- Section 18: Hazardous Locations

Workplace Hazardous Materials Information System Regulation

- (WHMIS, RRO 1990, Regulation 860)

For Further Information

To help you design your fire protection program, and particularly in carrying out your workplace assessment, consult the following:

- Commentary on Part 4 of the Ontario Fire Code
- Audit Guide to Part 4 of the Ontario Fire
- Fire Protection Handbook
- Fire Protection Guide to Hazardous Materials
- Suppliers' Safety Data Sheets for the hazardous materials used in your workplace

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Appendix 1: Assessing Your Workplace

Areas to be Assessed Comments	Comments
Work Processes/Activities ▪ Potential fire hazards (sources of ignition and their location) ▪ High risk areas (e.g., open tanks) ▪ Appliances, mechanical/electrical equipment used ▪ Hazardous materials – quantities used, characteristics (e.g., flammable, combustible, explosive, reactive, toxic, corrosive, oxidizing, compressed gases) ▪ Hazardous by-products (e.g., explosive dusts)	
Building ▪ Floor layout (e.g., stairs, exits, access to exits) ▪ Building materials (fire-resistance ratings) ▪ Storage areas ▪ Emergency lighting ▪ Ventilation systems ▪ Fire detectors and suppressors (e.g., smoke detectors, fire alarms, automatic sprinklers)	
People (employees, visitors, community) ▪ Number that might be affected ▪ Characteristics (i.e., consider any disabilities that would affect their ability to evacuate) ▪ Location: – Inside building (control rooms, offices) – Outside building (storage yards) – Neighborhood (industries, homes, hospitals, schools)	

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Areas to be Assessed Comments	Comments
Controls ▪ Engineering controls ▪ Work practices ▪ Administrative controls ▪ Primary containment (e.g., containers, tanks, piping systems) ▪ Fire containment (e.g., extinguishers) ▪ Flammable or combustible liquid spills containment (e.g., dykes, non-combustible retention ponds, site grading, raised door sills)	

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Appendix 2: Examples of Fire Controls

Engineering

- Process alteration
- Substitution with less hazardous process materials
- Workplace design
  - Proper storage facilities (i.e., properly marked and separated)
  - Proper and adequate ventilation
  - Fire proofing of buildings
  - Proper fire doors, fire walls and separators
  - Installation of fire/heat/smoke detectors
  - Sprinkler systems
  - Control of explosive atmospheres (e.g., dusts)
  - Adequate spill containment
- Electrical equipment
  - Intrinsically unsafe
  - Must conform to the Electrical Safety Code
- Consult a fire protection engineering consultant, if necessary

Work Practices

- Housekeeping
  - Adequate waste disposal
  - Exit/fire escape access
  - Unobstructed aisles
  - Control of flammable dusts
- Proper storage of flammables and combustibles
- Company policies
  - No smoking
  - Hot work permits

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- Spill control procedures for flammable or combustible liquid spills
  - Minor spills
  - Major spills
  - Safety considerations
  - Waste handling and disposal
- Use of approved portable safety containers for the dispensing of flammable liquids
- Bonding/grounding
- Proper use of electrical equipment
- Proper maintenance of equipment and machinery (i.e., to prevent leaks and breakdowns)
- Proper maintenance of ventilation systems
- Proper selection and use of fire extinguishers

Administrative Controls

- Fire Safety Plan (You may be required to have your plan approved by your local Fire Chief. See Section 2.8 of the Ontario Fire Code).
- Standards
  - Develop and enforce standards for all program elements and activities
- Fire Inspections
  - Establish schedule (e.g., daily, weekly, monthly)
  - By whom (internal: fire brigade members; external: fire department, insurance company)
  - By work area or department
  - Record keeping and follow-up
- Review
  - New construction
  - Change in process design
  - Similar industry experiences
  - Changes to legislation (fire/building codes)

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  - Smoking policy
  - Hot work permit procedures
  - Plant security
- Employee training (including orientation training and retraining) in:
  - Preventive measures
  - Inspection techniques
  - Fire extinguisher use
  - Hazard reporting
  - Spill control procedures
  - Emergency procedures
- Test
  - Employee knowledge of fire prevention procedures
  - Application of knowledge
- Measurement and Evaluation
  - Measure performance against standards (number of and reasons for deviations)
  - Monitor and evaluate effectiveness of programs (number of fire incidents, spills, review investigation results)
  - Correct for continual improvement

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Appendix 3: Guidelines for an Emergency Fire Plan

Assign responsibilities at all levels for each of the following areas.

Communications

Install a communications system, and establish procedures to:

- Alert occupants
  - Alarm systems
- Mobilize fire fighters
  - Municipal fire departments
- Plant fire brigade*
- Meet fire department on arrival, and advise them on:
  - Location of fire
  - Contents in and near the location*
  - Trapped people
  - Make contact with:
  - Neighboring industries that could be at risk
  - Police
  - Ambulance
  - Hospital
  - Workplace security
- Test communications system regularly
  - Mark all exists clearly

*Provide floor plan showing location and identity of hazardous materials.

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Fire Extinguishing

Organize a fire brigade, and provide training in:

- Proper procedures
  - Take into account the volume of flammable materials, potential for exposure to toxic materials, and areas at high risk of destruction
- Shutdown of processes
- Use of equipment:
  - Hoses
  - Personal protection, etc.
- Use of emergency lighting and power sources
- Emergency plant access for fire trucks and ambulances

Safety of People

To ensure the safety of all persons in your workplace:

- Make sure exits and fire escapes are adequate
  - Properly marked
  - Accessible
- Plan and drill for evacuation
  - Removal of all persons (including the handicapped, and those in special areas, e.g., washrooms)
  - Ensuring that all persons (including visitors) are accounted for – this includes prompt access to daily attendance record
  - Use of alternative exits
  - Escape from toxic gases that may be generated during the fire
- Provide temporary refuge for those unable to evacuate
- Plan and drill for rescue operations
  - Availability of equipment
  - First aid

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Appendix 4: Fire Protection Checklist

Inspection Date: _____ **Conducted By:** _____

Department: _____

Assessed Areas	Comments
Workplace Assessment ▪ Work Processes – All possible sources of ignition identified, etc? ▪ Building Construction – All wiring properly installed and of approved construction, without extensions or temporary wiring, etc.? ▪ Building Contents	
Controls ▪ Engineering – Ventilation systems implemented and working properly, etc.? ▪ Work Practices – Garbage removed daily or more frequently? – Aisles and floors free of oil and other flammable spills, etc.? ▪ Administrative Controls – Approved Fire Safety Plan posted? – Spill Control Procedure posted?	
Emergency Plan ▪ Communications – Emergency phone numbers readily accessible, etc.? ▪ Safety of People – All employees trained and tested in evacuation procedures, e.g., fire drills, etc.? ▪ Fire Extinguishers – Fire extinguishers tested, etc.?	

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