ANSWERING THE CALL

FIRE COMMUNICATIONS
FOR PUBLIC SAFETY COMMUNICATORS

KPU

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FOR PUBLIC SAFETY COMMUNICATORS

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Chapter 1:

Legislation Regulating Fire Services

A Short History

The need for legislation to deal with fire protection, fire suppression, prevention and the related regulations, dates back to when people first began living in structures. When people lived in isolated homesteads and small communities, firefighting could be left to those immediately threatened and to neighbours who came to their rescue out of friendship or self-interest. However, as soon as human beings began to live in large settled communities, communal provision for preventing fires and dealing with fire outbreaks became necessary. Today, the primary objective of the fire service is to control and extinguish fires; however, preventing the outbreak and serious spread of fire is considered equally as essential to public safety as proficiency in fire suppression.

Fire fighting organization dates back almost 2,000 years. The city of Rome had a paramilitary fire fighting organization with approximately 7,000 members, very similar to modern fire agency organizations, with the city divided into protection districts. Firefighters patrolled the city with buckets and axes and also acted as law enforcement. They had the authority to enforce fire prevention bylaws, and to dole out summary corporal punishment to offenders.

During the 11th and 12th centuries, fire protection bylaws were enacted in Britain, but there are no records of organized firefighting efforts. The great fire of London, which destroyed most of the city, broke out on September 2, 1666, and burned for five days. After the fire, the city responded by creating building

codes and proposals for improved firefighting methods. The creation of fire insurance companies within the city led to the formation of trained fire brigades available to fight fires in the areas the fire insurance company had agreed to protect. Each company provided a marker or sign on each insured property. Responding brigades would only protect or fight fire in the building displaying the company fire mark.

Early settlers from Britain brought the ideas of fire insurance and fire protection with them to North America. While there were no insurance companies to provide fire protection, the concepts and ideas led to the development of the institution of fire protection. Early European settlements suffered many devastating fires. Boston established a fire department in 1679 when homeowners formed a fire society, which operated in a similar fashion to the insurance companies.

In 1752 Philadelphia's volunteer fire companies formed America's first successful property insurance company, The Philadelphia Contributionship for the Insurance of Houses from Loss by Fire. These men, led by Benjamin Franklin, recognized the economic hardship fire caused, and established a mutual insurance company in 1752 where policyholders could share their risks. They based its method of operation (and name) on that of the Amicable Contributionship of London, founded in 1696. The new company was conservative in its underwriting, sending surveyors to inspect each building before insuring it. Accepted properties sported fire marks: four clasped gilded hands mounted on wood plaques.

The first fire brigades in British Columbia were likely established by the Hudson Bay Company in Victoria and were patterned after the volunteer firefighter system used in the United States. They started with two hand operated, horse-drawn engines.

In 1886, most of Vancouver was devastated by fire. City hall moved into a tent while an aggressive re-building program was begun. In 1907, Vancouver purchased the first Seagram motor apparatus, and a hose wagon soon followed.

The horses were retired completely in 1917, making Vancouver the first fully motorized fire department in Canada.

Current Reality

In Canada, *fire communicators* function under the specific agency dispatch policies and procedures established to meet the requirements of municipal fire protection bylaws, which are developed in response to the federal *Constitution Act and various* provincial acts. Bylaws are usually structured to work in accordance with these acts and state the rights and responsibilities of fire department personnel and the public in the municipality or district.

Fire communicators support the fire department in its daily operations of fire prevention and suppression activities, and must be familiar with the municipal bylaws that apply to their agency. Failure to comply with municipal bylaws may result in fines or jail terms for the citizen who has called asking for direction or assistance.

Federal Legislation

The *British North America Act* (1867), renamed the *Constitution Act, 1867,* delegated most of the responsibility for fire safety to the provincial governments. In general, fire **prevention** legislation was kept at the provincial level while fire suppression was designated as an optional function of municipal or local government.

Provincial Legislation

Provincial Legislation and application varies somewhat from province to province in Canada. (Refer to the Appendices for the information that is applicable in your area.)

Chapter 2:
Organizational Structure of Fire Departments

Fire Department Lines of Authority

Whether a fire department is large or small, comprising many members or only a few, it must have some method of delegating responsibility from the top of the organization to **its** members. This requirement is referred to as the *line of authority* or the *chain of command*.

Chain of Command Insignia

Chief Officers comprise the top ranks of the organization. The uniform of a chief includes a white shirt and dark blue trousers. As in all organizations there are various levels of chief officers and each has specific insignia that denotes the officer's rank. The chain of command insignia, from the top of the fire department down, is as follows:

Fire Chief – cap has two rows of gold braid and a gold cap badge with five cross trumpets. The uniform shirt and double breasted tunic is adorned with gold collar buttons displaying five crossed trumpets. Five gold strips are displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Deputy Chief – cap has one row of gold braid and a gold cap badge with four cross trumpets. The uniform shirt and double breasted tunic is adorned with gold collar buttons displaying four crossed trumpets. Four gold strips are displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Assistant Chief – cap has one gold band and a gold cap badge with three cross trumpets. The uniform shirt and double breasted tunic is adorned with gold collar buttons displaying three crossed trumpets. Three gold strips are displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Battalion Chief – cap has one gold band and a gold cap badge with two cross trumpets. The uniform shirt and double breasted tunic is adorned with gold collar buttons displaying two crossed trumpets. Two gold strips are displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Below the rank level of chief officer is that of Fire Officer. This next level in the organization is responsible for supervision and the day to day operation of the fire department. The uniform of an officer is comprised of a light blue shirt and dark blue trousers. There are various levels of officers and each has specific insignia that denotes rank.

Training Officer – cap has one silver band and silver cap badge with the rank engraved. The uniform shirt and double breasted tunic is adorned with silver collar buttons displaying three crossed trumpets. Three white strips are displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Captain – cap has one silver band and a silver cap badge with the rank engraved. The uniform shirt and double breasted tunic is adorned with silver collar buttons displaying two parallel trumpets. Two white strips are displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Lieutenant – cap has one white band and a silver cap badge with the rank engraved. The uniform shirt and double breasted tunic is adorned with silver collar buttons displaying one trumpet. One white strip is displayed on the shoulder epilates of the uniform shirt and at the cuff of the uniform tunic.

Rescue Officer – (Vancouver Fire Rescue) cap has one white band and a silver cap badge with the rank engraved. The uniform shirt and double breasted tunic is adorned with silver collar buttons displaying one trumpet. One blue strip is displayed on the shoulder epilates of the uniform shirt and white stripe at the cuff of the uniform tunic.

The basic rank level in the fire department organization is that of Fire Fighter, of which there may several class levels. The rank of Fire Fighter does not display a rank insignia. The uniform, or station wear worn consists of a dark blue shirt and trousers. The uniform cap has a black band and a silver cap badge. The dress uniform is a light blue shirt and double breasted tunic bearing no other insignia.

When fire fighting personnel are engaged in fighting fire they wear protective clothing called turn out or bunker gear. The rank of the individual is not easily determined due to the bulky nature of this Personal Protective Equipment (PPE). To assist in identifying who is in charge or in command the following identifying insignia is employed; All Chief Officers wear white bunker gear and white helmets. All Fire Officers and Fire Fighters wear the same bunker gear but officers wear red helmets and fire fighters wear yellow helmets. Some departments also display the rank of the individual on the helmet in the form of a decal.

Centralized Authority

Early fire departments were organized in a paramilitary manner. This method of organization has persisted through the years because a paramilitary type of command and discipline are considered necessary for accomplishing effective fireground operations. Traditionally, most fire departments used centralized **authority**, organized in a pyramid style, in which decisions were made at the top and implemented uniformly throughout the organization. Information in turn was transmitted up from the bottom to the positions at the top. This style of command remains in use today for fireground operations, while management structures are evolving to meet contemporary standards.

Decentralized Authority

Managing a fire department is a complex operation. Depending on the size of the department, it becomes necessary to decentralize authority by varying degrees to ensure the smooth running of the department.

Decentralized authority is basically delegated authority. Authority is the power accorded an individual to make decisions necessary to fulfill certain responsibilities. Exercise of that power carries with it accountability to a higher authority for the results. The fire chief, for example, is accountable to the chief executive officer of the city or municipality in which the fire department is located.

Line and Staff Personnel

Traditional fire departments are organized into *line* and *staff* functions. Line functions are generally perceived as fire suppression activities, while staff functions are seen as administrative activities supporting the fire suppression units. However, the distinction between line and staff functions is becoming less clear as firefighters increasingly perform staff functions related to public education and other community oriented services.

Functional Organization of Line Personnel

Depending on the size of a fire department, the supervision of firefighters can be performed by a number of individuals. Company Officers (which may include Fire Captains and Lieutenants) are responsible for an assigned crew at fire halls and at the scene of an emergency. Command Officers (which may include District Chiefs, Battalion Chiefs, Assistant Chiefs, Deputy Chiefs and Fire Chiefs) are responsible for management functions including overseeing operations at larger incidents, budgeting, planning, and co-ordination of staff.

Crews assigned to apparatus are termed Companies. Typically one (1) Officer and three (3) Firefighters are assigned to work together on a piece of apparatus. If assigned to an engine, this crew would be known as an; *Engine Company*.

The crews or companies are organized into working shifts/platoons that staff apparatus on 7/24 basis. The most common shift pattern used in the Lower Mainland of BC is comprised of two – 10 hour day shifts followed by two – 14 hour night shifts. Four shifts, titled A, B, C and D, rotate through 365 days to cover on duty staffing requirements.

Functional Organization of a Fire Department

The primary mandate of any fire **department** is to provide citizens with protection of life, property, and the environment. A fire department also provides to the public and to its staff many other services, which can be categorized into six functional areas:

1. Administration
2. Emergency response
3. Prevention/Education
4. Investigation
5. Mechanical Maintenance
6. Training

In smaller fire departments, all of these functions may be performed by one or more staff or by the fire chief. In other departments, each function may be the responsibility of an officer or other personnel appointed by the Fire Chief. The organizational structure of any fire department must take into account its obligations under legislation and bylaws. The organizational structure normally includes;

- Fire Prevention role/duties
- Fire Suppression role/duties
- Support services role/duties.

Often these duties cross organizational boundaries and impact the six functional areas described below.

Administration

Administration functions include long range planning, assignment of duties, budget preparation, policy making, maintaining records, and consulting with city or municipal authorities. The ultimate authority for administrative duties lies with the fire chief, although other personnel may be responsible for some administrative duties, depending on the size of the department.

Administrative functions carried out by *fire communicators* include maintaining reports on occurrences, maintaining emergency response records, keeping status and time logs, responding to telephone inquiries from the public, and liaising with other civic departments and emergency response agencies. Fire communicators often serve a public relations function as the first point of contact with a fire department.

Emergency Response

The most visible member of the fire department is the firefighter whose primary duty is to carry out the activities required at emergency scenes. Firefighters must develop and maintain numerous skills including medical aid, fire suppression techniques, and expertise working with apparatus and equipment. At a fire scene, the firefighter's duties include operating pumps and other equipment, laying and connecting fire hoses, operating hose nozzles and directing water streams, raising and climbing ladders, and using a variety of related tools and equipment. Firefighters must also be able to remove persons from dangerous situations, administer first aid, and conduct salvage and overhaul duties. Firefighters also provide emergency medical response, technical rescue, and hazardous materials response. The firefighter's role is not limited to responding to fire scenes. A firefighter must have the ability to maintain fire department equipment, participate in training drills, maintain inventory of tools and equipment, clean and service fire apparatus, and complete reports and records.

It is within the suppression function that fire communicators are the most valued, in that they provide the central communications for the fire department. The three primary functions of the fire communicator are: call taker, dispatcher and tactical radio operator. Call takers receive calls from citizens requesting emergency responses and obtain detailed information as to the location and nature of the emergency. Dispatchers initiate the response of required departmental resources. Tactical radio operators support fire scene operations by providing the important communication link with the incident commander,

as well as requesting and coordinating the response of any required outside resources or agencies.

Investigation

The main purpose of fire investigation is to determine the causes of fires. The data collected is used to determine if a fire is the result of a hazard that needs to be corrected or if a crime of arson has been committed. The responsibility for fire investigation falls at various levels within a fire department. Each firefighter and fire officer is responsible for recognizing and reporting possible causes of fires at emergency scenes, and must be able to recognize and preserve any evidence of the cause of a fire. Fire departments may have specially trained personnel who perform fire investigations within its jurisdiction, and who as Local Assistant to the Fire Commissioner provide testimony in court as qualified persons regarding fire causes. The Office of the Fire Commissioner provides investigators in areas that do not have their own personnel, or for investigations that require additional expertise. Fire investigation has become a highly technical and specialized field, and it is now possible to discover evidence that would have been impossible a few years ago.

Fire communicators may be required to contact Fire Investigators and Local Area Fire Commissioners to respond to the scene of a fire with damage. Fire communicators can play an important role in flagging suspicious circumstances, and may be asked to transcribe calls and copy audiotapes for the purposes of investigation.

Prevention/Education

An effective fire prevention program benefits citizens by decreasing the need for fire suppression functions, reduces the risk to life and safety and the cost of fire department emergency response. Fire prevention programs often include the enforcement of provincial and local bylaws relating to building fire codes, inspecting public facilities, businesses, and industries for potential fire hazards,

investigating complaints and issuing recommendations for corrections, and conducting fire drills at institutions such as hospitals and schools.

The public education specialist's duties may include planning and implementing local public education demonstrations and workshops, and working with the media to disseminate information about fire prevention and fire safety preparedness.

Fire communicators are required to manage and coordinate the movement of apparatus and resources involved in public education programs in schools and fire halls, and in regularly scheduled fire inspections by fire companies.

Mechanical Maintenance

All fire department apparatus require continual preventative maintenance, some of which can be performed in the fire hall. Equipment break-downs and major maintenance and repair work must be done by qualified heavy duty mechanics.

In larger fire departments the Mechanical Branch is responsible for all mechanical repair work on the apparatus. Depending on the size of the fire department this service and repair work might be contracted out to municipal works yards or private contractors.

Fire Communicators are tasked with keeping apparatus available to respond should an emergency occur and coordinating the movement of apparatus to and from the garage or repair facilitate.

Training

All fire department personnel, both experienced and new hires, receive continual training, as the protection of lives and property depends on how effectively and efficiently they perform their duties. Training will often be delegated to a fire training officer, a specialist within the fire department who is responsible for conducting effective programs of instruction for department staff on techniques and procedures for controlling and preventing fires as well as other areas of certification. Typical duties of a training officer include the

planning and instruction of fire fighting methods, rescue and first aid techniques. Other training can be coordinated through learning institutions such as the Fire Academy or local colleges. Many departments will also bring in people with expertise in specialized fields of knowledge such as hazardous materials, leadership or safety.

Scenario-based training requires the movement of apparatus and personnel across response districts to engage in classroom and field exercises. Scheduled events require planning and re-deployment of resources by *fire communicators.*

As discussed, the primary mandate of any fire department is to provide citizens with protection of life, property, and the environment. As small villages and towns build out and expand into ever larger towns and cities so does the need for fire protection. The initial main fire hall, usually numbered #1, may be renovated to accommodate additional fire apparatus, then satellite fire halls will need to be added as the population grows. In larger cities the emergency response function of the fire department will need to consolidate expansion into districts or battalions so as to maintain optimum command and control of department resources.

Types of Fire Departments

The type of fire department in a given area is determined by its city or municipal council and is related to demographics, population density, and available revenue. There are five basic types of fire departments:

1. Volunteer
2. Paid-on-call
3. Composite
4. Career
5. Industrial

Volunteer

Fully volunteer fire departments operate as social clubs and can be funded through community events and/or the taxation system. They may or may not have any paid staff, and may be compensated for attending calls. If they are compensated, moneys usually go to a central fund for internal distribution. A paid fire chief and/or paid support staff (Training, Inspection) maintain essential department operations and equipment. Volunteer personnel are usually compensated in some manner for call response and training time. Paid staff is generally considered part of the volunteer organization.

Paid-on-call

Paid-on-call volunteer fire departments usually consist of some full-time employed administration staff and some paid-on-call fire suppression members. The number of chief officers and administration staff is determined by the size of the department and the fire area it protects. Full-time employed command staff oversee the management of the department and the training and supervision of paid-on-call fire suppression staff, which are paid when called upon to respond to emergencies from their residences or places of employment twenty-four hours a day.

Composite

A composite fire department is composed of both full time career and paid-on-call fire suppression staff. A composite department is generally in the process of making the transition from a volunteer to a career department. Some fire halls within the jurisdiction may be staffed twenty-four hours a day with full time career staff and utilize paid-on-call suppression staff when extra resources are required.

Unseated fire halls utilize paid-on-call suppression staff that are called upon twenty-four hours a day to respond to emergencies. Paid-on-call staff may have living quarters in the fire hall, which reduces response time evenings and weekends.

Another common model for a composite fire department will have a certain number of fire halls fully staffed with career firefighters and the remainder staffed by volunteer or paid-on-call firefighters. Generally, a paid hall will respond and will rely on volunteers to provide the supplement staff required. In this model there is no set requirement for which personnel and equipment will respond. The local fire chief will generally define the staffing and equipment requirements for most effective use of resources.

Career

A career fire department consists of paid full time employed administration and suppression staff members. Fire suppression crews are on duty twenty-four hours a day at fire halls located within the jurisdiction. The career fire department is generally found in larger urban areas, where volunteer fire departments are inadequate. Career departments represent a minority of the fire service.

Industrial Departments

Industrial fire departments are found in larger industrial processes such as lumber mills, large factories or mining smelters. The department is generally structured according to one of two models:

1. Volunteer fire department. Members work at their regular jobs in the plant and respond to emergencies as required. Members of these brigades may or may not receive additional remuneration for their participation.
2. Career fire department. Members are paid full time firefighters. These firefighters are specialists in the types of fires that may occur in that industrial setting and do not work at any other job in the industrial setting. Such fire departments may have specialized equipment, and may operate as mini fire departments, which conduct their own fire prevention and education activities.

While these are the two most common types of industrial fire departments, others do exist. In many cases they would resemble departments at the municipal level, and may be supported by local fire departments.

Chapter 3:

Support from Other Agencies

The fire service is connected to a variety of other agencies as part of a greater support web of public safety, and is affected by the activities of those other agencies.

Ambulance Services

There is a close connection between the fire service and ambulance service whenever there are personal injuries. In the event of motor vehicle accidents, structure fires and hazardous material incidents, it is often necessary to provide medical attention for fire fighters or citizens who have been exposed or injured. Fire services are often the first responders to a variety of incidents and then hand off the patient(s) to the designated ambulance personnel. During rescue emergencies, the ambulance service is there in a partnership role to provide care during extrication and retrieval.

Police Agencies

During a fire incident, police attendance will be requested to provide traffic or crowd control. Theft or looting may be a mitigating factor in the fire incident and may require a police presence. After a fire incident has moved towards conclusion, police may be involved with issues of property and materials security as well. Police officers enforce evacuation orders given by the fire department at large scale emergencies should there be a need to relocate citizens for their own safety. In situations of suspected arson, sudden death, and suicide, the police will most likely be involved in the investigation process.

Other Fire Departments

Mutual aid is the term used to identify arrangements made between neighbouring fire agencies to provide assistance in situations that require more resources than one agency has available. There are both local and regional agreements for mutual aid. If a particular department is in need of more

apparatus or specialized apparatus, a mutual aid agreement is set up to let them call on an agency with the needed apparatus to attend. The ability of the accommodating agency to honour the mutual aid agreement will depend on the number and types of emergencies ongoing in their jurisdiction. There is no guarantee that the requested resource will be sent.

Under other local and regional agreements, arrangements may be made for *automatic aid*, which is assistance rendered as a matter of course in designated areas outside a specific jurisdiction. This may be due to the accessibility of the location or the types of apparatus that are nearest to the situation. Automatic aid agreements allow operational chief officers to call for resources and to have an immediate response. Example: An *automatic aid agreement* is in place between the Vancouver Fire Rescue and Richmond Fire Rescue for responses to all bridges connecting the two cities.

Public Utility Companies

In fire and motor vehicle accident situations, it is often necessary to call on electrical and natural/propane gas companies to deal with downed and broken power lines or to turn off the source of supply. Carbon monoxide monitoring may also involve public utility companies.

Regional, District, City or Municipal Departments

Fire departments call local authorities in civic governments under certain circumstances, such as when there is a need to shut off or increase water pressure, or to request public works equipment.

Certain departments – health, engineering, public works, bylaw enforcement and building – are all vitally interested in fire incidents, as they may involve danger to people, damage to public property, vehicles or structures. Fire departments rely heavily on Engineering departments of local government, for example:

- Water Department - when there is a need to boost fire hydrant pressures or divert water volume during large fires. This department of the city is call

upon when there is a need to shut-off water flowing from damaged hydrants or water mains.

- Sewers Department – if fuel or chemicals flow into storm drains.
- Streets Department – to provide barricades, sweep streets of debris, provide sand and materials for *dam & dike* control of run-off.
- Electrical Department – damage to traffic control lights or street lighting.

Fire departments also rely heavily on other civic departments of local government, for example:

- Health Department – when fire damages/contaminates restaurants or food storage.
- Law Enforcement – as the name implies enforces municipal fire by-laws pertaining to outdoor burning, over-crowding of public venues and occupancy issues.
- Park & Recreation –responds to boulevard or park trees involved in fire situations.

Civic governments are also responsible for dealing with contravention of bylaws (outdoor burning, occupancy issues), health issues (a fire in a restaurant) or safety issues (a structure weakened by fire damage).

Governmental Departments

Transport Canada, Emergency Canada, Ministry of Forests and the Coast Guard, just to name a few groups, may need to be notified during or after a fire incident to comply with legislation requirements. Provincial support services include welfare and hardship allowances for individuals, families and other groups.

Private and Public Agencies

Groups such as the Red Cross or Salvation Army provide food, shelter and communications for people who have been affected by personal disasters.

Chapter 4: Liability

Liability

The issue of liability has become commonplace in recent years. Today, insurance companies initiate legal action against the city and its fire department as a matter of course in an attempt to recover on fire insurance claims. All actions by the fire department and its staff come into question. Fire communicators must at all times be aware that their actions and all recorded information may be a matter of record during any court proceedings associated with the call or subsequent dispatch.

While the likelihood of a civil action for negligence is small, it is imperative that the fire communicator at all times be thorough in process and compliant in following established policies, procedures and guidelines. Standard Operating Procedures (SOPs) are developed for the protection of both the fire agency and the public. Individual employees who follow these prescribed procedures to the best of their ability and training are not likely to be held personally responsible for negligence by the courts.

Avoiding Liability

Agency Methods

Agencies can mitigate their liability risks by:

- Clearly documenting all employee job descriptions so that they are explicit and well defined.
- Using recognized Human Resources standards for screening and hiring employees.
- Having a comprehensive program of training that includes thoroughly documented practical and written applications and assessments.
- Ensuring that all employees complete competency training and that their assessments are reliable and valid.

- Regularly conducting a review of agency policies and procedures to ensure that they are current in the areas of:
  – education and certification
  – quality assurance
  – department program management
  – incident response

Standard Operational Guidelines (SOGs) are replacing the more familiar Standard Operating Procedures (SOPs). This is due in part to SOPs being challenged in court (in the US) when unusual situations did not fit with SOPs and hence there were no procedures to follow. Employees were forced to adapt as best they could with results that were not always satisfactory. If the situation was not covered by an SOP for employees to follow, the employer was found to have some liability.

SOGs are written in more general terms and provide employees with guidelines for dealing with a particular type of situation. It is better for training, less restrictive, empowers the employee and covers a range of situations and therefore reduces potential liability.

Individual Methods

Strategies to decrease liability for the individual employee include:

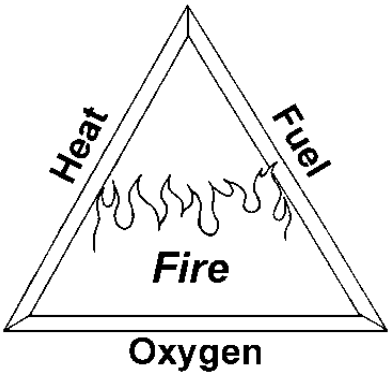
- Familiarity with and adherence to all policies, procedures and guidelines.
- Participation in re-certification training on a regular basis.

With respect to possible liability for a specific incident, the fire communicator must be prepared to question or challenge any direct orders from supervisors or fellow workers that deviate from established procedures. Should such orders be given, it is essential to document all processes that took place during the period of time on the incident.

SECTION 2
FIRE SERVICE OPERATIONS

Chapter 1:

Fire Basics



Three basic conditions must exist for fire to happen.
This is called the Fire Triangle and is a useful visual aid for basic fires.

There must be sufficient:

- oxygen
- fuel
- heat

If any one of the three is missing, there is no fire.

Fire prevention, containment, control and extinguishment are based on this reality. Let's look at each of the three conditions separately.

Fuel – When a fire runs out of fuel it will go out. Fuel can be removed naturally, as where the fire has consumed all the burnable fuel, or, manually, by mechanically or chemically removing the fuel from the fire. Fuel separation is an important factor in *wildland* fire suppression, and is the basis for most major tactics in forest fire fighting.

Oxygen – Oxygen may be removed from a fire by smothering it with an blanket of; foam, inert gas (e.g., carbon dioxide, Halon), dry chemicals, or, enclosing it where the fire will quickly use up all of the available oxygen, a candle snuffer uses this principle.

CAUTION – Once the fire is out, the fuel is still hot enough to ignite again. Care must be taken not to allow oxygen to come in contact with the hot fuel, or re-ignition will take place.

Heat – There must be enough heat to raise the material to its ignition temperature in order for combustion. Ignition temperature is the minimum temperature to which a substance must be heated before it will spontaneously burn independently of the source of heat. Without sufficient heat, a fire cannot start, and it cannot continue. Heat can be removed by dousing some types of fire with water; the water turns to steam, taking the heat with it. Turning off the electricity in an electrical fire removes the heat source.

There is a fourth essential element of fire: the sustained chemical reaction. This has led to development of the three dimensional fire triangle or Fire Tetrahedron. Combustion is the chemical reaction that feeds a fire more heat and allows it to continue. With most types of fires, the old fire triangle model works well enough, but when the fire involves burning metals, like lithium, magnesium, etc., it becomes useful to consider the chemistry of combustion. Putting water on such a fire could result in the fire getting hotter (or even exploding) because such metals can react with water in an exothermic reaction to produce flammable hydrogen gas. Therefore, other specialized chemicals must typically be used to break the chain reaction of metallic combustion and stop the fire.

Classification of Fires

Fires are classified into the four basic groups described below, with each class requiring specific treatment. More than one class of fire may be present at a given fire. For example, in structure and vehicle fires, several classifications may be present at the same time due to the variety of materials used in construction or which may be stored/carried.

Class A Fires

Class A Fires involve combustible materials such as wood, paper, cotton cloth or any other flammable materials. This type of fire can be extinguished with water or water-based liquids, which remove the heat from the event or some types of foam and dry chemical extinguishers with a Class A rating that will smother and also reduce the heat generated.

Class B Fires

Class B fires usually involve flammable petroleum liquids such as gasoline, oil, grease, and cleaning solutions. Because these fuels are lighter than water, they will float and spread the flame if water is used. Dry chemical or foam extinguishers with a Class B rating are used to blanket the fire and remove the oxygen from the equation. Baking soda can be used in the home for small grease or fat fires to do the same thing.

Class C Fires

Electricity is the key element in this class of fire. Motors, transformers, generators, appliances or switch panels may be involved and are generally the result of overloads or short circuits. In addition to the risk of burns, this type of fire also carries the danger of electrocution. The primary goal is to disconnect the power source as soon as possible. The fire should be dealt with using CO_2, which excludes oxygen, or a dry chemical extinguisher having a Class C rating. Liquids or fire extinguishers containing liquids should not be used as they conduct electricity.

Class D Fires

Certain combustible metals make up the hazards in this class of fire. Magnesium (found in some vehicle power trains), titanium, sodium, and potassium all burn with a very high temperature flame. Water may actually increase the fire due to reactivity with the material. Fire extinguishers in this class are filled with a special powder. In the case of a small fire, *dry* sand can be used.

Fire Extinguishers

A fire extinguisher is an active fire protection device used to extinguish or control a fire, often in emergency situations. Typically, a fire extinguisher consists of a handheld cylindrical pressure vessel containing an agent which can be discharged to extinguish a fire.

The typical steps for operating a fire extinguisher (described by the acronym PASS) are:

P - Pull the safety pin
A - Aim the nozzle at the base of the fire, from a safe distance (about six feet away)
S - Squeeze the handle
S - Sweep the extinguisher from side to side while aiming at the base of the fire

There are various types of extinguishers, which are used for different types of fires; using the wrong type can worsen the fire hazard. A fire extinguisher may emit a solid, liquid, or gaseous chemical as an extinguishing agent.

Extinguishing Agents

Water
Water is the most common chemical for Class A fires and if available in sufficient volume can be quite effective. Water extinguishes flame by cooling the fuel surfaces and thereby reduces the consumption rate of the fuel.

Foams
Foams are commonly used on class B fires, and are also effective on class A fires. These are mainly water based, with a foaming agent so that the foam can float on top of the burning liquid and break the interaction between the flames and the fuel surface. Ordinary foams work better if poured but it is not critical. A protein foam was used for fire suppression in aviation crashes until the 1960s development of *light water*, also known as Aqueous Film-Forming Foam (or AFFF). Carbon dioxide (later sodium bicarbonate) extinguishers were used to knock down the flames and foam used to prevent re-ignition of

the fuel fumes. Foaming the runway can reduce friction and sparks in a crash landing and protein foam continue to be used for that purpose.

Dry Powder / Dry Chemical

For classes B and C, a dry powder is used. There are two main dry powder chemistries in use: BC powder and ABC powder.

BC powder is either sodium bicarbonate or potassium bicarbonate, finely powdered and propelled by carbon dioxide or nitrogen. Similarly to almost all extinguishing agents the powders acts as a thermal ballast making the flames too cool for the chemical reactions to continue. Some powders also provide a minor chemical inhibition, although this effect is relatively weak. These powders thus provide rapid knockdown of flame fronts, but may not keep the fire suppressed. Consequently, they are often used in conjunction with foam for attacking large Class B fires.

ABC powder is monoammonium phosphate and/or ammonium sulphate. As well as suppressing the flame in the air, it also melts at a low temperature to form a layer of slag which excludes the gas and heat transfer at the fuel surface. For this reason it can also be effective against class A fires. ABC powder is usually the best agent for fires involving multiple classes. Both types of powders can also be used on electrical fires, but provide a significant cleanup and corrosion problem that is likely to make the electrical equipment unsalvageable.

Carbon dioxide

Carbon dioxide (CO_2) also works on classes B and C and works by suffocating the fire. Carbon dioxide will not burn and displaces air. Carbon dioxide can be used on electrical fires because, being a gas, it does not leave residues which might further harm the damaged equipment. Carbon dioxide extinguishers have a horn on the end of the hose. Due to the extreme cold of the carbon dioxide that is expelled from an extinguisher, it should not be touched.

Halon Extinguishers

There has been a lot of controversy about the use of Halon gas charged fire extinguishers. At one point it was thought to be the safest way to fight fires in areas with electronic equipment as it reacts with oxygen to remove it from the situation and therefore smother the flame. Unfortunately there is a growing body of evidence that it is a carcinogenic substance. These extinguishers still exist, but new systems are no longer installed.

Chapter 2:

Fire Service Apparatus Familiarization

To function efficiently, a dispatcher must be familiar with the general types of apparatus used in the Fire Service, the equipment contained on each apparatus and more importantly, the specific apparatus used by the department which he/she will dispatch.

From early on, to effectively put the fire out, it was understood that there is a need for four components; an affective extinguishing agent - water, a source had to be found, a way of delivering the water to the fire and a way of maximizing the delivery of the water once it got there.

Water sources typically, were ponds, streams and lakes. Wells brought water closer to structures and with the advent of pressure water systems the installation of hydrants were, and are today, the primary source of water for fire suppression. Hose was invented as a method of get the water from the source to the fire. The early hose apparatus were hand drawn by volunteers, from the fire hall to the fire scene where it could be used in place of the bucket brigades that had been the practice. Pumping is the way of maximizing the delivery of the water at the fire scene.

Early pump apparatus were also hand-drawn by volunteers from the Fire hall to the fire scene. On March 2, 1852, Greenwood's Eagle Ironworks of Cincinnati OH, began construction of the world's first practical steam-powered fire engine. Earlier inventors had manufactured steam-powered fire engines, but the Cincinnati version proved to be much more practical, as the steam engine could begin pumping water out of a water source in ten minutes. Earlier engines took significantly longer.

Standard Apparatus

Fire departments use many types of motorized fire vehicles, referred to as *apparatus*. Each piece of apparatus has a specific use or function. Because each department tailors its apparatus to its own requirements, there are as many

configurations for these apparatus as there are vehicles. The four general types of apparatus are *pumpers, tankers, aerial devices, and rescue vehicles.* Fire departments in other areas of the country also utilize *bush vehicles*.

Pumpers

The apparatus specifically designed for pumping water through hose under pressure are called a *pump*, or *engine*, is the primary response vehicle in most fire halls, and the tactics used on the fireground is based around this vehicle. Its main purpose is to supply and maintain steady pressure to fire streams. Most fire departments use triple *combination pumpers* as their standard pumpers, so called because it carries a fire pump, water tank and hose. Pumpers are rated in terms of their pumping capacity, that is, the volume of water the pump can discharge per minute at a given pressure. Pumpers are rated by their pumping capacity, usually starting at 750 GPM (gallons per minute), going to 2250 GPM in 250-gallon increments; the most common pumping capacities are 1250 GPM and 1500 GPM. These pumpers also carry their own hose supply, water supplies of 300 – 500 gallons and a complement of ground ladders. In addition, they will carry hand and power tools for fireground operations as well as some salvage tools, medical equipment and some rescue tools.

Hose wagon or *hose pump* is a term used by some departments to describe the second pumper stationed in a fire hall, or depending on the operating procedures of the department, it may serve a direct role in the initial lay into the fire scene. Traditionally, hose wagons were apparatus whose sole purpose was to carry hose, rarely used today except for specialized operations.

Tankers (Tender)

Tankers are mobile tanks of water that may also be coupled to a pump and therefore capable of delivering water under pressure. They are generally limited to fire departments where municipal water systems are not universal within the district and in areas that are not serviced by fire hydrants. Tanker capacity is usually between 1000 gallons (4500L) and 2500 gallons (11,400L).

Tankers serve two purposes:

- They provide the water supply to back up the pumper's water supply when fighting fires located beyond the municipal water system.
- They supplement a low volume of water from the hydrant.

Tankers are generally used in two ways:

- They shuttle back and forth between water supply and fire scene, dumping water into a portable reservoir from which the pumper is drawing water.
- They may connect directly to the intake of the pumper in an operation known as nursing.

Both pumpers and tankers carry small equipment, as well as hose and fittings required for the delivery of water through hose. Given the fact that a tanker operates in support of a pumper they are also considered to be a Tender. Fire communicators must be aware of the tanker response areas and water supply areas of both their own departments and any other departments they rely on for mutual aid.

Aerial Devices

Aerial devices have hydraulically driven extension ladders or articulated booms mounted on specially designed vehicle chassis, and depending on the configuration may be termed ladders or trucks or aerials or platforms or towers. Aerial devices range in height from approximately 40' to 200'.

These apparatus serve two purposes:

1. They are used for rescue above the working height of a ground ladder, that of about a two story building.
2. They allow firefighters to assess the roof of a building to ventilate or to operate as a water tower and apply water to elevated areas.

Ladder & Truck – is a term for apparatus equipped with a hydraulic extension ladder mounted of a turn-table that allow for 360 degree rotation to all allow the ladder to be operated where necessary. The total length of these extension ladder aerial devices is typically 100 feet.

The term *aerial* or *aerial ladder* is often used to differentiate between apparatus mounted ladders and the ground ladders that are carried on most fire apparatus.

Tower & Platform – a term for apparatus that may have either an extension ladder, as above, or articulating boom type aerial device, but all will be equipped with a bucket (platform) at the end of the aerial device making climbing un-necessary. The advantage of a telescoping articulating boom type aerial device is that it enables firefighters to operate below grade and at angles not possible with a straight aerial ladder.

As mentioned, each fire department purchases its apparatus to meet local requirements. The larger ladder and tower apparatus may not be required if building heights don't warrant aerial devices designed to reach 100 feet or more. Departments may purchase pumper apparatus that also have an aerial device attached. Two examples are;

Quints - are a combination type of apparatus having all the capabilities of a pumper / engine, but also equipped with a aerial ladder device. The term quint comes from the fact that it is a triple combination apparatus (typical pumper), but also having a wide compliment of ground ladders and an aerial ladder. The five components of a quint are; a pump, a tank of water, hose, ground ladders and aerial ladder.

Squirt - is a piece of apparatus that consists of a nozzle on an articulated boom mounted on the rear of a pumper. It is used as a water tower whenever an elevated fire stream is required, but does not have a platform or any climbing features.

Rescue Vehicles

Rescue vehicles are designed to house and transport a variety of tools and equipment necessary for rescue operations at either fire or non-fire incidents. Rescue apparatus are designed, built and equipped to support local requirements of rescue response. Rescue companies' primary roles are to

provide medical aid, forcible entry, search and rescue on the fireground, and to respond to a wide range of specialized rescue calls.

Most rescue apparatus are built to a variety of specifications and often referred to as light, medium or heavy rescue. These units may be utility or van style vehicles designed for quick response to medical aid incidents and carry light extrication and forcible entry tools.

Medium-sized rescue units carry a complement of rescue and medical supplies to support fireground and non-fire rescue operations. Built on three to five ton truck chassis, these larger vehicles can carry a wider array of rescue and extrication equipment such as Jaws of Life, air bags, cribbing, block and tackle, powered hydraulic tools, etc.

Heavy duty rescue units are generally custom made to local specifications. They are usually large vehicles capable of carrying quantities of shoring and cribbing material, construction and trench jacks, and the type of rescue and extrication equipment found on light and medium rescue vehicles. Many heavy rescue apparatus also double as an air supply or lighting unit, making it more versatile.

Brush Vehicles

Brush or Bush vehicles are lightweight, four wheel drive vehicles able to cover rough terrain. They often carry a small water tank, pump and hose, as well as hand pumps and tools used for fighting small brush fires. Their function is to contain small fires quickly before they spread and become major ground fires. If a fire department has a significant interface with forested or rural areas, it may have one or more bush vehicles.

Specialized Apparatus

Specialized apparatus and its function varies according to local department requirements. In a composite or paid fire department, specialized vehicles are generally not staffed until the need arises, at which time on duty personnel are

drawn from other assignments, or call-out or call-back to duty crews are used. The most common types of special apparatus are:

Hazardous Materials Vehicles

Hazardous materials (HazMat) vehicles are specifically designed and equipped to respond to hazardous materials spills. Most HazMat vehicles are equipped to support the HazMat team functions. Comprehensive reference library and computerized chemical databases would be located in the vehicle resource area. Various encapsulating and entry suits must be stored in the vehicle for the *entry teams*. Sophisticated detection and monitoring equipment is carried and used by team technicians. Containment and decontamination (DeCon) equipment must be transported to the scene. Specialty tools for plugging and patching leaks are also carried on this vehicle. Most of these units are not permanently staffed, but are activated on a needs basis. The unit is usually cross-staffed by on duty qualified personnel assigned to other fire apparatus.

Lighting/Air Apparatus

This equipment may be in a standalone vehicle or may be built into another vehicle. Lighting apparatus includes lighting units such as generators, lighting sets, fans, power tools, cords and distribution systems. Air apparatus is used to refill breathing air bottles used with Self Contained Breathing Apparatus (SCBA) for active fire fighters. Air apparatus typically includes air compressors, filtering systems, spare air bottles, and pressure testing equipment. When transported to the scene, it will be located at a suitable distance from the incident location. Both types of apparatus may be separate or combined as one. They are un-staffed units and are activated on a needs basis, generally by call-out personnel.

Crash Rescue Apparatus

Crash rescue apparatus is specifically designed for aircraft crash rescue firefighting and is located at controlled airports. This specialty apparatus features relatively good acceleration, ability to move on rough terrains outside

the runway and airport area, large water capacity, fire fighting foam tank, a high-capacity pump, and water/foam cannons with a good throw distance. These features give the airport crash vehicles a capability to reach an airplane rapidly, and rapidly put out large fires with jet fuel involved.

There are primarily three types of crash rescue apparatus:

1. Foam tenders
2. Dry chemical
3. Combination foam and dry chemical

Depending on the location, crash rescue apparatus may be supplied by nurse tenders (water tankers). Crash rescue apparatus are designed for rapid response and firefighting operations from interior cab systems. Combination apparatus are generally built as rapid intervention vehicles and are used for quick knockdown and building rescue paths.

Command Vehicles

Command vehicles are mobile command posts, generally assigned to the department responding Chief Officer, which serve as a command post for both fire and non-fire operations. The command vehicle may also be a large vehicle equipped to serve as a communications center depending on local operations.

Fire Boats

Fire boats are designed and built to meet local needs and applications, primarily to pump large volumes of water from deck-mounted master turrets or relay-pump water to supply land based pumpers. Most fire boats are equipped with fire hose that may be advanced onto vessels involved in fire.

Support Vehicles

Many large fire departments have vehicles that are used to provide on- site support for firefighters working at large scale events. While the support needs of fire fighting operations is consistent, for the most part, the local capabilities is as varied as the community itself. Fire departments imply ingenuity in their

efforts to meet operational requirements, which results in a wide range of support apparatus.

Tenders

Tenders are support vehicles that respond with other apparatus for the specific purpose of supporting the primary vehicle in its operations. For example a *HazMat Tender* will respond with a designated HazMat vehicle because it carries an assortment of equipment that will not fit on the primary HazMat unit. Often tenders provide an adjunct role in supporting the overall operation as in the case of a Tanker, to provide an additional water source where non-existent or to augment when volumes are low.

Cars & Vans

Most fire departments have a number of utility vehicles that are radio controlled. These may be cars or small trucks assigned to operational officers of various ranks that will be required to respond to emergencies or to transport personnel, equipment and for other related duties.

Small Equipment on Apparatus

Small Equipment

All fire apparatus carry a certain amount of *small equipment* such as hand tools and small portable gas or electrically operated equipment. The type of small equipment carried depends on the role the apparatus plays at the incident scene.

A wide array of small equipment such as ropes, axes, pike poles, wrecking bars, fire extinguishers of various types, and self contained breathing apparatus (SCBA) are common and are carried on all fire apparatus. SCBA, tanks of compressed breathing air, are worn by all fire fighters when they are required to work in an atmosphere that poses a risk to their health. Chainsaws, circular saws, (electric or gasoline powered) are used by firefighters to cut wood, particularly roof sheeting to open up a pathway to rid the building of built-up heat and smoke. Electrical generators may be stand-alone units or may be built

into the apparatus and must also have sufficient electrical cord for maximum utility. Water and gas shut-off keys are long-handled wrenches designed to shut off water or natural gas outside the building to control a potential emergency situation.

Hose fittings, nozzles, spanners (wrenches) for opening hydrants and hose clamps are normally found on pumpers. Hose fittings are used to connect lengths of hose together, attach hose of various diameters together (reducers or increasers) or connect two hoses to one (wye or siamese). Nozzles of various types are used to provide different spray patterns depending on the type of fire.

Smoke ejectors/fans, generators, flood lights, water and gas shut-off keys, and bolt cutters will be carried on aerial ladder trucks. Smoke ejectors/fans assist in the removal of heat, smoke or fumes from a structure. These units are placed in openings to force air into, or draw smoke from, the structure.

Rescue units come equipped with Jaws of Life, including cutter and spreader jaws, which are used to gain entry to wreckage, particularly in the event of motor vehicle accidents. They are combined with hydraulic and air jacks.

Various types of vehicles have certain capabilities. Fire communicators need to know what equipment is on which units in their department.

Role of Apparatus

The design of various apparatus, and the tools carried on each, relates fully to the *Operational Needs* of the fire fighters at a fire scene. For example:

- *Engines, Quint* and *Tankers* provide the water and deliver it under pressure for suppression of fire.
- *Ladders, Quint* and *Towers* provide the access to elevated positions to aid in rescue and fire fighting operations, applying water from elevated positions.
- *Rescue* and *Specialty* apparatus carry tools and special trained personnel that also aid in operations.

- *Support* vehicles, by definition, assist the operation.

The *type* of apparatus and the *number of each type* of apparatus purchased by a fire department will vary based on factors, such as the size of the community, geographical area and population density. Given that the ability to fund the local fire department is borne by the city tax payers Fire Chiefs are challenged with the question of how much fire suppression equipment will be needed to respond to, and control, emergencies within the jurisdiction.

Fire Department Response Objectives

When a fire does occur that threatens life and property the local fire department is called into action. In general all firefighters have the same response objective, in other words – in order of priority, when the fire department arrives at a fire scene the following **objectives** set the priorities and will dictate the **tactics** employed in the first few minute.

The tactical objectives are; Rescue, Suppression, Ventilation, Salvage, and Overhaul

Rescue or life-safety is the number one priority and response objective of every firefighter. When responding to a fire in an occupied house the first arriving fire company will focus on trying to account for every person living in that house. All actions taken will be directed at that effort before the saving of property begins. As a fire communicator every effort should be taken to determine if anyone is in the house and this information should be relayed to responding apparatus as soon as it is known.

Fire Suppression is the act of controlling and extinguishment of the fire. This is may be done in consort with the act of rescue if it is necessary to enter the burning structure to affect a rescue. At this point the focus is on containing the fire to allow firefighters time to do a search for possible victims.

Generally the objective of suppression has three secondary objective or tasks. First is to protect exposures. This is intended to contain the fire to the building or structure of origin, thus preventing its spread. Second, is the confinement of

the fire to the room or point of origin. This objective can only be met if the fire has not advanced too far and the structure has not been compromised.

The third step is to extinguish the fire or to put the fire out. The objectives are not complete at this point but the urgency of the situation has been brought under control.

Ventilation is the act of opening up the structure in a controlled manner so that trapped heat and smoke can be removed from the structure. This process permits firefighters to more safely enter into the building and see where victims are or find the point of origin of the fire. This process of ventilation is done in concert with rescue or suppression activities or anytime firefighters are working inside a structure that is on fire.

Salvage is the conservation of property from further damage that may result from fire suppression activities. This operation also is done while firefighters are actively engaged is fire suppression activities. Salvage operations are manpower intensive and are a focus in larger multi-story buildings. Salvage includes the following; the removal of valued items from the structure ahead of the advancing fire. The covering of furnishings to prevent water damage that may occur during fire fighting operations and the removal of water that may be accumulating in basement areas by pumping or the use of water vacuums.

Overhaul is defined as the task of examining a structure after a fire is extinguished to be sure that no hidden spark is left that will cause a rekindle, or flare-up, after the fire department has left the scene. Overhaul is done with the focus on ensuring that no further damage is done by fire. Firefighters attempt to do as little damage as possible in accomplishing this objective.

Chapter 3:
Fire Hall and Apparatus Location

Projected Needs of the Fire Department

Every fire organization makes an attempt to locate and group appropriate apparatus to best serve the community needs. Generally fire departments grow with the region they serve. When villages expand to become towns, then cities, geographically they become so spread out that the capability of existing fire fighting apparatus is seen as insufficient. It is then when expansion takes place in the form of new fire halls. The type of fire apparatus purchased for the new fire hall is largely determined by the type of service required. Sometimes the location of fire halls may be dictated by projected needs rather than current reality. The following possible locations, apparatus and activities are based on a logical application of this principle.

Headquarters

Headquarters for the department is most often located in the main fire hall, which could have been the first built in the heart of the original town site. Over time and with urban expansion these management components may expand with department growth or moved to more commercial office space

The following functions may be located at headquarters:

- Fire Chief's office – weekdays administration.
- Deputy Chief's office – weekdays administration.
- Assistant Chief's office – weekdays administration.
- Battalion Chief's office – four Chief Officers share the role of the Duty Chief, following a shift rotation covering 24/7, after hours and weekends.
- Fire Investigation office – on duty investigator
- Rescue & Safety Office – weekdays administration.
- Training Office – weekdays administration.

- Pre-Fire Planning Office – weekdays administration.

Fire Halls

Areas served by a fire department will comprise various mixes of buildings, uses and occupancy. Each hall must be located and staffed to best suit the needs of the area. In a high to medium density commercial office and high to medium density residential, consisting of single and multi-story as well as high-rise buildings, the apparatus in each hall might consist of:

- one or two *engine* companies

The following units will be placed strategically:

- *truck* company
- *ladder* company

A *generator* unit and an *air* unit may be housed together in a fire hall that is centrally located to serve all areas.

In a residential area consisting of homes on large lots there may only be an *engine* company.

In areas of heavy and light industrial and commercial properties, the apparatus may include:

- *engine* company
- *rescue* company

A mix of high to medium density commercial office and medium to light industrial, consisting of multi-story and warehouse type buildings has the assignment of:

- *engine* company
- *ladder* company

In fire halls strategically located for this area, the following units will if possible be placed centrally in one location so that they are able to respond quickly to all areas:

- Technical Rescue Team (*cross-staffed* with another company so that when one responds the other is *Out of Service*)
- HazMat Response Team (*cross-staffed* with a another company so when one responds the other is Out of Service)

In light rural residential areas the fire hall apparatus may consist of:

- *engine* company
- *tanker* company
- *brush* company
- *reserve* tanker

For a mix of live-aboard and storage marinas and water front commercial / industrial areas there will be consideration for:

- mooring for a fireboat

The fire hall designated as the *training academy* might be in a rural area that can accommodate a large training area and props used to make scenarios as realistic as possible. While this facility may not be staffed for fire suppression response, it may have assigned apparatus or storage for *reserve, engine, ladder* and *brush* apparatus that are used for training purposes. Off duty personnel may be called in to staff these units to augment suppression apparatus as required. A *spare engine* and *spare ladder* are housed in this fire hall. When placed into service, this apparatus assumes the identity of the unit it replaces. Spare apparatus is intended to replace another piece of apparatus that is out of service for repair. Typically it is not fully equipped, but requires the small equipment to be moved over from the unit it is replacing.

In most fire departments the primary piece of apparatus is the *pumper*. Therefore .each fire hall will house at a minimum one pumper (*engine*

company). This unit is the focus of most fire department response plans. It travels through traffic relatively quickly compared to the much larger and heavier aerial ladder and tower trucks. Pumpers are usually equipped and staffed to respond to all fire related incidents, as well as to medical aid, basic rescue and general types of calls that do not require specialty tools or apparatus.

The most common secondary piece of apparatus is the *aerial ladder truck.* This unit is equipped with a 100-foot extension ladder that may be used for exterior rescue operations where the ladder is placed to create an external fire escape. This unit can also assist fire fighting operations as a water tower. *Aerial ladder* (*ladder* or *truck* companies) would normally be housed with an engine company and respond as a team to structure fires.

Rescue apparatus are fully equipped units that can be placed in service when staffed to an operational level. They will be placed in service when additional companies are required.

SECTION 3
FIRE EMERGENCY CALL PROCESSING

Chapter 1:

Fire Call Assessment Model

Fire emergency call takers need to understand what is occurring prior to completing a written or computer report that will be used to initiate apparatus response. New or inexperienced call takers commonly err by:

- obtaining too little information to properly determine the appropriate response, or
- spending too much time getting information that is not needed, thereby delaying the initial response of fire apparatus.

To quickly determine the appropriate response to an emergency situation requires a call taker to differentiate between information that is absolutely essential prior to dispatching apparatus (*Primary*), and information that is necessary to obtain after dispatching apparatus (*Secondary*). It is far easier to cancel the response of apparatus while en route to a scene than to make the error of not dispatching them initially and wasting valuable time that could make a difference

By questioning each caller using a standardized technique, call takers can initiate appropriate apparatus response as quickly as possible. To increase speed and accuracy, the call taker must develop a systematic method of obtaining necessary *primary and secondary* information. Whether communication center staff is assigned on a rotational or permanent basis, all call takers should approach each emergency call using a similar method.

Primary information is the information required for the call taker to determine the address or location and nature of an incident as quickly as possible, and to

determine the category of the call. Sometimes, two or three pieces of information may identify the *where* and the *what* of the incident. In other situations more information may be required. *Secondary* information is other information required to complete the report or to supplement the primary information.

Fire Call Assessment Model

The *Fire Call Assessment Model* is a system of six principal steps to follow when taking emergency calls, as follows:

1. Answer all emergency telephone lines by immediately identifying your fire department.
2. Ask the caller for the address or location of the incident.
3. Determine from the caller what is happening.
4. Tell the caller the fire department is responding.
5. Ask the caller all required secondary information questions.
6. Reassure the caller

Preparation, repetition and experience help to increase speed and accuracy in using the Fire Call Assessment Model.

Answer all emergency telephone lines by immediately identifying your fire department.

This is the first step in gathering the required *primary* information. By completing this initial step, the caller who may be in a panic or stressful state is assured they have reached or been transferred to the correct agency. This allows the call taker to begin questioning the caller immediately.

Ask the caller for the address or location of the incident (Primary Information).

This is the call taker's first priority. Callers may need to disconnect the telephone line or end the conversation if they or someone else is in danger. Without address or location information, fire crews cannot respond. It is an error for the call taker to rely completely on the address or location information that appears on a 9-1-1 information screen (ANI/ALI). In certain situations, such as possible structure fires, the caller may not be calling from the exact

location of the emergency. There may also be circumstances in which the caller cannot provide an exact address or location, such as when the caller is a small child or an individual who is not familiar with the area. In such situations a 9-1-1 information screen becomes a valuable tool as a reference point when questioning the caller about their surroundings in an attempt to determine the exact location of the emergency.

Particulars about an identified structure are of specific concern to the initial dispatch of apparatus to an emergency. A single family residence, apartment complex or commercial building often requires the assignment of different apparatus during the initial response.

Determine from the caller what is happening (Primary Information). This must be accomplished quickly and accurately. Most callers willingly provide this information. It is the call taker's responsibility to control the conversation and obtain enough information to determine the nature of the call that can be categorized from a list of call types. The call type list recommends the appropriate apparatus to dispatch. It is at this point that some call takers feel the need to obtain *all* the information regarding an incident, which may result in a possible delay of an emergency response. As most fire departments have a predetermined apparatus assignment to any given type of emergency situation, all that is often necessary to initiate an emergency response is for the call taker to determine the type of emergency.

The challenge for the call taker is to ask only those questions that clarify what the caller knows about the emergency. Examples of some questions that assist with clarification are:

- What does it smell like? (smoke? chemicals?) Are the wires burning? Is the fire alarm (bells) still ringing?

The answers to these types of questions can provide crucial information as to the basic urgency of the situation which will affect the dispatch of appropriate fire apparatus.

- Is there smoke showing? Is the smoke black, blue or white?

These questions may help to determine if there is an actual fire. Black smoke means the presence of plastics and manmade products found in everyday living. Blue smoke can mean wood and natural products are burning and white smoke may not be smoke at all as it indicates the presents of water vapour (steam).

- Can you see any flames? Where are they coming from?

The answer to these types of questions may escalate the call if there is an indication of *smoke showing*. Smoke and flame visible confirms that a fire has a significant head start and will likely require more fire apparatus to control. A quick dispatch of fire companies along with accurate information provide firefighters with a picture of what is happening at the scene.

- Is it in a garage? Is the garage attached to the residence? Is there a vehicle inside? Is anyone inside the garage?

The answers to these questions can help determine the severity of the situation. If a vehicle is on fire in a garage that is attached to a residence, there is a greater potential for the situation to worsen and develop into a full structure fire than if the vehicle is in the middle of an intersection with no buildings surrounding it.

- Are there any wires down? Are the wires arcing (sparking)? Can you tell if the wires are electrical, telephone or cable?

These questions help to determine which utility or outside agencies need to be advised. Requesting response from a electric utility company prior to the arrival of responding apparatus saves valuable time, and possibly prevents fire crews at the scene waiting for service to be cut off or access to be obtained.

Inform the caller that the fire department is responding.

If a caller perceives that the call interrogation process is taking too long, there is a potential for the caller to become excited, panicked and even angry. Communicating to the caller that help is on the way allows the call taker to obtain all additional secondary information that confirms and further clarifies

what is happening, and will be of assistance to responding fire apparatus. At this step in the Call Assessment Model, the call taker has enough information to dispatch initial fire apparatus. Any additional information obtained from the caller may indicate the requirement of additional apparatus, but by initiating a response at this point, the time of arrival from the earliest dispatched apparatus will be sooner, saving valuable response time.

Ask the caller all required Secondary Information questions.
Questioning the caller about additional on scene information assists the call taker to determine the level of priority and potential dangers to fire personnel or citizens. Obtaining secondary information from a caller also assists the call taker to determine if additional outside resources or agencies are required to be notified prior to the arrival of responding apparatus. It is a common mistake for call takers not to question callers further for more specific information while apparatus is responding. The call taker's responsibility is to provide any information to responding apparatus that may have an impact on what responders are expecting to encounter, based on the initial information provided at the time of dispatch.

Fire agencies may have differing procedural requirement for completing a call report. Some questions call takers may be required to obtain secondary information are:

- Ask the caller for a call back telephone number.

Without this information the ability to verify any key information provided incorrectly by a caller is difficult. If the call taker is required to determine the severity of a situation in relation to other emergency incidents, a call back telephone number will assist in obtaining updated information necessary to determine the priority of emergency responses.

- What is your name, address?

This information is necessary if the situation requires an investigation into the cause of a fire. It is valuable information for both fire investigators and police

agencies. If this information is not obtained, there are no means to contact witnesses who may have seen or heard information related to a fire.

Other relevant questions relating to a given situation are part of the repertoire of an experienced fire communicator.

Reassure the caller.
Reassuring callers that the fire department is responding may prevent them from further endangering themselves or others due to a sense that no one is coming. By asking "*Can you hear the fire trucks?*" or stating, "*We're on the way.*" you reassure the caller that help will be with them soon.

During calls when there is a chance the situation may change or new information may assist the field units, always tell the caller to *"Call back if the situation changes."*

Provide the caller with safety instructions.
If it is the policy of the fire agency then fire communicators should assist the caller by providing the approved pre-arrival instructions. Giving instruction to take action to the caller, who may or may not be able to safely carry them out, is an issue that is widely debated in communication centers. Callers may decide to become involved in a rescue attempt or attempt to suppress a fire without consideration for their own personal safety. Simple safety instructions such as *"get everyone out of the house," "meet the fire crew outside,"* or *"stay away from the area"* alert the caller to the seriousness of the situation.

Termination of Calls

When ending a call, ensure that the caller is clear the conversation is about to be terminated. . By using a final statement such as *"The fire department is on the way, so I'm going to let you go now,"* or a similar phrase it becomes clear that the call is about to end. For calls that are routine in nature be polite and thank the caller if appropriate.

When the situation involves a structure fire and it is apparent that the caller may be in imminent danger and trapped, every effort should be made to stay on the line with the caller until fire companies arrive on scene. This contact is

important to the person in danger but also allows the call taker to obtain information about the caller's relative location in the building. That relayed information can assist firefighters in affecting a rescue.

In summary, for all calls, remember to:

- Obtain the address and / or location of the incident.
- Obtain appropriate pertinent information.
- Ask all specific questions.
- Obtain other appropriate information necessary to determine the nature of the call.
- Thoroughly question the caller to gain additional information, to assist the responding units with routing directions, or hazards they may encounter on arrival.
- Keep callers who are in imminent danger, or who are trapped on the line for constant updates to the dispatcher and other attending agencies or units.
- Reassure caller that the fire department is responding.
- Instruct caller to call back if conditions change.

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Chapter 2:

Fire Call Processing Procedures

Pass Information to Dispatcher

Ensure that the information is handed over to the dispatcher in a timely manner, either manually or electronically. In many cases this will mean sending the information as soon as you are aware that this is a high priority call, but before you have all the details. Supplementary information can be passed on to update field units responding to an incident.

Support Dispatcher / Field Units

Other personnel, such as the support dispatchers and field units, are also part of the dispatching equation. All team members must cooperate in passing information and otherwise support the dispatcher and supervisor.

The communication team consists of call takers, dispatchers, and supervisors within the center. Each team member has unique knowledge, skills, and abilities required for effective communication.

Team members count on each other during heavy workloads, during times of stress or with difficult calls or callers. Because the consequences of incorrect actions in emergency call taking can have tragic results, it is important for team members to be able to ask each other for help in difficult situations, and to help each other out. Pride or ignorance ought not to stand in the way of asking for assistance.

Can the Report Be Dispatched?

Efficiency is dependent on the ability of communicators to exercise a number of skills, such as emotional control, rational analysis, verbal communications skills, conflict resolution, keyboarding, and listening skills.

Effective radio dispatch communications is dependent on both accuracy and speed; one cannot be sacrificed for the other.

The communicator is responsible to ensure that the information gathered is COMPLETE, CONCISE, CLEAR, and CORRECT (The four Cs).

Communicators need to evaluate the reports they generate. A report must be self-explanatory since it is often directed to a person removed from the source of the incident. The recipient depends on the thoroughness and accuracy of the report to obtain the facts. If any part of the communication requires further explanation, the report has failed to serve its purpose. In evaluating the report, the following questions should be asked:

Is The Report Complete?

- Does it contain all the information necessary to accomplish its purpose?
- Does it answer all the questions the reader may have?

The report must incorporate all the available facts and information which pertain to the incident. Partially stated facts should not be incorporated in a report as they are misleading and may cause the reader to reach wrong conclusions and make wrong decisions.

Is The Report Concise?

Being long-winded is the curse of many writers. The elimination of superfluous words and phrases that contribute to the wordiness of a report will save the readers time and unnecessary work.

Is The Report Clear?

The first objective of any written communication is to convey ideas so that they cannot be misunderstood. The selection of words will influence the effectiveness of the report. The words used should be simple and not ambiguous. A barrier to quick understanding is the unnecessary use of complex or unusual words.

Is The Report Correct?

Reports must be factual. Errors reflect upon the ability and, at times, the integrity of the writer. In fire communications, errors could mean life or death. The content must consist of a true representation of the facts.

Summary

The information in a report depends upon the purpose of the report. The purpose of the report is to inform the recipient/reader of certain activities and the outcome of these activities. In an investigation, the object is to secure that information which explains an occurrence. Therefore in processing an incident, a communicator should always bear in mind that the primary purpose for processing the incident is to inform.

It is not enough to ask the right question; the communicator must accurately record and quickly process the information. The communicator relates the circumstances of a reported incident to responder personnel. In preparing the narrative account of the circumstances, the communicator cannot assume that the recipient will have any knowledge of the incident. The communicator cannot expect the recipient of the information to fill in any details. He/she must assume that the recipient's only information about the incident will come from the report generated. Reports that demonstrate the four Cs reflect the ability and the attitude of the communicator and the efficiency of the communication center.

The following steps will help to ensure accuracy.

- Document the call manually or on CAD.
- The call taker relates the circumstances of a reported incident to responder personnel via the dispatcher.
- Ensure that the information you gather is **COMPLETE, CONCISE, CLEAR**, and **CORRECT**.

Dispatch Information Procedures

In a manual system, once a call enters your agency it may be recorded on a dispatch form or ticket, in an occurrence report, as well as in an incident log book. The form is generally filled out for the dispatcher and will contain all the necessary information to assign a field unit to the call; it will also indicate any support or specialty sections that may be required at the scene.

Most agencies record caller information, telephone conversations and radio broadcasts on audio tapes. Communicators need to be aware that all their communications are recorded and may become part of a transcript, trial or evidence. Being professional at all times in conversations, interoffice communications and while broadcasting, even if on a scrambled or protected channel, will prevent possibly embarrassing or awkward situations for call takers.

Chapter 3:

Fire Priority & Apparatus Assignments

Emergent Nature of Incident

Fires by their nature are emergent situations and can double in intensity and area every 60 seconds. Because it is never completely clear what will happen with a fire incident, fire agency training is based on probabilities and on developing the ability to adapt to the incident at the time.

The objective of the fire communicator is to determine:

- the location and nature of the incident,
- the type of apparatus required,
- how many of each type of apparatus, and
- the urgency of the response to the event.

IMPORTANT: The responsibility of the fire communicator is to ensure that the fire department response is appropriate for the situation so that the event WILL NOT escalate beyond the control of the responding units before they arrive on scene.

Stages of Fire

Incipient / Ignition Stage

The process is an exothermic reaction that will increase in temperature greatly above the ambient. It can occur either by flaming match, spark or other source or by spontaneous ignition. The process can be either flaming or smoldering combustion. There may be nothing showing at the exterior of the building, but something is happening that has been indicated by a call or alarm. The response need to be immediate.

Growth Stage

The fire may grow fast or slow depending on the type of combustion, the fuel, access to oxygen etc. The smoldering combustion produces hazardous amounts of toxic gases even if the energy release rate is relatively low. The growth period for such a fire may be very long.

The growth stage could also be very fast with flaming combustion if the fuel is flammable enough. The heat produced from the first burning part is sufficient to ignite adjacent fuel surface if sufficient oxygen and fuel are available. Smoke and / or fire is showing at this stage, and the firefighters need to move in quickly with a fast aggressive interior attack on the fire if there is to be any chance of saving the structure. .

Flashover Stage

This stage is the transition to a state of total surface involvement in a fire of combustible material within an enclosure, in other words, the transition from the growth period to the fully developed fire. Flashover is not a precise term or mechanism but a phenomenon associated with thermal instability that can result in the contents of the room instantly erupting into f**l**ames with explosive force. When conditions for a flashover exist firefighters must use extreme caution.

Fully Developed (Fully Involved) Stage

The energy release in the room is at maximum and the process is limited by the availability of oxygen. At this stage un-burned gases can collect under the ceiling and as these gases leave the room they burn in contact with oxygen outside the room. The temperature in the room during this stage is very high and in the range of 700-1200 °C. A cautious *interior attack* will continue with precautions to ensure the safety of interior attack teams.

Decay Stage

The stage when the fuel becomes consumed and the energy release diminishes and thus the gas temperature decrease. At this point the fire will begin to

diminish in size. Ultimately, the fire will extinguish itself when the fuel supply is exhausted. Obviously this can take a considerable length of time. Flames will degrade until only glowing embers are visible. Eventually, even those will disappear. What is witnessed in the fireplace from ignition to final extinguishment is the same series of stages that occurs on a much larger scale in a *structure fire* or an open *wildfire*.

The actions and fire response tactics used by first arriving fire companies will depend on the fire stage encountered on arrival. A quick *sizeup* of the conditions within the structure will determine whether the strategy for fighting the fire will be *offensive* or *defensive* in nature.

Response to Fire

Offensive Response to Fire

In the early stages of fire development the fire fighters are aggressive in their response. Offensive strategy is an aggressive interior fire attack, designed to bring the fire under control quickly. Firefighters will attempt to contain the fire and conduct a rapid – but thorough – primary search of the structure and surrounding area, if it is believed there may be victims.

Defensive Response to Fire

When the fire has advanced to the *flashover* or *fully developed* stages, the approach is more cautious due to the increased danger for firefighters. *Defensive strategy* involves an exterior attack only designed to stop the forward progress of the fire beyond the structure of origin. When the decision is made to change tactical strategies, all crews working inside the structure are pulled back and a roll call taken to ensure all firefighters are accounted for.

Alarm Types

The term alarm is derived from the French word; À l'armes - "To the arms" or to respond to a warning of a problem or condition. Alarm types are basically a list of the different kinds of *calls for service* that the fire department responds

to. These will range from fires in various types of structure down to more routine public service events.

In determining the urgency of the situation the fire communicator will be need to use discretion when dispatching firefighters. Fire companies will be directed to respond either Routine (without emergency lights or siren operating) or Emergency to an incident. An emergency response (with emergency lights or siren operating) is warranted if the situation may worsen in the time interval between the unit receiving the alarm and arriving at the scene

Apparatus Response to Alarms

Each alarm type requires a response by the fire department. The appropriate apparatus response by the fire dispatcher depends on; what is occurring at the scene, the type and size of structure involve and the potential for the situation to escalate. Each categorized call (alarm type) will require one or more fire apparatus to attend in order to effectively control the situation. Apparatus responses will generally be a single unit, two units or multiple unit response. The following examples show responses to different types of calls for service:

Single Unit Responses

For certain types of events a single unit dispatched on a *routine* basis is appropriate. An *emergency* response is warranted if the situation may worsen in the time interval between the unit acknowledging the alarm and traveling through traffic to arrive at the scene. The following types of incidents would normally result in a single unit being dispatched:

- **Automatic Alarms**
  Alarms received from an alarm monitoring station to private residences during regular daytime hours.
- **Miscellaneous**
  BBQ, rubbish fire, grass and brush fire, (away from a structure), vehicle fire(no propane), electrical appliance fire, assistance to public (resetting alarm panels, CO detectors activated).

- **Medical Aid**
  Response with Ambulance Service to provide *first responder* medical aid.

- **Motor Vehicle Accidents**
  Response with police and/or Ambulance Service to secure the accident scene and provide medical aid.

Two Unit Responses

Certain types of events may require more than one unit to attend. This is generally determined by the type of crew action anticipated on arrival (company role) or the size of the structure involved. When two units are dispatched, one unit should have pumping capacity, and is normally a pumper (Engine) to deliver water, if required. Two units may be dispatched on a *routine* or *emergency* basis. Particular types of incidents require the response of a command officer (Battalion Chief or District Chief) who acts as a field supervisor. The following types of incidents normally result in two units being dispatched:

- **Automatic Alarms**
  Alarms received from an alarm monitoring station, to large structures, or private residences after hours.

- **Hazardous Materials**
  Dangerous goods products leaking that would be classified as low/moderate risk

- **Miscellaneous Alarms**
  Any of the following that are near *but not involving* a structure: BBQ, rubbish fire, grass and brush fire, vehicle fire (or having a propane fuel system), electrical fire, chimney fire, mattress fire, electrical wires (down or burning)

- **Motor Vehicle Accidents**
  Response with police and/or Ambulance Service, known entrapment

Multiple Unit Response

Due to the inherent nature of fire, most large scale incidents the fire department responds to require multiple units of various types to attend. The following types of incidents normally result in multiple units being dispatched:

- **Miscellaneous**
  Smell of smoke inside a structure or reported fire involving cooking appliances, such as a fire on the stove or in the oven
- **Hazardous Materials**
  Dangerous Goods products leaking what would be classified as – High risk or gases such as Natural Gas Leak
- **Structure Fires**
  Fire reported in structures such as; apartment or commercial building, Hospital or /Care Home, private residence or detached garage. Certain types of events, such as - Structure Collapse, require significant numbers of firefighters to work on site this necessitates the response of multiple apparatus.

In most instances, the response of multiple apparatus is on an emergency basis.

A field supervisor (Battalion Chief / District Chief) is normally required to respond, to assume the Incident Commander role, when:

- It is likely a need for a more formal Incident Command
- The incident is significant enough to have a Chief Officer in attendance
- The incident may have the potential to escalate to a *First Alarm*, and always on a *First Alarm* assignment.

Alarm Assignments (Apparatus)

Assignment is defined as something assigned, a task allotted to a person, or in context the act of giving the incident to a specific fire company or companies.

The objective for the fire communicator is to; obtain the *address / location* of the incident, assess the incident being reported for the purpose of determining

the type of incident (call type) of incident the fire department will be dealing with. The *call type* determines the type of apparatus that need to attend, and the number of each apparatus type. This is referred to as an *alarm assignment*. The address or location of the incident determines which specific fire apparatus are closest and there selected to fill the alarm assignment.

The initial alarm assignment of apparatus may (will) change over the duration of the incident and is under constant watch to ensure that the correct response is dispatched for the task required at the incident.

Should the initial assignment of apparatus be less than that of a first alarm, for example; one engine and one ladder, and the request is made by the on scene fire officer (I/C) to *upgrade the alarm* to a first alarm then only the balance of the assignment would be sent. This *balancing* of the assignment would ensure that for the first alarm level the appropriate number of each type of apparatus are assigned to the call.

Fire agencies use various alarm assignments according to the amount and types of fire apparatus resources under their direct control, and organizational structure of the department whether it be volunteer, composite or fully paid career.

Alarm Levels

Larger fire departments pre-build alarm assignments for incidents that require multiple apparatus response, such as structure fires. These assignments take into account the departments apparatus resources and staffing levels. The larger the fire department, the greater the number of fire apparatus, that can be allocated to any one incident, or alarm assignment. The number of pre-built alarm levels, numbered starting at one, again depends on the number of apparatus resources the fire department has on hand.

First Alarm Assignment

A *First Alarm* (Alarm Level 1) is the initial level dispatched for structure fires when reports indicate this level of resource may be needed. This may be based

on reports which indicate an actual or potential major situation. A *First Alarm* assignment is agency specific, but generally is intended to be enough apparatus to manage a residential structure fire. Example: two engine companies, two ladder companies, one rescue company and one command chief (I/C).

A *First Alarm* may be dispatched for other types of incidents at the discretion of the fire communicators, acting within established agency policy and procedures.

Multiple Alarm Assignments

Second Alarm Assignment

When the extent of the tasks to be accomplished at the scene of a *First Alarm* is greater than the capability of the apparatus resources committed. The Incident Commander will radio for the next level of apparatus assignment – a *Second Alarm*.

If this in turn is not enough a *Third Alarm*, then *Forth Alarm*, etc will be ordered. This is referred to a *upgrading an alarm*.

More than one alarm level called for the same incident is referred to as a *multiple alarm fire*.

The units dispatched on each successive multiple alarm level is usually predetermined and may replicate the preceding level. However, the actual number and type of units vary by fire department, and is dependent on the amount of apparatus resources available within that agency. A large fully paid department may respond with several engine companies on each multiple alarm level, while a smaller city or composite fire department may have less apparatus and a limited number of multiple alarm levels.

The following groupings are typical of apparatus assignments at various alarm levels:

First Alarm	2 – Engines or Quints 2 – Ladders or Quints or Tower 1 – Rescue 1 - Command Officer
Second Alarm (Two Alarms)	2 – Engines or Quints 2 – Ladders or Quints or Tower 1 – Rescue
Third Alarm (Three Alarms)	2 – Engines or Quints 2 – Ladders or Quints or Tower 1 – Command Officer
Fourth Alarm (Four Alarms)	2 – Engines or Quints
Fifth Alarm (Five Alarms)	2 – Engines or Quints

Greater Alarm Assignments

A *Greater Alarm,* a term used by some agencies, generally refers to the escalation of an incident beyond the established multiple alarm levels of that fire agency. The primary factors that determine a *greater alarm* are the need for:

1. Additional fresh fire crews (officers and firefighters) to relieve companies that have been working at the incident scene, and/or
2. Mutual aid companies from adjacent fire departments to respond to the incident scene and work under the Incident Commander or fill-in vacant fire halls to protect exposed areas.

Managing Multiple and Greater Alarm Radio

Large-scale major alarm incidents require a greater degree of radio discipline to be maintained due to the higher than normal radio traffic that will occur.

The normal mode of operation for the communications system has the main dispatch channel being utilized for emergency and non-emergency communications of an official nature. Dispatch broadcasts are the highest priority, followed by incident-related communication which always takes priority over other routine traffic.

During periods of extremely heavy traffic, it becomes impossible for Dispatch to carry on all normal functions. It is necessary in such circumstances to restrict non-essential communications. The supervisor in the communications center or in the field will determine when it becomes necessary to restrict communications and when normal communications can be resumed. Some examples of conditions that may be applied are:

- All non-incident related radio messages and other types of messages (such as from a Mobile Data Terminal) will be restricted, and units will transmit only essential communications.
- All non-emergency paging will be suspended.
- Units out of service will return to available status as soon as possible.
- Units engaged in training or non-essential maintenance will be released and return to quarters.
- Units will be directed to fill in empty fire halls.
- Units will avoid calling Dispatch unless necessary.
- CAD terminals shall not be used to enter reports or conduct non-essential transactions.

Special Duty Assignment

Special duty assignments generally refer to dispatches of apparatus to non-structural fire-related incidents. They have evolved to include *specialty team* responses as well as other public assistance calls that have become part of the services provided by fire departments. Response to special duty incidents is governed greatly by the type of department (fully paid, composite or

volunteer), the level of specialty team deployment by that agency, and the makeup of fire apparatus. Incidents can be categorized differently by different fire departments, depending on influences such as geography (east or west coast), nationality (Canadian or American), the size of the fire department, and the effects of strong department culture and traditions.

Hazardous Material Assignments

Hazardous Materials Response Teams are highly trained and skilled members of the department who are usually assigned to eight-person specialty teams as well as to other general duty companies. On duty team members must be located and dispatched whenever there is a need for a hazardous materials team response.

The level of response is determined by the amount of risk to life, property and the environment. The type of product involved, the amount of product spilled, and the properties of the product are some of the considerations used to determine the response level from the following suggested list.

Dangerous Goods – level 1 (low risk): The closest engine or ladder is dispatched for investigation purposes by HazMat Operation Level trained firefighters. Generally the Hazardous Materials Response Team is not alerted to the incident. This assignment should be dispatched on most situations involving minor leaks or spills of known low-risk hazardous materials. This includes situations that appear to be manageable on site by the calling party and do not create a risk to the public by virtue of location, amount or type of product.

Dangerous Goods – level 2 (low/moderate risk): The closest two engines, one ladder and a Battalion Chief, in addition, the Hazardous Materials Response Team may be responded, or just notified and placed on standby. This level of assignment should be dispatched to any situations involving leaks or spills of a product that may represent a moderate risk. This includes situations which may *not* be manageable on site by the calling party and needs to be

cordoned off to reduce the risk to the public. Arriving companies will determine if the HazMat team needs to be dispatched to the scene.

Dangerous Goods – level 3 (moderate/high risk): The closest First Alarm units in addition to Hazardous Materials Response Team should be dispatched. A Dangerous Goods – level 3 assignment should be dispatched for incidents which indicate a major potential danger by virtue of materials involved, quantities, location, fire or explosion danger and number of people exposed.

Technical Rescue Assignments

Technical rescue refers to those aspects of saving life or property that employ the use of tools and skills that exceed those normally reserved for fire fighting, medical emergency, and rescue. These disciplines include rope rescue (high-angle), swiftwater rescue, confined space rescue, ski rescue, cave rescue, trench/excavation rescue, and building collapse rescue, among others. Technical rescues will often have multiple agencies/jurisdictions operating together to effect the rescue, and will likely use the Incident Command System to manage the incident and resources at scene.

Trench Rescue

A *Trench rescue* assignment would be dispatched for trench/tunnel collapses, scaffold, structural collapses and similar situations requiring the special skills and equipment of the units with the specialized apparatus. A trench assignment typically consists of multiple units up to a *First Alarm level*, plus apparatus carrying specialized equipment specific to the situation.

High-Angle Rope Rescue

A *high-angle rescue* assignment should be dispatched for the medical aid rescue of workers trapped high up on window washer stages or construction cranes and to similar situations requiring the special skills and equipment of the units with the specialized apparatus. A high-angle assignment typically consists of the units carrying specialized equipment specific to the situation plus multiple apparatus for staffing assistance as required.

Airport Alert

Airport alerts are generally the result of emergencies declared by aircraft and are controlled by the airport tower. Notification of the local fire department may be immediate (Automatic Aid) if the agency is included in the crash-rescue pre-plans and are therefore considered firefighting resources for the airport. Alternatively, apparatus response is through a request process (Mutual Aid) if the department is part of an escalating response plan for the airport. Various levels of apparatus assignments may be defined as *Alert 1, 2* or *3* that represent higher risk situations.

Specialized Equipment

Additional specialized equipment is dispatched on any incident where the need is indicated by a field unit (Command). For example, a Foam unit could be dispatched on incidents involving flammable liquids, or an Air Unit to provide breathing air for crews working to clear smoke from an underground parking garage. If required, specialized equipment may be brought in from other municipalities or departments.

SECTION 4
FIRE RADIO COMMUNICATIONS

Chapter 1:
Technical Elements

Fire Alarm Box System

A fire alarm box is an outdoor device used for notifying a fire department of a fire. Early boxes used the telegraph system and were the main method of calling the fire department to a neighborhood in the days before people had telephones. When the box is triggered, a spring-loaded wheel turns and taps out a signal onto the telegraph wire, much like Morse code, indicating the box number. The receiver at a fire station then can match the number to the location.

The first practical fire alarm system utilizing the telegraph system was developed by Dr. William Channing and Moses Farmer in 1852. Two years later, they applied for a patent for their "Electromagnetic Fire Alarm Telegraph for Cities". In 1855, John Gamewell purchased regional rights to market the fire alarm telegraph, later obtaining full rights to the system in 1859. The Gamewell Fire Alarm Telegraph Co. was later formed in 1879. Gamewell systems were installed in 250 cities by 1886 and 500 cities in 1890. By 1910, Gamewell had a 95% market share

Radio Systems and Frequencies

The use of communications systems in the fire service has evolved as technologies became available to the public sector. Most often initial costs of implementing leading edge technology has kept it out of the hands of the local fire department. Paradoxically fire department operations and procedures are often structured around the capabilities of the radio communications system in place.

As fire departments evolve into more complex organizations, expanding both in size and diversity of operation, the need for additional radio channels that allow for independent communication becomes paramount.

Many emergency agencies are looking at trunking radio systems in the 800 MHz frequencies (channels) to address their communications needs. In fire communications, several frequencies may be assigned for use in specific zones or areas. There are usually operational frequencies and general-use frequencies. Some are designated for active dispatch and some are for tactical operations.

A transmitter/receiver/repeater system is a system of interconnected radio equipment that is designed to extend the coverage of a radio system. Departments with a large jurisdiction – especially over wilderness areas where wireline may not exist or be too costly to install – use this type of radio system to communicate with field units. A transmitter is high powered base radio that the dispatcher controls to transmit out to field units and portable radio users. A receiver provides the reversal, a base radio that is listening for radio signals sent by apparatus and portable radios used by firefighters. These received signals are brought into the communications system and heard by the dispatcher. A repeater is a radio tower site that has in essence two radios, a receiver that listens and a transmitter that re-broadcasts the received signal. This system allows communications from relatively low powered handheld radios to be heard be the dispatcher often miles away.

All radio systems use frequencies, or radio waves that are specific in nature. Consider *frequencies* to be just part of the technology that is working in the background. All users of the system, regardless of complexity, tune their radio to a c*hannel* by way of a selector knob or button on the radio. Channels typically have an intended purpose, such as for alerting firefighters of a fire, sending broadcast messages, communicating with the Incident Commander (I/C) at a fire or enabling firefighters to coordinate tactics on the fire ground.

Data Channels

Radio channels can be used for the transmission of data information, which is far more efficient than voice communications. With the advent of affordable data communications systems more and more fire departments are implementing mobile data devices in fire hall and the cab of fire apparatus. These systems are integrated with the Computer Aided Dispatch (CAD) system used by the fire communicator. Fire departments typically move to data applications as a way of reducing the amount of voice radio traffic on the department's radio network. The seamless connection with CAD permits dispatch related information to be displayed to the company officer in the vehicle, and allow for status changes to be done at the push of a button on the Mobile Data Terminal (MDT). Additional information about a building and associated hazards can be recalled to the vehicle enroute to a fire.

Paging Channels

Paging channels are the frequencies used by the dispatcher to broadcast information to volunteer or paid-on-call departments. Members of this type of department carry pagers, a receiver only device that is activated by a series of tones sent over the frequency that the pager monitors. Once the pager is active it allows the firefighter to monitor the dispatcher who is broadcasting alarm information. Pager channels may be separate, or the same as, the fire department main channel.

Main Channels

Main channels are the frequencies used by all of the operational units engaged in normal activities. All apparatus not assigned to an incident have their radios tuned to the main channel. This channel is also for dispatching of the apparatus assignments. If the fire agency services a large metropolitan area, the system might be zoned. There may be a north zone channel, a south zone channel, or some other method of dividing up the various areas.

If the fire communications center serves a large geographic area, then channels will be assigned to communications districts. The system may be divided up according to communities, stretches of highway, etc. In large systems like these, there is often a backbone system of repeaters all linked together. The operator can link various repeaters together to give units the capability of communicating to other units located in a completely different part of the communications system.

Tactical (Tac) Channels

These channels are used for tactical operations on the fireground. Long-term emergency situations will often be located to one of the tactical channels so as not to interfere with normal operational traffic

Tac channels are usually simplex, that is, all communications are point to point and do not use a repeater. Range is usually quite limited, as these channels are intended for localized operations.

Alert Tone

Alert tones are used by the dispatcher to get the attention of operational units. An alert tone usually means that an occurrence of some significance is about to be dispatched, such as a fire dispatch. To operational units, the hearing of an alert tone means they must *stay off the radio, and wait for further instructions*.

Some agencies use a tone warble on a radio channel when a priority incident is in progress. This alerts everyone using the channel that radio transmissions are restricted to emergency use only.

Chapter 2:

Dispatch Message Structure

The *dispatch message* is a structured broadcast message that is a compilation of information obtained by the call taker, as to the location and nature of the event, and the dispatcher's apparatus assignment. The information is structured in a consistent format and broadcast to waiting fire companies. The order that the information is presented must be reliable and have a hierarchical order.

Dispatch Message Structure

The assignment of apparatus

The dispatcher reads off a list of the apparatus call-signs of the assignment. This gets the attention of the individual fire companies that are listening to radio broadcast.

The response urgency

The fire companies are next given direction as to the level of urgency for the response. The direction word RESPOND is given followed by the level:

- **Emergency** – to respond with emergency lights and siren operating.
- **Routine** – to respond without any emergency lights and siren operating,

The incident type

This information prepares the responder for what they may encounter on arrival at the scene. Before exiting the fire hall all personnel will don personal protective equipment (PPE) that is appropriate for the type of call they are responding to. Firefighters will not change into fire fighting bunker gear to respond to a medical emergency for example.

The location / address

Now that the fire companies have been alerted and the type of incident they are to attend has been given, the next and most important information is the

location or address of the call. The reason this is given last is per the old adage; "…last thing heard, first thing remembered."

All of the above information is then repeated a second time to allow for the errors to be corrected, either by the dispatcher or the listening firefighters. Due to noise levels in the fire hall or ambient noise experienced on the fire apparatus it is possible that some of the information was not clearly heard on the first round. Repeating the information as a matter of policy gives the receiver a chance to catch it on the second round.

Tactical radio channel

If there is a tactical radio channel provided for on-scene fireground communications this is appended at the end of the broadcast, the end of the repeated message. Any additional information germane to the incident should be appended after the repeat as well. For example: Provide any additional information that might assist responding personnel, such as cross-street, map page, map grid or directions.

Dispatch Messages – General

- Before you speak, listen for a few seconds to make sure no other message is being transmitted.
- Avoid the use of the words to or for when giving an address, e.g., "Respond Emergency, First Alarm at (instead of to) 402 Main Street" (FOUR ZERO TWO MAIN STREET).
- Apparatus by policy MUST ALWAYS respond directly to the address or location given in the dispatch message. Any other emergencies encountered en route to the location will be relayed to Dispatch and a separate incident will be logged.

Chapter 3:
Fire Communications Model

Need for a Communications Model

Established Procedures

Standard procedures of any communications centre should include lines of communication, which frequencies to use, and when to use them. Equipment designations, a standard set of words and phrases, and a method of alerting personnel to hazardous conditions at an emergency scene should all be included.

For procedures to be most effective, they should be compatible with those of other emergency service agencies with which a department is likely to work. Inter-agency relations and operational procedures should include as broad a region as possible. Personnel from all service agencies, including fire communicators, will be held accountable for conforming to established standards (the department's set of rules to follow). The saying "perfect practice makes perfect" applies well here. When personnel understand the procedures and have been trained in their use and use these procedures daily during their routine activities, the procedures will come automatically during an emergency.

Established Communications

The need for an area-wide communications system is best demonstrated during a natural or large scale disaster that affects many jurisdictions. When cities, municipalities, fire districts, police agencies and disaster offices are all engaged in combating the same emergency, the need for co-ordinated communications is critical. Any time life or property is threatened and more than one agency is involved, the need for co-ordinated communication is just as great, but on a smaller scale. It is easy to determine that police, fire and ambulance need to interact on a regular basis within their own jurisdictions and

need common frequencies and procedures to do so. What is often overlooked is the need for an area-wide plan involving a wide variety of agencies.

In the event of a flood, tornado, hurricane, tank car derailment, large wildland fire or other disaster, a multitude of agencies will be involved. It is possible that the most important thing to a fire department might be a piece of heavy equipment which is under the control of the city public works department. As time is always a critical factor, the communications system among the departments should be in place prior to the emergency. The planning of how your system is to be used requires thorough analysis of which agencies could be involved in a large-scale emergency. Those agencies should be included in your plan, along with an inventory of their capabilities and equipment.

Compatible Hardware

A significant benefit of an area-wide communication plan is that the agencies involved can band together for their mutual advantage in several areas. Because of the costs incurred from duplicating services, some jurisdictions have combined dispatching facilities. Some services share a building, with each retaining separate dispatchers. Others have combined to establish multi-agency communication centres, either sharing or rotating dispatchers. Sharing of frequencies, repeater towers, training for dispatchers and training materials can all be done within a regional system.

The alternative to large-scale joint radio systems and consolidated regional communications centres is to establish links between smaller systems, and to store caches of portable radios that can be issued to responding agencies to allow them to operate on the local radio network.

Benefits of a Communications Model

Training in the use of a communications model makes communication a matter of habit and also develops confidence in the communicator’s ability to communicate effectively. Specific benefits to using the communications model include:

- The sender and receiver are clearly identified, and there is direct confirmation that messages are received and understood.
- Radio traffic is reduced because the communications model confirms receipt and understanding the first time, reducing the need to repeat.
- Good communications improves fire-fighter safety, reduces liability, and increases individual accountability.

The fire services across the country enjoy the reputation of being dedicated public servants. One way to improve and enlarge that reputation is by projecting a professional image in the way communications are handled. Other emergency service and governmental agencies will use communications as one of the measures by which to judge your department. When a representative from another emergency agency views your department as being highly capable, co-operation is easier to receive. In addition, you have recruited a supporter in the form of another agency.

It is important to any department's well-being to have the support of the community. With so many scanners now in use in cars and homes and carried as portables, few, if any, radio transmissions go unnoticed. What the public hears may likely be the only contact you have with the majority of them, and communications will be the sole criterion upon which they evaluate your department.

The Fire Communication Model

The *Fire Communication model* is used for voice radio conversation that is two-way in nature. This model is used by all radio system users and governs conversations whether it is between the dispatcher and apparatus or the Incident Commander (I/C) and company officers operating on the fireground. The communications model is a six-step process.

1. Sender formulates idea.
2. Sender gets the attention of receiver.

3. Sender transfers the message through the medium.
   - Verbal
   - Written
   - Visual
   - Non-verbal
4. Receiver receives and interprets message.
5. Receiver confirms message to sender.
6. Sender acknowledges the receiver.

The sender formulates an idea that he/she wants to convey to another person.

Before attempting to send the message, the sender must have in mind clearly the message that is to be conveyed. It is very difficult to make a message clear to others until it is clear in one's own mind.

Messages must be concise. Eliminate information that is not essential to the message you are trying to impart. The more information that is included, the greater the chance that important parts will be lost. If it is necessary to send a long message, send it in manageable and logical parts. If the demands of the incident interfere with your ability to formulate your messages, you must delegate to re-establish the required focus.

Sender gets the attention of the receiver

Each radio user has a call sign, or call ID, that is unique on the system. The call sign may be assigned to a piece of apparatus, to a crew member on the apparatus or to an individual, such as a chief officer. When a radio user is monitoring a channel they may be listening to traffic on that channel out of interest or waiting for an important message. Before a message can be sent the receiver has to be contacted to ensure that they are listening. The sender will need to send the receivers call sign and wait for a reply before the message can be sent and successfully received.

Sender transfers the message.

Differences in word meaning are a major cause for communication failure. An example is the word *charge*. You *charge* someone a fee for doing a service,

you *charge* a purchase when you want to pay later, you *charge* a battery when you want it to provide electricity, you *charge* a horse into battle against the enemy, you got a *charge* out of something funny, you put a powder *charge* in a cannon, you *charge* a criminal with crimes and you can *charge* a hoseline.

Use *clear text* and *standard resource designators*. *Clear text* is a standard set of words and phrases used in many kinds of communications and eliminate the use of 10-codes and code words. Clear text has long been used as part of the Incident Command System. *Standard resource designators* consist of standardized terminology used to identify apparatus and equipment.

In the case of written communications, sending occurs when words are typed or handwritten. In oral communications, spoken words are sent.

Media for transferring messages are *verbal* or *written*. Methods of *verbal* communications are face-to-face interactive conversation, or via telephone and radio. Interference in the form of outside noise can lead to miscommunication and confusion.

If the message is *written*, can the other person read and decode it? Because written messages are one-way, they are subject to interpretation, or incorrect decoding of the meaning of the message. Examples of written media communication include memos, e-mail, notes or information typed directly into a computer aided dispatch (CAD) system.

Visual and non-verbal media include signs or symbols, body language and expressions, and other hand gestures. Hand signals may be utilized in noisy environments and where the sender and receiver are within sight of each other. In such circumstances, visual hand signal messages can be a useful form of communications.

All the forms of media described above may be used at major incidents that extend over a long period of time.

Receiver receives and interprets the message.
When waiting for the message to be sent, the receiver must try to minimize background interference and distractions.

It is important that the receiver is able to understand the sender's meaning. Clear text and standard resource designators provide common terminology, so that decoding and interpretation result in the message the sender intended. It is possible that the sender may have sent the message incorrectly or the receiver might have heard it incorrectly.

The receiver confirms that message has been received and understood by providing feedback.
If the message is important enough to send, it is even more important to know that it was received and understood. If there is any confusion or misunderstanding, the sender has the opportunity to correct it.

Sender acknowledges the Receiver.
Sender should provide an acknowledgement such as "Roger" or "Affirmative" as a response to the Sender's feedback thereby confirming that the message has been interpreted correctly. At this point it is easy to catch and make corrections if the message has been misunderstood.

Example of Fire Communications Model

Sender: (Thought – Dispatcher) "I want Engine 1 to return to the fire hall." **(the idea)**

Sender: *(Verbal)* "Engine 1, [this is] Dispatch." **(Getting attention of receiver)**

Receiver: *(Verbal)* "Dispatch, [this is] Engine l." **(I'm paying attention)**

Sender: *(Verbal)* "Engine 1 you are to return to quarters, Over." **(Conveying information)**

Receiver: (Thought – E1) "I'm to return to fire hall #1." **(E 1 interprets the message)**

Receiver: *(Verbal)* "Roger, Engine 1 returning to quarters." **(Feedback – that Engine 1 understands the direction)**

Sender: *(Verbal)* "Roger, Engine l." **(Acknowledgement)**

Radio traffic is reduced because this communications model confirms receipt and understanding immediately through feedback.

Formulate Your Message

Before you begin a radio broadcast, know what you are going to say. This may seem to be an unnecessary statement; however, many new dispatchers make the mistake of keying the microphone before they have formulated the message properly. Instead of a professional broadcast, the field units are treated to a bumbling, babbling dialogue. Think it through before you transmit the message. Breakdowns in the communication process are the result of poor or hastily organized thoughts, poor speech, noise and other distractions, unfamiliar words and experiences, interruptions, or time pressures.

To be most effective on the radio:

- Your voice should be steady.
- Your pitch, volume and speed should be consistent at all times while broadcasting.
- Your tone during critical incidents may affect the field unit's response to the incident. Don't shout or lose control.
- Always maintain a professional tone and Stay in Control.
- Use the phonetic alphabet and numerals as mandated.
- Choose words that convey a specific meaning and indicate confidence in your job ability.
- Examine the list of preferred words from the text and glossary.
- Speak slowly and clearly. If field units are constantly asking you to repeat information or dispatches, you are probably speaking too fast.

- The optimum broadcast rate is 40 words per minute. This is also the rate at which most people can copy information correctly. During an average conversation, most people speak at 100 words per minute. Practice keeping your speech at the optimum level for comprehension and accuracy.
- The radio is not the place for idle chat or conversation. Be brief and to the point in all your transmissions.
- Radio broadcasts should be 30 seconds or less. If they must be longer, break your transmission down, keeping in mind that where you break may affect how your transmission is understood.
- Make sure the transmit button is depressed before you start transmitting and do not release before you are finished transmitting. In other words, do not cut yourself off.
- Always acknowledge a field unit's request. If you are busy, do not ignore them, but indicate so by stating, "Stand by". If the unit's request will take longer than anticipated, advise them of such. If a check is delayed or the system is down, advise the field unit.

Summary

The steps of the fire radio communications model are; formulate, encode, transmit through a medium, receive, decode, provide feedback and confirmation.

The major benefit of using the communications model is the assurance that messages have been received and understood.

Effective communication is needed to ensure firefighter safety, make effective use of resources, improve interagency cooperation, reduce liability, and increase accountability.

When verbal radio communication is effective, information has been given in a clear and concise manner and has been received and understood.

The Dispatch Message Model

The Dispatch Message model is used to broadcast the dispatch alarms and as such are one-way in nature and have priority over all other radio traffic. Dispatch messages may be different for volunteer departments that do not have firefighters on-duty, 24/7 in the fire hall. Fire departments that rely on radio paging as the primary mode of notification often have procedures that are quite repetitive for the fire communicator.

The dispatch model requires the dispatcher to activate tones in the appropriate fire hall(s) to raise the attention of the fire companies stationed there. This process usually opens a public address (PA) system and activates lighting so firefighters can see their way to the apparatus.

The broadcast message structure;

List all companies that are assigned to the incident.

- Give direction and the urgency – RESPOND (Emergency or Routine).
- Provide the *Incident Type* and/or related information in a concise manner. This provides some detail as what type of call they are responding to.
- Provide the Address or Location of the incident.
- REPEAT the above steps to ensure that the details have been hear and provides for error correction, if necessary.
- Append any additional information that might assist responding personnel, such as; tactical radio channel, cross-street, map page, map grid or directions.

Chapter 4:

Practical Communication Procedures

Clear Text

A lot of confusion can be caused by the use of codes. Many agencies and organizations have eliminated this problem by the use of *clear text*. In lieu of codes, a standard set of words and phrases is used. This removes the chance of misunderstanding and misinterpretation of codes. In British Columbia, the Greater Vancouver Regional District (GVRD) Fire Departments utilizes a *plain English/*clear *text* system based on words rather than numbers such as the 10-code.

Procedural Words and Phrases

ACKNOWLEDGE	Verify that you have received my message.
AFFIRMATIVE	Yes, or permission granted.
CONFIRM	My version . . . Is that Correct?
CORRECTION	An Error has been made in this message. The correct version is . . .
EMERGENCY	*Emergency Traffic* request for immediate attention of a Dispatcher.
GO AHEAD	Proceed with your message.
HOW DO YOU READ	Confirm the clarity of this radio.
I SAY AGAIN	Self-explanatory. Use instead of "I Repeat"
NEGATIVE	No, or permission is not granted, or that is not correct, or I do not agree.
OVER	My transmission is ended and a response is expected.
RESPOND	A direction to attend.

ROGER	Message has been received and understood.
STAND BY	I must pause for a few seconds. Please Wait.
SAY AGAIN	Self-explanatory. Do not use "Repeat".

More phrases and terminology are contained in the glossary in the back of the text.

Response Words

The following phrases are used as the *direction* in a message to establish a level of priority in how the receiver of the message is expected to respond or handle the message. This same structure relates to the dispatch message when setting the level of response for fire apparatus.

Advise

An *advise* message is for notification only; attendance now is *not* required. This could apply to notification of Chief Officers that an incident had occurred, or to an inspection branch, e.g., the Health Department, that an inspection should be made the next working day.

Example: "Advise the Food Inspector of spoilage."

Routine

Routine requires attendance as soon as possible without using emergency equipment (siren and lights). Routine will become the direction (priority level) for the unit that has the smoke ejector and will be dispatched to the scene.

Example: "Proceed / Respond a smoke ejector, non-emergency / routine"

Emergency

Emergency requires immediate response, using full emergency equipment (siren and lights). Emergency will become the direction (priority level) for the Rescue unit that will be dispatched to the scene.

Example: "Respond Rescue, emergency, we require power rescue tools."

Radio Message Structure

All radio traffic messages must still provide for rapid and concise communication of more complex messages. Any such radio message should comprise the:

- Direction request;
- Who or what; and
- How.

Example: An I/C making a request to have an additional engine company respond to the scene might phrase the message as follows: "Dispatch, Respond One Engine Company, Emergency to this location, Over."

Police Department Response Terms

The following terms may be used when communicating directly with the police department, and are intended to initiate a specific response or action by their dispatch.

VSA (Vital Signs Absent) or Sudden Death

VSA or Sudden death refers to death by causes other than fire-related. This would most likely be received from a unit that is attending a medical aid call. A response level is required with this request to assist the police dispatcher with prioritizing the incident for response;

- Routine: requires the police for a VSA or sudden death from apparent natural causes.
- Emergency: requires an emergency response by the police for a VSA or sudden death with suspicious circumstances.

Example: "Respond police, routine, for a VSA / sudden death."

Traffic

Request a police unit for the specific purpose of traffic control at the incident scene. This is always a lower level priority, and therefore no priority is expected.

Example: "Respond police for traffic".

PC

Uniformed police officer required for assistance or authority.

Note: This is a general request for a police officer and some degree of explanation of circumstances is essential.

Example: "Respond a PC, an insecure building." or "Respond a PC, emergency, a belligerent patient."

Wagon

Prisoner wagon is required to remove an intoxicated person. A wagon will normally respond routine, and transport either male or female prisoners.

Note: A request for a wagon should include the:

- Number of intoxicated persons, and,
- Sex of the person(s).

Ambulance Service Terms

BLS Ambulance

A regular transport ambulance (EMA2).

Example: "Respond one ambulance, routine."

ALS (Medics)

Advance Life Support is a paramedic ambulance (EMA3). Any request for ALS/Medics must be accompanied by the following patient information:

- Sex and age of patient, and

- Condition of patient.

Note: This information allows the ambulance dispatcher to properly prioritize the call and allocate paramedic ambulance to the most serious situations, and allows the hospital time to prepare the appropriate trauma team.

Example: "Respond ALS, emergency, male 65, cardiac arrest."

Resource Designators

In conjunction with the regional communications plan, a standard set of *resource designators* has been established. Because terminology, equipment and capability vary from department to department, it is important to develop a common understanding about what is being called for in mutual aid, and what a particular resource will bring. One department may refer to their aerial ladder apparatus as trucks while another may make the same designation for boom equipped apparatus that has no climbing ladder. These two pieces of apparatus have two different operational roles. Both the requesting and sending agencies need to understand which type is required.

As with the communications plan, the resource designators should be confirmed. The Incident Command System (ICS) has a published list of standard resource designators from which the regional fire departments have agreed on the following list of common apparatus designators.

Primary Resource Designators

Resource	Radio Call	Description
Engine Company Pump Company	Engine Pump	A Triple Combination pumper is typically used. A vehicle carrying hose, booster and a pump connected to a tank of water.
Ladder Company	Ladder	An aerial apparatus with a ladder climbing capability, carrying additional ground ladders; performs truck company operations.
Truck Company	Truck	An aerial apparatus with no climbing capability, carrying additional ground ladders or otherwise designated to perform truck company operations.
Tanker	Tanker	A vehicle that carries a large quantity of water to support the engine company.
Rescue Medical	Ambulance	Ambulance/Medical Aid.
Brush	Brush	A vehicle designed for off-road use at wildland fires.
Rescue Company	Rescue	A vehicle carrying special tools and equipment to function in rescue situations.

Apparatus Status Keeping Terms

The responsibility for accurate unit status keeping remains with the officer in charge of the apparatus. A clear understanding and correct relay of status information to Dispatch is critical. Communications operators are required to ensure that all apparatus movements are logged and properly documented. While mobile data devices, such as MDTs, may be the *primary* means of apparatus status keeping in departments that employ data systems, updates via the voice radio system may also be used. The following status changes must be logged by the communications operator:

Available In Quarters

Apparatus is available in the fire hall and off the voice radio system. Dispatch of unit in this status will be via the Paging/Fire hall Alerting system.

Available On Radio

Apparatus is available to receive calls or messages via voice radio. Units on this status are usually out of quarters and in the district.

En Route

Apparatus assigned to an incident will have their status set to *en route* when they advise the dispatcher that the unit is *responding*.

On-Scene

When the unit arrives at the dispatch location, the officer will advise the dispatcher that the unit is *on-scene*.

Available On Scene

Apparatus that are no longer committed at the scene, but are *standing by* assisting, may be placed in service and *available on scene*. Time on the incident continues to be included.

Out of Service

Apparatus or equipment cannot be used and is not able to respond.

Dispatch Processes

Time Stamping

If your agency operates on a manual system, once you have broadcast your information, indicate on your log, ticket or dispatch form. Include the date and time of the broadcast, which unit was assigned the call, what time they accepted the call, what time they arrived at scene and what time they cleared the scene.

On an automated system, much of the required time-keeping is completed by field units by pressing a sequence of coded buttons to indicate their status. The

dispatcher ensures that this process has been completed. On a number of systems, the dispatcher will be able to pull up the call and immediately see the status, and associated times, of the unit attached to any given call. The completed file will also show the times involved in the field unit's arrival, as well as those of any support units who also attended the call.

Manual Radio Log

The manual radio log is the most basic system of recording status changes, the dispatching of occurrences, and any other information that occurs on a radio channel. When the power is off, or when the main system fails, it is the method that must be reverted to for managing fire operations. Every facility should regularly use the manual system as a training exercise. All communicators should know where to get the radio log sheets and know how to use them. Small agencies without a CAD system may be required by law to keep radio log sheets.

Computer Aided Dispatch (CAD)

Computerized call taking and dispatch systems come in all sizes and configurations, and can be very complex. Each agency has distinct and unique requirements. Some computerized call taking and dispatch systems are relatively basic, but very effective. Pre-formatted screens enable operators to manually enter caller information. Emergency units are entered on another screen, and status keeping is simplified and archive-able.

More elaborate systems allow for automatic loading of ANI/ALI information directly into an incident screen. Information concerning a call can be sent directly to field units via a mobile data terminal system. Status changes appear automatically on the dispatcher's screen. Data base queries can be made without re-entering the same information. Records are automatically created and archived directly from the system, significantly reducing the paper burden.

Systems may include several keyboards, large color monitors, and printers. There are several suppliers of emergency dispatch systems.

Chapter 5:
Fireground Communications

Fireground Definition

The *fireground* can be defined as the area within an imaginary line (fireground perimeter) which encloses the space where the fire situation creates potential hazard to citizens and fire personnel.

Fireground Operations Definition

Fireground operations are the various activities that take place on the fireground. The basic tactical objectives (operations) that the arriving fire companies initiate are related to life safety (rescue), control of the fire (suppression), conservation of property (salvage) and extinguishment (overhaul).

Effective Fireground Communications

Effective communication is the basis of good incident management, while faulty communication is the root cause of many incident problems. Communication can only take place if common understanding is established between the responding fire companies and the fire communicator. The fire communicator sets the standard of communication protocol in emergency situations. The professional conduct of the fire communicator instils confidence in decision making by field units. Through voice inflection, tone, volume, pitch, and setting an example in all procedures, the fire communicator can have a positive impact on all involved in the emergency. Both success and failure are contagious, and the fire communicator can be the source of either. At all times, the cumulative effect of poor communication skills will be a lack of direction and leadership. In the absence of leadership, chaos can quickly fill the void.

Communication is only effective when it is two-way. During the initial stages of an emergency, a large amount of radio traffic usually needs to take place. The bulk of the orders are given, requests are made, and information

concerning the situation is gathered and passed along to the responders. The level of excitement is at its peak. Unless proper discipline is maintained, messages get lost in the crush of radio traffic. Critical to any radio transmission is the acknowledgement that the message has been received.

The importance and relevance of information must be understood by both parties. The skills necessary to ensure that this occurs are described below.

Listening

Listening is the active, conscious process of receiving, interpreting and understanding the spoken message. In order to strengthen listening skills, the fire communicator must see listening as desirable and have a readiness to listen and a willingness to understand. Knowledge of what is important within a message ensures that the proper actions will take place. Suggestions for improving listening skills include:

- Try to find the purpose in every listening situation.
- Physically and mentally concentrate on listening effectively.
- Be patient. One can listen faster than one can speak.
- Stop talking.
- Minimize distractions.

Self-confidence

Mutual respect between communicators and field officers and confidence in each other's decisions are essential for effective fire communications. The self-confident fire communicator makes short, precise statements containing the essential information to field officers. Brevity in radio transmissions does not indicate a lack of direction, but rather can convey decisiveness. Brief, clear and precise statements contribute to better understanding and reduce the chance of confusion or misunderstanding.

Radio Protocol

It is imperative that the fire communicator promotes appropriate procedures in the use of the radio at all times, particularly during tactical radio operations with the Incident Commander on the fireground. Many of the methods and procedures described also apply in the use of the telephone.

During most emergencies, the adrenaline level of the responders can lead to communication problems which can seriously affect the effectiveness of the fireground operations. Everyone with a radio may think what he/she has to say is more important than what anyone else has to say. This may result in a breakdown of radio discipline. Everyone may be trying to talk at once. Messages may not get acknowledged, transmissions may be cut off, all messages may have equal priority, lines of communication may become crossed, and control of the scene may be lost.

To prevent this from occurring, all initial radio communication is strictly between the first arriving unit and the fire communicator. All task-specific radio traffic in an emergency should be handled on a separate radio channel if possible to avoid overwhelming the fire communicator.

Effective Use of Resources

Effective Use of Apparatus Resources

For a fire communicator to manage an incident capably, he/she needs to convey information in a manner that is clearly understandable to all, with an emphasis on brevity. The fire communicator's ability to communicate directions succinctly and clearly eliminates confusion and gives fire companies defined boundaries in which to operate. This drastically reduces the chance or need for fire officers to function independently or to freelance.

At the incident scene, a well-communicated action plan keeps emergency personnel functioning as part of the team and maximises the capabilities of the tactical resources with which the Incident Commander (IC) has to work.

Effective Use of Fireground Resources

The emergency scene is dynamic in nature, not static, and is constantly changing. If the Incident Commander is to have an accurate picture of what is going on, the information needs to flow back from subordinates. Procedures are normally established which outline when and how this information is to be transmitted back and forth between the Fire Communicator and the Incident Commander. Without periodic updates on how well crews are progressing with their assigned tasks, the Incident Commander can be left in the dark, unable to react properly to the changing conditions. This holds true for the fire communicator as well. If the Incident Commander does not provide periodic updates, the planning and logistical deployment of the remaining fire apparatus will be affected. All information should be transmitted in a clear, concise manner.

Fireground Personnel Safety

Paramount on the list of the fire communicator's responsibilities is the safety of personnel. Effective communication enables the fire communicator to know where personnel are at all times. It allows for co-ordinated unit dispatch and tactical operations so that no crew is operating beyond the scope of the overall plan and the support of other crews. Responding fire companies must be advised quickly of any safety hazards that may exist at the scene.

In the back of every fire communicator's mind is the fear that responding personnel may be killed or injured. Using proper and effective communications throughout emergency operations can help keep personnel safe and reduce the fear.

Fireground Communication Methods

As a dispatcher the primary means of exchanging information with the Incident Commander operating on the fireground is by wireless communications, specifically voice radio. As discussed there are several mediums through which

information can be exchanged between the Incident Commander and subordinates.

Face-to-Face

When possible, the Incident Commander will use face-to-face communication, which is the most effective form of communication, flows more naturally, and is easier to understand. It is much easier to convey the message when the person on the receiving end can see the facial expression, hand gestures and other non-verbal messages the speaker is sending out. The speaker is better able to tell if the message is being received. A blank stare on the part of the person hearing what is being said is not nearly so reassuring as when his/her head is nodding in acknowledgement. The blank stare will indicate to the sender that he or she may need to clarify or expand on what was said.

Another advantage of face-to-face communication is the ability to ask questions and seek clarification rather than tie up additional air time, or guessing at the meaning.

Use of Aides

The Incident Commander at an emergency frequently becomes the head radio operator and spends much of the time on the radio responding to a multitude of transmissions. If extra personnel are available, an *aide* can be designated to screen radio traffic, log information about the status of companies, handle traffic to and from the communications centre, and relieve the Incident Commander of all but the transmissions necessary to carry out the action plan on the fireground.

Use of Runners

A *runner* is a messenger charged with carrying written or verbal communications between locations. When there are problems with communication due to lack of radios or radio channels, noise levels or physical barriers, runners can be used to relay messages. They can also advise the

Incident Commander of what they have observed, lending another set of eyes and perceptions of the incident.

Both *aides* and *runners* are often employed inside the communications centre by the fire communicator, as well as in the field by the Incident Commander.

Common Communications Problems

Any blocks to effective communications on the fireground should be understood by the fire communicator to appreciate the conditions under which the fire personnel are forced to operate. Some obstacles may be out of the control of the fire communicator. It remains the responsibility of the fire communicator to identify each communication block she/he is unable to resolve and to bring these problems to the attention of her/his superiors through the appropriate channels of authority.

Lack of Adequate Communications Equipment

Many departments are forced to function with equipment that is ineffective or outdated, either through budget restraints or other restrictions. Not enough base stations, pagers, repeater sites, and a multitude of other hardware limitations prevent emergency personnel from communicating effectively. These conditions may exist in certain geographical areas or inside certain types of structures.

Lack of Adequate Emergency Frequencies

Another limiting factor many departments face today is the lack of an adequate number of emergency frequencies. Many departments share a frequency with other agencies or groups of agencies. If administrative radio traffic, simultaneous alarms in progress, and alarm paging are all done on the same frequency, confusion will occur.

Separate tactical frequencies need to be used so that emergency scene communications can be made without the interruptions and confusion. As a department grows, more tactical frequencies are usually added to reduce the possibility of multiple incidents running at the same time on the same

frequency. When possible, a separate tactical radio operator should be assigned to manage each working tactical radio frequency, and to ensure that each message is responded to without delay.

Mix and Match Frequencies

When multiple agencies operate at the same emergency scene, each using its own frequency, police personnel are unable to talk to fire agencies, fire personnel have no means of talking to the ambulance agencies, and the ambulance personnel are incapable of talking to the mutual-aid fire department that may just have arrived.

Available mutual aid channels may be used to bring agencies together on a common frequency, by patching channels (frequencies) together on the radio console to enable the multiple-agency cross-communications for that specific incident.

Incompatible Radio Codes

Any department has its choice of a multitude of radio codes. Several national organizations, local agencies and jurisdictions publish their own codes. What may be an "accident with injuries" using one code can be "a dead animal in street" using another. Many departments use codes particular to their own agency, which may result in a wide variety of radio codes being used at a multiple-agency response. This can be not only confusing, but dangerous. For this reason, *clear text* is being used more and more in emergency services, particularly when multiple agencies are all working at the same incident. The standard set of words and phrases are used to eliminate confusion and assure messages are understood and acted upon.

Need for Common Terminology

The fire service has a language of its own, but different departments and different parts of the country may speak a dialect not completely understandable to someone from another department or area. A truck carrying lots of water may be a *water tender* in one department, a *tanker* in another

department, or a *water wagon* in yet another department. It's a *booster line* in Colorado, but you had better call it a *red line* in Texas. That tanker may be a truck with lots of water in some parts, but in others it's an airplane loaded with retardant. When departments work together, there must be a mutual understanding of terms. There is no reason or excuse to ask an adjoining department for a tanker and be surprised when an airplane shows up. The understanding needs to be established prior to the emergency in meetings between the agencies. An emergency scene is a poor location at which to do planning or training.

Need for Training

Radio and other communications do not just flow without problems during the high stress atmosphere of an emergency. Skills need to be developed through training so that they come naturally during the stress of an emergency. Proper procedures and skills should be practised on all emergency scenes and be the standard rule of any fire department.

Fireground Support

Working Fire

A *working fire* is an incident that will require the assignment of apparatus to be engaged in fire suppression for a period of time.

Example Initial Report: "This is a working fire, heavy black smoke visible from a second floor suite in a three story apartment building."

On receiving the indication of a *working fire*, Dispatch must consider responding or notifying the following:

- Rescue Unit, if not assigned - to provide heavy tools for forcible entry and rescue,
- Specialty Units - such as Generator, Air, etc. to support site illumination and SCBA breathing air requirements,

- Fire Investigator - to begin the investigations to determine the cause of the fire,
- Standby Ambulance - to be kept on scene in case of injuries to fire fighters or civilians. Normally one BLS ambulance would be dispatched on all First Alarms as a precaution. Additional units may be dispatched on each upgrade of multiple alarm level, at the discretion of the ambulance service.
- Police for traffic/site control - prevent vehicles from passing over hose lines, and provide security to prevent theft from unattended fire apparatus staged near the fire scene.
- Transit Supervisor- if incident is on a known transit route, to re-route buses.
- Public Works (Water & Sewers) – Water Branch can increase water pressure to hydrants or redirect water to increase capacity
- Public Utilities (Electric & Gas) –Hydro & Gas may be requested to shut off electrical and natural gas service to the building or area to prevent electrocution or fuel for the fire, thereby making the area safe for firefighters.

Dispatch will begin moving apparatus up to fill-in empty fire halls to provide response coverage across the jurisdiction, due to the extended period of time units will be tied-up. This it referred to a *move-up* or *fill-in.*

Fireground Tactical Communications

Tactical communications are those used to convey appropriate information on tactics as they apply to the fireground. Different types of tactical communications include; progress reports from officers who are responsible for meeting their action plan, new updates from Command, reports of safety hazards or evacuation orders,

Report on Conditions

Company officers must supply progress reports on conditions. They may report that the tactical operations to which they were assigned are having a positive impact (Good news). They may report that assigned tactical operations are not having a positive impact and why (Bad news). Reports on conditions let the immediate supervisor know the nature of the problem. When reporting bad news, try to offer a solution to the problem, since you are usually in the best position to make that determination. Identify additional resources that may be needed, and include additional crews to assist with the tactical operation, and any additional or specialized equipment.

Advance warning to the supervisor is needed when relief crews will be required, and if and when resources might be available for release or reassignment, along with periodic reports on the status of the incident and assigned resources.

Emergency Radio Traffic

These are reports of safety hazards or evacuation orders. All personnel have the responsibility to communicate when safety hazards are identified that may adversely affect firefighter safety or the tactical operation. A method to quickly convey emergency information should be established through standard operating procedures.

Evacuation Orders

If the emergency radio traffic involves the evacuation of a structure, such as a change of condition within a structure may require a change from offensive to defensive firefighting tactics, the priority is to notify personnel of imminent danger. The need to evacuate to safety can be managed on scene by blasts on the air horns, sirens, PA systems and anything loud and easily understood by all personnel.

Mayday

Mayday is an emergency code word used internationally as a distress signal in voice procedure radio communications. It is used to signal a life-threatening emergency by many groups. If firefighters become trapped or are unable to remove themselves to safety the *mayday* code indicates emergency radio traffic to follow. Radios equipped with an emergency button will display a mayday and radio identification to the controlling dispatcher. A *mayday* signal will initiate the deployment of a Rapid Intervention Team (RIT) in a search dedicated to finding the missing firefighters in their last known location.

Personnel emergencies on the fireground should evoke the accountability procedures that include a method which accounts for all personnel when the structure has been evacuated, such as designated reporting locations, radio check-off system (roll call) and confirmation by supervisors that all personnel are accounted for.

Fireground to Dispatch Communications

Fireground tactical communications between the Incident Commander and fire companies operating at the tactical level is not normally monitored by the communications centre to avoid tuning out of constant chatter not directed to dispatch. The operational expectation is that communications between the I/C and dispatcher takes place on a main channel, or channel identified for that purpose. During the course of an incident there are expected exchanges of information with dispatch, such as; initial conditions reports and tactical benchmarks

Initial Report

The normal procedure that is followed by the first arriving fire company responding as part of a multiple apparatus assignment is to indicate their status (On Scene) and provide a quick *initial report* of conditions found. For example; if lots of flame and smoke is visible from the second story windows of a house, the initial report might be as follows. “Engine 1 is on-scene, we

have heavy smoke and flame showing, second floor. Engine 1 is laying a line to the front."

This quick radio message informs all other apparatus on that channel of the situation and what initial actions are being taken.

Tactical Benchmarks

The Incident Commander (I/C) has a series of specific incident priorities. These are: life safety, incident stabilization and property conservation. At the completion of each phase of tactical operations it is important to communicate the fact and benchmark the completion. The duties of the radio dispatcher include the logging of benchmarks into the CAD file as a means of time stamping for reporting purposes.

All Clear
Completion of primary search (life safety priority) allows a shift of emphasis in tactical operations to incident stabilization. Resources confining the fire to permit search operations can now be applied to extinguishment.

Under Control
Stopping the forward progress of the fire allows the Incident Commander to shift resources to property conservation. Some resources assigned to fire attack and ventilation may be reassigned to overhaul and property conservation.

Loss Stopped
When further property loss is stopped.

Strike Out
The fire is deemed to be out. Incident Commander can begin the process of demobilization. Resources can be made available and returned to service.

Termination of Command

A formal command is no longer required as the number of apparatus resources on scene is at a minimum. I/C will be passed to the primary unit remaining on scene, likely the last company to clear the scene.

Chapter 6:

Interagency Cooperation

Protocol Needs

When two or more agencies are involved in one incident, how they communicate with each other is of paramount importance. Relating back to the basic premise of communication, we know that the primary purpose of communication is to establish a common understanding between the sender and receiver. True communication can only be achieved if both parties understand the information or messages being sent. This is extremely important when dealing with emergency situations. In an emergency situation, radio communications play a vital and active role in relaying information that may ultimately save a life, or lives. Clear, concise instruction and the relay of accurate information enable each agency to respond to the incident in a timely and efficient manner. Using plain language transmission can assist in this relay of information.

During the early stages of an emergency response, a large amount of air time is used. The communications center is busy gathering and relaying information, notifying appropriate personnel and agencies. This is followed up by additional air traffic from field units for the purposes of:

- acknowledging duties or information
- communicating between themselves or with supervisors and the communications center

The operator and field units constantly relay updates between the center and the scene to keep all involved personnel informed about the status of the emergency. Unless correct radio discipline is maintained, critical information may get lost in the rush of on air transmissions. *It is the radio operator's / dispatcher's job to maintain radio control.*

During most emergencies, each individual's adrenaline and stress levels elevate. Each person with a radio believes the information they have to relay is more important than what the next person has to say. If everyone tries to talk at once, messages may not get acknowledged, transmissions may be cut off and vital information may not be relayed to the person who requires it. Once that happens, the problem compounds because of the anger and frustration of personnel unable to perform their job because they cannot get on the radio or are able to use it properly. Proper radio discipline is a vital component to ensure communication problems are kept to a minimum and do not interfere with the successful conclusion of an emergency situation. Established radio communication protocols ensure that messages are received and understood, and promote:

- personnel and public safety,
- cooperation between agencies,
- effective use of outside resources, and
- professionalism and pride.

Personnel and Public Safety

The greatest responsibility of the communication operator is the safety of the field unit personnel and the general public. Effective radio communications allow the operator to know a field unit's location at all times. Personnel can then be quickly advised of any updated information regarding safety hazards, the need for additional services, and for medical attention or requirements. Relaying of new information assists agency personnel in making decisions or taking actions to ensure their own safety and the safety of the victim(s) or general public.

Cooperation Between Agencies

Effective radio communications make it easier for agencies to understand each other's departmental requirements. Standardized radio protocols help to eliminate costly and timely duplication of services among agencies attending

the same emergency or situation. The use of plain language, clear text transmissions helps to eliminate confusion and relays the intended message to other agency personnel.

Effective Use of Outside Resources

Standardized radio protocols simplify communication with outside agencies in requesting their assistance, attendance or cooperation at a scene or situation. All emergency service agencies or resources are equally busy and appreciate receiving as much information as possible, in the briefest manner possible, to relay to their own personnel. Always acknowledge and confirm requests for attendance by outside resources with an ETA if possible for the arrival, and extend the same courtesy to an outside resource requesting your assistance.

Professionalism

Using established radio protocols and discipline demonstrates your agency's commitment to a professional code of conduct within your industry. Every time you transmit over the air, you are, in essence, making a public broadcast. Conducting yourself in a professional manner may assist in developing a better rapport between your agency and the public. The manner in which you and agency personnel communicate on the air may be the basis for how you are judged by the public and other industries. ALWAYS act in a professional manner.

Chapter 7:

Multiple Fire Incidents and Priority Levels

Determining Priority Level

You will need to use discretion when determining the level of priority of an incident.

- Acquire sufficient information. This may necessitate a call back to get additional information, or to clarify what the caller's needs are.
- Apply personal knowledge to situation. As you become more experienced in the job of fire call taking and dispatching, you will find that you will be able to apply what you already know about a situation to an incident. You may remember what your agency has used as an assignment for a particular type of incident in the past, and will anticipate needs by applying your experience.
- Confer with experienced communicators as appropriate. If you are unsure how to effectively prioritize an incident, ask. This also gets information out into the communications center and lets your co-workers know what is happening. It could give you some important connections later in the shift.

Multiple Incident Priority Levels

Multiple fire incidents require careful use of your knowledge and ability to change as the incident progresses.

Two incidents (different, same, changing priority)
Two fire calls with different priorities. As a fire dispatcher, you need to determine how best to use your resources in assigning calls.

- When incidents are entered into CAD they have a time entered and default priority level, which will prioritize how they sort and display
- You should handle the events in the order of sort priority, even if lower priority calls are left waiting.

- Lower priority incidents generally have less risk associated with them, and require less apparatus resources to manage.

Two fire calls with the same priority.

- The first selection should be based on the type of structure due to the potential for escalation and life safety considerations.
- For example: Structure Fire – Hospital should be handled before Structure Fire – House, for the reasons stated above.
- If *all things are equal*, send each call in order of receipt. (…first received – first dispatched!)
- Consider time delay if you have to draw apparatus from other district(s) for assistance.

Changing priorities. Some calls may change as more information is received, and as a dispatcher, you may be faced with having to commit more resources to a call than had been originally sent. An MVA leaking may turn into a personal injury when the HazMat unit has arrived on the scene. This could necessitate calling for backup, for an ambulance, and possibly for police vehicles for traffic control.

Note: The priority of the incident dictates from where you will draw your resources. In a major incident, support can be drawn from any fire hall in the district.

Three incidents (different, same, changing priority)

This follows much the same format as above. As the dispatcher, you are required to juggle your assignments in order to give the appropriate level of response to the call that has the greater potential. It is important for you to know the different priorities of the calls in progress to best determine which apparatus may be diverted, if necessary.

Multiple incidents (different, same, changing priority)

Again, managing multiple incidents becomes somewhat of a juggling act. Respond to the calls of greatest priority according to your agency's SOPs and

get to the lower priority calls as resources allow. Extra resources can be drawn from different areas as required with the permission of the Commander.

Fire incidents & non-fire incidents

The fire department will respond to a wide range of calls for service. Each type of call waiting for dispatch needs to be accessed against the others to determine its priority.

Life safety is paramount and because of this medical aid response with the ambulance service is important and usually takes priority over other types of calls that have less impact and risk potential.

One exception is *Structure Fires* that generally get first priority due to;

- the 'emergent nature' of fires, as well as,
- no other emergency service will be responding.

SECTION 5
INCIDENT COMMAND SYSTEM

Chapter 1:
Incident Management
and the Incident Command System

Incident Management Systems (IMS) Elements

For an IMS to be effective, it should share some common elements, including:

- Suitability for use regardless of jurisdiction or agency involved.
- Ability of the organizational structure to adapt to an incident regardless of type or complexity.
- Applicability and acceptability to users throughout the community and region.
- Readily adaptable to new technology such as computers or improved communication capabilities.
- Expandable in a logical manner from initial response to a major emergency to avoid having one plan for everyday use and a separate plan for major events.
- Basic common elements in organization, terminology, and procedures.
- Cause the least possible disruption to the existing system during implementation.
- Fulfill the above requirements effectively and simply to ensure low operation and maintenance costs.

Incident Command System (ICS) as a Management System

ICS is a practical and effective incident management system for all emergency response agencies. An effective incident command system does the following:

Provides for manageable span of control.

Span of control is the number of subordinates one supervisor can manage effectively. Experience has shown that a workable span of control is somewhere between three and seven, with an optimum of five.

Ensures unity of command so that all personnel are managed and accounted for.

Unity of command means that each individual participating in the operation reports to only one supervisor. This increases accountability, prevents freelancing, improves the flow of information, and enhances firefighter safety.

Provides a standard set of terms for communicating designation of resources and facilities.

ICS uses plain English rather than 10-codes to communicate. ICS also offers a set of standard resource designators to identify the range of resources and facilities that may be required.

Lines of authority provide for lines of communication.

Based on the simple principle that communications follow the same lines as the organization, the amount of communication is minimized. Lines of authority limit the number of individuals needing to talk to each other, improves flow of communications, and prevents messages from being missed by those for whom they are intended.

Has all-risk design.

ICS can be adapted to any type of emergency, whether it be fire, mass casualty, hostage situation, or natural disaster.

Is suitable for everyday use.

Many departments, agencies, and jurisdictions have disaster plans that are used only when a major incident occurs. These plans are often inappropriate to the emergency because they are generic rather than specific. ICS works in a variety of emergency situations.

Provides for safety of personnel.

Span of control and unity of command ensure that personnel are accounted for, and that their efforts are coordinated in a manner that provides for firefighter safety. Improved communications and reduced confusion also facilitate protecting their safety.

Provides for modular expansion.

As the incident grows, the ICS organization can expand in a modular fashion to meet the demands of the emergency.

Improved resources utilization.

With a clear organizational structure, each resource can concentrate on its assignment and eliminate duplication of effort. This maximizes the effectiveness of each resource.

History of ICS

FIRESCOPE

In the early 1970s, major wildland fires required the involvement of a vast number of resources and the participation of local, county, state, and federal jurisdictions and agencies. The problems encountered included:

- ineffective communications,
- lack of a common command structure,
- lack of accountability, and
- the inability to coordinate the available resources.

The agencies involved formed FIRESCOPE (Fire Resources of Southern California Organized for Potential Emergencies), and developed the first generation of ICS. Although it was designed to deal with wildland fires, it has evolved into an all-risk management system.

Fire Ground Command (FGC) System

This system was developed in the Phoenix Fire Department in response to the need to improve incident operations management for urban firefighting. FGC was intended to be used primarily for structural firefighting.

National Fire Academy (NFA) Model System

The National Fire Academy has produced the Model Incident Command System that can be used as a model for agencies and jurisdictions wishing to adopt ICS. The NFA is made up of representatives from all the disciplines involved in emergency management. They recommended development and adoption of an all-risk system that could be used by all response agencies. The system is based on management principles, emphasizing personnel safety, coordination, clear lines of authority, maximizing resources, unity of command, and a manageable span of control.

ICS offers ample opportunity to delegate responsibility and create subordinate positions to maintain span of control. Emergency managers can develop an extensive incident organization. The positions within the ICS are there to be utilized **if** they are needed and will assist in better organizing and managing the incident.

ICS can be looked at as being similar to a toolbox. Just as a toolbox may be loaded with different tools, ICS has a number of management positions in its arsenal. Only those positions that are needed to help get the job done should be implemented. Although the first-arriving Company officer may act as the initial incident commander, command can be passed due to aggressive actions required at the time of arrival. Command will then be formally established as

soon as possible by the next arriving Company officer. Other officers who are not first-in may be assigned to a subordinate positions upon their arrival.

Five ICS Functional Areas

ICS uses the five major components that make up more successful organizations. ICS is broken down into functional areas of:

1. Command
2. Operations
3. Planning
4. Logistics
5. Finance

The functions of Operations, Planning, Logistics, and Finance are referred to in ICS as the *general staff* positions. When assigned, Operations, Planning, Logistics, and Finance report directly to Command.

Command

The function of *Command* is to assume responsibility for the overall management of the incident. Command establishes the strategy and tactics for the incident and has the ultimate responsibility for the success of the incident activities. Firefighters' safety is the primary responsibility of Command. The Command role is filled by the Incident Commander (IC) and is the position that is established at *every* incident no matter how small or whether it involves only a single resource.

Operations

The function of *Operations* is to accomplish the strategy Command develops by meeting the tactical objectives. Operations directs all the incident tactical operations and assists Command in the development of the action plan.

Planning

The *Planning* function is to collect and evaluate information that is needed for preparation of the action plan. Planning forecasts the probable course of events

the incident may take and prepares alternative strategies for changes in or modifications to the action plan.

Logistics

Logistics can be described as filling the Supply Sergeant role for the incident. This position provides services and supplies in support of the tactical operations and their responsibilities are providing for facilities, transportation, supplies, equipment maintenance and fueling, and feeding and medical services for response personnel.

Finance

Usually formally implemented during large-scale incidents. *Finance* is responsible for the required fiscal documentation needed and produced as a result of the emergency. Finance also provides financial planning and advice to the IC to aid in meeting any fiscal statutory requirements. Finance is a *must* for disaster recovery involving federal or provincial funding.

ICS Command Staff

The Command Staff positions are designed to provide aid and assistance in helping the Incident Commander fulfill the responsibilities associated with managing the emergency. They handle key incident activities that enable the Incident Commander to concentrate on *managing* the incident. Command Staff are not part of the line organization and do *not* count when determining the number of positions under the Incident Commander's span of control. The positions are:

- Safety Officer
- Liaison Officer
- Information Officer

Safety Officer

The *Safety Officer* is responsible for monitoring and assessing safety hazards or unsafe situations, and developing measures for ensuring personnel safety.

After identifying the hazards, the information is conveyed to the IC, and any necessary adjustments are made to the action plan. The Safety Officer is appointed when the IC cannot adequately monitor hazards or unsafe conditions due to the size, complexity, or numbers of resources involved in the incident.

Liaison Officer

Liaison Officer responsibilities are to provide the point of contact and coordination for assisting agencies not involved in the Command function. The *Liaison Officer* also aids in coordinating the efforts of the other agencies and reduces the risk of their operating independently.

Information Officer

Also known as *Public Information Officer (PIO),* this position is responsible for the development and release of accurate and complete information about the incident and to serve as the point of contact for the media. The Information Officer establishes an area for the media away from the Command Post and a safe distance from the incident. They will provide news releases, answer questions the media may have, arrange for tours or photo opportunities of the incident from safe areas, and arrange for the media to speak with the IC if incident conditions allow.

Incident Commander's Role

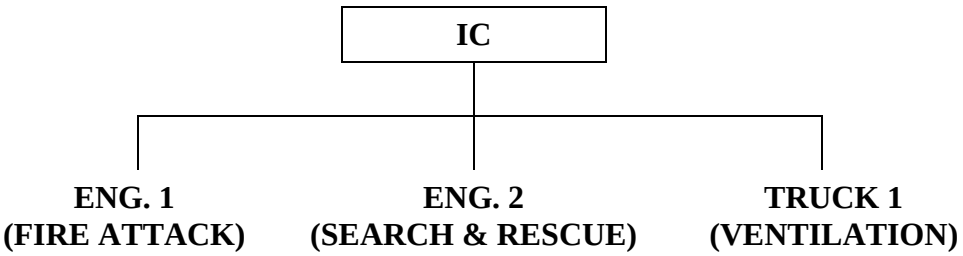
The Incident Commander's role is to establish the strategy and tactics needed to control the incident and implement and manage the action plan that will allow the available resources to be successful. The Incident Commander has the ultimate responsibility for success or failure and for protecting the safety of the personnel. As an incentive to delegating responsibility to maintain span of control, whatever responsibilities the Incident Commander does not delegate, the Incident Commander retains. Without delegating responsibilities and creating subordinate positions, the Incident Commander can quickly exceed an effective span of control.

In the previous sections the emphasis has been on developing and implementing an action plan. The importance of the first-in Company officer's responsibility to make good decisions upon arrival with the initial assignments must be stressed. The responsibilities of the initial Incident Commander include:

- Do a thorough size-up and report to dispatch.
- Identify strategy and select tactics.
- Develop initial action plan.
- Implement an action plan.
- Coordinate incident resources.
- Modify the action plan as necessary.
- Call for additional resources if needed.
- Maintain Command until it can be passed or transferred.
- Be prepared to fill a subordinate position within the incident organization.

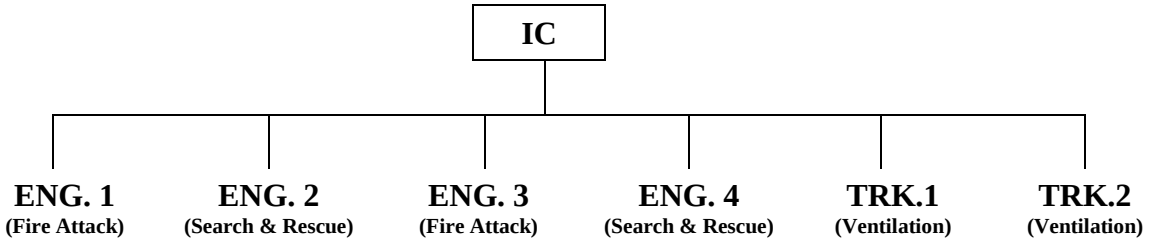
Divisions and Groups

Most incidents fire departments respond to can be handled by the assignments given to the initial responding units. A typical room and content fire in a single-family residence could well be organized in the following manner:



This organization allows the Incident Commander to maintain span of control and effectively deal with incident management.

Problems arise when the number of companies involved in the tactical operations exceed the Incident Commander's span of control. In an expanding emergency the Incident Commander can become overloaded:



The Incident Commander's span of control is stretched to the limit, and subordinate positions must be created to restore a manageable span of control.

Creating Divisions and Groups

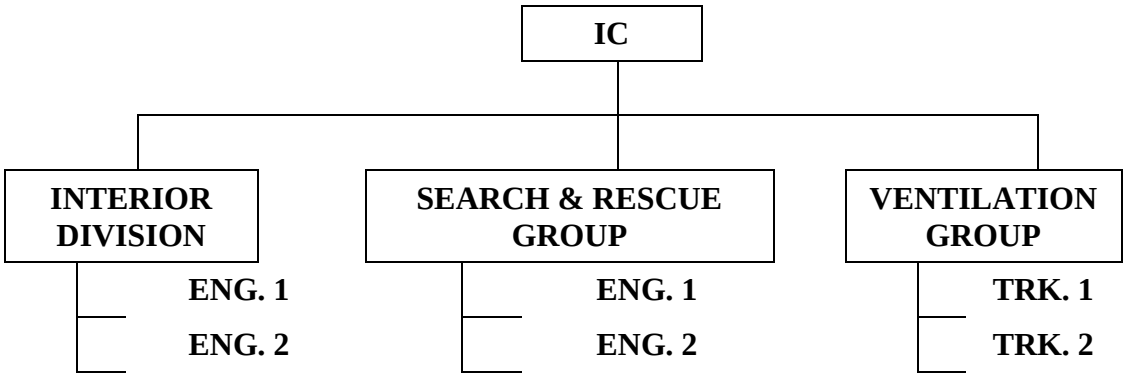
The first line position created by the Incident Commander is most often that of a Division and/or Group.

Division: The organizational level responsible for operations in a specified geographical area is called a Division. When the span of control is exceeded at the Division level the next organization level, Sector is created in a specific geographical area.

Example: A Division or Sector may be responsible for operations on a specified floor of a building or a specified side or area of a structure.

Groups: An organizational level responsible for a specified functional assignment.

Example: A *Group* may be responsible for search and rescue or for ventilating in the entire structure. Combining resources into *Divisions* or *Groups* allows the Incident Commander to reduce the number of individuals to be supervised and communicated with.



Relationship between Division and Groups

In the ICS organization, Divisions and Groups function at the same organizational level. Divisions do *not* work for the Groups and Groups do *not* work for the Divisions. Since Groups are responsible for the specified functional assignment in the entire structure, such as ventilation, their responsibilities may cross Divisional boundaries. As Divisions are responsible for *all* tactical operations in their designated area not assigned to a Group, the Division officer must be aware that if search and rescue needs to be accomplished, they are responsible for seeing it is performed. Division and Group officers report directly to the Incident Commander unless the incident is of such a scale that an Operations Chief has been appointed. They would then work for and report to the Operations Chief.

Chapter 2:
Fireground Operation and the Incident Command System

Operational Needs versus Resource Capabilities

Capabilities of a Fire Company

The standard number of firefighters assigned to a piece of fire fighting apparatus, as established by NFPA, is four. This is deemed to be the minimum number required to be able to initiate basic actions on the fireground.

Let examine the crew positions on an engine and each member has a role and responsibility;

Company Officer – This officer, having the rank of Captain or Lieutenant, is in charge of the apparatus and is responsible for the operations and safety of the rest of the crew. The officer rides in the cab passenger seat next to the driver. The officer will be responsible to assume the role of *Command* or work under the direction of Command.

Firefighter (Driver / Operator) – This position, sometimes referred to as a Chauffeur or Engineer, is the vehicle driver and pump operator and is responsible for the safe operation of the apparatus, both when responding through traffic with emergency equipment operating and when pumping water under pressure at the scene of the fire. The driver/operator is responsible for the whereabouts and operating condition of all small equipment carried on the apparatus. The driver usually remains with the apparatus if there is any chance of it being deployed.

Firefighter (Hydrantman / #2 Nozzelman) – The member of the crew has the responsibility to work with the driver to secure a water source by connecting the supply line to the hydrant and opening it up when water is called for. This member rides behind the driver in the crew compartment.

Firefighter (Nozzelman) – The last member of the crew works with the officer to initiate action on arrival. When tasked to do suppression work this member will pull a pre-connected attack line and get into position to apply a fire stream when the hoseline is charged. If there is a need to leave the apparatus staged this member will accompany the officer if required, leaving the driver and Hydrantman with the apparatus. The member rides behind the officer in the crew compartment.

Fireground Staffing.

In order to be affective in fighting a structure fire there must be a minimum number of firefighters on scene before a safe entry can be made into a burning structure, or an *offensive* fire attack. The accepted minimum is ten firefighters.

We have discussed the fact that fire departments vary greatly in staffing levels, both on-duty and organizationally. Staffing levels on apparatus may vary by time-on-day and day-of-week, or based on risk factors such as population density or hazards present in the district being protected. In some cases the staffing required might come from one large fire hall having several pieces of apparatus or from a number of fire hall each having a one apparatus. Volunteer and paid-on-call departments might respond two apparatus to the scene and rely on members attending directly from their homes or places of employment. In each case the time required to sufficient numbers of firefighters on the fireground and operationally deployed will affect the successful outcome for the Incident Commander.

Initial Actions of First Arriving Fire Companies

The first arriving, or *first-in*, fire company is usually the one closest and therefore will be from the local fire hall. The company officer of the apparatus must initiate some immediate action if the next few hours of work will have a positive outcome. The officer is responsible to make good decisions upon arrival with the initial apparatus assignment. The responsibilities of the initial *Incident Commander* include the following: to do a thorough *size-up*, verbally report to dispatch – an *initial report* on conditions, then to assume *Command*,

Accomplishing these steps confirms to all responding what the conditions are on scene and sets a framework in place to manage the incident, identifying who is in charge or in command.

Size-up

Size-up is the initial phase of the situation evaluation. The company officer will exit the apparatus and move to a position that will allow for a quick visual of the building. The purpose is to size-up the situation, or in other words; to figure out what the situation is. This first look will be the basis for what information is going to be relayed to all other apparatus responding, via Dispatch, and what immediate actions need to take place to bring the fire under control.

Initial Report

Initial Report is a short radio transmission from the first arriving apparatus to the dispatcher that provides a description of conditions and the confirmation and designation of command. This exchange of information from the scene serves three purposes. First – all other responding apparatus knows what's happening and what to expect on arrival. Secondly – dispatch can then anticipate what may be required and can pre-plan for what other resources may be called for. And third – everyone knows who is on-scene, what immediate actions if any are being taken, and who to report to for task assignments. Each initial report should contain a description of conditions, such as one of the following;

Nothing Showing

Nothing Showing indicates nothing visible to the outside of the structure, which might indicate a very minor fire. This will require further investigation.

Smoke Showing

Smoke Showing indicates conditions where *rescue* and *fire control* may be simultaneous strategies. The *rescue mode* is in effect until the primary search is completed and an all clear is transmitted.

Fully Involved

Fully involved indicates heavy smoke and flame visible and that immediate entry and search activities are impossible and victim survival is improbable. The affect of the fire is such that an all clear will not follow.

Working Fire

Working Fire is used to indicate that all responding apparatus will be committed at the incident location for an undetermined period of time.

Tactical Fireground Actions

After the *size-up* and *initial report*, which should include the establishment of command the next step by the first on-scene company officer is to *formulate a plan* and then *action the plan*. In the case of a structure fire the normal first action taken to secure a water source by laying a line and stretching an attack line into position to control the fire.

Laying a line

Laying a line is the evolution of stretching a line of fire hose from the hydrant to the fire, and employing all the necessary operations to place a fire stream in service.

Attack Line

Attack Line is a hand held hose line ranging in size from 1 1/4 to 2 1/2 used for aggressive offensive fire attack.

ICS on the Fireground

Assumption of Command – is the verbal statement by a fire officer that they are the person taking charge of the scene and assuming responsibility for the outcome. The basic sequence of steps:

- First arriving Officer does a visual size-up of the situation.
- The officer communicates with Dispatch, on the main channel, providing an initial report of conditions
- The officer then states the apparatus call-sign of the unit assuming the role of Command.

To avoid radio confusion with other command operations that may be operating the call sign of the new Incident Commander (I/C) changes from the apparatus call-sign to the STREET NAME + COMMAND.

Command communicates with the second arriving unit on the tactical channel and assigns a tactical objective. This is done in succession with each assigned apparatus.

Transfer of Command – is the act of handing off the role and responsibility of command to another officer. On a *First Alarm* this transfer of command usually takes place when the Battalion Chief arrives on scene. The following steps illustrate what takes place prior to the actual transfer of responsibility:

- The arriving Battalion Chief advises dispatch of arrival on scene
- The Battalion Chief switches the radio to the assigned tactical channel and requests an update situation / status report from Command.
- The Battalion Chief will assume Command and call sign once there has been an exchange of information as to:
- What companies have been assigned which objectives?
    - What progress has been made on the objectives?
    - What benchmarks have been cleared?

The Incident Commander (I/C) will be evaluating the situation to determine what tasks need to be undertaken in order to gain control of the fire scene. In order to maintain some order on the fireground and ensure that all responding apparatus do not arrive in front of the building, at the address given, *staging* is implemented as a matter of procedure (SOG).

Staging

Staging is the process for organizing responding vehicles at a fire incident. Without having clear procedures to direct them otherwise, some departments could end up having all the responding vehicles massed in front of the involved

structure. Access for other vehicles is often blocked, and the ability to move equipment to another location can be hampered, if not impossible.

Level 1 Staging

On the fireground the first arriving apparatus will proceed to the location / address. All other apparatus will stop approximately one city block away from the address, in the direction on travel, and await tactical assignments. This is referred to as *Level 1 Staging*

Level 2 Staging

This is the utilization of a Staging Area. *Level 2 Staging* is always initiated on Multiple Alarms due to the large number of apparatus assigned to the incident. All apparatus in the *Second Alarm*, and higher assignments, are dispatched to the Staging Area.

Staging Area

The *staging area* is the location where apparatus resources report until given a task to do on the fireground. The staging area must be located close enough to the incident that resources can respond immediately when given the direction to do so.

The use of staging increases accountability as responders are prevented from taking a look at the conditions at the scene and picking a task that looks like the most fun, or one they feel needs to be addressed and self initiating action, known as *freelancing*. The Incident Commander has control of the action plan and the resources responsible for its implementation. By establishing a staging area, the Incident Commander gains time to determine how companies can best be utilized. Resources are logged in, and where they will be operating and who will be supervising them is also recorded. Staging offers the opportunity to form crews that can be placed into service in an organized manner. It is similar to the Command Staff positions, in that it serves a support role to Command. Staging does not count when determining the Incident Commander's span of control.

Staging Officer

Staging is under the direction of the Staging Officer whose responsibility is to manage all of the activities within the staging area. Often, the first-arriving officer into the staging area is designated as the staging officer, until relieved or assigned.

The responsibilities of the Staging Officer include:

- Keeping track of all resources entering and leaving the Staging Area.
- Updating the Incident Commander of the level of resources in Staging.
- Maintaining a minimum level of resources if one has been determined by the Incident Commander.
- Responding to requests for personnel and equipment at the incident.

If the incident is of a size or complexity such that the Incident Commander has appointed an Operations Chief, the Staging Officer no longer reports to the Incident Commander but works directly for the Operations Chief.

Rehabilitation (Rehab) Area

Rehab is an area adjacent to the fireground where firefighters and other personnel can be sent to rest after being engaged in fire suppression activities. In the rehab area fire companies can rest, drink fluids, wash and eat, and be medically evaluated before returning to do fire suppression activities.

First Alarm ICS

As discussed previously, Incident Command is set up for each incident involving multiple apparatus (First Alarm). In ICS the *span of control* must be maintained and overall co-ordination is done by one individual the Incident Commander (I/C), in most cases a responding field supervisor, a Battalion Chief. A typical *First Alarm* assignment of two-engines, two-ladders and one rescue will result is a reasonable span of control as the I/C will only communicate on the fireground with each of the company officers, for a total

of five. Level 1 staging is maintained until task assignments are given by the I/C.

Multiple Alarm ICS

When a *First Alarm* assignment of apparatus is insufficient to manage the fireground tasks that remain, based on the tactical objectives of; Rescue, Ventilation, Suppression, Salvage & Overhaul then additional apparatus needs to be called for. As discussed, additional alarm levels of apparatus called to the same incident are called *Multiple Alarms*. It is common place for higher ranking chief officer to attend on these additional alarm levels, as the magnitude of the fire escalates so does the level of responsibility. As other ranking Chief Officers arrive, *Command* would likely be passed up the Chain of Command.

In the case of larger fire incidents such as; *Second Alarm*, *Third Alarm*, and greater, there is an organizational need to assign Divisions (Sectors) to accomplish the I/C's objectives at the task level. Divisions (Sectors) or Groups organize the individual fire companies, again reducing the span of control.

The logical expansion of ICS on the fireground is the appointment of an Operations Chief to manage just the Divisions and Groups. This splits the areas of responsibility into fireground operations under the Operations Chief and all other ICS roles; planning, logistics and finance remain with Command. Each incident presents its own set of circumstances that may lead Command to implement some or all of the general staff positions.

The Company Officer, originally the I/C on arrival, would likely become a Division (Sector) Officer as the event escalates due to that officer having been involved initially and had implemented the first planned fire attack.

SECTION 6
HAZARDOUS MATERIALS

Chapter 1:
Workplace Hazardous Materials Information System (WHMIS)

The federal and provincial governments have legislated that every worker has a right to know about the hazardous materials they may encounter in the workplace. Implementation of this legislation is the responsibility of the provincial Workers' Compensation Boards. Thousands of workers have been damaged by not knowing about hazards. Training is mandated to ensure that workers know about hazardous materials in their workplace.

Legislation

In 1982, a federal/provincial task force released a feasibility report on the labeling of workplace hazardous materials and recommended that a national system be put in place to deliver information. In 1983, the two levels of government were joined by industry and labour representatives to develop *Workplace Hazardous Materials* Information *System (WHMIS)* legislation and regulations and to make recommendations for implementation.

The Federal *Hazardous Products Act* and the *Controlled Products Regulations* established the criteria for including products in WHMIS. They require suppliers to provide appropriate labels and Material Safety Data Sheet (MSDS) on all hazardous products imported or sold in Canada. This legislation is a close match to US legislation and complements legislation relating to the transportation of dangerous goods.

Training Requirements

Provincial legislation is based on current occupations safety and health regulations and sets out the responsibilities of the employer to provide worker education on controlled products, labeling, identification and material safety data sheets.

Controlled Products

All controlled products under the act and regulations are classified into six classes with a total of eight possible designations. Each of these is identified by a symbol within a circle.

Class A – Compressed Gas

- gas cylinders for oxy-acetylene welding, medical oxygen, fire extinguishers.

Class B – Flammable and Combustible Material

- acetone, butane, propane are flammable
- kerosene, paints, diesel fuel are combustible

Class C – Oxidizing Material

- sodium hypochlorite, perchloric acid, inorganic peroxides

Class D – Poisonous and Infectious Materials

Division 1 Materials Causing Immediate and Serious Toxic Effects

- sodium cyanide, hydrogen sulphide, some herbicides and pesticides

Division 2 Materials Causing Other Toxic Effects

- asbestos, toluene, solvents

Division 3 Biohazardous Infectious Materials

- salmonella, hepatitis, HIV

Class E – Corrosive Material

- muriatic acid, lye, caustic soda

Class F – Dangerously Reactive Material

- butadiene, some cyanides

Exemptions

Some products are already covered by other legislation. In some cases, these items will be partially exempt from labeling and information requirements, such as some consumer products, cosmetics, explosives, pesticides and radioactive substances. In other situations, they will be completely exempt even though they are known to be hazardous. Examples of these products include tobacco, wood and products made of wood.

Labeling

Suppliers must label products with a label containing seven pieces of information in both English and French and enclosed in a distinctive border. The seven items are:

- Product Identification
- Hazard Symbols
- Risk Phrases
- Precautionary statements
- First Aid measure
- Reference to a material safety data sheet (MSDS)
- Supplier Identification

Employers must ensure that controlled products that are not in containers identified by a supplier label have a workplace label in the language of choice. These labels have three types of information:

- Product name
- Safe handling information
- Reference to MSDS

Other means of identification, such as placards, colours and piping diagrams may be used where the previous labels are not suitable.

Material Safety Data Sheets (MSDS)

These are technical bulletins that provide detailed hazard, precautions and emergency information. They have nine sections:

1. Product information
2. Hazardous ingredients
3. Physical date
4. Fire and explosion hazard
5. Reactivity data
6. Toxicological properties
7. Preventive measures
8. First aid measure
9. Date of preparation and contact names/numbers

Not all MSDSs are written up the same way, but they are acceptable as long as all the information is supplied. They must be revised or reissued at least every three years or whenever the data changes.

Responsibilities

The supplier must develop or acquire the MSDS for distribution with the product described and must classify all products. The employer must ensure that the MSDS are available to all workers and that they are updated every three years. Employers are also responsible to ensure that all workers are trained in WHMIS. Workers are responsible to take training if they work with or near controlled products. Implementation is the responsibility of everyone in industry and within each individual workplace.

In the event of an emergency call about a spill or exposure, the MSDS is the quickest way to get detailed information to assist the caller and to let the response units know about the dangers.

Chapter 2:
Transportation of Dangerous Goods (TDG)

A number of years ago, an off-duty firefighter traveling on the Trans-Canada Highway, saw a tank truck go out of control and smash into a telephone pole. The truck rolled over and came to rest upside-down in a ditch. The fireman stopped his car and ran to help.

As he was struggling to open the driver's door, he noticed that liquid was pouring out of a huge hole in the side of the tank, filling the ditch where he stood. He struggled harder, worried the liquid was flammable and could be ignited by a spark, or possibly the fumes were poisonous and he might collapse before he could rescue the driver. Finally he managed to get the door open and drag the unconscious driver to safety.

What the rescuer did not know was that he had been standing in a puddle of very strong acid. The truck driver recovered quickly from his concussion, but the rescuer lost both his legs. Had the truck carried placards, the rescuer would probably still have his legs.

There are nine classifications of dangerous goods and an Emergency Response Guide to identify dangerous goods, to help call takers inform callers of appropriate precautions to take with dangerous goods in the event of a leak or spill.

Legislation

The Mississauga Train Derailment, November 10, 1979, in which tanker cars containing reactive chemicals derailed and split, resulted in the largest peacetime evacuation in Canadian history. The resulting clouds of poisonous gases forced the evacuation of 250,000 people from their homes for up to five days. This incident led to a heightened public awareness of the transportation of dangerous goods.

The Government of Canada passed the Transportation of Dangerous Goods Act (TDGA) on July 17, 1980. The Act was further amended in 1992. The

Transportation of Dangerous Goods Regulations were written to provide information to people who handle and transport Dangerous Goods, and for people who respond to emergencies involving Dangerous Goods.

The legislation is the result of a cooperative effort. Complementary federal, provincial and territorial legislation, developed in consultation with industry, was enacted to consolidate a number of previously uncoordinated and separately administered acts and regulations. This national uniformity is the result of the application of the *Transportation of Dangerous Goods Regulations* to all modes of transport. The regulations automatically prevail where they are inconsistent with other federal regulations. Where they are silent on any aspect, all other applicable existing regulations still apply. This principle also applies in several of the provinces with respect to their provincial legislation.

The Transportation of Dangerous Goods Regulations came into effect on July 1, 1985 and were revised a number of times in order to promote public safety when dangerous goods are handled, offered for transport or transported in Canada. Rail, marine and air transport have been regulated for many years. Eventually, the regulations will include handling procedures and methods of packing, but now they focus mainly on providing information.

The intent of the act and regulations is to promote a greater level of public safety. The Transportation of Dangerous Goods Regulations cover the carriage of dangerous goods by all modes of transport in Canada. The regulations prescribe safety standards and requirements and provide a mechanism for communicating the relative degree and nature of the hazard. The purpose of the regulations is to improve public safety.

For safety standards and requirements by air and marine, two other sets of regulations also apply. For air consignments, the *Technical Instructions for the Safe Transport of Dangerous Goods by Air* published by the International Civil Aviation Organization (ICAO) must be consulted. For marine consignments, the *International Marine Dangerous Goods Code (IMDG Code)* must be

consulted. For further information on transportation of dangerous goods within a specific province/territory, contact with the proper authorities of the region is required.

CANUTEC

CANUTEC is the Canadian Transport Emergency Centre and is operated by the Transport Dangerous Goods Directorate of Transport Canada. CANUTEC provides a national, bilingual (English and French) advisory service and is staffed by professional chemists experienced and trained in interpreting technical information and providing emergency response advice.

Any person who has the charge, management or control of dangerous goods at the time of a dangerous occurrence must immediately notify the appropriate provincial authority; the appropriate federal authority specified for each of marine, rail and air; the owner, lessee or charterer in the case of a road vehicle; his or her employer; and, the owner or consignor of the consignment. In any emergency that involves dangerous goods, CANUTEC can be contacted by calling collect at: (613) 996-6666 (24 hours). In addition, a written Dangerous Occurrence report must be sent to the Transport Dangerous Goods Directorate (Ottawa) within 30 days of any accident.

Training Requirements

The Regulations state that no person shall handle, offer for transport or transport dangerous goods unless they are trained or working under the direct supervision of a person who has been trained. People are considered trained when their employer is satisfied they have received adequate training regarding the dangerous goods related to their assigned duties, and issues a Certificate of Training as prescribed by the Regulations. Every person who handles or transports dangerous goods is required to produce a Certificate of Training if requested to do so by an inspector. The Certificate of Training is valid for a period of 36 months after completion of initial dangerous goods training or subsequent training. (For air, the certificate is valid for a period of 12 months.)

Employers who issue Certificates of Training shall retain a copy on file for two years beyond the date of expiration.

Classes and Divisions of Dangerous Goods

The TDGA divides dangerous goods into nine classes according to the type of danger they present. Some of these classes are further divided into divisions, which are also associated with hazard characteristics.

Class 1 - Explosives

- ammunition, dynamite, flares, fire-crackers.

Division 1.1
- has a mass explosion hazard.

Division 1.2
- has a fragment projection hazard.

Division 1.3
- has a fire hazard & minor blast and/or minor projection hazard.

Division 1.4

- presents no significant hazard; explosion effects are largely confined to packaging.

Division 1.5
- very insensitive substance, which has mass explosion hazards associate.

Division 1.6
- extremely insensitive substance, no mass explosion hazards associated.

Class 2 - Gases

Division 2.1 Flammable Gas
- propane, hair spray, etc.

Division 2.2 Non-flammable
- non-poisonous, non-corrosive compressed gas – fire extinguishers

Division 2.3 Poisonous Gas
- nitric oxide

Division 2.4 Corrosive Gas

- chlorine

Note: Under the ICAO Regulations, (air transport) there are only three divisions. Class 2 does not have a Division 2.4 Corrosive gases. This is included under Division 2.3 Poisonous Gases.

Class 3 - Flammable Liquids

- gasoline, solvents, paints, acetone

Class 4 - Flammable Solids

Division 4.1 Flammable Solids

- matches

Division 4.2 Substances Liable to Spontaneous Combustion

- oily rags

Division 4.3 Substances Which, on Contact with Water, Emit Flammable Gases

- sodium

Class 5 - Oxidizing Substances

Division 5.1 Oxidizing Substances

- hydrogen peroxide, very strong bleaches, potassium permanganate, some swimming-pool chemicals.

Division 5.2 Organic Peroxides

- fiberglass hardeners (dibenzoyl peroxide)

Class 6 - Poisonous & Infectious Substances

Division 6.1 Poisonous (toxic)

- arsenic, cyanide, some herbicides & pesticides

Division 6.2 Infectious substances

- Rabies specimens, etc.

Class 7 - Radioactive materials

- X-ray equipment, some pharmaceuticals, testing equipment, smoke alarms, etc.

Class 8 - Corrosives

- acids, car batteries, sodium hydroxide, some cleaners.

Class 9 - Miscellaneous Products or Substances

- internal combustion engines (air transport only), dry ice, PCB's

Division 9.1 Miscellaneous dangerous goods

- other dangerous substances not previously mentioned above.

Division 9.2 Items hazardous to the environment
Division 9.3 Hazardous wastes

- Most hazardous wastes are labeled for the type of waste. For example a flammable waste would require a flammable label.

Documentation

The consignor must complete a shipping document when offering dangerous goods for transport. It must be handed over to the initial carrier and accompany the consignment throughout its journey. The carrier must ensure, to the extent possible, that the information on the shipping document matches the consignment. The carrier must also ensure that all documents relating to the dangerous goods accompany the consignment at all times and are located as required for each of the modes of transport. When dangerous goods are being transported by road;

- the driver shall keep one copy in the cab within his reach or in a pocket mounted on the driver's door.
- When the driver leaves the vehicle, one copy shall be left on the driver's seat or in a pocket mounted on the drivers' door.
- When the tractor unit is detached from the trailer, the documents are placed in a waterproof container attached to the fifth wheel.

When dangerous goods are shipped by air;

- two copies of the Shipper's Declaration for Dangerous Goods must be given to the air carrier.
- The air carrier will be responsible for the documents during transport. They are kept in the cockpit with the flight crew.

When dangerous goods are shipped by train, the documents are kept in the locomotive/engine unit with the train crew.

In the case of a waste consignment, a waste manifest must be prepared to accompany the consignment, with a copy submitted to the appropriate federal or provincial authority.

Dangerous Occurrences

Examples of dangerous occurrences and for which action should be taken are:

- spillage or leakage of contents or escape of fumes or gases or smoke from package;
- breakage or failure of inner or outer receptacles;
- damage to property or injury to persons caused by contents;
- any omission relating to the shipment that jeopardizes people or property.

Penalties

The TDGA provides for the following penalties:

> *Failure to comply with Sections 4 or 5 of the Act or with a protective direction, could lead to a fine of not more than $50,000 for a first offense and not more than $100,000 for each subsequent offense or imprisonment for a term not exceeding two years. Failure to comply with other provisions of the Act or Regulations could lead to a fine of not more than $10,000 or, upon conviction, to imprisonment for a term not exceeding one year.*

Fire Department Response

Fire communicators must be aware of the regulations regarding the transportation of dangerous goods and how a dangerous occurrence involving dangerous goods affects emergency response. When the public calls for help

about unknown substances, it is important to be able to identify those that are documented and to provide information and support immediately. At the same time, appropriate resources must be dispatched to attend the scene. The Hazard Materials (*HazMat*) response apparatus and crew are trained to deal with containment, clean up and decontamination procedures as a stand-alone fire department team or in conjunction with other agencies.

The fire communicator will need to be able to look up the PIN (*product identification number*) or UN (*universal number*) and be able to give general information over the phone to the caller about safety measures and emergency procedures, and to provide responding fire companies with the appropriate Guide number from the North American Emergency Response Guidebook or other relevant document.

Safety Marks

Placards

Containers with a capacity greater than 454 litres (100 gal) must be placarded. Four placards are required. The placards must indicate the class and any subsidiary risks of the contents. In addition it is also necessary that the UN number be indicated on the placard or on a separate placard.

Vehicles carrying dangerous goods must also carry placards. Four are required and must be visible from either side and at each end of a vehicle.

Normally the quantity of dangerous goods must exceed 500 kg. (1100 lb.) before placards are required on a road vehicle.

Purpose of Placards

Placards are a clear indication that a transport unit contains dangerous goods that otherwise might not be identified as such immediately.

When an accident involving a transport unit occurs, these placards alert responders to the presence of dangerous goods so that the necessary precautions to avoid injury and damage can be taken.

Safety Measures

Dangerous goods packages showing signs of leakage, fumes, or other signs of damage should be removed to a safe isolated place, preferably in the open air.

Whenever possible, mechanically operated devices such as forklift trucks should be used to move damaged packages. This minimizes danger to people. No attempt should be made to open damaged packages. Make sure that your skin and clothing do not come in contact with dangerous goods.

Packages, which are damaged, suspected of being damaged or poorly packaged, must never be loaded on a vehicle or an aircraft. When insufficient packaging, damage or spillage of shipments of dangerous goods is noticed, the person in charge must be notified. (e.g., supervisor, manager, pilot-in-command, dispatcher, engineer responsible for the aircraft)

No one shall handle damaged dangerous goods shipments until the nature of the hazard is determined. A supervisor must be present to supervise any clean-up or other action.

When handling damaged packages, the following general precautions should be taken:

- Do not allow the contents of the package to come into contact with any part of the body.
- Do not inhale any vapour or fumes.
- Guard against fire.
- If you come in physical contact with dangerous goods, immediately wash the affected areas of the body with soap and water. DO NOT EAT OR SMOKE. Keep your hands away from your eyes, mouth, nose, etc.

Emergency Procedures

The first priority when an accident occurs is the protection of people. The following procedures are recommended and should, with some local variations, always be used:

- Secure the area, ensuring that unauthorized persons are kept away. Do not expose yourself or other people to unnecessary hazards.
- Identify the product using the Bill of Lading, Shipper's Declaration, Air Waybill, Notice to Pilot-in-command, markings, labels, etc.
- For assistance call the RCMP, the Shipper, and the employer.
- Have a person stand by for telephone messages.
- If the emergency exists in an organized area, advise the fire department.
- If Radioactive Materials or Explosives are misplaced, lost, or stolen, notify local police immediately.
- If Infectious Substances, including exempt Test Samples, are misplaced, lost or stolen, notify CANUTEC immediately.
- Transport Canada must be notified ***immediately*** of any Dangerous Goods occurrence involving an aircraft or taking place at an airport.

Chapter 3:
HazMat Team Response

Levels of Fire Department Hazardous Materials Training

Fire departments are the primary response organization at the municipal level. Should a release of a *dangerous good* occur in an urban area, the local fire department will be called upon to provide some level of action. However, as discussed, not all fire departments are organized and funded to the same level therefore it is not reasonable to expect all fire departments to have the same capability with respect to dangerous goods incidents. The organizational structure of the department, levels of staffing , the financial capability of the city / municipality, and the potential or risk that dangerous goods pose to the public all influence the level of training of fire fighters..

NFPA 472: Standard for Competence of Responders to Hazardous Materials/Weapons of Mass Destruction Incidents - Fire departments train their response personnel to this standard, which covers the competencies for awareness level personnel, operations level responders, hazardous materials technicians.

Awareness Level Training

First responder with an understanding of and the skills necessary to detect the presence of hazardous materials, identify the hazards associated with these materials, and notify proper authorities. Fire communicators should be trained to the *Awareness Level.*

Operations Level Training

Fire responders have *Awareness level* training, plus training to conduct operations in a *defensive* mode, outside the *Hot Zone.* Firefighters must possess the knowledge of how to protect themselves and the public, and be able to implement basic decontamination measures. This level of training ensures all members operating at the scene of a dangerous goods spill

understanding standard operating and termination procedures. This level of training is provided to all Fire Officers and Firefighters.

Technician Level Training

This level of training is provided to the HazMat Team. Training to this level includes *Awareness* and *Operations* level training, plus specialized training in the handling of dangerous goods and use of equipment that allows for offensive operations, inside the *Hot Zone*, to mitigate the extent of the chemical spill or release.

Hazardous Materials ICS

ICS uses the five major components that make up more successful organizations. ICS is broken down into functional areas of*;* Command, Operations, Planning, Logistics, and Finance**.**

As discussed previously the function of *Command* is to assume responsibility for the overall management of the incident. Command also establishes the strategy and tactical objectives for the incident. *Operations* function is to accomplish the strategy *Command* develops by meeting the tactical objectives. *Operations* directs all the incident tactical operations. Given that a hazardous materials spill requires specialized training and equipment it is reasonable that the *Command* and *Operations Chief* would expand the ICS model to include a *HazMat Group* under the Fire Branch.

HazMat Team Organization

The HazMat Team will consist of specialty apparatus and a number of trained members that can step into one or more of the functional positions on the team. Each team position has a responsibility to ensure the safety of the team members. Functionally the team has four primary positions that report to the *Team Leader*. These positions are; *Safety, Resource*, *Entry Leader* and *Decon Leader.*

Eleven (11) Technicians are required to fill the team positions in order to do an entry into the *Hot Zone*

Team Leader

This position is overall responsible for the HazMat team and the operations and activities that take place in the Hot Zone. This person is usually the highest ranking member of the team, the Captain. This person reports directly to the Incident Commander (I/C) normally, Operations Chief if one is activated, or to the Fire Branch Director if ICS is fully implemented.

Safety

This position is responsible for safe operation of the hazardous materials site, and liaises with the command staff *Safety Officer* as their roles and responsibilities are very similar.

Resource

A key position on the team this person is responsible for the determination of chemical properties of the product spilled. Without this information the action plan, compatibility protective equipment, and decontamination materials need cannot be determined.

Decon Leader

The function of *Decontamination (Decon)* is setup in the *Warm Zone*, and is the cleaning of the tools and entry suit ensemble worn by the *Entry Team* when exiting the *Hot Zone*. The *decon leader* is responsible for the decontamination process and the team members working the decon line.

Decon #1
A team member position that is stationed in the *Warm Zone* and tasked with the cleaning of the entry suits and equipment used by the entry team, when they exit the *Hot Zone*.

Decon #2
Working in pairs this team member assists Decon #1. In some situations additional technicians (Decon # 3 & Decon #4) will be required to work the *decon line*, under the direction of the Decon Leader

Entry Leader

The *Entry Team Leader* is responsible for the entry and back-up team members working in the Hot Zone. As the team leader, they maintain voice communication solely with these members, monitoring their conversations and documenting the time spent in the Hot Zone.

Entry Team #1
The role of the entry team (Entry Team #1 & #2) is to enter into the Hot Zone and do a *recon* to determine the situation, if it cannot be clearly determined from the Cold Zone area. They will re-enter and action the plan, in an attempt at mitigating the situation.

Entry Team #2
Working in pairs this team member assists Entry Team #1. The entry team and back-up team work together, alternating in the Hot Zone, each providing a Rapid Intervention Team (RIT) for the other team.

Back Up Team #1
The role of the entry team is to enter into the Hot Zone and do a recon to determine the situation, if it cannot be clearly determined from the Cold Zone area. They will re-enter and action the plan, in an attempt at mitigating the situation. The entry team and back-up team work together in pairs, each providing a RIT, for the team that is in the Hot Zone.

Back Up Team #2
Working in pairs this team member assists Back-up Team #1. The entry team and back-up team work together, alternating in the Hot Zone, each providing a RIT, for the other team.

HazMat Team Operations

When the HatMat arrives on scene they use eight Principles of Operation, in sequence, to ensure a logical and safe approach to the hazards.

#1 - Site Management & Control

In most situations the first response of apparatus is not the HazMat team but rather the apparatus from the closest fire hall to the incident. The level of training of these firefighters should be to Operations Level and as such will have initiated defensive actions prior to the arrival of the HazMat team. The six main tactical objectives of first arriving responders are:

- Approach safely – from upwind and uphill.
- Perform a Size-up of what you are actually dealing with & report on conditions when other units are responding.

Assume Command

Establish Staging Area for controlling responding resources and agencies.

- Isolate & Deny Entry by establishing Hot Zone and Cold Zone with outer/inner perimeters, and isolate contaminated and injured civilians
- Begin actions to protect the public; such as evacuation, or shelter-in-place or both

#2 - Identify the problem/product

Some of the products being transported present challenges to the responders and may take some time before accurate information can be obtained.

#3 - Hazard & Risk Assessment

A series of determinations will need to be made;

- What is the product? - How is this material expected to react, given present conditions? How will the material react if conditions change?
- What actions are necessary to protect life, property and the environment?
- Do we have sufficient manpower and equipment to take action?
- What is to be gained or lost by doing nothing…
- ***What are the overall Strategies and Objectives of COMMAND…?***

#4 - Selection of Personal Protective Equipment (PPE)

#5 – Develop an Action Plan

The *Incident Action Plan* (IAP) develops the strategic goals and tactical objectives with the necessary resources to mitigate the incident. The IAP should answer questions such as; what needs to be done and how will it be accomplished?

#6 - Implement Action Plan

The entire team will hold a tailgate meeting to brief all team members as to what the objectives are and what tactics are going to be used to complete the strategic goal.

#7 - Decontamination

Decontamination of the team member who have entered into the Hot Zone is one situation, more easily managed due to training and equipment that ensures safety during the decon process. However there is the potential that civilians may have been exposed or contaminated by the spilled chemical. There are also the *worried well*, those who are concerned that they might be in danger just by being in proximity to the incident. Regardless they to require *triage* to be sure.

#8 - Termination of the incident

The decision to terminate the incident will be made by *Command.* Large scale hazardous materials incident involve any number of stakeholders; building management company, business owners/agents, companies directly affected, other tenants impacted by isolation and evacuation, employee unions, WorkSafeBC to name a few. In cases like this the decision must be jointly made by the *Unified Command.*

Basics of Hazardous Material Call Assessment

To quickly and thoroughly assess the full potential of a hazardous material spill can be challenging. The *information we need versus the information we get* are very often two totally different things.

The selection of the appropriate event type in CAD must be done to ensure the correct response of members, with the appropriate level of training, and with the correct equipment to mitigate the situation. This challenge presents itself each time the fire call-taker answers the 9-1-1 line.

Is the caller knowledgeable…? If YES – Perhaps the caller may have access to; Material Safety Data Sheets (MSDS), Bills of Lading (Truck or Rail), or inventory sheets. Regardless of the source, having detailed information pertaining to the product spills will save time and help to ensure that the situation does not escalate and is handled safely. Of course, this is not always the case and the 9-1-1 call may be received from someone in the manufacturing facility, a distribution warehouse, be the carrier (truck or rail) or product end-user.

Is the caller knowledgeable…? If NO - Call may be received from a passerby with no specific or detailed information. They may be calling 9-1-1 because they can see something that causes them concern. This person may be on a cell phone and do not know exactly where they are, or perhaps someone has been asked to phone in the emergency. Recognizing that the caller has no specific information that will be of assistance allows the call taker to quickly terminate the call and move to the next caller**.**

The basic information required that will assist in the HazMat Call Assessment is:

What is the Product?

Every product shipped had a product name or a chemical name. The caller might be instructed to look on the shipping documents, bills of lading or to the Material Safety Data Sheets (MSDS), if stored on premises. Is there a placard

or UN number? The product/chemical name is the most important piece of information required by the responders.

If the caller has no specific information as to the name, additional information can be gleaned by ask the following:

- ***What do you see …?***
  Is there a puddle / powder / vapor cloud …?? The answer to these questions will determine the physical properties of the material spilled/released. Gases – vapour clouds can be more hazardous than liquids or solid (powder) as the affects of inhalation are greater.
- ***Is there a Placard on the container or vehicle...?***
  Even from a distance the colours of the placard provide important information.
  Placard (indicates Classes of Chemicals) Refer to the Emergency Response Guide (ERG) book for information.
- **What kind of container is it …?**
  The shape and size of container may provide clues to what is inside. Refer to the Emergency Response Guide (ERG) book for information

How much has Spilled?

Once the product, type of material is known, the next step is to try to determine how extensive the release is. By determining the physical state of the material further questions can be directed at volumes. For example;

- Liquids = ounces / gallons / milliLitres / Litres
- Solids = ounces / pounds / grams / kilograms…tons!
- Gases = cubic yards / cubic meters

The following line of questioning will help get a sense of what is going on and whether the situation is getting worse. These questions will solicit an estimate on the part of the caller.

- **How large of an area is covered?**
  If there is a vapor cloud – is it getting larger?
  If there is a puddle – is it getting bigger?

How large is the Container?

The next step is to determine the potential by asking question relating to container size or capacity;

How large is the container that is leaking? Depending on the physical state we will be dealing with different types of container:

- Liquids – bottles / pails / drums / tanks
- Solids – packages / boxes / pails / bins
- Gases – cylinders (pressure)

Was the container full? - (If applicable) The intent is to **quantify the amount of material** that has the potential to leak out of the container.

Is anyone injured?

Ensure that any injuries are identified. It is important to determine if anyone at the scene is suffering any injuries. The concern here is;

- Are injured still in the building? (Hot Zone) – This may require an entry into the contaminated area
- Numbers of injured? – Require extensive triage and transport to hospital (BCAS)
- Are the injured contaminated with the spilled product? – Require decontamination (De-Con) prior to Triage, Treatment and Transport

Ensure, to the best of your ability, that any injuries are identified. Can the caller see anyone experiencing; Collapse, Shortness of Breath, Choking, Eye Irritation, etc.

Information must be conveyed to Dispatch. **Your role as a Call taker** is to, as quickly as possible, assess the seriousness of the spill / release and enter the event into CAD so that it can be dispatched.

HazMat Response

The Dispatcher's role is to send the appropriate HazMat Assignment. This apparatus assignment should ensure that firefighters with appropriate level of training, along with the necessary tools and equipment, will be sent.

It is important for the dispatcher to understand the following;

- Fire suppression apparatus DO NOT carry any Personal Protection Equipment (PPE) necessary to deal with chemicals. These companies do not carry detection equipment necessary in determining the presence of chemical, biological or radiological materials or any specialized tools used at hazardous material incident.
- Pumping apparatus (Engine) may be called upon to provide water for Decon or to provide personnel protection fog streams if the chemicals involved are flammable.
- Hazardous Material Team vehicles DO carry the necessary Personal Protection Equipment necessary to deal with chemicals, i.e. Suits, boots and gloves and detection equipment. Tools carried on this apparatus are specifically used to; contain spilled materials, plug and patch containers and decontaminate members exiting from the Hot Zone

HazMat Response Levels

NFPA 471 provides a simplified planning guide that was developed for training. Conceptual use of this Guide must be understood and lays out criteria that helps establish a response level.

Level 1 (Firefighters)

Dangerous Goods - Level 1 (Low Risk) - are situations involving hazardous material that can be managed by Operation trained firefighters. These include the following:

- Gasoline leaking from vehicle (<30 gallons / 120 litres)
- Investigate unknown odor
- Small container - appears to be intact and abandoned.
- Small amount of chemical products, minor leak (NO placard)
- Natural Gas Leak

Level 2 (HazMat)

Dangerous Goods - Level 2 (Low/Moderate Risk) - situations involving hazardous material that can be managed by *Technician* trained firefighters, using specialized equipment. These include the following:

- Propane leaking from vehicle (flare-off).
- Response to chemical spill/leak with Classification known (Placard).
- PCBs.
- Medium or Large containers - appears to be leaking a small amount.

Level 3 (HazMat)

- **Dangerous Goods - Level 3 (High Risk**) – situations involving hazardous material that can be managed only by *Technician* trained firefighters, using specialized equipment. These include the following:
- When there is a chemical release that is uncontrolled.
- When size of the container is deemed *Large* with a potential that is severe.
- When there is a need to do an entry into the Hot Zone for the purpose of Re-con or mitigation. This situation requires de-contamination of entry teams and is manpower intensive.

APPENDIX I
GLOSSARY OF FIRE TERMS AND PHRASES

Fire Terms and Phrases Glossary

Advance a Line	Instructions to move a hose towards a given area from where an apparatus has stopped.
Alarm	Came from Old French 'à l'armes'; "to the arms", telling armed men to pick up their weapons and get ready for action. In context it refers to responding to, or notification of, a fire
Alarm Upgrade / Escalation	The severity of the incident requires additional resources or personnel, e.g., 2nd alarm or 3rd alarm.
All Clear	Benchmark - A verbal report by the Incident Commander that the primary search has been completed, no victims found.
Apparatus	A motorized piece of equipment (a fire truck) used to transport staff and equipment to the scene of an emergency.
Arson	The setting of a fire to defraud or for any other illegal or malicious purpose.
At Scene	Status see *On Scene*
Attack	The actual physical firefighting operations utilizing men and available equipment. The actual placing tactics in motion at the fire scene using all available personnel and equipment.
Attack Line	A hand held hose line ranging in size from 1 1/2” to 2 1/2” used for aggressive offensive fire attack.
Automatic Sprinkler	See *Sprinkler System*.
Available on Radio	Apparatus and units that are in radio contact
Back Up Line	A supplementary hose line used to protect fire personnel or as an additional hose line to attack the fire.

Backdraft	An explosion or rapid burning of heated gases resulting from the introduction of oxygen admitted to a building heavily charged with smoke from a fire that has depleted the oxygen content in the building.
Benchmarks	The objectives of each tactical priority; the "primary search is completed" the "fire is controlled" and "fire loss is stopped".
BLEVE	Boiling Liquid Expanding Vapour Explosion
Booster Hose	The one-inch rubber-lined and rubber-covered hose connected to the discharge side of the pump, usually coiled on a reel, often used on Brush rigs.
Bunker Gear	See *Turn-out Gear*
CAD	Computer Aided Dispatch system
Channel	A selectable radio frequency that is available for voice or data radio communications.
Charged Line	A line of hose that is filled with water under pressure and ready for use.
Class A Fires	Fires occurring in ordinary combustibles that are usually extinguished by water. Examples include wood, paper, cloth.
Class B Fires	Fires involving flammable liquids, usually extinguished by a smothering method or through the introduction of a halogenated agent (breaking the chain reaction of combustion). Examples include gasoline, kerosene, alcohol.
Class C Fires	Fires involving energized electrical equipment.
Class D Fires	Fires involving metals that are flammable or combustible. Some contain their own oxygen which is released when heated.

Cold Zone	HazMat- The uncontaminated area where workers should not be exposed to hazardous conditions.
Combustible	Refers to a material that can burn, such as wood, paper, cloth.
Command	Fireground radio designation for the Incident Commander. Refers to the person, the Incident Command function, and the location of the incident command post.
Command Post	The location from which the Incident Commander oversees all incident operations, usually a designated building, inside the command vehicle or fire apparatus.
Command Vehicle	Vehicle used for the transportation of command officers and for storage of pre-fire plans and other significant fire data. Generally used at initial command post.
Company	Crew of personnel staffing a piece of apparatus. This term also refers to a team consisting of an officer and group of firefighters.
Company Officer	The fire officer who is in charge of a team of firefighters and usually a piece of fire apparatus.
Cross Staffing	An term referring to the staffing of two or more pieces of apparatus with one company of firefighters. Often done to cover a primary response vehicle and specialty apparatus.
Decay Stage	The stage of a fire when the fuel becomes consumed and the energy release diminishes and the gas temperature decrease.
Defensive Strategy	An exterior fire attack, with related support, designed to stop the forward progress of the fire beyond the building of origin and then provide fire control.

Division	ICS Organizational level - of fireground operations delegated by the Incident Commander, or Operations Section Chief for specific functions of geographical areas on the fireground .
Division Officer	ICS position that reports to the Operations Section Chief responsible to manage specific geographical areas of the incident scene, operating at the tactical level.
Drafting	To lift or draw water from a static source, such as a swimming pool, cistern, lake, etc., into a pump that is above the water source.
Elevated Master Streams	Defensive fire streams provided by ladder pipes, platforms, buckets and booms.
Emergency Traffic	A priority message to be immediately broadcast through the fireground and requiring the immediate attention of Dispatch.
Engine	A fire department pumping apparatus.
Engine Company	Basic unit of fire attack consisting of pumping apparatus and personnel trained and equipped to provide a water supply, and deliver water under pressure to the fire through hose lines.
Enroute	Status – Indicates change of location or used to designate destinations. Enroute may be a substitute for *Responding*.
Exposure	Anything that may be in danger of catching fire from another building or from an outside source.
Extension	The spread of a fire to areas not previously involved.
Extinguisher	A portable fire and fire fighting appliance.
Fill- In	See *Move-up*.
Fire	Is the heat and light energy released during a chemical

	reaction, in particular a combustion reaction.
Fire Attack	See *Attack*
Fire Attack Teams	One of more fire companies engaged in fire suppression.
Fire Is Struck	See *Strike Out*.
Fire Prevention	The precautions that are taken to prevent or reduce the likelihood of a fire that may result in death, injury, or property damage.
Fire Protection	Refers to those methods used to provide fire control and fire extinguishment, and those methods used to protect human life.
Fire Storm	An extremely large fire which attains such intensity that it creates and sustains its own wind system. It is most commonly a natural phenomenon, created during the largest forest fires.
Fire Stream	Water applied directly to the fire to control and extinguish it.
Fire Suppression	The process of controlling and/or extinguishing fires for the purpose of protecting people from injury, death, and/or property loss.
Fire Under Control	Benchmark – See *Under Control*.
Fireground	Defined by an imaginary line (perimeter) which encloses the space where the fire situation creates potential hazard to fire personnel.
First Alarm	The first level of a predefined assignment of apparatus, that is to respond to a structure fire.
Flammable Liquid	Those liquids with a flash point below 100 degrees Fahrenheit. Generally, a flammable liquid means a liquid which may catch fire easily.

Flashover	Gases trapped against the ceiling ignite, quickly involving the entire interior space.
Forcible Entry	Activities required when firefighters encounter barriers that keep them from the fire area.
Fully Involved	Initial report indicating heavy smoke and fire conditions on arrival. Immediate entry and search activities are impossible and victim survival is improbably.
Fumes	Vapor or gas passed off by a material due to vaporization or by heating.
Greater Alarm	Refers to the escalation of an incident beyond the established alarm levels of apparatus.
Ground Ladders	Climbing ladders carried on most fire apparatus that are placed on the ground when used.
Group Officer	ICS position that reports to the Operations Chief, or Branch Director responsible for a specific function, such as Search & Rescue or ventilation, operating at the tactical level.
Hand Lines	Hand held hose lines used in fire attack usually 1 ¼" to 2 ½" in diameter.
Hose	A firehose is used to carry water or other fire retardant (such as foam) to a fire to extinguish it.
Hose Bed	Location on the apparatus where hose is stored in a manner that permits it to be deployed out the back of moving apparatus.
Hot Zone	HazMat - also referred to as the isolation zone, is the area where contamination may occur.
In-Quarters	Status - used to indicate that a unit is in a station / firehall and no longer monitoring the radio.

In-Service	Status - denotes that a piece of apparatus is equipped, and available for instant use. The normal status of all fire apparatus.
Incendiary Device	A rig or mechanism that when activated results in ignition and burning, used in arsons.
Incipient Fires	Beginning, or first stage of fires. The process can be either flaming or smoldering combustion.
Inflammable	Synonymous with Flammable, anything that will burn readily, as certain gases and liquids; does not mean nonflammable.
Initial Report	A short radio transmission by the first arriving fire officer, to provide a description of conditions on arrival, actions taken and the confirmation of command.
Interior Division	ICS Organizational level responsible in this case for operations geographically within the fire building.
Knock Down	To reduce flame and heat to prevent further fire.
Ladder	A fire department apparatus that incorporates a aerial extension ladder mounted on a turn-table used to apply water to elevated area, for rescue, and ventilation.
Ladder Company	Basic unit of fire attack consisting of apparatus and personnel trained and equipped to provide operation of elevated master streams, rescue, roof ventilation, salvage, and overhaul.
Lay	A method or sequence of laying fire hose on the ground, from a hydrant or from apparatus.
Laying a Line	The evolution of stretching a line of fire hose from the hydrant to the pump, and employing all the necessary operations to place a fire stream in service.

Leeward Side.	The opposite side from which the wind is blowing.
Level I Staging	Initial arriving apparatus go directly to the scene taking standard positions, assume command, and begin operations. The remaining units stage (stop) about one block from the scene, in the direction of travel, and remain until ordered into action by the Incident Commander.
Level II Staging	Used for large, complex, or lengthy operations (Multiple Alarms). Additional units are staged together in a specific location, a Staging Area, under the command of a Staging Officer.
LP / LPG	Liquefied Petroleum Gas
Master Streams	Defensive fire streams of a large capacity provided by grounded or apparatus-mounted turrets, deluges and monitors.
Mayday	An emergency code word used internationally as a distress call used to signal a life-threatening emergency.
Move-up	Refers to apparatus moving from one district to another to maintain overall response coverage.
Multiple Alarm	More than one alarm level called for the same incident. Escalation from a *First Alarm* to *Second Alarm*, etc., is referred to as a *multiple alarm* fire.
Mushroom	A term describing the action when fire, heat or smoke that is traveling vertically, meets an obstruction that causes it to spread horizontally.
Mutual Aid	A prior agreement that allows apparatus from jurisdictions outside your department area to be requested to assist with an incident.

NFPA	National Fire Protection Association
Nothing Showing	Initial report indicating no smoke or flames visible on arrival and further investigation will follow.
Offensive Strategy	An aggressive interior attack, with related support, designed to bring the fire under control quickly.
On Scene	Status – used to indicate that a unit has arrived at the scene. Example: "Engine 6 at scene, Over."
Out of Service	Status - used when a piece of apparatus is temporarily unavailable and not available for response.
Overhauling a Fire	The task of examining a structure after a fire to be sure that no hidden spark is left that will cause a rekindle.
Plume	A cloud or dispersion of smoke or gases being moved by wind or air currents.
PPE	Personal Protection Equipment which is worn by suppression firefighters including jacket, pants, helmet, gloves and boots. Extended to include SCBA or other protective equipment.
Pre-fire Plan	Written analysis of the fire problems of a particular building in terms of size, hazards, and built-in protection.
Primary Search	A rapid search of all involved and exposed areas affected by the fire that can be safely entered. Its purpose is to verify the removal and/or safety of all occupants.
Pumper	See *Engine*
Quad	A fire apparatus consisting of a pump, hose bed, water tank and large compliment of ground ladders.
Quint	A fire apparatus consisting of a pump, hose bed, water tank, large compliment of ground ladders, and an aerial ladder.

Rehabilitation Sector	*Rehab*, an area outside the fireground perimeter where crews can go for rest, receive nourishment, comfort, and medical evaluation.
Rekindle	To revive or renew. A return to flaming combustion after apparent but incomplete extinguishment.
Report On Conditions	An update by the Incident Commander (I/C) as to what progress has been made on the fireground.
Rescue	The fire department apparatus. Essentially toolboxes on wheels, they are primarily designed to deliver rescue and medical services. Also, by action to free from harm.
Rescue Company	Apparatus and personnel trained and equipped to provide rescue functions and safety for fireground personnel.
Rescue Group	ICS organization level - Responsible for the location, protection, and removal of fire victims anywhere on the fireground.
Reserve Apparatus	A term applied to apparatus or equipment which, although serviceable and ready for use, is kept as supplemental apparatus or equipment that may be staffed as required.
Respond, Responding	Proceed to or proceeding to an incident. Example: "Engine 5, respond emergency…" or "Dispatch, Engine 5 is responding." A direction used by Fire Dispatchers.
RIT	*Rapid Intervention Team*. – A team of firefighters on the fireground that are held in *reserve* to initiate a search should a firefighter be un-accounted for..
Run	Another term for a call for assistance from the public. A response to a fire or fire alarm, etc.

Safety Officer	ICS Command Staff - A specialist who provides expertise and individual attention to the role of safety on the fireground.
Salvage	The fireground operation focused on preservation of property.
SCBA	Self Contained Breathing Apparatus; the air tanks and masks that are used by suppression firefighters where there is potential danger of physical harm from smoke or toxic gases.
Second Alarm	The second level of apparatus assignment in a pre-built list of alarm levels to a structure fire.
Secondary Search	A complete, thorough search of the interior fire area for victims after completing fire control, ventilation, and other required support activities.
Size-up	The initial phase of the situation evaluation, done by the first arriving fire officer..
Smoke	A product of incomplete combustion.
Smoke Showing	Initial report of conditions existing, where it may be possible to extend rescue and fire control simultaneously.
SOG	Standard Operating Guideline – A written document intended to provide the reader with guidelines as to how handle a situation.
SOP	Standard Operating Procedure – A written document intended to provide the reader with procedures to follow in the event of something specific happening. SOPs are falling into disuse in favour of *SOGs*
Spontaneous Ignition	Ignition produced by the slow building up of heat from

(Combustion)	oxidation; usually occurs from drying oils.
Sprinkler System	Equipment for fire control and extinguishment whereby water is piped to specially designed orifices, or sprinkler heads, distributed throughout a property and operated automatically in the event of a fire.
Staging	The management of responding and uncommitted apparatus. To provide orderly deployment. See; *Level I Staging* and *Level II Staging*.
Staging Area	An identified location nearby the incident where apparatus are directed to respond to. A holding or resource pool. Defines *Level II Staging.*
Staging Officer	ICS position - Advises the Incident Commander of equipment and resources available in the Staging Area, assigns specific companies to the Incident Command's requests and assists companies to respond to assignments.
Stand-By	(a) Radio procedural phrase meaning "I pause for a minute, please wait" used in place of "break" (b) Reference to a unit that is being held where they are, but not presently committed, example; "Engine 1, stand-by until we get more information, over".
Standpipe	A pipe placed vertically in a building stairwell, having an outlet on each floor to which hose lines can be attached to combat a fire.
Strike Out	A benchmark indicating that the fire is deemed to be out.
Tactical Objective	An intermediate goal that is part of a comprehensive strategy of achieving a given result. They are; rescue, suppression, ventilation, salvage and overhaul.
Tanker	A fire department apparatus that is designed to carry a

	large amount of water to the scene. Operates in concert with pumping apparatus to deliver the water under pressure to the fire. A tender for a pumper.
Tender	A support vehicle that responds automatically with other apparatus for the specific purpose of supporting the primary vehicle in its operations. For example: a HazMat Equipment Tender
Tower	A fire department apparatus that incorporates an aerial device mounted on a turn-table and having a bucket on the end. Use for rescue, to apply water to elevated areas and to access roof areas.
Tower Company	See Ladder Company
Triple Combination Pumper	A pumping apparatus consisting of a pump, hose in a hose bed, and tank of water.
Turnout Gear	Refers to the system of outer protective clothing. Worn by firefighter to protect them during fire suppression. Specifically, to just the trouser, boots, helmet and jacket.
Under Control	Benchmark - A fire is sufficiently surrounded and stopped so it no longer threatens the destruction of additional structures
Unreadable	Used when a radio message received is not clear; should include reason or problem. Example: “Unreadable, background noise.”
Ventilating	Also known as Opening Up, an important part of fire fighting, concerned with the regulated release of gases, heat and smoke from structures during fires, or other emergencies.
Volatile	Any liquid or material that will readily evaporate at normal temperatures and pressures.

Warm Zone	HazMat – is the area where the decontamination corridor, between the Hot Zone and the Cold Zone, is located. Established by HazMat team.
What Is Your Location?	A radio request by Dispatch to determine the location of a piece of apparatus that is *available on radio*. Used to locate apparatus for assignment.
Wind Direction	The direction the wind is coming from. Important in dangerous goods incident to determine the direction a plume might move.
Working Fire	The term is used when all responding apparatus will be committed at the incident location for an undetermined period of time engaged in fire suppression.

APPENDIX II
B.C. FIRE SERVICE

Part 1: Legislation Regulating the BC Fire Service

Provincial Legislation

In British Columbia, the *Fire Marshal's Act* established the Office of the Fire Marshal in 1921 to administer fire prevention legislation. Fire prevention was defined by the Act as everything that would prevent a fire or reduce fire loss. Therefore, the Fire Marshal was responsible for setting fire safety regulations for public buildings, investigating fires to determine cause, studying methods of fire prevention, collecting fire related statistics, and fire inspection for code compliance. Fire suppression, on the other hand, defined as the act of extinguishing or controlling a fire after it has started, or the preparation required for this activity, was not included in the Act.

Fire Services Act, 1978

In 1978, The *Fire Marshal's Act* was replaced with the *Fire Services Act* and the position of Fire Marshal was changed to Fire Commissioner. The Fire Commissioner administers the *Fire Services Act*, a provincial statute, and a series of Regulations which include fire prevention legislation for the entire province. The regulations require municipalities to provide for

- A system of regular fire safety inspections;
- Investigation of all fires with damage to determine the cause, and maintain continuity of evidence, and
- Collection and reporting of specific data related to fire services operations for the Fire Commissioner.

These activities directly affect the day-to-day operations of the fire department and the duties of the fire communicator.

Inspection and investigation are both carried out by either a Local Assistant to the Fire Commissioner (LAFC) or other person authorized by a municipal council to the *Fire Services Act*. There is, however, no obligation for municipalities, and non-municipal areas such as regional districts and

improvement districts, to provide a fire department. A fire department is usually established in response to local demand, and accordingly must be administered and funded at the local level. Private fire departments can be established for and funded by corporations.

Local Government Act (formerly B.C. Municipal Act)

Division 3 — Fire Protection

Special fire protection powers

(1) Subject to the Fire Services Act and the regulations under it, a board may, by bylaw, do one or more of the following:

(a) authorize the fire chief to

(i) enter on property and inspect premises for conditions that may cause a fire, increase the danger of a fire or increase the danger to persons or property from a fire,

(ii) take the measures described in the bylaw to prevent and suppress fires, including the demolition of buildings and other structures to prevent the spreading of fire, and

(b) require the owners or occupiers of real property to remove from a building or yard anything that, in the opinion of the fire chief, is a fire hazard or increases the danger of fire;

(c) if property is endangered by debris caused by lumbering, land clearing or industrial operation, require the person who is carrying on or who has carried on the operation, or the owner or occupier of the land on which the debris exists, to

(i) dispose of the debris, and

(ii) undertake any other actions for the purpose of removing or reducing the danger

as directed by the bylaw or by the fire chief;

(d) deal with any matter within the scope of the Fire Services Act in a manner not contrary to that Act or the regulations under it.

(2) The authority of the fire chief under a bylaw under subsection (1) may be exercised by a person under the authority of the fire chief or by another person designated in the bylaw.

Fire Suppression

Municipalities have the authority under the *Act* to provide fire suppression in their local areas. A City or Municipal Council may, pass a bylaw to:

- Establish a Fire Department (paid-on-call, career or combination).
- Accept and hold property for use by the Fire Department.
- Make building and equipment agreements for the furnishing of fire protection.
- Pay and collect payment through property taxes for fire protection. These powers are authorized by Section 699 of the Municipal Act but are not subject to the Fire Services Act.
- Establish bylaws that state the rights and responsibilities of the Fire Department.
- Council may appoint a Fire Chief, Deputy Fire Chief and any other personnel considered necessary for efficient operation of the Fire Department.

The duties of the Fire Chief may include:

- Responsibility for efficient and effective operation of the Fire Department.
- Responsibility for management of buildings and apparatus.
- Responsibility for investigation and reporting on the cause of fire.
- The power to cause demolition of any structure to prevent the spread of fire.

- The power to order the evacuation of any building or site.
- The ability to limit the entry of any persons into an area or building.

Protection of persons and property

Municipal council is permitted to:

- Regulate conduct of persons at or near fires or during other emergencies.
- Regulate dangerous substances.
- Require disposal of debris caused by lumbering, land clearing or industrial operation.
- Regulate handling of flammable liquids.
- Regulate the use of open fires.
- Keep people from blocking fire exits.
- Require fire hazards on a property to be dealt with appropriately.
- Authorize fire inspections and issue burning permits.

Part 2: Organizational Structure of the Office of the Fire Commissioner

Responsibility of the Office of the Fire Commissioner

The Office of the Fire Commissioner plays a significant role in fire prevention, which is often not clearly understood because it is much less visible in most communities than the local fire department. This office coordinates with Regional Offices and local fire departments to provide standardized enforcement of the *Fire Services Act* throughout the province. Activities include the following:

- Collecting and publishing statistical and other information.
- Conducting investigations and making recommendations.
- Interpreting and applying the National Fire Code
- Providing fire safety and public education.
- Providing advice and recommendations to municipalities on fire protection.
- Providing emergency response and expert testimony when required.

The Ministry of Education, Skills and Training provides funding for the Justice Institute of British Columbia Fire Academy to provide standardized training for the British Columbia Fire Service. The primary role of the Fire Academy is to develop courses and deliver training to enable firefighters to meet the standards established by the Fire Commissioner. The Fire Academy provides pre-employment training to the public, certification for new recruit volunteer firefighters in cooperation with the fire departments, and self-paced upgrading distance education courses for career and paid-on-call fire suppression personnel.

All Canadian provinces have either a Fire Commissioner or Fire Marshal, and forty-nine states in the US have organizations that carry out similar functions. In British Columbia, the Office of the Fire Commissioner operates within the

Ministry of Public Safety and Solicitor General, with the head office located in Victoria. A Deputy Fire Commissioner deals primarily with fire safety and acts as Fire Commissioner in his absence.

Regional Fire Commissioners

Fire Service Advisors are responsible for enforcing the Fire Services Act by providing direct contact with the public and assistance to fire departments in each region. They report to the Fire Commissioner and maintain offices within their regions. The four regions are:

1. *Coastal Region*, with the regional office in the head office in Victoria;
2. *Interior Region*, with the regional office in Kamloops;
3. *Northern Region*, with the regional office in Prince George, and
4. *Kootenay Region*, with the regional office in Cranbrook.

Local Assistants to the Fire Commissioner

A fire chief appointed by an incorporated municipality automatically becomes a Local Assistant to the Fire Commissioner (LAFC) with the responsibility for fire prevention, fire investigation and reporting. The Fire Chief may appoint other persons to exercise the powers of the LAFC. Appointees may include fire department members, bylaw enforcement officers and building inspectors.

In municipalities, which do not maintain a fire department, the mayor is automatically appointed as Local Assistant to the Fire Commissioner, or the municipal council may appoint someone else. In unincorporated areas, the chief police officer might assume this role, or the Fire Commissioner may make an appointment. In British Columbia, there are over 800 Local Assistants. In issues requiring investigation, the fire communicator may be required to liaise with the LAFC, who is the local point of contact between the Office of the Fire Commissioner and the fire departments.

Fire Safety

Administrative staff and technical specialists in the Fire Commissioner's Office perform the following fire safety functions:

- Collect, study and publicize information on fires.
- Act as resource to Regional offices in major or specialized investigations.
- Publish guidelines and interpretations of fire safety regulations.
- Provide standardized technical assistance to the regional offices.
- Assist the regional offices to ensure standardized enforcement of regulations.
- Review national and provincial standards and regulations relating to fire safety.
- Develop and coordinate province-wide public education and special programs such as arson prevention.
- Provide technical assistance to fire departments and building officials through the regional offices.
- Represent the Fire Commissioner on Provincial and Federal committees and organizations concerned with codes, standards and fire safety.

Operations

The *Fire Service Advisors* have full responsibility for the enforcement of the Fire Services Act and regulations in their respective regions. The regional offices are strategically located throughout the province in order for the Regional Commissioners to have direct contact with Local Assistants to the Fire Commissioner, fire departments and the general public. They provide a variety of services, including:

- Fire Protection surveys to assist fire departments and local government.
- Immediate response to assist Local Assistants or the police in fire investigation.
- Aid to Local Assistants with on-site fire prevention duties.
- Regional training for Local Assistants in fire prevention and fire investigation.

- Provide advice to fire, police, building officials and general public in matters of fire safety.
- Emergency response to assist fire and police when fire threatens life safety.
- Provide expert testimony to the courts in matters of fire safety.
- Investigate and hear appeals on Fire Services Act and Fire Code orders.
- Represent Fire Commissioner and make presentations at meetings and seminars held in the region.

APPENDIX III
ONTARIO FIRE SERVICE

Part 1: Legislation Regulating the Ontario Fire Service

Provincial Legislation

The Office of the Fire Marshal (OFM) in Ontario plays a significant role in fire prevention, which is often not clearly understood because it is much less visible in most communities than the local fire department.

The OFM is part of the Public Safety Division of the Ontario Ministry of the Solicitor General and Correctional Services. Our primary function is to minimize the loss of life and property from fire by assisting Ontario municipalities and fire departments to improve their fire protection and fire prevention services. As the foremost center of knowledge on fire and certain other public safety issues and programs, the OFM provides leadership within government and supports the fire service across the province to meet the needs of the community.

Established in 1916, the OFM has evolved beyond its original purpose, which was to combat arson. By administering the Fire Protection and Prevention Act, 1997 Bill 84 (FPPA), the OFM supports the organization and the functions of municipal fire departments through a variety of advisory, training and instructional programs. In addition, the OFM conducts research and advises the Ontario Government on standards and legislation that relate to fire protection and fire prevention.

Fire Protection and Prevention Act, 1997 Bill 84 (FPPA)

Although the OFM administers fire-related legislation and provides a variety of training and support programs to fire departments, municipal councils are responsible for setting out the general policies and responsibilities of their fire departments, including the level of fire protection to be provided. In addition, the local Fire Chiefs are responsible for day to day operations, including enforcement of the Fire Code.

Under the Fire Protection and Prevention Act, 1997, members of a fire department are vested with certain powers. For example:

- The *Fire Chief* is assigned powers for the enforcement of the Fire Code and other fire prevention measures.
- Certain orders authorized by the Fire Protection and Prevention Act, 1997 can be issued only with approval from the *Fire Marshal.*
- *Assistants to the Fire Marshal* are typically Prevention Officers in the employ of a municipal fire department.
- The Fire Marshal may also delegate his powers to carry out specific duties on his behalf (e.g., Regional Fire Coordinator). Under the direction of the Fire Marshal, the primary responsibility of the Coordinator is to establish and maintain an Emergency Fire Service Plan (Mutual Aid) under which neighbouring fire departments agree to assist each other in the event of a major fire or emergency. There are currently 47 Fire Coordinators throughout the Province. The Fire Coordinator is usually the Chief of the largest fire department in the area he/she coordinates.

The Fire Marshal and Assistants to the Fire Marshal also has certain powers under the Fire Protection and Prevention Act, 1997 to take action to prevent loss of life or serious damage to the environment which may result from a fire. As part of an ongoing reorganization and rationalization of the OFM, direct services such as hotel inspections are increasingly being assumed by municipal fire departments to enable the OFM to direct more resources to training and standard-setting.

Municipal Fire Services

There are approximately 645 municipal fire departments in Ontario. Of these, 31 are full time, 125 are composite (consisting of a core group of full-time firefighters supplemented by volunteers) and 499 are exclusively volunteer. These departments are staffed by over 9,000 full-time and 17,000 volunteer firefighters across the province.

The OFM plays a key role in providing fire protection services to unorganized communities through the Northern Fire Protection Program and Natives Fire Protection Program. There are 113 Fire Protection Teams serving unorganized communities throughout the province. One hundred of these teams serve communities that do not have a formal municipal government and the remaining 13 teams serve First Nation (aboriginal) communities that do not have federal reserve status. There are also approximately 58 First Nation Fire Departments.

Each municipality determines what services will be provided and at what level. Other than policing services, virtually all emergency response activities in municipal areas (with the exception of ambulance services provided through the Ministry of Health) are delivered by the local municipal fire department. In addition to fire suppression, these emergency services include rescue, auto extrication, response to hazardous materials spills and first aid. Most larger municipalities carry out fire prevention services (e.g., fire safety inspections to promote compliance with the Fire Code) and public education activities. Fire departments are also responsible for providing a basic level of training to their firefighters. Some municipalities purchase fire protection services from neighboring municipalities, or jointly manage and operate a fire department. Not all municipalities provide fire suppression services.

All municipal fire protection services are organized and delivered at the lower tier of the municipal structure, although there is some cooperation across municipal boundaries such as automatic aid, mutual aid and shared communication centers.

Fire Protection and Prevention Act, 1997

The Fire Protection and Prevention *Act*, 1997, Statutes of Ontario, 1997,

Bill 84 1997

An Act to promote Fire Prevention and Public Safety in Ontario and to amend and repeal certain other Acts relating to Fire Services.

Responsibility for Fire Protection Services

Municipal responsibilities

2. (1) Every municipality shall,

(a) establish a program in the municipality which must include public education with respect to fire safety and certain components of fire prevention; and

(b) provide such other fire protection services as it determines may be necessary in accordance with its needs and circumstances.

Methods of providing services

(2) In discharging its responsibilities under subsection (1), a municipality shall,

(a) appoint a community fire safety officer or a community fire safety team; or

(b) establish a fire department.

Services to be provided

(3) In determining the form and content of the program that it must offer under clause (1) (a) and the other fire protection services that it may offer under clause (1) (b), a municipality may seek the advice of the Fire Marshal.

Shared responsibilities

(4) Two or more municipalities may appoint a community fire safety officer or a community fire safety team or establish a fire department for the purpose of providing fire protection services in those municipalities.

Services outside municipality

(5) A municipality may, under such conditions as may be specified in the agreement, enter into an agreement to,

(a) provide such fire protection services as may be specified in the agreement to lands or premises that are situated outside the territorial limits of the municipality; and

(b) receive such fire protection services as may be specified in the agreement from a fire department situated outside the territorial limits of the municipality.

Automatic aid agreements

(6) A municipality may enter into an automatic aid agreement to provide or receive the initial or supplemental response to fires, rescues and emergencies.

Review of municipal fire services

(7) The Fire Marshal may monitor and review the fire protection services provided by municipalities to ensure that municipalities have met their responsibilities under this section and, if the Fire Marshal is of the opinion that, as a result of a municipality failing to comply with its responsibilities under subsection (1), a serious threat to public safety exists in the municipality, he or she may make recommendations to the council of the municipality with respect to possible measures the municipality may take to remedy or reduce the threat to public safety.

Failure to provide services

(8) If a municipality fails to adhere to the recommendations made by the Fire Marshal under subsection (7) or to take any other measures that in the opinion of the Fire Marshal will remedy or reduce the threat to public safety, the Minister may recommend to the Lieutenant Governor in Council that a regulation be made under subsection (9).

Regulation

(9) Upon the recommendation of the Minister, the Lieutenant Governor in Council may make regulations establishing standards for fire protection services in municipalities and requiring municipalities to comply with the standards.

Same

(10) A regulation under this section may be general or specific in its application and may be restricted to those municipalities specified in the regulation.

Territory without municipal organization

3.(1) The Fire Marshal, a services board established to provide services in territory without municipal organization or a prescribed person or organization may enter into agreements to provide fire protection services in territory without municipal organization and to govern the provision of those services.

Same

(2) An agreement referred to in subsection (1) may provide for,

(a) the appointment of a community fire safety officer or a community fire safety team; or

(b) the establishment of a fire department.

Community fire safety officer or team

4.(1) A community fire safety officer or a community fire safety team appointed in a municipality or in a group of municipalities shall provide the program established under clause 2 (1)(a) in the municipality or in the group of municipalities, as the case may be.

Same

(2) A community fire safety officer or a community fire safety team appointed by agreement with the Fire Marshal, a services board or a prescribed person or organization to provide services in territory without municipal organization shall provide a program which includes public education with respect to fire safety and certain components of fire prevention in the territory in accordance with the agreement.

Fire departments

5.(1) A fire department shall provide fire suppression services and may provide other fire protection services in a municipality, group of municipalities or in territory without municipal organization.

Same

(2) Subject to subsection (3), the council of a municipality may establish more than one fire department for the municipality.

Exception

(3) The council of a municipality may not establish more than one fire department if, for a period of at least 12 months before the day this Act comes into force, fire protection services in the municipality were provided by a fire department composed exclusively of full-time firefighters.

Same

(4) The councils of two or more municipalities may establish one or more fire departments for the municipalities.

Fire chief, municipalities

6.(1) If a fire department is established for the whole or a part of a municipality or for more than one municipality, the council of the municipality or the councils of the municipalities, as the case may be, shall appoint a fire chief for the fire department.

Same

(2) The council of a municipality or the councils of two or more municipalities may appoint one fire chief for two or more fire departments.

Responsibility to council

(3) A fire chief is the person who is ultimately responsible to the council of a municipality that appointed him or her for the delivery of fire protection services.

Fire chief, territory without municipal organization

(4) If a fire department is established in territory without municipal organization under subsection 3

(2), the agreement shall provide for the appointment of a fire chief.

Powers of fire chief

(5) The fire chief may exercise all the powers assigned to him or her under this Act within the territorial limits of the municipality and within any other area in which the municipality has agreed to provide fire protection services, subject to any conditions specified in the agreement.

Delegation

(6) A fire chief may delegate his or her powers or duties under sections 14, 19 and 20 and such other powers and duties as may be prescribed to any firefighter or class of firefighters, subject to such limitations, restrictions or conditions as may be prescribed or set out in the delegation.

Fire Co-ordinators

7.(1) The Fire Marshal may appoint fire co-ordinators for such areas as may be designated in the appointment.

Duties

(2) A fire co-ordinator shall, subject to the direction of the Fire Marshal,

(a) establish and maintain a mutual aid plan under which the fire departments that serve the designated area agree to assist each other in the event of an emergency; and

(b) perform such other duties as may be assigned by the Fire Marshal.

Part 2: Organizational Structure of the Office of the Fire Marshal

Responsibility of the Office of the Fire Marshal

Mission Statement

The Office of the Fire Marshal (OFM) contributes to a safe environment from fire and other public safety hazards for the residents of Ontario, by providing leadership and expertise in the reduction or elimination of these hazards.

Role And Mandate

The OFM is a branch of the Public Safety Division of the Ontario Ministry of the Solicitor General and Correctional Services. Our primary function is to minimize the loss of life and property from fire by assisting Ontario municipalities and fire departments to improve their fire protection, fire prevention and public education services. As the foremost center of knowledge on fire and certain other public safety issues and programs, the OFM provides leadership within government and supports the fire service across the province to meet the needs of the community. It serves as a catalyst to encourage the participation of key stakeholders and the public in determining what the OFM will be and how it should operate.

A key role of the OFM is to provide recommendations for the provision of adequate levels of fire safety for buildings and premises in Ontario.

The priorities of the OFM are Public Education, Fire Prevention and Firefighter Safety and Training. These three priorities are inextricably linked with the ultimate goal to prevent or minimize losses related to fire. To achieve this goal we realize that we must be able to operate as an open system allowing for greater input from stakeholders, clients and the public. To this end, the OFM is committed to working in partnership with both the public and private sectors -individuals, fire fighter associations, municipalities, and other levels of government-in determining its future roles and responsibilities. By

encouraging public participation in this process, the OFM recognizes the unique and changing needs of the communities it serves. Development of program policy in this manner will enable the OFM to best meet its public education and community-based prevention program needs. However, to become a truly open organization, the OFM must exist in harmony with its external environment. We believe that the best way to achieve this harmony is to establish effective interfaces with our external environment.

Training And Education Services

Historically, training for firefighters has always been a priority of the Ministry. In recognition of the need for better trained firefighters, municipal fire departments, local universities, the Canadian Association of Fire Chiefs and fire fighter groups have worked with the OFM to develop a variety of training programs for municipal firefighters. These efforts culminated in the establishment of the Ontario Fire College (OFC) in 1949. Today, the OFC is recognized internationally for its expertise in delivering high quality fire service training programs such as: Fire Ground Command, Fire Prevention, Fire Cause Determination, Management Training and Fire Technology. The OFC also has facilities for hands-on training and simulations, which are not available to most fire departments in the province. The OFC provides a uniform standard of training for municipal fire departments and is looked to by the fire service for support and leadership in all areas of academic training and education. Approximately 3,250 students attend the college each year. OFC diplomas are required for advancement in many municipal fire departments.

Since 1990, the OFM has been working closely with the Ontario Association of Fire Chiefs (OAFC) through the Professional Standards Setting Body, to develop performance standards, training objectives, supporting curriculum and a validated testing process for firefighters. Common performance standards and learning objectives, combined with objective and independent testing, will enable Ontario firefighters to demonstrate a very high level of skill and professionalism.

All Canadian provinces have either a Fire Commissioner or Fire Marshal, and forty-nine states in the US have organizations that carry out similar functions.

Regional Fire Commissioners

Regional Commissioners are responsible for enforcing the FPPA by providing direct contact with the public and assistance to fire departments in each region. They report to the Office of the Fire Marshal and maintain offices within their regions. The OFM's structure includes a head office in Toronto, five regional offices across the Province (Mississauga, London, Kingston, Sudbury and Thunder Bay) and the Ontario Fire College (OFC) in Gravenhurst. Head office provides leadership and coordination by focusing on a broad range of relevant fire and public safety issues, including program development, standards setting, training, prevention, policy setting, public education and monitoring. The regional offices represent the delivery arm of all OFM functions and enable the OFM to enhance responsiveness to local needs and conditions. Each regional office is responsible for delivering all direct services provided by the OFM, including fire investigations, fire safety inspections, fire advisory and fire department assist services.

Assistants to the Fire Marshal

A fire chief appointed by an incorporated municipality automatically becomes an Assistant to the Fire Marshal with the responsibility for fire prevention, fire investigation and reporting. The Fire Chief may appoint other persons to exercise the powers of the assistant. Appointees may include fire department members, bylaw enforcement officers and building inspectors.

Assistants to the Fire Marshal

11. (1) The following persons are assistants to the Fire Marshal and shall follow the Fire Marshal's directions in carrying out this Act,

(a) the fire chief of every fire department;

(b) the clerk of every municipality that does not have a fire department;

(c) any member of a fire prevention bureau established by a municipality; and

(d) every person designated by the Fire Marshal as an assistant to the Fire Marshal.

Duty to report

(2) The assistants to the Fire Marshal shall report to the Fire Marshal all fires and other matters related to fire protection services as may be specified by the Fire Marshal.

Submitting report

(3) A report under subsection (2) shall be made in the form and manner and within the time period specified by the Fire Marshal.

Workers' compensation not affected

(4) The relationship between a person who is an assistant to the Fire Marshal under this section and the municipality or such other person by which he or she is employed continues for the purposes of the Workers' Compensation Act as if the person were not an assistant to the Fire Marshal.

Fire Safety

Administrative staff and technical specialists in the Office of the Fire Marshal perform the following fire safety functions:

- Collect, study and publicize information on fires.
- Act as resource to Regional offices in major or specialized investigations.
- Publish guidelines and interpretations of fire safety regulations.
- Provide standardized technical assistance to the regional offices.
- Assist the regional offices to ensure standardized enforcement of regulations.
- Review national and provincial standards and regulations relating to fire safety.

- Develop and coordinate province-wide public education and special programs such as arson prevention.
- Provide technical assistance to fire departments and building officials through the regional offices.
- Represent the Fire Marshal on Provincial and Federal committees and organizations concerned with codes, standards and fire safety.

Operations

The Regional Commissioners have full responsibility for the enforcement of the *Fire Prevention and Fire Protection Act* and regulations in their respective regions. The regional offices are strategically located throughout the province in order for the Regional Commissioners to have direct contact with assistants to the Fire Marshal, fire departments and the general public. They provide a variety of services, including:

- Fire Protection surveys to assist fire departments and local government.
- Immediate response to assist assistants to the Fire Marshal or the police in fire investigation.
- Aid to Assistants to the Fire Marshal with on-site fire prevention duties.
- Regional training for assistants to the Fire Marshal in fire prevention and fire investigation.
- Provide advice to fire, police, building officials and general public in matters of fire safety.
- Emergency response to assist fire and police when fire threatens life safety.
- Provide expert testimony to the courts in matters of fire safety.
- Investigate and hear appeals on FPPA and Fire Code orders.
- Represent Fire Marshal and make presentations at meetings and seminars held in the region.