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MINISTRY OF HOME AFFAIRS

FIRE AND RESCUE FORCE

STANDARD OPERATING PROCEDURE MANUAL

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OPERATION EQUIPMENT

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SOP 1: B.A COMMAND, CONTROL AND USE

1.0Scope

Breathing apparatus command and control was introduced to apply a greater degree of control at incidents when wearers would be committed within a risk area. Through the application of monitoring conditions and applying a properly structured and recognized recording system, the Command and control interventions will ensure:

- Less likelihood of wearers running out of air.
- A more structured approach to incidents where breathing apparatus is worn.
- Greater knowledge of the location of breathing apparatus wearers within a risk. This will enhance their chances of rescue within a breathing apparatus emergency.

1.1 Purpose

A standard operational procedure is required for breathing apparatus command and control for the following reasons:

- To introduce a risk assessment based, Output focused approach.
- Greater clarification of the roles and responsibilities of individual managers and fire-fighters in the application of B.A. Command and Control Procedures.

2.0 Hazards and Risks

2.1 Risk Assessments

The guidance contained within this document will allow the FRF to apply a Risk Based Approach to the wearing of breathing apparatus. This requires the Incident

Commander to identify, analyze and assess risks and select the appropriate breathing apparatus procedure for risk control prior to committing B.A. Crews. The Incident Commander or an appointed sector commander with responsibility for either breathing apparatus or operational tactics will have responsibility for the safe implementation of appropriate breathing apparatus operations and tactics.

Interpretation of what is the better option(s) is a matter of subjective professional judgment based on the prevailing circumstances, the Incident Commander's dynamic risk assessment and available resources. On arrival at the incident, the Incident Commander will assess the risk and the available resources and apply the appropriate level of control procedures. It must, however, be emphasized that the procedures of rapid deployment with minimum crew are regarded as the minimum level of control under normal circumstances.

The procedures applied may change with the gravity or complexity of the incident but, whenever B.A. is in use, a control procedure must be in place which is sufficient to monitor the risk to the safety of B.A. wearers.

2.2 Risk Analysis

The urgent nature of some situations may require decisions about firefighter deployment and tactics to be made immediately. However, the Incident Commander should take the following into account when deciding on the use of B.A. and the appropriate level of B.A. Control.

i) The need for rescues to be undertaken and the likely number of people requiring rescue or removing from the risk area.
ii) Urgent tasks requiring immediate action.

iii) Resources immediately available and how quickly other support might be obtained.
iv) Nature and extent of the hazard.
v) Likelihood of rapid escalation of the incident.
vi) Risk to the public and adjacent properties.
vii) Information available at the scene.
viii) Means of access to and egress from the risk area.

3.0 Clarification of Roles

3.1 Entry Control Officer

At commencement of duty, the Officer-in-Charge will be responsible for nominating an Entry Control Officer for each appliance equipped with an Entry Control Board. In nominating an Entry Control Officer, the Officer-in-Charge should consider any other specific duties any crew member may have at an operational incident. On arrival at an incident this nomination may have to be changed. Where Stage II entry control procedures are initiated at an incident, it is recommended that the Stage II Entry Control Officer should be a Sergeant. Where this is not initially possible, the Incident Commander must be satisfied that the Entry Control Officer nominated possesses the appropriate skills and competence to function in the role.

When Main Control procedures are initiated at an incident, the Incident Commander must be satisfied that the appointed Main Control Officer and any assistants possess the appropriate command and management skills to function in that role. The role of main control officer should desirably be undertaken by Inspector with proven skills.

3.1 BA Teams

Incident Commanders will need to consider carefully the size and makeup of the BA teams and must ensure that the team leader is fully briefed of what is required of the team. Effective leadership is required and the Incident Commander should consider as is practical, that the team is led by an experienced BA wearer. For more complex, difficult or dangerous incidents, team leaders should be drawn from experienced officers whenever these are available. Where possible, B.A crews should be formed from teams from the same station and led by their own officers.

4.0 Notes on command procedures

B.A. Wearers must follow standard procedures and the instructions of the Incident Commander if risk to their health and safety are to be minimized. The Incident Commander must ensure that adequate resources are available at an incident to fully support B.A. Wearers for the appropriate level of B.A. Control, which is in operation. The Incident Commander of any incident is responsible for initiating the use of B.A., which must be worn when there is a danger of permanent damage to health if working in an irrespirable or toxic atmosphere, or whenever discomfort and possible injury to a firefighter respiratory system can be avoided.

There may be operational circumstances where the application of full control procedures for B.A. use would be inappropriate i.e., working from head of ladder, working in open air but affected by smoke or fumes, such as a comfort and safety wear at a car on fire, turning over or dampening down. When working in open air or there is an eye contact of I.C or Crew, no need for B.A control procedures. In such circumstances, the B.A. wearer must be in view of another crewmember who may be another B.A. wearer. The B.A. wearers will still insert their B.A. Tallies in the Entry Control Board. This will facilitate in identifying who the B.A. Wearer(s) are.

5.0 Radio Communications

The use of handheld radio communications with B.A is essential in ensuring the safety of crews, and for information gathering. The Incident Commander should make best use of the different radio channels to prevent over-use and confusion during an incident.

6.0 Training

The procedures adopted for operational incidents apply equally during training. In recognition of the risks likely to be faced by B.A. Wearers, only those firefighters who have satisfactorily completed a basic B.A. Training Assessment should be allowed to use B.A. for the full range of operational training. B.A Command and Control must be re- enforced by continual and appropriate training designed to develop and maintain the professional competence and safety of all personnel.

7.0 Breathing Apparatus Recording

Duties of officer in charge of an incident or practical training session where:

1. A malfunction of a BA set causes distress to the wearer; Or

2. A BA wearer suffers injury (including heat exhaustion) whilst wearing a set.
    a. Initiate emergency procedures; render first aid, resuscitation as appropriate.
    b. Inform control of “BA emergency”. Request ambulance if required.
    c. Consider need for further appliances etc.
    d. Inform control of details of injury to personnel. Use service numbers of personnel, control will confirm identity with initials.
    e. Impound BA set, ancillary equipment and log book.

Note the following:

- i) Cylinder contents.
- ii) Number of turns to close valve, this to be witnessed.
- iii) Obvious damage to set or ancillaries.
- iv) Last entries in logbook.

f. Do not tamper with or adjust the set, apart from turning off.
g. Impound BAECO board, ensure all details remain.
h. Place set, ancillary equipment, log book(s) and BAECO board in a safe position for inspection by IC. of BA accident
i. Complete “defect aide memoir card”.

8.0 Duties of B.A. Accident Investigation Officer

1. Remove and secure set(s), ancillary equipment, BA board and log book(s), pending detailed examination.
2. Collate all written reports.
3. Submit report as per safety event procedure.
4. Impound BAECO board, ensure all details remain.
5. Place set, ancillary equipment, log book(s) and

6. BAECO board in a safe position for inspection by IC of BA accident
7. Complete “defect aide memoir card”.

Breathing Apparatus: Defect Record

Time of Defect (From B.A. Board)	
Date of Defect	
Name of Fire-Fighter	
Station of Fire-Fighter	
(Where the Incident Occurred)	
Was there air flow when the mask seal to the face was broken	Yes...........No...........
Position of By-Pass Control	Open...........Closed...........
Position of Cylinder Valve	Full open...........Part open...........
Pressure at Gauge	Bar...........
Any Major Leakage Heard	Yes...........No...........
Distress Signal Unit	Operating...........Not operating......

Tally Information

Set number Time in Gauge reading Name and role of B.A. control officer	.... Hrs.. .... Bar.. ....

Further information that may be relevant:	………………………………………………………………… …………………………………………………………………
Name and role of person completing form …………………………………………………… ***Note: The above information must be recorded in the event of wearers in distress or set failure. Impound set, B.A. log book.***	

9.0 B.A. Testing and Maintenance

Each set of breathing apparatus should be examined and tested; on acceptance monthly; and after operational use or drill. In addition, each individual should make a General Check of the apparatus at any time when taking over a set.

(a) General Check

Personnel nominated as Wearers, in the case of should carry out the General Check:

- Operational stations, immediately after the roll call at the change of shift and, as necessary, at other times during the shift.
- Training Centers, at the commencement of a BA course or particular drill period.
- Officers personal sets, at the Commencement of a tour of duty.

The General Check should be in accordance with the manufacturer's instructions to ensure that the apparatus and ancillary equipment is complete and functioning properly. The mask and carrying harness should be adjusted for the wearer's personal use and the provisions of the ‘Operational procedure for the use of breathing apparatus’ should be complied with. The results of the check should be entered in the appropriate station record.

(b) Monthly Test (and after use)

Each set of breathing apparatus should be examined and tested, in accordance with the manufacturers’ instruction taking into account any additional central guidance, on acceptance, at least once per month and after operational or training use.

1) Carrying frames, harness and buckles should be carefully examined for signs of wear; facemasks and goggles should be carefully examined to ensure that they are in good condition. Fittings for ancillary equipment should be checked to ensure that they are satisfactory.

2) If the set has been worn it must be thoroughly washed, disinfected, dried and tested: the manufacturers’ instructions should be followed as to materials and equipment to be used.

3) Before fitting the replacement cylinder on the apparatus, the pressure should be checked, using the standard gauge, and noted. After the cylinder is fitted to the apparatus the pressure reading on the set gauge can then be compared with that of the standard gauge, thus checking its accuracy.

4) Standard gauges and testing equipment should be checked periodically.

(c) Low cylinder pressure warning Whistles

If a low cylinder pressure warning whistle fails to operate between the pressures specified in the tests the apparatus should be placed out of commission until the fault has been rectified.

(d) Cylinders

A visual inspection should be done on the cylinder body, to examine for deep scratches and abrasions, rust and general condition of the paint. An examination at the neck of the cylinder will reveal the date of manufacture and the date of subsequent Hydro-test. Periodic Inspection and Test of Cylinders should be kept in circulation and at intervals not exceeding 5 years must be subjected to an inspection and hydraulic stretch test by an approved authority. This does not apply to ultra-lightweight cylinders which must be inspected and tested at 3 yearly intervals. Any cylinder failing the test must be taken out of service.

- **Changing of Cylinders**

Cylinders showing a pressure reading of less than 80 per cent of their maximum capacity should be replaced by fully charged cylinders. They should be marked MT to avoid confusion. Cylinders removed from the set and awaiting recharge should not be completely emptied. The Valve should be kept completely closed and a blank cap fitted to the outlet.

(e) Breathing apparatus ancillary Equipment

The following equipment except guide lines and personal lines which are tested quarterly, should be examined and tested, on acceptance, monthly, after operational use or drill and after a battery has been replaced. It is not practicable to have a test for dry batteries. They should therefore be renewed at regular intervals or after a prescribed time of operational use.

(f) Communications equipment

- **Examination**

All items of speech reception and transmission equipment, including face masks, should be examined for defects, damage, or deterioration. Cables should be examined throughout their length for cuts and abrasions. End connections should be examined for defects. Batteries should be examined to ensure that contact points are clean and that no sulphation has occurred.

- **Test**

Face masks should be connected to the appropriate breathing apparatus set and given a low-pressure test. The equipment should then be donned by two men and tested for clear speech and reception. The test should be repeated with the spare headset, where issued.

(g) Distress signal unit

Any type of DSU should be examined and tested in accordance with the manufacturers' recommendations and as deemed necessary by the breathing apparatus technical order.

(h) Guide and personal lines

- **Examination**

Guide lines and personal lines used with breathing apparatus should be examined in accordance with the adopted procedures. Where personal lines have an outer cover of plastics material this should be examined for cuts and abrasions. Hooks and 'D' rings should be examined to see that they are free from defects, and that the serrations on hooks are clean. Line carriers and pouches should be examined for wear and damage; particular attention should be given to press or other fastenings.

- ***Test***

Guide lines should be tested in accordance with the adopted procedures

(i) Lamps

Lamps used with breathing apparatus should be examined in accordance with the manufacturer's recommendations.

(e) Resuscitation apparatus

Each set should be tested in accordance with the manufacturers' instructions on acceptance and weekly, after operational use or drill. Cylinders should be checked to see that they contain a full pressure of gas (usually 120 bars). Rubber parts such as masks, valves and bellows used with some types should be examined to ensure that they are not perished and are working freely.

After each occasion when a set is worn, the mask and tubing should be disconnected, and thoroughly washed and disinfected. Cylinders must be subjected to an inspection and test at intervals not exceeding 5 years as described for breathing apparatus cylinders.

10.0 Breathing Apparatus Cylinders

Note: Cylinder Hydraulic Test 3 or 5 Yearly as appropriate.

A thorough visual check should be done;

- Before Drills
- After all checks
- Operationally
- Use or drill

The cylinder neck should be examined to ensure that the correct date is applied by means of a stamp marked on the cylinder. A check of the validity can be achieved by looking at the date of manufacture and then calculating the subsequent Hydro-test date stamps.

11.0 Log Books

The log book assigned to each Breathing Apparatus Set should be marked up and signed for by the wearer accordingly following the inspection and test. Cylinder log books should be kept in the BA room, together with all manufacturers' certificates and Hydro-test sheets.

12.0 B.A. Use: Sage I and II

The following SOP is designed with the safety of the operator and crew in mind. When using Breathing Apparatus always follow strict procedures and back it up with regular exposure training.

12.1 Breathing apparatus stage I and II

As with both stages I and II Breathing Apparatus Wearers should always work in pairs of a minimum of two persons, and it is mandatory that if one exits the scene, then both must exit together, never leave a firefighter working alone.

12.1.1 STAGE I - Rapid Deployment

Small incidents where use is not protracted.
Two Wearers to be a minimum of one Team.
Maximum of 2 entry control points.
Maximum of 10 wearers in risk area and where branch guidelines will not be used.

Entry control duties

The entry control officer should be a qualified Breathing Apparatus Wearer

Record

Wearers names, cylinder contents, time of whistle for each wearer, bracket teams together, lowest time outside the bracket, complete location and remarks column. Over write set no. on board. Have emergency team standing by when resources permit.

Breathing apparatus emergency
Commit a BA emergency team if:

BA team fails to return by time of whistle, BA wearer is in distress, or a dangerous situation develops that could endanger wearers.

Actions
Commit emergency team, inform Incident Commander, inform operations control. The emergency team must be dressed to the same standard and of the same size (no. of personnel) as the largest team committed.
Taking with them 1 spare BA set + 2m airline, box / bag to carry set in.
Prior to entry BA emergency crews are suitably briefed.
A resuscitator to be left at entry control point with first aid kit.

12.1.2 STAGE II
Initiated where one or more of the following apply:

1. Protracted incident or greater control and supervision required.
2. More than 10 BA wearers in risk area.
3. 1 BAECO. For every 10 wearers.
4. More than 2 entry control points in use.
5. Branch guidelines required

SOP 2: FIRE HYDRANT INSPECTION, TESTING AND MAINTENANCE

2.0 SCOPE

This SOP is to ensure regular and consistent execution of the preventive maintenance, inspection, and testing of hydrants throughout the distribution system. The hydrant maintenance program shall be conducted in accordance with the Ministry of Water Manual for Fire Hydrants: Installation, Field Testing, and Maintenance. Per the referenced publication, "all hydrants should be inspected regularly, at least once or twice per Month and after each Operations, to ensure their satisfactory operation.

In addition, "it is good practice to conduct flow tests on all parts of the distribution system approximately every month to identify the service areas affected by significant changes in the distribution system. An accurate and digital record should be kept of each flow test so it is readily available."

The, maintenance and testing practices may vary Service personnel should apply maintenance practices consistent with the make and model of the hydrant in accordance with manufacturer's recommendations.

2.1 PURPOSE

This SOP should be used in coordination with a comprehensive asset management plan and hydraulic model. Any updates to condition, status, or operation of valves shall be relayed to the appropriate staff so that information is consistent across distribution system operations. This SOP does not cover hydrant installation and replacement procedures, which would include inspection before installation, installation or replacement, and testing and/or inspection after installation.

2.3 KEY PERSONNEL AND RESPONSIBILITIES

- **Water Distribution Superintendent**:
    - Maintain schedule and generate work orders for hydrant inspection, testing and maintenance.
    - Identify additional planning/scheduling activities and resources for each hydrant (such as establishing additional traffic control measures, coordinating with valve exercising, performing customer notification, and assessing the hydraulic impact).
    - Maintain records of hydrant maintenance.
    - Ensure all repairs, map discrepancies, and other issues are properly communicated to the responsible parties and ensure identified repairs/replacements are executed within a timely manner.

- **Water Distribution Operator (Fire and Rescue Force and Water Authorities):**
    - Perform field inspection, testing and maintenance of hydrants as generated by work orders.
    - Prepare records of field testing, inspection and maintenance for each hydrant and enter into enterprise asset management (EAM) system

2.4 PROCEDURE

2.4.1 Equipment Required:

- Water system map (with clear labels for pipe diameter, street names, parcel addresses, critical water users, and all hydrant/appurtenance identification numbers)
- Traffic cones
- Temporary signs/arrow boards (warning lights, strobe lights, arrow boards, traffic maintenance signs)
- Pruning shears
- Wrench
- Approved lubricating oil (and funnel)
- Spare parts (cap, stem, nut, bonnet, etc.)
- Scraper, wire brush, and/or sand-paper Spray paint and primer (if applicable)
- Plastic tarp or newspaper
- Approved cleaning agent and paper towels
- GPS unit (optional)
- Digital camera (optional)

2.4.2 Procedure:

1. Prior to driving to the site, perform the necessary pre-planning activities. This includes reviewing system maps, GIS, as-builts, and asset history to identify hydrants that are in busy intersections, high-profile of sensitive customers, or may result in a potential hydraulic impact as well as reviewing the manufacturer's manual for the specific hydrants to be inspected. Notify the Water Authorities Supervisor if additional planning/coordination is needed.
2. Identify the best route to conduct the work. This includes identifying the starting and ending point (hydrant location), sequence of hydrants to be completed for the day, and potential parking areas.

3. Upon arrival to the site, assess the site for safety (including the appropriate PPE) and set up the appropriate traffic control measures. This may include: warning lights, strobe lights, arrow boards, traffic maintenance signs, cones, flagmen (if necessary), safety vests and/or other PPE. Document the following information on the work order:

- Operator last name
- Inspection date
- Arrival time

4. Locate and access the fire hydrant identified on the work order. Identify the unique identification number for the hydrant on the appropriate water system map and confirm the actual field location is a correct match. Verify the following information in the field and document it on the work order:

- Hydrant ID number
- Map grid/page number
- Street
- Cross street
- Address
- GPS position (if applicable)
- Other location notes (i.e. measurements from the property line)
- Hydrant source main size
- Map discrepancies (if applicable)

5. Clear the area of excessive debris, vegetation, or dirt (within a 3-foot clearance). There should be no obstructions, including the ground, preventing easy coupling of hoses or turning of spanners. The hydrant should be visible from all approaches. There should be no brush or tree limbs that could interfere with anyone approaching the hydrant and attempting to connect to it or operate it. Where needed, perform minor corrections,

such as pruning and minor digging. Document more significant work on a new work order.

6. Check hydrant information against records (to be provided on work order) and note any discrepancies. Document the following information on the work order:

- Manufacturer 1
- Model
- Year

7. Visually inspect hydrant for leaks, rust, or any obvious cap/chain defects. Caps should be free from cracks and turn freely. Chains should be attached to caps and the hydrant body and turn freely.
8. Loosen the top cap and open the hydrant a few turns to allow air to vent, and then tighten the cap and open the hydrant fully. A full tear down is required to look for internal damage, gasket, and tread conditions. Pay special attention to all seals and threads, and note any wear.
9. Replace any components, if required.
10. Before putting the hydrant back together, make sure the operating nut, all nozzle outlets, and all seals/threads are cleaned and lubricated (in compliance with manufacturer recommendations).
11. Re-assemble the hydrant and fully tighten all caps.
12. Locate, access, and exercise the fire hydrant isolation valve in accordance with manufacturer recommendations. Valves should open and close properly and should not leak at either the stem or the nozzle. Tighten leaky packings on older hydrants. Document any valves that are difficult to operate, have bent stems, or do not open/close fully on the work order for follow-up.
13. Turn on the hydrant fully and test for adequate, sustained water pressure and proper drainage. Also check for any leaks around the operating stem, nozzles, any

seals or packing, and at the flanges. Replace the O-rings if necessary.

14. Open and close the hydrant with the nozzle caps in place to check for seal leakage. Verify that hydrant main (bottom) valve completely closes. Refer to appropriate manufacturer's manual for step by step instructions.

15. If a wet barrel hydrant, drain the hydrant in accordance with manufacturer's instructions.

16. Thoroughly clean the exterior of the hydrant, washing off any dirt, bird droppings, or loose debris.

17. Confirm paint is in good condition. Touch up hydrants with chips or rust using an approved spray paint. A plastic tarp or newspaper should use used to protect sidewalk or nearby vegetation. Remove any surface rust using scraper or wire brush. any shiny surfaces with light sanding (to improve paint adhesion). Apply spot primer to coat areas of bare metal. Apply a top coat with a polyurethane enamel compatible paint as directed by the hydrant manufacturer (typically sprayed to minimum 4 mil dry coat thickness).

18. Visually inspect the hydrant for damaged or missing parts. Document any operational deficiencies, leaks, vandalism, and other relevant observations in addition to the following information on the work order:

- Operated (yes/no)
- Drained (yes/no)
- Flow observed (yes/no)
- Close direction
- Number of turns
- Fire hydrant condition (operable/inoperable)
- Specific hydrant discrepancy (by category and details)
- Specific repair activity required to return the hydrant to full operability

- Picture taken (for raises or other conditions)
- Time work order completed
- Comments (other relevant observations or items requiring additional maintenance on the work order)

19. Restore the area to a clean and safe condition. This includes clearing the area of any tools/materials used and any traffic control devices.

2.5 HEALTH AND SAFETY

One of the most significant health and safety risks during hydrant maintenance is vehicle traffic. The field service team should use trucks, temporary signs, and traffic cones to prevent automotive accidents and injury to staff. In addition, a flag crew may be needed to direct traffic in some locations. Trucks should be parked between oncoming traffic and the work area to provide a barrier. In addition, the following personal protective equipment (PPE) should be worn during maintenance activities:

- FRF identification
- Hard hat
- High visibility safety vest
- Knee pads (as needed)
- Safety glasses
- Steel-toed boots
- Work gloves

2.6 DATA RECORDING AND MANAGEMENT

Following completion of a hydrant test, inspection or maintenance work order, enter all necessary information, including the date of maintenance, hydrant identification,

condition, test results and personnel completing the maintenance.
The Water Distribution Superintendent must be notified of any additional required maintenance or if the hydrant is inoperable or in disrepair. The Water Distribution Superintendent shall assign work orders for any follow-up items and coordinate updates to the asset management plan.

FH inspection, test and maintenance form
Completed inspection forms shall be submitted and then distributed as follows:

Condition	**Corrective Action**
Inaccessible	Make accessible
Barrel contains water	Repair and drain; for high (presence of water or ice could indicate a faulty drain, a leaky hydrant valve, or high groundwater table)
Improper drainage from barrel	Repair drain
Leaks in outlets or at top of hydrant	Repair or replace gaskets, packing, or parts as necessary
Cracks in hydrant barrel	Repair or replace
Tightness of outlets	Lubricate if necessary; tighten if necessary.
Worn nozzle threads	Repair or replace
Worn hydrant operating nut	Repair or replace

Reporting and Repair Procedures
Reporting of hydrant condition and associated repairs comes from two sources, annual inspections and field reports from staff, customers and Fire District person

SOP 3: CHAIN SAW: OPERATING PROCEDURES

3.0 General Safety

- Safety glasses face mask and Hi-Vis Jacket must be worn at all times in work areas.
- Appropriate footwear (steel caps) with substantial chaps must be worn.
- Long and loose hair must be contained
- Close fitting/protective clothing must be worn.
- Hearing protection must be worn when using this machine.
- Check for loose and rotating chain
- Check for movement of work piece and trip hazards
- Beware of inhalation of fumes and dust particles
- Beware of kick-back - Push-back and Pull-in Beware of loose clothing entanglement

3.1 Transport of Chain Saw

- Ensure unit is firmly tied down on transport vehicle without damaging mechanical or fuel components
- Avoid handling chain

3.2 Operating Conditions

- Ensure the machine is clean to facilitate detection of loose, worn or defective parts and other safety hazards.
- Inspect fuel lines, tank, and area around carburetor for fuel leaks. Do not operate unit if leaks are found.
- Faulty equipment must not be used. report suspect machinery immediately.
- Check the effectiveness of chain brakes and operating controls.
- Ensure safety guards and other safety devices are fitted, secure and functioning.

- Check condition of the anti-vibration mountings of the handles.
- Ensure chain is sharp and correctly tensioned.
- When starting the chainsaw on the ground:
  - o Ensure no obstructions are present particularly near the tip of the guide bar.
  - o Place the right foot through the rear handle and place the left hand on the front handle.
  - o Operate the starter with the right hand.
  - o Keep a firm grip on the chainsaw with both hands, with the thumb of the hand holding the front handle wrapped around the handle.
  - o Maintain a proper balance and secure footing when operating the chainsaw. Start the cut with the saw chain rotating at full speed and the spiked bumper in contact with the wood.
- Be aware of the guide bar nose at all times when the saw chain is in motion.
- Pay attention to the operation and be alert for movement of the material being cut.
- Be alert to situations that may cause material to pinch the top of the saw chain.
- Apply chain brake when saw is at rest.
- Avoid the accumulation of debris.
- Never use a chainsaw over shoulder height.
- Allow a hot chainsaw to cool before refilling the fuel tank.

3.3 Inspection and Maintenance

- Inspect fuel lines, tank, and area around carburetor for fuel leaks. Do not operate unit if
- leaks are found
- Ensure safety guards and other safety devices are fitted, secure and functioning.
- Check condition of the anti-vibration mountings of

the handles.

- Ensure chain is sharp and correctly tensioned.

The above instructions must be followed at all times if any of the instructions are not possible, contact the site supervisor for an assessment of any safety requirements

SOP 4: LADDERS OPERATING PROCEDURES

4.0 SCOPE

The use of ladders puts workers in a potentially unsafe position. Ladders are used for many purposes but no matter what type of ladder you use or what you use it for, it pays to take some extra precautions. Any fall can be serious, and a fall from the height of even a low ladder can mean a painful and incapacitating injury.

4.1 Straight and Extension Ladders

To raise a ladder,
Brace the lower end against a wall and then grasp the top rung with both hands. Raise the top end and walk underneath the ladder, moving down the rungs until the ladder is vertical.

When using an extension ladder,
Raise it to the desired height, being sure the locks engage properly on both sides of the ladder. To position the ladder properly, place it against the wall so the distance between the wall and the base of the ladder is 1/4 of the length along the ladder from the base to its point of support (1/4 of its working length). Since the rungs on ladders are normally one foot apart, the approximate distance is easy to compute.

The ground under the ladder should be both level and firm. Large flat wooden boards placed under the ladder can level a ladder on uneven ground or give a ladder better footing on soft ground. If possible, secure the ladder.

When portable ladders are used for access to an upper landing surface, the side rails must extend at least 3 feet (.9 m) above the upper landing surface.

Ladders must be secured when used at heights above 10'. Have someone hold the bottom of the ladder or tie it off at the roof level.

If the ladder is to be tied off it must done in a way that does not create a tripping hazard to the user. (i.e.: Buckles from tie downs should be located in the middle of the ladder rather than on the side.)

When approaching a ladder for descent from a roof always,

- Approach from the center.
- Hold the ladder with both hands before attempting to mount the ladder.
- Step around the ladder with one leg and place that foot on a rung, which is lower than the ladder's point of contact with the roof.
- Place the other foot on the ladder and proceed to descend with three points of contact at all times.
- Never carry heavy equipment on the ladder with you. Use hoisting materials wherever possible.

4.2 Step Ladders

Many of the suggestions for using straight and extension ladders also apply to stepladders.

When using a stepladder,

- Never carry heavy equipment on the ladder with you. Use hoisting materials wherever possible.
- Erect a stepladder only on a flat level surface. Do not place it on a table or any similar platform for added height.
- Never use a stepladder as a straight ladder.

- Before climbing a stepladder, make sure that its legs are fully extended and the spreader locked. The locking device on some ladders may present a pinching hazard, so keep fingers clear when setting up the ladder.
- Never stand on the top two steps of a stepladder.
- Do not step on the bucket shelf or attempt to climb or stand on the rear section supports.

They are not designed to support the weight of a person. Finally, no matter what kind of ladder you are using, never leave a raised ladder unattended. It could fall unexpectedly and injure someone.

4.3 General Precautions for the Safe Use of all Ladders

- Ladders must be maintained free of oil, grease, and other slipping hazards.
- Wooden ladders must not be painted as this could hide flaws or damage of the ladder.
- Ladders must not be loaded beyond their manufacturer's rated capacity.
- Ladders must be used only for the purpose for which they were designed.
- Non-self-supporting ladders must be used at an angle where the horizontal distance from the top support to the foot of the ladder is approximately one-quarter of the working length of the ladder.
- Fixed ladders must be used at a pitch no greater than 90 degrees from the horizontal, measured from the backside of the ladder. Above 8’, ship’s ladders should be installed with slip resistant steps and handrails as required.
- Ladders must be used only on stable and level surfaces unless secured to prevent accidental movement.
- Ladders must not be used on slippery surfaces

unless secured or provided with slip- resistant feet to prevent accidental movement. Slip-resistant feet must not be used as a substitute for the care in placing, lashing, or holding a ladder upon slippery surfaces.

- Ladders placed in areas such as passageways, doorways, or driveways, or where they can be displaced by workplace activities or traffic must be secured to prevent accidental movement or a barricade must be used to keep traffic or activities away from the ladder.
- The area around the top and bottom of the ladders must be kept clear.
- The top of a non-self-supporting ladder must be placed with two rails supported equally unless it is equipped with a single support attachment.
- Ladders must not be moved, shifted, or extended while in use.
- Ladders must have nonconductive side rails if they are used where the worker or the ladder could contact exposed energized electrical equipment.
- Cross bracing on the rear section of stepladders must not be used for climbing unless the ladders are designed and provided with steps for climbing on both front and rear sections.
- Ladders must be inspected by a competent person for visible defects on a periodic basis and after any incident that could affect their safe use.
- When ascending or descending a ladder, the worker must face the ladder and must use at least one hand to grasp the ladder while climbing.
- A worker on a ladder must not carry any object or load that could cause him/her to lose balance and fall.

4.4 Other points to remember when using a Ladder are

1. Never carry heavy equipment on the ladder with you. Using hoisting materials wherever possible.
2. Never use a ladder in a strong wind.
3. The point where the ladder rests against the wall should be flat and firm.
4. A ladder should not be placed in front of a door that is not locked, blocked or guarded.
5. Before positioning the ladder, check for insect or bird nests under the eaves; the top of a ladder is no place to discover a wasp nest.
6. Tools should be carried in the pockets, in a bag attached to a belt, or raised and lowered by rope. Be sure that the soles of your shoes are clean and dry.
7. Work facing the ladder, holding on with one hand. If it is ever necessary to work with both hands, hook one leg over the rung.
8. Don't lean too far to the side while working. A good general guide is to keep your body centered between the rails of the ladder. Instead of leaning to the side, get down and move the ladder.
9. In case of sudden dizziness or a panicky feeling, bow your head, drape both arms over the rung in front of you, close your eyes, and wait until the feeling passes.
10. Do not use a ladder as a scaffold or for any purpose except what was intended.
11. Many fatalities occur when a metal ladder brushes against power lines while being moved. Use only double-insulated or properly grounded electrical tools on a metal ladder.
12. To be safer, use only a dry wooden or non-conductive fiberglass ladder when working around electrical wires or equipment.

4.5 Maintenance & Structural Defects

- Portable ladders with structural defects--such as broken or missing rungs, cleats, or steps, broken or split rails, corroded components or other faulty or defective components—must immediately be marked defective, or tagged with "Do Not Use" and withdrawn from service until repaired.
- Fixed ladders with structural defects--such as broken or missing rungs, cleats, or steps, broken or split rails, or corroded components--must be withdrawn from service until repaired.
- Defective fixed ladders are considered withdrawn from use when they are
    a. Immediately tagged with "Do Not Use";
    b. Marked in a manner that identifies them as defective;
    c. Blocked-such as with a plywood attachment that spans several rungs.
- Ladder repairs must restore the ladder to a condition meeting its original design criteria before the ladder is returned to use.
- Major repairs to portable ladders will not be performed. Ladders are to be replaced and not re-used. The damaged ladder must be destroyed prior to disposal.

4.6 TRAINING REQUIREMENTS

The employer is required to provide training for each worker using ladders. The program must enable each employee to recognize hazards related to ladders and to use proper procedures to minimize these hazards. Each worker is to be trained by a competent person in the following areas, as applicable:

- the nature of fall hazards in the work area;
- the correct procedures for erecting, using,

maintaining, and disassembling the fall protection systems to be used;

- the proper use, placement, and care in handling of all ladders; and
- the maximum intended load-carrying capacities of ladders used.

Employees will be evaluated on their competency before being allowed to use ladders in the field. In addition, the employer must re-train each employee as necessary to maintain the understanding and knowledge acquired through compliance with the standard.

SOP 5: SCBA OPERATING PROCEDURES

5.0 SCOPE

To establish those guidelines necessary for compliance with TBS and manufacturers recommendations for maintenance standards of self-contained breathing apparatus (S.C.B.A.).

Only those individuals who have been trained and certified by the equipment manufacturer may perform the maintenance procedures on department owned self-contained breathing apparatus.

Replacement or repairs shall be done only by qualified persons, using parts or supplies designed for the breathing apparatus. No attempt shall be made to make adjustments beyond manufacturers recommendations. Parts shall not be interchanged among devices of different manufacturers.

All maintenance procedures and time schedules shall conform to NFPA and manufacturers recommendations and guidelines.

All breathing apparatus maintenance shall be performed in the air mask service area, so designated by the department.

The rear portion of the Fire Equipment Mechanics Office shall be the only authorized S.C.B.A. repair and service area.
Tools that have been painted blue are designated as breathing apparatus maintenance tools and can only be used for the repair, adjustment and service of self-contained breathing apparatus or the respiratory air compressor system.

5.1 Responsibility

The Fire Equipment Mechanic and/or those personnel assigned shall be the only individuals who may perform maintenance on department owned SCBA's except for the routine cleaning of the SCBA.

6.2 Procedures

All department owned S.C.B.A. shall undergo the inspection, cleaning and maintenance procedures outlined in this policy.

A. Daily inspection and operational check;

The following steps will be performed on all SCBA on a daily basis:

1. Cylinder pressure will be between 2000 and 2200 psi or cylinder must be recharged or replaced.
2. Examine face piece and breathing tube assembly for cleanliness, broken or deteriorating parts and proper exhalation valve operation. Personnel will check face piece for proper facial seal by placing face piece against the face, cupping hand on breathing tube end and inhaling. Gently exhale to check proper exhalation valve operation.
3. Each individual shall sanitize the face piece assigned for his/her use with M.S.A. Cleaner/sanitizer.
4. Harness straps shall be inspected for excessive wear, loose screws and proper operation of the strap adjustment hardware. The tank should not be loose in the frame.
5. The operation check will be performed in the following sequence:

a) Check regulator valves; the main line valve should be fully open, the bypass valve should be fully closed.

b) Check high pressure hose hand wheel for tightness.
c) Check to be sure the regulator outlet port is covered with the rubber dust cover.
d) With your hand over the outlet cover, pressurize the regulator by turning the tank valve hand wheel counter-clockwise.
e) Listen for the alarm bell to ring as the pressure builds but the bell should quit ringing as the pressure builds above 1200 psi on the regulator gauge.
f) Remove hand from outlet cover, the cover should remain in place.
g) Check to verify that the regulator gauge and tank gauge are equal (and 50 psi).

h) Turn off the tank valve and watch the regulator gauge for 30 45 seconds. There should be no noticeable drop in pressure.
i) Lift an edge of the rubber outlet cover and slowly allow the air pressure to drop. When the alarm bell starts ringing, reseal the outlet cover and allow the alarm to ring until all air pressure is exhausted. The alarm should start to ring at 550 psi (and 50) and continue to ring until 200 psi or lower.
j) Carrying cases for SCBA will be cleaned and the interior wiped with a damp rag or sponge.
k) Breathing apparatus that does not perform properly as outlined must be returned to the maintenance division for repair.

B. After each use:

1. Air cylinder shall be recharged.
2. Harness assembly will be washed with mild soap and water and scrubbed with a soft bristle brush if necessary.

3. Never apply water to SCBA unless high pressure line is connected to an air cylinder and the regulator outlet port is covered.
4. Wash and sanitize face piece.
5. Perform daily inspection and operational.

C. The monthly inspection will be scheduled and conducted by the Fire Equipment Mechanic and/or those other individuals designated by the department. The monthly inspection program contains four (4) sections: flow testing, leak testing, visual inspection and if necessary, maintenance and repair of worn or damaged parts.

1. Regulators will be flow tested and test results recorded. Flow tests will be conducted using the portable regulator tester and procedures as outlined in the accompanying manual.
2. The regulator, high pressure hose, alarm, cylinder valve, and admission valve will be tested for leakage.
3. A visual inspection of the entire apparatus shall be made. Areas to be covered include:
    a. Regulator diaphragm
    b. Lever assembly
    c. Pressure gauge
    d. High pressure hose
    e. Air cylinder and valve
    f. Face piece
    g. Breathing tube
    h. Harness assembly
4. When all tests have been completed any repairs needed can be made before returning the apparatus to service.

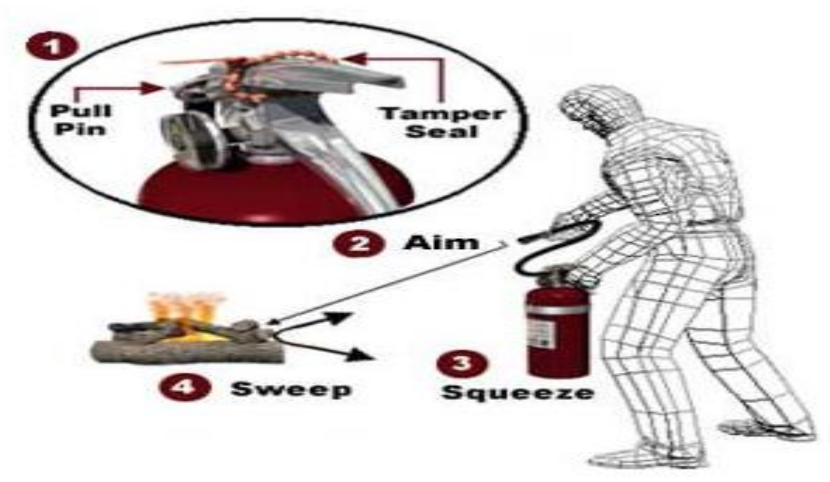
5. Maintenance records for each S.C.B.A. Shall be maintained and shall reflect findings of inspections and repairs made to breathing apparatus.

SOP 6: PORTABLE FIRE EXTINGUISHERS: OPERATION PROCEDURES

Most fire extinguishers operate using the following P.A.S.S. technique:

1. **PULL…** Pull the pin. This will also break the tamper seal.
2. **AIM…** Aim low, pointing the extinguisher nozzle (or its horn or hose) at the base of the fire.
   ***NOTE*:** Do not touch the plastic discharge horn on CO2 extinguishers, it gets very cold and may damage skin.
3. **SQUEEZE…** Squeeze the handle to release the extinguishing agent.
4. **SWEEP…** Sweep from side to side at the base of the fire until it appears to be out. Watch the area. If the fire re-ignites, repeat steps 2 - 4.

If you have the slightest doubt about your ability to fight a fire…. EVACUATE IMMEDIATELY!



SOP 7: FIRE HOSE REEL WITH SEMI–RIGID HOSE

Fire hose reels provide a very effective firefighting facility with a continuous supply of water available immediately. The construction and performance of a fire hose reel with semi-rigid hose ensures suitable installation in buildings and other construction works for use by the occupants. The fire hose reels are manufactured in both manual and automatic versions to comply with BS EN 671-1:2012 standard with semi-rigid hose complying with EN 694:2001 standards.

7.1 Features

- The fire hose reels are capable of rotating in one plane (fixed type) or rotating in more than one plane with mounting on one of the following: swinging arm, swinging pipe or swinging door in manual and automatic version.
- The automatic fire hose reels will open fully within 3 revolution of the reel.
- The nozzle has SHUT, JET and SPRAY control settings
- The minimum flow rate of hose reels in JET and SPRAY setting is 41 L/MIN. at 0.6 MPa (6 bar) pressure and setting in chrome plated rotary nozzle is 53Lpm at 0.6 Mpa (6 bar) pressure.
- The effective throw range of discharge at 0.2 MPa (2 bar) pressure is 10 mtrs. in JET setting.
- The reel discs are painted RED with printed user instructions.

7. 2 Operating Procedures for Automatic Hose Reels

- Pull out the hose and then water flow will start within 3 rotations.
- Open nozzle, adjust to spray or jet as required.

- Aim nozzle at base of fire.
- After use, close the nozzle and rewind the hose, ensuring that it is properly wound around the hose reel (not overlapping side plates). Open the nozzle to drain water from the hose and then close the nozzle on completion.

7. 3 SOP for Manual Hose Reels

- Open the main valve fully.
- Pull out the hose.
- Open nozzle, adjust to spray or jet as required.
- Aim nozzle at base of fire.
- After use, close the nozzle, turn off the main valve, and rewind the hose, ensuring that it is properly wound around the hose reel (not overlapping the side plates). Open the nozzle to drain water from the hose and then close the nozzle on completion.

7.4 Fire Hose Inspection Procedures

1. CHECK: For damage to couplings, or hose section, or leakers.

ACTION REQUIRED: Recouple and retest.

2. CHECK: Inspect to be sure:
   a. All hose threads are local fire department or have correct thread adapters provided.
      ACTION REQUIRED (a): Recouple with correct hose thread couplings, retest or furnish correct hose thread adapters.
   b. Hose threads on female swivel or male coupling are not damaged.
      ACTION REQUIRED (b): If damaged, recouple with new couplings and retest.
   c. Correct female hose coupling swivel gasket is in place.
      ACTION REQUIRED (c): Replace with new

gasket of proper size.

3. CHECK: Is hose connected to hose rack nipple? Check to see that the hose rack nipple is not blocked.
   ACTION REQUIRED: Connect and remove obstruction in nipple if necessary.
4. CHECK: What is the general condition of the hose? Date of manufacture. Approved hose? Has it been hydrostatically tested per the NFPA standard?
   ACTION REQUIRED: Inspect hose. Hydrostatically test if necessary. Remove any hose found to be sub-standard, failed testing or not considered in good condition.

7.4.1 Hose Rack Nipple

1. CHECK: To see if nipple is securely attached to angle hose valve, thru opening in the metal hose rack. Be sure nipple is clear of obstruction.
   ACTION REQUIRED: If not, disassemble hose rack unit, and re-install nipple correctly. Clear nipple of obstruction.

2. CHECK: Inspect threads on hose end of rack nipple for damage.
   ACTION REQUIRED: If damaged, repair or replace.

7.5 HOSE/APPLIANCE TESTING

1) Scope:

This policy applies to Department Hose/Appliance Testing. It was promulgated to establish a uniform policy for purchasing hose and recording water flow.

2) General:

a. Each new section of fire hose shall have an acceptance test conducted prior to placing hose into service. This acceptance test shall comply with Standard for the Care, Use, and Service Testing of Fire Hose Including Couplings and Nozzles.

b. Annual service testing of all fire hose and appliances shall be in accordance with fire and rescue laws and regulations.
c. All hose will be tested to the pressures listed on the hose

SOP 8: COMBINATION SPREADER/ CUTTER PROCEDURES:

Spreaders and cutters are probably the two pieces of equipment that most people think about when they hear about the Jaws of Life on a news report. The powerful jaws of these machines can tear apart most vehicles like cutting through a tin can. The **spreader** is used to pull pieces of the structure apart, or it can be inserted into the side of the vehicle to tear a section out. The **cutter**, as the name suggests, is used to cut through the vehicle like a pair of giant bolt cutters. The mechanics of how these two devices work is very similar and some Jaws of Life equipment combine the cutter and spreader into one machine.

8. 1 How to Open

To open the arms of the spreader, the operator slides a **valve switch** that causes the hydraulic fluid to flow from one hose into the cylinder, pushing the piston and rod up. This rod is attached to linkages that are conjointly attached to the spreader's arms. When the rod pushes up, it causes the linkages to rotate, which opens the arms. To close the arms, the operator moves the valve in the opposite direction, which causes the hydraulic fluid to flow through a second hose.

8. 2 How to Use

To use the spreader, a rescue worker inserts the closed spreader arms into an opening in the vehicle or structure, such as a door jam. The spreader can also clamp down on a structure to crush any material between its arms.

SOP 9: SAFETY ROPE MAINTENANCE AND CARE

9.0 Scope

The purpose of this policy is to establish a guideline for the use, care, storage, inspection and logging of life safety rope.

It is standard procedure to use life safety rope during Special Operations functions such as high and low angle rope rescue, trench rescue, confined space rescue, swift water rescue, and incidents involving hazardous materials. During these operations rope can be used as rappel line, lowering line, safety belay line, Stokes basket tag line, and in mechanical advantage systems. Life safety rope is not intended to be used as a tow line, utility line, or any other use that is not directly related to life safety.

9.1 Cleaning

When life safety rope is used in rescue functions, it will likely become soiled. When this is the case, the rope must be cleaned. At a minimum, the rope shall be cleaned and dried according to the manufacturer's specifications prior to storage.

When the rope is excessively dirty it shall be soaked in water and cleaned in a front- loading clothes washer. The washer should be run through an empty cycle first to rinse out any contaminants or detergents. After soaking, double the rope over and "daisy chain" it before placing it in a front-loading clothes washer. Wash rope in cold water on the gentle cycle with mild detergent. During the rinse cycle a small amount of Downy fabric softener may be added (1 oz. per 3 gallons of water) to replace the lubricants that are lost during repeated use and washing (if in doubt refer to the manufacturer's recommendations). After washing the rope, it should be hanged loosely in a cool, dry area and allowed to dry

9.2 Storage

Life safety rope should be stored in rope bags in a cool dry place and out of direct sunlight. It should also be kept away from chemical atmospheres such as those found near batteries, engine exhausts and gasoline. Rope should be stuffed or "piled" into the bag, not coiled. After each use the rope ends should be switched so that the end that was used is put in the bag first. The end of the rope that goes in first should be threaded through the grommet in the end of the bag and tied in a figure eight knot.

9.3 Inspection

Inspection of life safety rope should be done before each rope is put into service as well as before and after each use. In addition, all life safety ropes will be inspected on a quarterly basis and logged accordingly. The rope should be inspected by at least two people. After each inspection, the inspector is responsible for record keeping and documentation. It will be the Rescue Company Captain(s) responsibility to ensure that all inspections and documentation are assigned and completed quarterly.

During inspection the rope should be visually checked for cuts, chafed areas, glazed surfaces, discolorations and other sheath damage as well as dirt and/or mildew. The inspectors should also look for any unusual or uneven wear on the rope. The rope should also be inspected by holding it firmly in one hand, pulling the rope between your thumb and index finger about 18 inches at a time, while feeling for broken fibers, soft or hard spots, and variations in diameter. This process is performed without gloves on so that the inspector can inspect the rope more thoroughly.

If any of the above imperfections are found, the rope should be taken out of service and the Rescue Company Captain notified as soon as possible. Also, if the rope has been subject to shock load, fall arrest, or any abuse other than normal rappel or rescue training, the rope should be taken out of service.

9.4 Record Keeping
In order to accurately track the history and use of life safety rope, record keeping must be accomplished. A rope record will be maintained on each rope within the Rogers Fire
Department from the date of purchase until the date of retirement from service. The rope log for all life safety rope used by the SOT of the Rogers Fire Department shall be kept in the cab of Rescue 5. The rope log is form 110 Life Safety Rope Log and shall be maintained for each rope within the Rogers Fire Department.

The use of life safety rope shall be logged for training evolutions, actual incidents, and quarterly inspections. It is essential to always verify that the rope used matches the log on which you are entering the information. Make sure all applicable information is filled out as accurately as possible.

This should include the following data:
- date the rope was used
- location
- type of use
- exposure
- date the rope was inspected
- who inspected the rope?
- any unusual circumstances or events that occurred during use including any
- damage, shock loads, or use over sharp edges
- any additional comments

SOP 10: POWER SAWS

This standard establishes guidelines for the safe and proper operation of power saws, it was promulgated to:

a) Prevent accidents, injuries, or deaths that might result from unsafe operation or improper use of a power saw.
b) Prevent damage to a power saw that might result from unsafe operation or improper use.

10.1 General

c) Members who respond to fire and emergency medical incidents shall be responsible for knowing how to properly and safely operate the power saws used by the department.
d) Officers shall train the members under their command in the safe and proper use of the power saws assigned to their apparatus.
e) An officer shall immediately stop any unsafe or improper use of a power saw and shall take the appropriate action necessary to correct the situation.
f) Drivers shall inspect and operate each power saw carried on their apparatus at the beginning of each tour of duty or each training night and after each use to ensure that they are clean, functioning properly, and safe to operate. Any power saw discovered to be unsafe or malfunctioning shall be removed from service and properly tagged as to the nature of the problem. Tools removed shall be immediately reported to the shift or station supervisor.
g) Drivers shall also be responsible for ensuring that saws are properly fuelled and that spare fuel containers are full of the correct gas/oil mixture and in the proper place on the apparatus.

10.2 Personal Protection

a) Full protective clothing shall be worn by those members operating, and by those members in close proximity to the operation of power saws.
b) The face shield from helmet and safety glasses shall be in a position to provide eye protection, ear protection shall be worn.
c) To prevent accidents caused by moving chains, it is imperative that the operator and guide have their protective clothing completely buttoned up.

10.3 Operating Procedures

a) Start the saw and warm up on the ground prior to use.
b) Keep both hands on the control handles when operating the saw.
c) Make sure of your footing before operating saw.
d) Carry the saw with the engine stopped, and the bar pointed to the back.
e) The saw may be used in the ventilation of roofs. They can be used on shingle or composite roofs after the stone or gravel has been removed. Caution: Not to be used on metal roofing unless saw has metal cutting blade installed.
f) The saw may also be used for opening up walls or floors if they are of wood or lathe construction. The saw should not be used on plaster and metal lathe. The saw should not be used on masonry or metal construction unless it has an appropriate blade installed. Remember the carbide tipped saw chain is not indestructible Always carry a power saw with the engine stopped or the electrical power disconnected.
g) Always keep both hands on the control handles, using a firm grip with your thumbs and your

forefingers encircling the handles.

h) Always turn off a saw when it is unattended.
i) Have a plan of action before placing a saw into operation. The plan should include the location and sequence of the cuts and openings.
j) Wind direction – consider its effects on exposures and personnel.
k) Escape routes – at least two means of egress.
l) Always place the safety guard in the proper position for the use intended before operating the saw.
m) Remember that power saw operations are safest when cutting on a horizontal surface near the ground level or on a vertical surface at or below waist level.
n) Whenever possible, a team of two firefighters shall perform cutting operations. The firefighter operating the saw (operator) will be assisted and/or guided by the second firefighter (guide). The guide may use the sling in which the saw is carried as a safety harness to guide and assist the operator. The saw shall always be shut down when unattended.
o) Operating a power saw above chest height is extremely hazardous and should not be attempted as a normal course of action. This type of operation should be conducted only under the direct order and supervision of an officer. The officer ordering this operation shall first consider the value to be gained vs. the extreme hazard to personnel.
p) The use of a power saw from a ladder shall only be done if no other alternatives are available.
g) Do not operate a power saw close to a highly combustible or flammable material due to the possibility of ignition from sparks.

h) Do not operate saws in flammable or explosive atmospheres.
i) When operating a power saw, avoid placing side pressure or twisting the blade. Never force the saw. If too much pressure is applied to the blade, the hazard of blade breakage (carbide tipped) or shattering (aluminium oxide or silicon carbide discs) is increased. A blade that breaks or shatters during cutting operations may cause serious injury to the operator or bystanders.
j) The saw cut should only be as deep as necessary. Deep cuts may weaken supporting beams and lead to collapse. The experienced operator will know when he has reached a beam by the sound and feel of the saw.
k) If conditions permit, scrape gravel and debris from the cutting path to reduce the danger of injury from flying chips and loose materials.

5) Safety Precautions:
   a) A member who operates a power saw at an emergency incident or during a training session shall wear full protective clothing, including both ear and eye protection.
   b) Have a plan of action before putting the saw into operation, the plan should include:
      i. Location and sequence of cuts and openings.
      ii. Structural integrity of roof or area of operation.
      iii. Wind direction. Consider its effect on the saw, exposures and personnel.
   c) Remain observant of changing conditions a member who operates a power saw for the purpose of inspecting or maintenance shall wear eye/ear protection and safety shoes or boots.
   d) When operating a power saw, all clothing shall be

close fitting and completely buttoned to prevent an accident due to moving belts, gears, chains, blades, etc. Do not operate a gasoline-powered saw with a fuel leak. Remove the saw from service.

e) The saw shall be raised and lowered using a utility rope, to keep hands free to climb a ladder.

q) f) Always keep saw in good, clean, serviceable condition. Examine the saw after each use to check for loose or missing parts. Check chain for proper tension, missing or damaged teeth. Ensure saw is full of fuel and bar oil. Check for proper chain tension.

r) Fuelling and maintenance:
    a. Power saws shall be kept clean and in good serviceable condition.
    b. Do not restart a saw in a small-enclosed space after refuelling.
    c. The cutting wheel, chain, or blade shall be examined at the beginning of each tour of duty or training night and after each use for nicks or defects. These items should also be checked for tightness and shall be kept clean and properly lubricated. Defective items shall be replaced.
    d. Ensure that abrasive saw blades do not become contaminated with petroleum-based products. Such contamination may dissolve the resin that is used to bond the blade; thus, causing the blade to shatter when used. New blades should be stored in plastic bags to ensure cleanliness.
    e. When fuelling a power saw:
        i. Always turn the engine off.
        ii. Make sure to use the proper fuel mixture. Many saws require a specific fuel and oil mixture.

Wipe off the saw to remove any spilled fuel before starting

SOP 11: HYDRAULIC - POWERED RESCUE TOOLS OPERATING

11.0 Scope

This standard mandate safety guideline to be followed while operating a hydraulic-powered rescue tool. It was promulgated to:

a) Prevent accidents, injuries, and deaths that might result from the misuse or improper operation of hydraulic-powered rescue tools.
b) Prevent damage to hydraulic-powered rescue tools that might result from misuse or abuse.
c) To insure proper and safe training and certification in the use of hydraulic-powered tools

11.2 Purpose

a) Members that respond to fire, rescue and emergency incidents are responsible for knowing how to properly and safely operate hydraulic-powered rescue tools.
b) Officers shall train the members under their command to properly and safely operate the hydraulic-powered rescue tools assigned to their fire engine.
c) An officer shall immediately stop any unsafe or improper operation of a hydraulic-powered rescue tool and make the adjustments and corrections necessary to safely accomplish the assignment.
d) The fluid used to operate rescue tools can cause damage to the eyes. To provide eye protection, allowing for the event of a hose or coupling failure where fluid could be expelled; all members in the area of operation of a rescue tool shall place their face shield in the down position and wear safety glasses to provide for such protection. Protective

clothing and safety glasses shall be worn when operating the rescue tool.

e) Drivers shall inspect the hydraulic-powered rescue tools assigned to their apparatus at the beginning of each tour of duty and after every use to ensure that they are functioning properly. Tools found to be unsafe or malfunctioning shall be removed from service and **tagged** as to the nature of the problem. Tools removed shall be immediately reported to the shift in charge.

f) Drivers shall check the fluid levels in each tool to ensure that each is properly filled.

11.3 Operating Procedure

a) Before operating a tool, always inspect the tips to make sure that the appropriate tips are being used and that the retainer pins, if used, are in place.

b) Place the power unit as level as possible, connect the hoses, but do not start the power unit until the tool operator gives the command to do so.

c) Remember that it takes two people to operate the tool: one person to operate the tool and another person to operate the power unit.

d) To start the power unit, place one foot on the bottom of the roll cage to help stabilize the unit. Hold the cage with one hand and pull the recoil starter cord with the other hand. Take care not to pull the cord out too far. The start-up sequence is as follows:

    i) Move the choke to the closed position.
    ii) Pull the recoil starter until the engine pops.
    iii) Move the choke to run.
    iv) Pull the recoil starter cord.
    v) Repeat the sequence if the engine fails to start.

To stop the power unit, use your hand to engage the kill switch. When refuelling the tool, always use the appropriate fuel type and take care not to spill fuel on a hot surface. Note: the pitch of the power unit will normally change prior to running out of fuel.

11.4 Safety Precautions

a) Protective clothing, including eye and ear protection, shall be worn while using a hydraulic-powered rescue tool during actual rescues as well as training exercises.
b) Approved eye and ear protection, safety shoes or boots, and any other item of protective clothing that is appropriate shall be worn while operating a tool for the purpose of inspection or maintenance.
c) Always work on the outside of the tool. *Never* insert your hands or other parts of your body between the jaws or tips of the tool.
d) Cover and protect the victim, and always explain to him what you're doing, if possible.
e) When bleeding or disconnecting a hose, place a rag over the coupling to prevent fluid from spraying on anyone.
f) If fluid comes in contact with any exposed skin area, be sure to wash it off immediately. Should fluid come in contact with the eyes they should be flushed immediately with copious amounts of water and that person should seek medical attention.
g) Precautions shall be taken to protect the trapped and injured from further injuries during the operation (i.e. sparks, propelled objects, flying glass, etc.), and a charged 1 1/2" foam hose line in place, manned by personnel in full protective

clothing.

h) If a fluid spill does occur, immediately clean any floor area or painted surface to prevent a fall or damage.
i) The hydraulic tool engine should be kept away from the injured and placed downwind of the work area. It must not be placed where it would provide a source of ignition for any flammable vapours in the air. Power unit must be placed where no carbon monoxide poisoning is possible.
j) Always remember to make the required hose connections prior to starting a power unit. Hose should be laid out in such a manner as to prevent damage from sharp objects, vehicles, etc.
k) Likewise, always stop a power unit prior to disconnecting a hose.
l) Do not use the shears to cut a steering column or any piece of metal with a free end, since it may become a projectile. Shears are designed to create a compression fracture rather than to cut. Always remember to cut at a right angle.
m) At a motor vehicle accident, always have a charged hose line to protect against the possibility of a fire.
n) Rotate personnel to avoid fatigue.
o) Rest the tool on your thigh and always maintain body balance.
p) Guide and hold the tool; do not force it. Don’t strain against the tool; rather, work with it.

SOP 12. FOAM FOR FIREFIGHTING OPERATION

12.0 Scope

This Standard Operating Procedure (SOP) outlines the principles to be adopted when using Foam for Firefighting Operations. Fires in flammable liquids are difficult and, in some cases impossible to extinguish with water even in the form of spray or fog. Firefighting foams have been developed which are able to float on a liquid and create a barrier between the vapor and the air.

12.1 Principles of Foam

12.1.1 How foam extinguishes a fire

- Formation of a blanket sealing blanket over the fuel surface which prevents vapor escaping
- Interception of radiant heat from the flames, preventing it from reaching the surface of the fuel and causing further evaporation;
- Isolation of fuel from oxygen from the oxygen in the air;
- Cooling of fuel
- Dilution of surrounding air with water vapor – from evaporated foam

12.1.2 Characteristics of foam

- **Stability** after application, the ability of the foam to retain its liquid content ie the time it takes for the liquid to drain from the foam.
- **Expansion** ability of the foam solution, where necessary, to foam when passed through aspirating nozzles.
- **Burn- back resistance (security)** the ability of a foam blanket to provide security against re-ignition.

- **Flow** ability of the foam to be projected and to flow across the liquid to be extinguished and/or protected.
- **Contamination resistance** ability of the foam to resist contamination by the flammable liquid leading to foam destruction.

12.1.3 Types of Foam Concentrate

Different risks will require different combinations of foam characteristics and different methods of application, and this has been responsible for the development of two types of foam.

- Protein Based Foam
- Synthetic Foam

And a variety of both aspirating and no aspirating equipment to apply them to incidents.

1. Protein based foam – Characteristics Protein (P)

These are liquids containing hydrolyzed protein materials, with certain salts added to improve stability and storage.

- 3% & 6% concentration
- Very stable
- Relatively slow flowing
- High sheer stress
- Good burn- back resistance
- Poor contamination resistance

2. Synthetic foam – Characteristics Synthetic (S)

These are based upon mixtures of water-soluble surface-active agents derived from hydrocarbons with additional stabilizers.

- 1% - 6% concentration
- Flows more freely than protein foam
- Tendency to mix with the fuel
- Poor burn- back resistance
- Good storage properties

Be Careful!!: *If you have to enter or walk through the solution. If the heat is still present, the barrier could get broken and may flash, burning back the solution and engulfing you.*

12.2 Foam Concentrate

Concentrated aqueous solution of carefully selected foaming agents and surfactants (surface-active agents). May also contain various other additives. SAAs are substances designed to carry out their function on the surface of a liquid rather than penetrating and mixing.

Foam concentrates are grouped according to their chemical constituents as follows:

a) Fluorprotein 7 (FP) foam

- Flows more quickly across the fuel surface
- Good resealing properties
- Good burn- back resistance
- Less likely to be contaminated by hydrocarbons

These are made from protein-based concentrates by the addition of fluorinated and other types of surface-active agents. They are usually available for use at 3% or 6% concentrations.

b) Film forming foam

These concentrates produce a foam which, when used in suitable circumstances, has the ability to form a thin transparent film over the surface of the fuel, which helps to prevent re-ignition. There are two types of film forming concentrate. Both can be used to make either aspirated or non-aspirated foam.

c) Aqueous film forming foam (AFFF)

This is based on fluorinated surface-active agents with other surface-active agents and stabilizers.
The characteristics of AFFF are as follows:

- It is more fluid than Protein, Fluorprotein or Synthetic foam
- It has quick control and extinction properties
- It has a fast drainage rate

Aqueous film forming foam (AFFF) the liquid draining out floats on the fuel surface, thereby forming the film.

- Its resealing capability is good.
- It has a reasonably good "burn back" resistance.
- Its contamination resistance is moderate AFFF concentrates are usually designed for 1, 3 or 6% use.

d) Film forming Fluor protein (FFFP)

This consists of a combination of protein and fluorinated surface-active agents and stabilizers. The foam produced has similar characteristics to AFFF, but its "burn back" resistance may be superior, and its resistance to fuel contamination is excellent. FFFP is usually available for use at 3% and 6% concentrations.

e) Alcohol resistant (AR) – Specialist Foam

This consists of Protein, FP or FFFP foam concentrate with an added polymer ingredient, which by precipitation, forms a thin fuel insoluble 'skin' or membrane at the interface between the fuel and the foam. The effectiveness of such foam depends on the water miscible (polar) fuel involved and the method of application. Polar Solvent with high concentration of alcohol will affect the result of foam attack as it Resists water miscible liquids, only practical choice for many solvents with high concentrations of Alcohol.

Disadvantage - Application rates are up to twice as much as other foams.

12.2,1 Other properties of foam

- Temperature effect on induction rate
- Effects on personnel
- Pollution of water courses
- Viscosity varies with temperature and effects induction rate.
- May also cause dermatitis
- 5-10% sodium, so equipment must be washed after use.

Note: *Dermatitis is inflammation of the skin, typically characterized by itchiness, redness and a rash.*

12.3 Foam Application

The foam as applied to the fire: It may be ***aspirated*** (foam concentrate + water + air). or ***non-aspirated*** (foam concentrate + water only). Foam is produced by mixing foam concentrate with water in the correct proportions. This is called FOAM SOLUTION. If appropriate the solution is aspirated, this is then called Finished Foam.

Variable factors when producing foam:

- Concentration
- Expansion
- Size of bubbles

Concentration determined by the induction equipment selected. Can be varied by calibrated controls.

Expansion determined by:

- Type of foam concentrate
- Concentration
- Design of foam making branch or generator
- Operating pressure

Bubble Size: Size of bubble in Medium expansion (MX) and High expansion (HX) foam is determined by the size of net or mesh in foam-making equipment.

Note: *Careful Selection of the correct equipment and ancillary equipment should be made according the specific risks in the general area.*

12.4 Categories according to expansion

- Low expansion (LX)
- Medium expansion (MX)
- High expansion (HX)

Low expansion (LX): Expansion ratio from 2:1 to 20:1 but usually between 5:1 and 15:1. Produced in aspirated form by FMBS, or non-aspirated by standard branches.

Medium expansion (MX): Expansion ration from 20:1 to 200:1 but usually between 50:1 and 150:1. Produced by special FMBS with gauze meshes.

High expansion (HX): Expansion ratio from 200:1 to 2000:1 but usually no more than 200:1 Produced by generators with air fans and nets, using synthetic concentrate

12.5 Quality of Foam

The Quality of Foam Depends on:

- Condition of concentrate
- Correct concentration
- Design of equipment
- Maintenance of equipment
- Correct pump pressure

Compatibility of foam concentrates: Don't mix different types; when changing from one type to another ensure container fully empty and thoroughly clean. **Consider age of concentrate.**

Note: *When stored on stations particular attention should be paid to the dates and / or batch numbers*

Compatibility of finished foam:

May react badly with some extinguishing powders. Consult manufacturers if necessary. Find out what types of foam/powder other Emirates/Industrial Fire Departments are using. This will be crucial when considering a mutual attack on a large fire requiring extended foam attack. Generally, all types of foam can be used together. Although consider order of application (non-aspirated followed by aspirated).

12.6 Firefighting Tactics & Considerations

There are a number of decisions that have to be considered prior to any Foam application.

OIC OF INCIDENT – Do Not Apply Foam Before: considering initial Size up carefully, considering:

- Life risk and life exposure (Dynamic Risk Assessment)
- details of the Flammable material involved in the Fire

- type of foam application required
- amount of foam concentrate required for a complete attack
- availability of back-up resources of foam and water for a sustained attack
- effect of cooling jets / sprays on finished foam attack

12.6.1 Choice of Firefighting Foams

Why LX foam is used most

- Can be projected over fairly long distances
- Spreads fairly quickly
- Is capable of forming a stable and secure foam blanket

Operational Tactics & Considerations (LX)

- Direct away from the fire first
- Never strike a liquid fuel fire
- Do not 'work around' foam branches in a water jet manner, apply the foam in a manner to increase depth and spread naturally outwards over burning liquid surface
- A minimum of ***30 minutes*** supply of foam concentrate should be collected before an attack is made on a fire (Large incidents)

Methods of application (LX)

- Rear wall
- Free-fall
- Bounce in front of running fuel

Operational Tactics & Considerations (HX)

- Slow flowing
- Poured not projected
- Used in enclosed spaces

- Sighted in open air
- Injected as high as possible
- Must ventilate compartment
- Personnel should wear BA and take hose line and Stay on Line

12.6.2 Clearing of HX foam

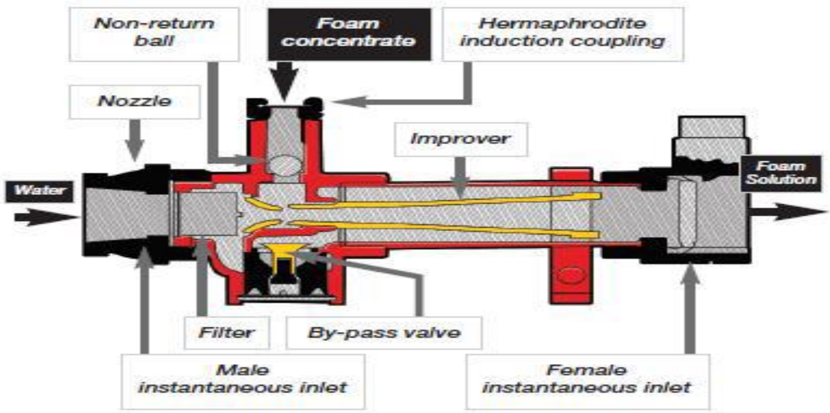
- High pressure hose reel
- Powder extinguisher
- HX generator in suction, using semi rigid ducting

12.6.3 Hazards in HX foam

- Loss of vision, hearing and sense of direction, ie disorientation
- Penetration of light from torches and equipment is severely affected
- Audibility of speech, evacuation signals, low pressure warning whistles and
- distress signal units are severely restricted – NO SOUND
- Transmission of heat is reduced
- Location and travel of fire difficult to determine
- Damage to structural features may not be visible
- Openings, machinery, electric cables etc will all be difficult to discern

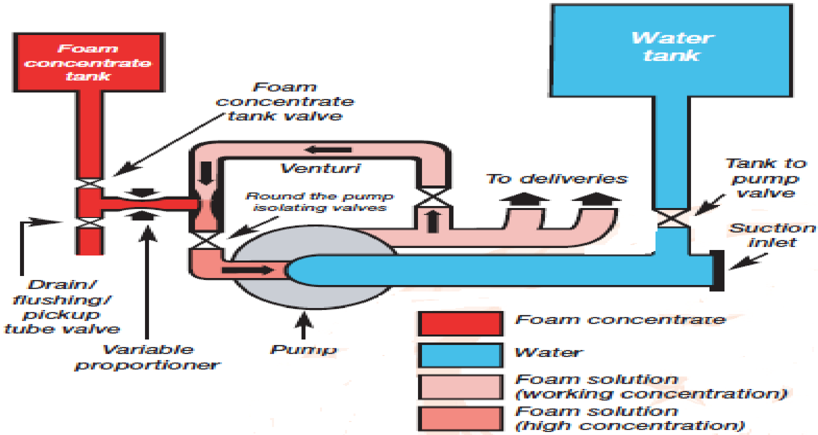
12.6.4 Foam inductors in line inductor

An inline inductor is placed in a line of delivery hose usually not more than 60m from the FMB. There will always be a pressure drop across the inductor due to turbulence and energy loss involved in the induction.



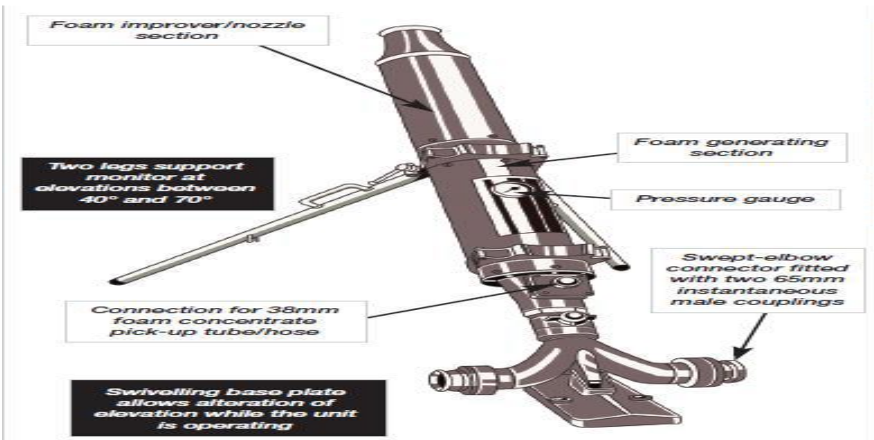
12.6.5 Round-the-pump proportioned:

This type of inductor is connected across a pump. When pumping begins, some water flows to the deliveries and some passes to the proportioned. The proportioned induces foam concentrate, to produce a rich foam solution which passes back to the suction side of the pump. Before re-entering the pump, the foam solution mixes with a fresh intake of water, and is consequently diluted to the required concentration. Most of it then passes to the deliveries, while a small amount returns to the proportional where more concentrate is induced, and the sequence is repeated.



12.6.6 LX foam making branches

Most FMBs have a narrow section at the inlet end in which the air entrainment takes place, and then a wider section in which the foam forms. The wider section of the foam making tube frequently contains improvers' which are designed to enhance the foam quality, e.g. semicircular baffles or a cone. At the outlet, the branch pipe is reduced in diameter to increase the exit velocity; thus helping the foam stream to be projected an effective distance. Give handout on FMBs technical details. Foam concentrate has to be transported to the branch.



12.6.7 Foam Monitors (LX)

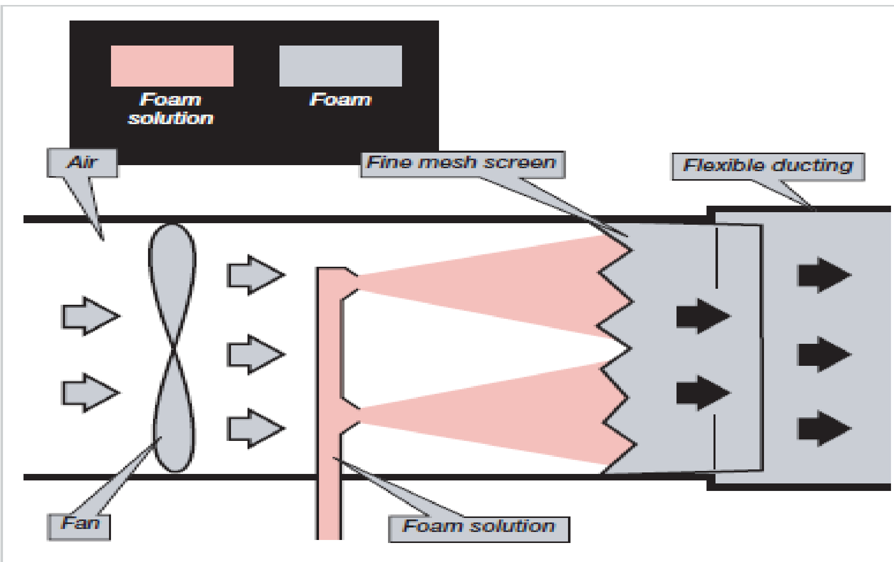
Foam monitors are larger versions of FMB which cannot be hand-held. They may be free-standing and portable or mounted on trailers. They usually have multiple water connections, and may be self-inducing or use one of the induction methods.

12.6.8 HX Foam generators

Designed to use synthetic foam concentrate. Air is blown through the generator by a fan; foam solution is sprayed into the air stream and directed onto a fine net screen. This produces foam with a mass of bubbles which is poured, rather than projected, through large diameter flexible tubes.

12.6.9 Power for HX foam generators

Internal combustion engine Electric motor Water turbine



SOP 13. RECORDS, MAINTENANCE, INSPECTIONS OF VEHICLES AND EQUIPMENT

1) All vehicle and equipment information will be documented and tracked with Fire House computer software.

2) All items identified as needing attention will be annotated on a repair request and Faxed to the Fire Office Headquarter. The Transport Officer is responsible for scheduling repairs on vehicles assigned to the force with the RFO/DFO.

3) All maintenance of Fire Vehicles will be accomplished by an approved Emergency Vehicle Technician assigned to the Vehicle Maintenance Repair section.

4) All maintenance completed on a Fire vehicle will be documented on the repair request form and signed by the Emergency Vehicle Technician.

5) The Transport officer or his designee will advise RFO when and Fire and rescue vehicle is repaired and ready to be picked-up. Fire and Rescue personnel picking up the fire and rescue tenders from the Vehicle Maintenance area will do a complete inspection of the vehicle before it leaves the area, any items found not corrected will be reported to the PMU.

6) All Preventive Maintenance (PM) conducted by an approved Emergency Vehicle Tech will be performed annually on all assigned Fire Apparatus.

7) Fire vehicles will normally be serviced with fuel by an FRF Fuelling Vehicle or at the Fuelling Centre. Some departments may continue to have an open fuel account in their respective districts; however, the account must be approved by the CGF. All fuel

tickets will have the district member's name printed legibly and signed by the member.

8) At no time will Fire and rescue tenders be operated when a safety item is discovered that needs to be repaired i.e. emergency lights, head and tail lights, brakes, steering etc.
9) Fire Administration shall maintain repair and service records for all Fire Vehicles and Equipment. Fire stations will be required to maintain all inspection reports on their fire engines and equipment.
10) Any Fire tender or Fire Equipment found to be unserviceable or unsafe to operate will be taken out of service.

11) The RFO/DFO or his designee will be notified and arrangements will be made to repair the fire tender and or equipment.

12) All Fire engine, Fire Pumps will be service tested at least annually and after any maintenance is performed on the pump itself.

13) All Ground Ladders will be tested and serviced annually or as needed.

14) All Fire Hose will be tested in annually. Fire Hose will be numbered and that number will be stencilled on each end of the hose on the couplings.

15) All Self-Contained Breathing Apparatus (SCBA) will be inspected weekly and after each use. All air bottles that are in service will have a current Hydrostatic Test date. All Firefighters and Fire Officers will be trained in the proper use of, care, inspection, and maintenance of SCBA's.

16) Only Certified personnel will be allowed to work on

SCBA regulators, mask and bottles.

16) Fire Station that have SCBA re-servicing capability will be certified by the manufacture, will not re-service any bottle that has an expired Hydrostatic test date, and will have an air sample tested from their system quarterly. The results of this test will be on file at the respective Stations and at the RFO/DFO office.

17) All fire hydrants and dry hydrants will be inspected, tested, and serviced semi-annual

SOP 14: HELICOPTERS OPERATION FIREFIGHTING

Introduction

Aerial firefighting, also known as waterbombing, is the use of aircraft and other aerial resources such as helicopter to combat wildfires. The types of aircraft used include fixed-wing aircraft and helicopters. Chemicals used to fight fires may include water, water enhancers such as foams

Helicopters

Helicopters may be fitted with tanks (helitankers) or they may carry buckets. Some helitankers, such as the Erickson Aircrane, are also outfitted with a front-mounted foam cannon. Buckets are usually filled by submerging or dipping them in lakes, rivers, reservoirs, or portable tanks. The most popular of the buckets is the flexible Bambi Bucket. Tanks can be filled on the ground (by water tenders or truck-mounted systems) or water can be siphoned from lakes, rivers, reservoirs, or a portable tank through a hanging snorkel.

Popular firefighting helicopters include variants of the Bell UH-1H Super Huey, Bell 204, Bell 205, Bell 212, Boeing Vertol 107, Boeing Vertol 234, Sikorsky S-70 "Firehawk" and the Sikorsky S-64 Aircrane helitanker, which features a snorkel for filling from a natural or man-made water source while in hover. Currently the world's largest helicopter, the Mil Mi-26, uses a Bambi bucket.

Purpose
The purpose of this SOP is to provide clear guidelines for deploying helicopters in aerial firefighting operations to ensure the safety of personnel, the public, and effective control of fire.

Scope
This SOP applies to all personnel involved in aerial firefighting operations, including pilots, ground crew, air traffic controllers, and incident command teams. The SOP covers procedures for water and fire-retardant drops, safety protocols, communication, and coordination with ground firefighting teams.

Aerial water delivery to aid firefighting efforts
Aerial water delivery is a means of skycrane helicopter firefighting that enables the aircraft to drop a stream of water or fire suppressants on the fire below.

How aerial water delivery works

- The pilot will strategically position the firefighter helicopter over the wildfire. Then, either the pilot or the crew will enable the release valve of the aircraft's attached, suspended bucket or tank to drop water or retardants on the fire.

- Experienced firefighting pilots or crew members can open the bucket or tank electronically to drop suppressants while in forward flight, or they can open and close the water delivery system to dispense spot drops. A third option to target stubborn fire hotpots is to dispense a significant amount of water or retardant in one specific area.

- Crews can fill buckets and tanks using a snorkel that siphons water from deep water sources such as rivers, lakes, and oceans. Some snorkels even allow for siphoning from shallow water sources like streams or ponds.

Customizable Bambi Bucket features

Bucket capacities range from 72 gallons to 2,600 gallons to fit nearly any helicopter. The Bambi Bucket includes numerous features and offers a variety of options for helicopter operators, including:

- Cost-efficient aerial water delivery
- Compact size, minimal weight, and portability
- Versatility (suitable for any size helicopter)
- Variable fill capability (including fast fill or shallow water capability)
- Ability to be controlled by pilot or helicopter crew
- Unique construction of bucket using fabric designed for optimum durability and strength
- Instant-open dump valve
- Foam injection systems available

Responsibilities

- **Pilot-in-Command (PIC):** Responsible for safe operation of the helicopter and making tactical decisions during firefighting.

- **Ground Crew:** Assists in refueling, maintenance, and communication with aerial units. Incident Commander (IC): Coordinates all firefighting efforts, including aerial and ground operations.
- **Air Traffic Controller (ATC):** Manages airspace to prevent collisions and ensure smooth aerial operations.

Pre-Operation Preparation

1. **Weather Assessment**

- Confirm wind direction, wind speed, visibility, and other weather conditions that may affect flying. Operations should cease if weather poses a significant risk.

2. **Aircraft Inspection**

- Perform pre-flight checks including fuel, equipment, and communications.
- Ensure that water buckets, tanks, or retardant systems are fully operational.

3. **Safety Briefing**

- All team members (pilots, ground crew, and command staff) should attend a pre-flight briefing.
- Discuss the flight plan, objectives, airspace restrictions, and safety measures.

4. **Coordination with Ground Units**

- Ensure clear communication channels are established between air and ground teams. Ground commanders provide updated fire maps, identifying key locations for water drops.

Operational Procedure

1. **Take-Off**

- The pilot receives clearance from air traffic control (ATC) or Incident Command (IC) before take-off.
- Fly at a safe altitude, avoiding smoke columns, power lines, and other hazards.

2. **Fire Water/Retardant Drop**

- Approach: Fly towards the fire zone at a controlled speed.
- The approach should be downwind of the fire.
- Target Identification: The pilot confirms the drop target with the IC or ground commanders.
- Drop Execution: Release water or retardant over the target in a controlled manner.
- Drops may be direct or indirect (targeting areas ahead of the fire to slow its advance).

3. **Return for Reload**

- After completing the drop, the helicopter returns to the designated water source or base for refilling water/retardant.
- Refueling of the helicopter should be done if required.

4. **Communication During Operations**

- Pilots must maintain constant communication with the ground team and other air units to avoid collisions.
- Use clear, standardized radio procedures for updates on fire behavior and drop effectiveness.

Post-Operation Procedure

1. **Landing and Shutdown**

- Safely return to the base or landing zone.

- Perform post-flight checks to ensure aircraft is ready for further operations.

2. **Debriefing**

- Conduct a debrief with the crew and ground commanders.
- Discuss the effectiveness of the operations, challenges faced, and areas for improvement.

3. **Maintenance**

- Ground crew should inspect the helicopter for any damage or wear that occurred during operations.
- Refill water/retardant tanks and refuel the aircraft for the next deployment.

4. **Safety Protocols**

- **Pilot Safety:** Avoid flying in poor visibility due to smoke or extreme weather.
- Drop Zone Safety: Ensure that no personnel are present in the drop zone.
- **Airspace Management:** Monitor other aerial firefighting units to avoid mid-air collisions.
- **Fire Behavior:** Continuously assess fire behavior and adjust flight paths accordingly. Emergency Procedures: Have emergency landing zones identified in case of equipment failure or hazardous conditions.

Contingencies

- **Weather Change:** If weather conditions deteriorate, suspend helicopter operations.
- Aircraft Malfunction: Follow standard emergency landing procedures and notify IC immediately.

- **Fire Escalation:** If the fire spreads beyond expected parameters, consult with the IC to reassess the strategy.

Training and Certification

- All personnel involved in aerial firefighting operations must undergo regular training on safety protocols, communication procedures, and equipment handling.
- Pilots must hold appropriate certifications for aerial firefighting and demonstrate proficiency in water and retardant drops.

SOP 15: BOAT OPERATION FIRFIGHTING

Objective

This SOP provides clear guidelines for firefighting operations using boats to ensure the safety of personnel, the public, and effective fire control on or near water bodies.

Scope

This SOP applies to all personnel involved in firefighting using boats, including boat operators, firefighters, incident command, and support crews. It covers procedures for water supply operations, fire suppression, safety protocols, and coordination with land-based firefighting units.

Responsibilities

- Boat Operator: Responsible for the safe navigation and operation of the firefighting vessel.
- Firefighting Crew: Manages fire suppression operations, including hose deployment, water pumps, and coordination with land-based teams.
- Incident Commander (IC): Oversees the overall firefighting effort and coordinates between land and water-based units.
- Support Crew: Provides logistical support, such as refueling, equipment maintenance, and communication.

Pre-Operation Preparation

Weather and Water Conditions Assessment

- Confirm water conditions (e.g., tides, currents, waves) and weather (e.g., wind, storms) that could affect the boat's operation.
- Operations should cease if water or weather conditions are unsafe.

Boat Inspection

- Perform a pre-operation check of the boat's engine, pumps, navigation systems, and firefighting equipment (hoses, nozzles, foam systems).
- Ensure enough fuel, water, and firefighting foam (if used) are available for the operation.

Safety Briefing

- Conduct a safety briefing for all crew members, including fire risks, water hazards, communication protocols, and emergency procedures.

Coordination with Land-Based Units

- Establish clear communication channels between boat-based and land-based firefighting teams.
- Review the fire's location and plan water access points, coordination zones, and target areas for suppression.

Operational Procedure

Boat Positioning

- Approach: Navigate the boat toward the fire while considering wind direction, water currents, and obstacles.
- Positioning: The boat should be positioned as close to the fire as safely possible, allowing for effective water pumping and hose deployment while maintaining safe distance from heat, flames, or debris.

Water Supply and Firefighting

- Direct Attack: Use mounted water cannons or high-pressure hoses to target flames directly. Water may be drawn from the body of water (lake, river, ocean) or from on-board tanks.

- Fire Retardant/Foam Application: If available, use foam to cover the fire source and suppress flames more effectively than water alone.
- Water Supply to Land Units: If necessary, provide water support to land-based firefighting units by supplying water through hoses or portable tanks.

Coordination with Land-Based Crews

- Maintain constant communication with land teams to align efforts and avoid duplication or inefficiency.
- If the fire spreads to a shoreline or nearby structure, coordinate water drops or hose support to suppress fire at the water's edge.

Communication During Operations

- Use standardized radio communication protocols to relay updates on fire conditions, boat positioning, and effectiveness of water or foam application.
- All team members must be alert to any changes in fire behavior or environmental hazards.

Post-Operation Procedure
Returning to Base

- Safely navigate the boat back to its base or designated docking area.
- Secure all firefighting equipment on the vessel and perform a post-operation equipment check.

Debriefing

- Conduct a debrief with the crew and the incident commander. Review the effectiveness of operations, challenges encountered, and recommendations for improvement.

Boat and Equipment Maintenance

- Inspect all firefighting and boat equipment for damage or wear. Clean and service pumps, hoses, and nozzles.
- Refill water tanks, replenish firefighting foam, and refuel the boat to ensure readiness for the next deployment.

Safety Protocols

- Crew Safety: All personnel must wear life jackets and fire-resistant gear while on the boat. Maintain awareness of water and fire conditions.
- Boat Safety: Monitor the boat's stability and ensure that it does not approach too closely to heat sources or obstacles that could damage the vessel.
- Fire Safety: Avoid areas where flames could ignite flammable materials on board or pose a risk to crew.
- Emergency Evacuation: Be prepared to evacuate the boat if fire conditions worsen or if equipment failure occurs. Have clear escape routes and rescue boats ready for quick action.

Contingencies

Adverse Weather or Water Conditions

- If water conditions deteriorate (e.g., high waves, strong currents), suspend firefighting operations and retreat to a safe area.

Fire Escalation

- If the fire spreads beyond the capacity of the boat’s firefighting systems, retreat to a safe distance and notify the IC for reassessment of strategy or reinforcements.

Equipment Failure

- In the event of pump or hose malfunction, switch to backup systems or notify the IC. Return to base if repairs are not immediately possible.

Training and Certification

- All personnel operating firefighting boats must receive proper training in boat handling, firefighting tactics, water safety, and emergency procedures.
- Boat operators should be certified in navigation and marine firefighting techniques, including the use of water cannons, hoses, and foam systems.

SOP 16: RADIO COMMUNICATION

1.0 Scope

This standard establishes guidelines for the use of two-way radio communications and associated equipment. It was promulgated to promote the most efficient and effective use of the radio communications system.

1.1 General

It is the responsibility of all personnel to remain in radio contact with control room and the Headquarters while they are on duty or on call. Dispatch shall be notified whenever responding to an event.

1.2 Restricted Activities

a) The radio system is designed for emergency communications and those activities that support the accomplishment of the FRF mission and is not for personal use. Therefore, a number of subjects are inappropriate when using the system. Common sense and good judgment should always be the user's guide when deciding the appropriateness of a message.

b) Personnel who use a two-way radio should realize that the radio does not afford the user the same level of privacy as when making a land-line telephone call.

c) The following items are inappropriate and should never be broadcast over a two-way radio:
   - i) Any term that would be offensive to someone of another race, ethinity or gender
   - ii) Profanity
   - iii) Any discussion of a possible fire cause
   - iv) Personal information of a victim or patient

v) The name of an injured or deceased firefighter
vi) Business of a personal nature
vii) Reprimanding another or invoking another

1.3 Terminology

Use plain speech or clear text when transmitting over a two-way radio. Although the FRF does not use numerical codes, a distinctive vocabulary of words, phrases, and terms has been developed for use in radio conversations. These terms simplify and clarify radio conversation as well as contribute to brevity (See Clear Text, below).

FRF uses the 24-hour clock rather than the traditional 12-hour clock. The 24-hour clock is often referred to as the military clock. All references to time used in two-way radio communications will be expressed in the 24-hour format. For example, 9:00 A.M. is expressed, as 0900 hrs (pronounced zero nine hundred hours).

Use the following phonetic alphabet to clearly identify each letter of the alphabet:

A – Alpha	H- Hotel	O – Oscar	V – Victor
B – Bravo	I – India	P – Papa	W– Whiskey
C – Charlie	J – Juliet	Q – Quebec	X – X-ray
D – Delta	K – Kilo	R – Romeo	Y – Yankee
E – Echo	L – Lima	S – Sierra	Z – Zulu
F – Foxtrot	M – Mike	T – Tango	
G – Golf	N – November	U – Uniform	

1.4 Sending and Receiving Messages:

To ensure that a radio message will be clear and understandable, the user of a two-way radio should observe the following practices:

1 Always speak in a conversational tone and at a moderate speed.

2 Speak directly into the microphone. While speaking, keep your lips approximately 1 to 2 inches from the microphone.
3 Remain calm. Always speak distinctly and clearly, pronouncing each word carefully.
4 Avoid lengthy discussions; be clear and to the point.
5 Use ordinary conversation strength. If surrounding noise interferes, speak louder, but do not shout. Shouting will cause interference and distortion. You want to be heard the first time.
6 Do not talk while others are speaking. This causes distortion.

Message format:

- Identify the unit or function sending the message, as well as the unit or function to which the message is being directed.
- Example: "6601 to Command." "Command to 6601, go ahead."
- Use procedural words and phrases whenever possible.
- Use phonetic spelling when using words or terms that might be difficult to understand or may be spelled a variety of ways.

Eliminating common errors:

- The most common error committed by a user of a two-way radio is short keying. This is caused when a radio operator attempts to transmit a message before the repeater has time to engage. This practice chops off the first part of the message.

- To correct the problem, the user should press the transmit button and delay his message for 2 to 3 seconds. This delay allows the repeater time to engage. An experienced operator should be able to hear the repeater engage.

Using radio when not responding to incident.

- If personnel are not responding to incident, then remain off the radio so that response information can be sent.
- Command can never be transferred by radio or assumed by someone who is not on scene.

7 Clear Text:

Words & Phrases	Application
Affirmative	Yes
Call by phone	Self-explanatory
Clear	Understood
Clear off the scene	Assignment completed, returning etc.
Disregard	Cancel present assignment/message
Emergency	Term used to gain control of the radio channel to report an emergency. All other radio users shall refrain from using that channel until the channel is cleared.
Emergency traffic only	Radio users will confine all transmissions to an emergency in progress.
En route	Responding to a destination
In quarters	Indicates a unit is in a station
In service	Available for a call

Loud and clear	self-explanatory
Negative	No
On scene	Unit arrived at the scene
Out of service	Unit is unavailable to respond to a call
Received	Understood
Repeat	self-explanatory
Report	Provide a status update of the incident
Resume normal traffic	Channel is cleared for normal use
Return to	self-explanatory
Respond, responding to/is proceeding to	Unit should proceed
Stand by	Stop transmitting
Unreadable	Radio signal is unclear

1.0Fire and Rescue Ground Communications

Radio communications are an important aspect of all Operational incidents. A breakdown in radio communications and or incorrect allocation of radio channels can have serious consequences for the safety of all personnel on the incident ground.

2.1 Allocation of Incident Ground Radio Channels

Na	Channel	Name of the channel	User Section
1	Channel 1	Branch 1	Firefighting crew
2	Channel 2	Rope 1	Rescue crew
3	Channel 3	Whistle	Operations Command
4	Channel 4	B. A	Incident Command
5	Channel 5	Anga	Airport Command
6	Channel 6	Tabibu	Paramedic
7	Channel 7	Sumu	HazMat
8	Channel 8	Nyangumi	Maritime SAR

9	Channel 9	Makao	Administrative
10	Channel 10	Kiberenge	Railway Command
11	Channel 11	Rope 2	Reserved for Rescue Crew
12	Channel 12	Branch 2	Reserved for Firefighting crew

1.1 Incident Ground Radio Procedure

To ensure the Incident Commander is fully aware of all messages being sent to Fire Control Room from the Incident, all messages must be sent via Command Support. The use of Mobile Telephones for sending messages should be avoided.

Personnel undertaking a named role will use that role as their call sign i.e. Sector Commander, Safety Officer. All other personnel, except Breathing Apparatus wearers, will use "Rank –surname" as call sign. The Incident Commander and Command Support will have the radio prefix "Incident Command". When contacting Incident Command, a response will be made by an appropriate member of the command team, at the Incident Commanders discretion. When the Incident Commander and Command Support are contacting each other "Incident Commander" and "Command Support" prefixes will be used respectively.

When transmitting always start with your own call sign followed by the name/function of the person you are trying to contact and then end with your call sign. On no account must first name or any other method of identification be used on the incident ground.
"Incident Command to Sector 1 Commander, Incident Command over" Sector Commanders will have the prefix of the sector or support function they are responsible for "Sector 1 Commander" or "Water Sector Commander".

Operational Sector Commanders will direct all radio messages to “Incident Command”. Support Sectors will direct all radio communications via “Command Support”. Should the Incident warrant an Operations Commander, messages to Operations Commander will be prefixed with “Operations”. When an Operations Commander is in use at an incident, Operational Sector Commanders must communicate directly with the Operations Commander and not the Incident Commander.

Except for urgent safety messages, communication between sectors must only be done through “Incident Command”. This ensures that the Incident Commander is fully aware of what is happening within each sector. Normally only Sector Commanders or, when in place, Operations Commander will have direct radio communications to “Incident Command”.

1.2 Urgent Safety Messages

Any individual may transmit a message to any other individual, or to all personnel, when the content of the message is of an urgent safety related nature.

To ensure that those personnel at most risk can be informed urgently, any person on the incident ground can pass a safety priority message. This message can be passed directly to those concerned without informing Incident Command. These messages must contain the phrase “Safety priority”. Once an urgent safety message has been sent, the sender must contact “Incident Command” to ensure message has been received and logged.

1.3 Breathing Apparatus Radio Procedure

The channels available for use with Breathing Apparatus are Channels 2 and 11. These channels are permanently marked on the Maxton Radios and will enable B.A. crews to locate these channels in poor light conditions.
During the course of an incident, it may be necessary to establish a number of Breathing Apparatus entry control points, with multiple Entry Control Boards, committing several teams each. The practice of each control board numbering teams independently can lead to confusion with multiple teams sharing the same name/call sign.

To avoid this the following procedure will apply: Each entry control point will use a Phonetic letter identifier as part of its teams' name. The first board established at an incident ill be "ALPHA".

All B.A teams who enter via this entry point will have an alphanumeric call sign "ALPHA 1"and "ALPHA 2" etc. The next entry control point will be "BRAVO" and B.A teams will be "BRAVO 1" and "BRAVO 2" etc. To avoid confusion when Guidelines are used the team call signs will always use the Phonetic letter i.e. "Alpha 1" not "A1". The same will apply to "Bravo 1" not "B1". The Entry Control Officer (ECO) at each board will have the radio call sign "ALPHA CONTROL" and "BRAVO CONTROL".

The Incident Commander is responsible for the identification of each entry control point. The entry control point identifier will be written clearly at the top of the entry control board. The Entry Control Officer is responsible for allocating teams their call sign and ensuring they are aware of their call sign and a test of communications equipment before entering the risk area. As mentioned previously all Breathing Apparatus wearers and Entry Control Officers will be on Channel 2. At incidents where large amount of BA teams is in use, the

Incident Commander can issue a second BA channel, Channel 11 to reduce amount of traffic on existing channel. When sectors have Breathing Apparatus teams operating within their sector, Sector Commanders, at their discretion, may utilize a second portable radio permanently tuned to BA radio channel to monitor radio messages and keep in contact with B.A teams.

1.4 Communications Failure

In the event of a Communications failure there is numerous alternative "Safe" protocols to adopt. As a standard Radio channel is routed through repeater apparatus, in the event of a communication breakdown, there is a DMO radios to turn to a direct (Pre-agreed) channel for 'Talk to Talk' without going through the repeater equipment up to a maximum distance built up area of 800m.

Therefore, in a multi-storey (High-Rise) building the OIC should appoint a communications officer, who will organize DMO radio sets and operators to be deployed at points through the building, so as to pass on crucial communications to the Incident Commander and then onwards to the Operations Room when communications allow. Where the operations are protracted, consideration should be given to mobilizing the radio sets which are held in the Operations technical store. These sets on direct 'Talk to Talk' will give an operational Range of 2km which is much more effective in the case of protracted High-Rise incidents.

The Incident Commander will order the dispatch of these units in consultation with the Communications Officer at the scene. In the case of Major Incidents or Disasters, then the Incident Commanders will liaise with other agencies, such as Police or Military who will have at their disposal the 'Thruway' satellite equipment.

In all cases it is important that the incident commander appoints a Comms Officer to handle the tactical issues of establishing good flowing communications from the fire incident scene to the Operations Control Room.

Summary:

1. TETRA RADIO – Talk dedicated channel max. Distance 800m
2. Deploy Motorola sets from Operations technical store – Max. Distance 2km

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