BASICS PRINCIPLES OF FIRE LINE PERSONNEL'S SAFETY IN FOREST FIRES

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Abstract: *Fighting forest fires is dangerous and exhausting work. As the safety of all employees is of utmost importance, fire fighting and safety training must be given to all employees prior to being assigned to fight wildfires. In this paper presented Safety Rules – referring to interventions of staff at Forest Fire – which will be enlisted to Memorandum Actions for such fires and must be kept under at least regular review (based on acquired experience and suggestions of any person anyway involved). These rules do not restrain the first responsible from undertaking initiative of extra "insurance" measure, if he judges that he should do so, to protect the life and health of the staff and even canceling some individual intervention actions of high risk.*

Keywords: *Health and Safety, Forest Fires, Firefighters, Safety Rules*

Introduction

The first and highest call of a firefighter is the safety of those they are sworn to serve. To answer that call, it is essential that firefighters understand how to protect themselves so they can protect others. Moreover, the safety of personnel is the most weighty duty of every head (Officer Response) in any incident; safe personnel defines directly and unilaterally the successful management of every case.

An accident at the forefront of fire incident provokes complications and multiplies effects (domino) that hinder the extinction / rescue, as it actually influences the psychophysical performance of all who intervene. What's more we end up spending more time, using more personnel and means.

The following quoted Safety Rules – referring to interventions of staff at Forest Fire – which will be enlisted to Memorandum Actions for such fires and must be kept under at least regular review (based on acquired experience and suggestions of any person anyway involved).

These rules do not restrain the first responsible from undertaking initiative of extra "insurance" measure, if he judges that he should do so, to protect the life and health of the staff and even canceling some individual intervention actions of high risk.

Results and discussions

General safety personnel rules in forest fires

The response to forest fires relates to the fact that each fire incident involves complex and unpredictable risks; the head officer must pay full attention and have a complete and clear view of what is happening. Beyond this, all staff must be focused on the situation to avoid hazards for the safety and health. They must also transmit directly every relevant information.

Particular attention will be given to compliance with the following general rules:

I. The leader must ensure that he and his staff are not psychosomatically exhausted, as they need to maintain their strength to deal with any unforeseen situation or imminent danger (eg to escape and / or retreat). He must therefore cater for his or for the personnel' s replacement in time.
II. Discipline and immediate information-sharing is a key safety factor.
III. Staff improperly dressed must be removed and return to mission wearing the necessary emergency equipment, personal protective equipment and outfit that has been granted/ provided with. Proper clothing is an essential safety factor when fighting forest fires and the head officer must check if the staff carries properly the fire-intervention outfit and in whole the equipment has been distributed.
IV. Persons acting under the state of intense emotion should be removed and only return when they are able to calmly cooperation on the incident
V. Head officer should ensure adequate staffing; Media (vehicles, tools, etc.) and materials (fire extinguishing, fuel, etc.).

VI. No one of the staff ever works alone or without visual contact with at least another one (who is involved in the incident even in a small rate). The most advanced members of the personnel/ the first in line must always have a good wireless communication with those who stay back and of course with the Fire Truck.

VII. Two independent escape routes must always be at disposal, as there is always the possibility of a blockade, since the velocity of a fire fluctuates and its direction alters according to the regular changes of the conditions and can trap us.

VIII. Changes of the wind intensity and direction, as well as its relative humidity, are likely to require change of the response plan, as it affects the process of combustion, the intensity and speed of the spread of fire. In order for such an alternative plan to be applied, the staff needs to be directly and constantly updated to avoid dangerous situations.

IX. In case the staff is not familiar with the terrain and its particularities or if there is no good visibility (smoke or night), then there is an increased risk of injury (falls, branches, snakes, abandoned ammunition etc.) so all movements must be done more carefully.

X. Fighting fire in an area with inclination may involve certain hazards: flaming materials may flow from higher places towards the personnel or fire to be transmitted by through spotting at lower points than the personnel and threaten them. Again, there should be an assessment of the response feasibility from areas such inclination or from another point with better conditions. Interference responding from points that favor the phenomenon of the chimney should be particularly avoided.

XI. When we have phenomenon of spotting we may end up trapped between two fires. We all need to be aware constantly of the possible movement of the fire front, the local intensity and direction of the wind, the adopted tactics and progress. The communication of all the personnel during the incident must always be good. To avoid simultaneous emission of two or more users and to confront better the incident, the person holding the overall coordination and operational responsibility has priority to cordless calls over the others. Only in case of imperative necessity or particular risk, communication can be stopped or if a third person occupies the communication channel (eg. serious injury, accident, trapping in fire etc). In all cases the order of "radio silence" has the meaning ‘‘absolute’’ and ‘‘immediate’’ to all fire departments and stakeholders.

XII. Incomplete understanding of the orders may lead to incorrect handling of the fire and put the staff at risk.

Specific rules in case of trapping in a forest fire

I. Fear is actually a friend, always sobering and creative; however it should never evolve into terror and even worse to panic with senseless and irrational behaviors.

II. To avoid exposure to radiation, protect in cavities or cracks in the soil, in water (pool, water tank, bowl, streams, etc.) behind a rock, tree trunks or other bulky object that can provide thermal cover.

III. Wells and / or caves should not be used as the oxygen they contain may be consumed.

IV. If you need to escape from a burned area do not delay.

V. Choose a location where the flame height is no more than 1.5 m and a maximum width 9m within the burnt area.

VI. Scroll to burnt area or region without inflammable materials, yet wherever you have considerable thermal comfort (decrease radiation even with wet or not cloth, means and materials) and breathable (even from breathing apparatus) air.

a) If requested, pass as quickly as possible by regions of high temperature or radiation.
b) If the flames are too high create burnt area and enter for protection from radiation.
c) If you do not have time to escape lay on ground face-down and cover your body in the most convenient way (sleeves down and collar of the uniform raised, use a fire refuge if provided, etc.), so that the chances of survival are greater.
d) Do not run unless the routing is safe.
e) Put a wet towel or cloth in front of your nose; it helps to avoid inhalation of dense smoke, to cool and filter the air in case the intensity of thermal radiation is low. Non valid in the opposite case.

VII. If trapped near fire truck:

a) Do not hesitate to leave your vehicle if getting away is doubtful, while there is other safer escape route.
b) Inform your head officer about your being exposed at danger.
c) Call -through the coordinator officer- the aerial means to throw rescue shots and to guide you to a safe place.
d) Drive the vehicle in an area where there are no combustible materials beneath or around it.
e) When you move into burnt area with the vehicle, activate the vehicle' s self-protection, as the engine may turn off automatically if left for a long time through dense smoke.
f) In absolute trapping:
    a. Get inside the vehicle tank when it is filled with water (the filler port allows access) if you can trust your capability in it, since the temperature in there is not expected to increase significantly. A prerequisite for this action is to ensure an adequate amount of oxygen for breathing. To ensure certain amount of oxygen, appropriate breathing apparatus is necessary to work well when submerged in shallow, while the door of the tank is not closed. Then, even if parts of the vehicle ignite (eg rubber, plastics, etc.), but it is clear that the external radiation has been tolerated (the front / flames have passed and the place is considered as burnt), exit the tank (in a manner already arranged before entering, via e.g. scale). This action is should be avoided when water in the tank exceeds 42 degrees Celsius (42^{o} C), because the human body as there is danger of stroke or fainting, resulting to drowning, heat stroke or getting burnt.
    b. Enclosed inside the cabin of the vehicle covering interior glass surfaces with materials such as wet jackets, sleeping bags, blankets, etc., and definitely keep respirators and masks with filter ready for use; also have a lumen in use in the cabin (if there is water and after window through installation is being traversed has been covered with wet materials). It is advisable to cover (if possible) with wet materials the supply piping and the fuel tank of the vehicle and remove from the place any other liquid fuels (containers and machines of internal combustion).

As soon as you estimate that acceptable and sustainable conditions have been restored around you, your priority is to escape to a safe area, in order to achieve your self - rescue. Then, once considered to have survived and feel safe, inform (others in hierarchy) and examine the possibility of rescue vehicle and equipment.

Note that the choice of the two above actions for self-rescuing is extremely risky.

Specific rules against risks from shots of aerial means

I. There must be good communication between ground forces and air means, and direct permanent staff briefing.
II. Measures that make visible to the aerial means the presence of ground staff (reflective vests and lit beacons vehicles).
III. Removal of personnel 60 meters perpendicular to the direction of the aircrafts' shots and 200 m along with the direction.
IV. Intense caution in areas where retardant liquids have been used, because these are very slippery especially on rocks or logs.
V. Lay on the floor face-down with the helmet on the head if you're in the shot-area, with your head towards the direction from where the air means comes. Take cover behind thick tree trunk only for the moment of shot (an exception to the rule of the preceding paragraph II), so as not to be seen by the pilot, always wearing a helmet and any body-protective you have.
VI. Place your tools in distance or throw them away, while expecting a shot, so you do not get hurt in case they explode. Generally, look after so that any objects or branches are blown towards you at the moment of the shot.
VII. Hold onto something solid not to get carried away by the water.
VIII. Put your head towards the direction from where the aircraft is coming, wearing a helmet or using any suitable cover and do not run to escape unless there is a safe escape route.
IX. After the incident is over, and since the equipment and / or clothing are soaked with retarder foam or other kinds of foams, the personnel needs to clean the equipment and change dirty clothing-footwear before entering the vehicle.

3. Results

All the aforementioned specific rules followed - executed and implemented according to the component's judgment as appropriate and they are being properly materialized; forest fires are dynamic phenomena and one is never identical to the other, since even a small change of a single parameter significantly alters its form the scene and of course indicates to (de facto) a state of emergency.

Even improvisation is useful, which is a common process regarding the first stage of an emergency which is rather common during the first stage of the emergency, since no project can accurately predict each situation and all possible effects. Improvisation, however, must be based on fluent knowledge of these basic safety principles.

Fire line personnel are expected to conduct their fire-fighting activities in a safe and professional manner with the highest regard for the safety of themselves and others. Therefore the present context must be included to the training program of the services as a training protocol.

Due to the fact that safety of fire line employees is of utmost importance we must prefer to use professional fire fighters who are physically fit and trained in fire behavior and fire safety. Un-trained, un-fit fire fighters can be dangerous to themselves and others.

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