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Search Techniques

Section 1 Introduction

Searching refers to the actions taken when a fire or accident has occurred to find out if there are any people trapped or unable to get out on their own power because of an obstruction that endangers their life or physical well-being; to locate these people needing rescue; or to the series of actions to ascertain the extent and details of an emergency situation. It is the highest priority action that can be taken to rescue people safely, correctly, and quickly. Because of the wide range of emergency situations that call for rescue efforts, there are no fixed methods of searching. Most of these efforts rely on the individual judgment of the firefighter at the scene of an emergency. The nature of a search, however, differs radically depending on whether or not the emergency situation involves searching for people in a fire. The following search techniques will focus on searching for people at the scene of a fire. For other emergency situations, apply the techniques from this section.

Section 2 Search Efforts

1. Priority Action Before Searching

In saving lives at the scene of a fire, one must know in advance what the dangers are to human life when a fire breaks out—in other words how it comes to be that rescue is needed. Since the danger to human life is not limited to building fires, one must study the hazards to life that an outbreak of fire presents for different types of fires. The firefighter must fully understand these dangers and utilize this knowledge in search operations.

Early discovery is the most important thing in lifesaving. No matter how early one arrives at the scene or how polished one's rescue skills or superior one's equipment, it is all meaningless if one is too late in discovering a person who needs to be rescued. To quickly locate a person or persons who need rescuing in a fire, as soon as one arrives at the scene one must execute a series of actions focusing on the burning building—visual confirmation, information gathering, and searching.

(1) Visual Confirmation

Visual confirmation means to observe the condition of the burning building, the spread of the fire, and the movements of the people in the vicinity; if there are cries for help, to heed those cries; and anything else to help find out more quickly if there is anyone trapped inside in need of rescue.

(2) Information Gathering

To gather information, the firefighter asks people questions, or uses the truck loudspeaker or a handheld megaphone to call together people knowledgeable about burning building, evacuees from the building, or others, so that information can be collected quickly regarding the existence of people unable to escape on their own and needing to be rescued.

(3) Information to Confirm regarding Need for Rescue

Rather than asking general questions such as whether or not anyone has been unable to get out or if everyone has evacuated, or pursuing the six questions—who, what, where, when, how, and why—instead ask specific, leading questions—is it an adult, a child, man, or woman—to find out whether there exist any persons needing rescue and what situation they might be in.

Make note of the following points in asking questions:

a. Besides the residents or employees, was anyone else inside?

b. Have the police or the media taken anyone away from the scene?

c. Was anybody absent or already taken to a hospital or clinic?

(4) Other Important Points

a. Confirm the existence of hazardous materials, toxic gas, high-pressure gas or other inflammable or explosive objects that threaten to cause a secondary disaster. If such hazardous articles exist, find out the types, volume, and location; pay close attention to labellings and other markings.

b. Confirm: the building structure, its intended use, scale of fire and extent of spread, degree of threat of the fire spreading, possibility of use of indoor stairways, emergency stairways, elevators, etc., the existence and operability of firefighting equipment, the existence of obstacles to entry, the planned search route and/or firefighting efforts.

(5) Report the information obtained in steps (1) - (4) to the fire chief immediately, or if the fire chief is not available, directly to the field headquarters at the scene.

The firefighter must not attempt a rescue effort without first reporting this information.

It is no exaggeration to say that once the existence of a person or persons needing rescue is known, along with his or her location and the internal structure of the building, 70% of the objective of the search has been achieved. Now the search effort can be done smoothly—entering the building immediately and confirming the existence of such person or persons requiring aid. These information-gathering efforts and results of the search later become factors that will determine the success of rescue efforts—guiding the rescuee to safety or extricating them from danger. The firefighter must understand that gathering information is a crucial task.

2. Handling the Gas Mask and Safety Rope in Thick Smoke

After arriving at the scene, the rescue squad must decide where to focus the priority of the search-and-rescue efforts based on the information gained through visual confirmation and by talking with the people at the scene. The squad must then split into two-person teams, arrange the equipment that will be needed, and prepare for action.

If these efforts are pursued without taking measures to ensure the safety of the rescuers, it can be extremely dangerous, even suicidal. As a rule, when searching in thick smoke, rescuers must always be wearing their own respiratory apparatus, have a safety rope attached, and go in with water application for back up. The safety rope in particular must always be prepared and used for rescue efforts of all kinds, not limited to fires. This section covers how to handle a respiratory apparatus and safety ropes when carrying out a search.

(1) Handling the Gas Mask

When putting on a respiratory apparatus, check the following points:

a. How long the oxygen will last and the planned time to evacuate.

b. At the planned time to evacuate or when the alarm sounds, rescuers must contact each other and get out immediately.

(2) Handling the Safety Rope

a. Setting up the safety rope for a search The safety rope can be set up in different ways. Choose the method that best suits the task and location. These methods include: making a coiled bowline in the bight of the rope; using a sling rope, carabiner and coiled bowline in the bight of the rope; or using a safety belt in place of the coiled bowline.

The following are summaries of how to set up a safety rope for a search.

(a) One searcher makes a coiled bowline at one end of the rope to form a safety rope, while the other forms a safety rope using a sling rope and carabiner. The latter is attached to the coiled portion of the former using a carabiner, and the other end of the rope is held by a belayer at the entry point. (Fig. 6-1-1, 2)

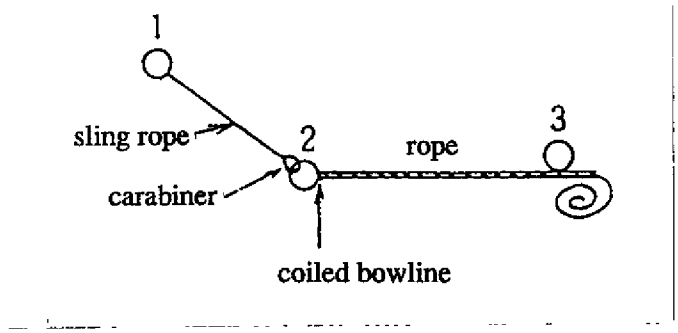

Fig. 6-1-1

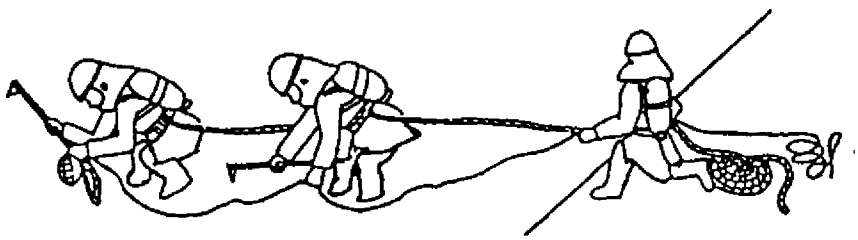

Fig. 6-1-2

(b) Both searchers form a safety rope using sling rope and carabiner, while the belayer makes a bowline and single hitch at one end of the rope to form a small loop. This loop is attached to the carabiners of both searchers, and the other end of the rope is held by the belayer at the entry point. (Fig. 6-2-1, 2)

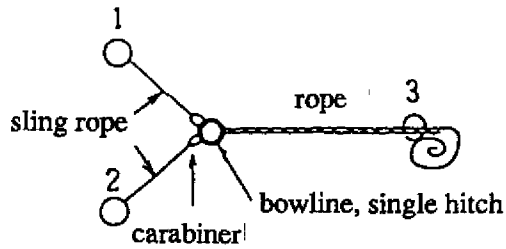

Fig. 6-2-1

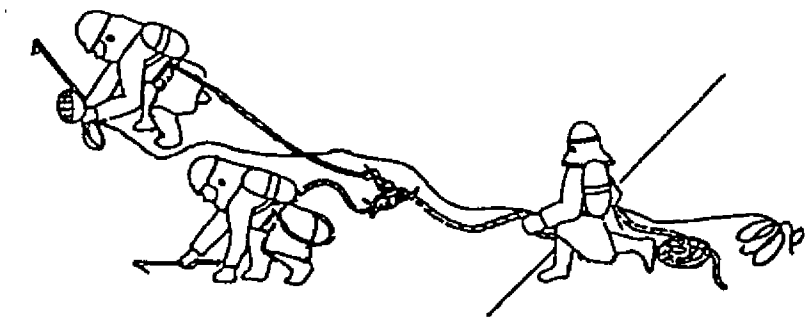

Fig. 6-2-2

(c) There is a third method for forming a safety rope in addition to the above two methods. One end of the rope is anchored to a solid object at the entry point that will depend on the building and fire conditions. One of the searchers holds the bundle of rope in one hand and lets out the rope little by little as the other searcher enters. To get out, the person that is deeper into the building uses the rope as a handrail to move back toward the entry point.

With this method, it must be clearly marked at the point where the rope is attached that a search is in progress.

b. Cautions in Using the Safety Rope

(a) The belayer must be aware of the importance of the role of belaying, must provide an anchor and let out the rope according to the movement of the searcher, making sure it is neither too slack nor too tight, then drawing the rope to guide the searcher out.

(b) Signals can be simply tugs on the rope, as described below, or used in conjunction with walkie-talkies, lamplight, and sounds.

Example of signals

① Start..... one big tug
② Okay ..... two tugs
③ Found..... three tugs
④ Wait ..... four tugs
⑤ Out ..... repeated tugging

(c) When passing a spot where the safety rope might get caught, such as a self-closing fire door or table leg, use a fire hook or other object close at hand to prop open or otherwise prevent the safety rope from catching.

3. Search Principles

Searching is the highest priority action in the rescue effort and plays the most important role in determining the success of the rescue, as noted above. The following principles should be followed regardless of the fire's location, degree of spread, the number of people who need rescuing, or the number of firefighting squads or amount of equipment available for the rescue effort.

(1) One must fully recognize that a search is carried out to rescue people swiftly, safely, and correctly in conditions that grow worse as time elapses. Rescue squads must therefore work quickly and vigorously based on accurate assessment of the situation and with the proper attention paid to ensuring safety.

(2) Setup of the opening should be done only after the watch nozzle is ready.

(3) Searching after one has entered a building requires the full use of all of one's senses. To prevent the threat of an accident, beware of the following:

a. The collapse of items stored in the building, falling objects, etc.

b. The flow of smoke, its direction, volume, speed, thickness, toxicity, direction of spread of the fire, heat fluctuations, etc.

c. The infiltration or buildup of toxic gas, its thickness, etc.

d. Using a respiratory apparatus and safety rope in thick smoke.

e. Getting fire hose cover.

f. The escape route, method of escape in an emergency, and position of exit.

(4) Always carry out searches in pairs, cooperating with each other. At times when visibility is zero due to thick smoke, keep your body in a low stance and proceed below the neutral zone, or use a short-handled fire hook as a pole for searching.

(5) In a location with thick smoke and heat that also threatens explosive combustion (backdraft, flashover, etc.), always take measures to prevent injury by oneself or in conjunction with a pump company such as using a shield, or going in with fire hose cover or exposure protection. (Fig. 6-3)

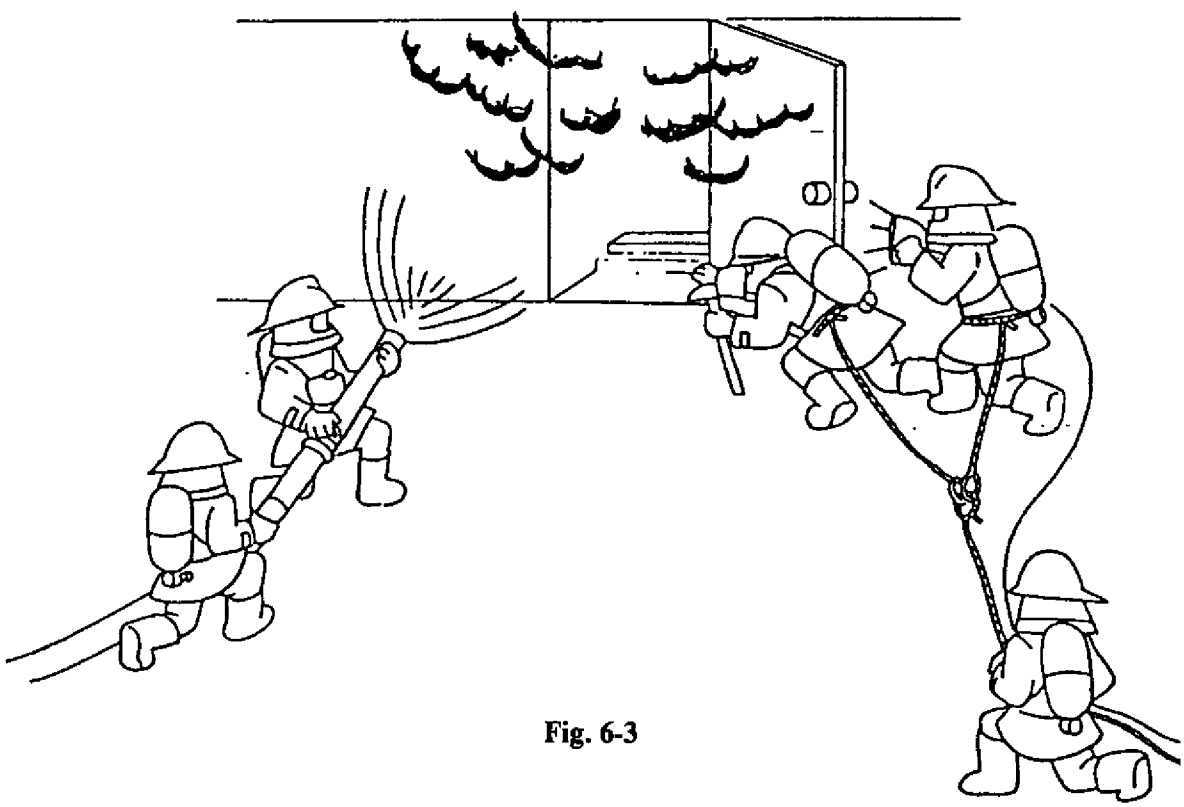

Fig. 6-3

(6) For a search, confirm the range of the search you will be responsible for within your own rescue squad, and set search priorities according to the following order, or give priority to important search spots.

a. Search priority order

(a) Give priority to the burning building; search buildings to which the fire is in danger of spreading next.

(b) Regardless of the size of the burning building, give priority to residential over non-residential buildings.

(c) Give priority to the area closest to the origin of the fire, and upper floors next.

(d) Give priority to the downwind side and ventilating side.

(e) In commercial districts, for example, where most openings lead out to the street, give priority to the rear exit.

b. Important search spots

(a) Stairway exits, dead-end passageways, hallways and near corners

(b) Inside elevators and near elevator lobby

(c) Near fire escape apparatus

(d) Windows, corners of rooms, at exits such as verandas, and in the vicinity of these spots

(e) Inside private rooms, lockers, display cases and other large pieces of furniture, as well as in spaces between such objects

(f) Lavatories, bathrooms, storerooms, and other spots chosen for temporary refuge to escape from smoke or heat

(7) Searching must be done systematically; to prevent redundant searches, keep in close contact with command headquarters or with other search teams, and mark a place that has already been searched using a chemical light.

(8) Danger to human life exists with any size fire, and even if the scale of the disaster is minimal, do not cut short the search. Always take responsibility and carry out the search properly.

(9) It often happens that a person who has already evacuated reenters the building and becomes trapped, so until the location of everyone who has evacuated is confirmed, search with the conviction that people remain inside. No matter what the circumstances, do not allow anyone other than a firefighter into a place that has already been searched. (Fig. 6-4)

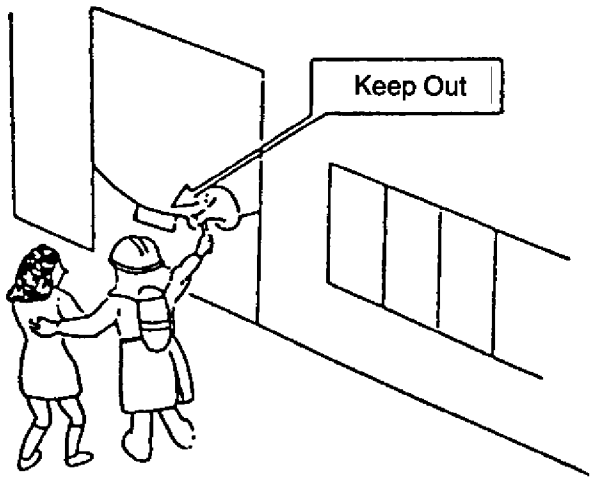

Fig. 6-4

(10) When changing shifts in a search, notify the next person of the search route, search range, conditions inside, etc.

Section 3 Searching in Fires in Wooden Structures

1. Summary

Because fire spreads rapidly in wooden structures, burn victims are common as well as failure to escape among the elderly, children, the disabled, and others, who become overwhelmed by smoke. The danger to human life rises markedly in the late hours of the night. Needless to say, the danger is greater on upper floors than on lower floors.

2. Keys to Searching

Weather conditions and other factors will affect fires in wooden structures, but to search under these highly dangerous conditions where the fire burns rapidly and spreads fast upon its outbreak one must accurately assess the stage of the fire (early, intermediate, peak), follow search principles and work quickly, according to the following points.

(1) Give priority to the burning area and vicinity of the floor to which the fire is spreading; search the upper floors next.

(2) Give priority to the burning building; search buildings to which the fire is in danger of spreading next.

(3) Give priority to the downwind side and ventilating side.

3. Cautions in Searching

(1) Know the fast-burning nature of this type of fire; as soon as the squad arrives at the scene it must form search teams. Using information that is gathered, the teams must quickly confirm whether or not there are any people who need to be rescued, and must try to locate them.

(2) Because of the construction of the building, many things are prone to fall or collapse, including roofing materials, ceilings, upper floor ceilings, and upper floor flooring; or floors can collapse under one's feet, so full precautions must be taken to prevent injury.

(3) Depending on the location of search, one will need to request fire hose cover from one's own squad or another squad, so keep in close contact with firefighting company.

(4) It often happens that a person who has already evacuated reenters the building after picking up some information and gets overwhelmed by smoke. Do not trust seemingly confident answers claiming that everyone has safely evacuated or indefinite words on the order of "I think so." Search thoroughly, with the conviction that people remain inside.

(5) People who need to be rescued tend to act out of the ordinary without realizing what they are doing, so focus on bedrooms, entrances, stairway exits, windows, lavatories, bathrooms, storerooms, closets, etc.

(6) Burn victims and those with other injuries, and people whose clothing, words or actions are out of the ordinary are an important source of information, so always ask them how they got out and get any other information from them that you can.

Section 4 Searching in Fires in Structures of Fire-resistant Construction

1. Summary

Fire-resistant structures differ from wooden structures in that the exterior uses government-approved fire-resistant materials. As a result, when a fire breaks out, the wood that is encapsulated by mortar walls smolders and the inside of the building becomes filled with fire gas and thick smoke. For this reason, the threat to human life from flames and smoke is aggravated by the danger of suffocation and gas poisoning. Also, in buildings of fire-resistant construction, when doors and other openings are carelessly left open, it can cause backdrafts, flashovers, and other explosive combustion. Collapsing mortar walls are a secondary threat of injury.

2. Keys to Searching

Follow search principles and the keys to searching for fires in wooden structures, and act promptly.

3. Cautions in Searching

Heed the cautions listed under searching in fires in wooden structures; also heed the following points.

(1) In apartment buildings and other large structures, fires tend to spread through the under-roof space, so even rooms that one would not think susceptible to the spreading fire must be searched early, and the effort made to discover people who have not evacuated for one reason or another.

(2) In thick smoke, always use a respiratory apparatus, safety rope and floodlight, and proceed with constant awareness of the extent of spread of the fire, its direction, degree of threat of further spread, and other conditions of the fire.

(3) To find out whether or not there are any people who are trapped inside, it is important to collect information not only from parties concerned with the building but from other people at the scene as well who may be unrelated to the building.

Section 5 Searching in Fires in Mid-rise and High-rise Buildings

1. Summary

In recent years, the number of mid-rise buildings (3 stories or more but less than 31 meters in height) and high-rise buildings (11 stories or more and over 31 meters in height) being built in Japan has risen dramatically, varying widely in all aspects of construction. The pattern of combustion of a fire in these structures also varies widely depending on such factors as: many windows or no windows, large or small partitions, high or low ceilings, interior materials, the building contents, amount of ventilation, etc. This type of fire spreads horizontally across the floor where it starts with thick smoke filling upper floors via stairways, escalators, air conditioning ducts, and other openings. Another major characteristic is the buildup of high heat, then the spread of fire upwards. At buildings such as department stores, theaters, hospitals, schools, inns, sauna bathhouses, and nursing homes, if fire-retarding partitions are in good order, the fire will not spread very rapidly. However, many of these structures use combustible materials and contain unspecified numbers of people, so one must assume that many people will get trapped by flames, thick smoke, heat, and fire gas. Particularly when an unknown number of people are inside, mass hysteria can take hold and lead to chaos, including people jumping from the building. The firefighter must be aware that the risk to human life and threat of secondary hazards are particularly high in this type of fire.

2. Keys to Searching

In searching mid-rise and high-rise buildings, follow search principles, and act quickly according to the following points.

(1) When the firefighting plan has been established based on orders given and the target is understood, the search teams must confirm the type of building construction, presence of firefighting equipment, search routes, and important spots to search.

(2) Searches will depend on the type of building that is burning, how the fire is spreading, and other factors. While the circumstances are never exactly the same twice, searches must be carried out rapidly and in line with the following points.

   a. Give priority to the floor on which the fire started, and proceed next to floors to which the fire is in danger of spreading. In the early stage of the fire, when flames cannot be seen from outside, take a fire extinguisher and go directly to the floor on which the fire has started.

b. Keeping in mind that thick smoke will rise and spread rapidly to upper floors, focus on the top floor, rooftop, and ventilating side; open or break open the rooftop exit on top of the building; open windows, doors, or create other openings on the top floor to let the smoke out.

3. Cautions in Searching

(1) When calling together building personnel, use a loudspeaker and indicate your purpose' call out the building's name, what you need a person for, or the name of person and their managerial position. When you need people for different things, often the person concerned will speak only about their own area, so it is necessary to summon all evacuees and related personnel to the field headquarters or to a specific location, and quickly ascertain whether or not there is anyone trapped inside in need of rescue.

(2) If it becomes known that several people are in need of rescuing, designate search teams and evacuation guidance teams, determine the range of responsibility for each, and attempt to confirm the presence of those requiring rescue.

(3) Entry will be limited to indoor and outdoor fire escapes and emergency stairways, or the elevators for firefighters. Evacuees may also be trying to use these for getting out, so it is necessary to assess the situation accurately and decide on a plan for entering the building.

(4) In thick smoke, wear a respiratory apparatus, always use a safety rope and floodlight, proceed in pairs along the walls at the neutral zone or below as far as possible. In places where you hear the explosion of concrete or there is explosive combustion such as a backdraft or flashover, contact the other member of your search team, and seek fire hose cover or other support.

(5) Within the range of your search team's responsibility, use the equipment you have to the fullest; search carefully taking full responsibility; mark those spots that you have finished searching; keep in close contact with the field headquarters; and search systematically and efficiently to avoid redundant searches.

(6) Because of the construction of mid-rise and high-rise buildings, there will be many zones where walkie-talkies will not work, so it is necessary to devise a plan ahead of time using other methods to establish communication with the command headquarters (on the ground).

(7) When searching in sections that are burning or that are being threatened by the spread of fire, use the firefighting equipment located in the building (wall hydrants or fire department standpipe — as long as the water pipes are not being used by the pump squad.) When these are not sufficient, always request fire hose cover from the pump company.

Section 6 Searching in Fires in Underground Facilities

1. Summary

In recent years, the drive for more effective land utilization has led to a vast expansion of underground facilities in downtown commercial districts including subways, shopping arcades, theaters, and parking lots, forming special blocks underground. This section covers in general terms the underground fires that are handled by firefighters. Underground fires burn using air supplied from above ground, and they display different combustion patterns depending on such factors as: type of occupation, type of construction, form of structure, number of entrances, etc. Generally, in the early stage of a fire there is a slow smoldering as in fire-resistant structures. generation of fire gas due to incomplete combustion, the permeation of thick smoke and heat, blackouts due to power outages and other obstructions to the search process. In many zones walkie-talkies will not work, and their limited effectiveness causes difficulties in communicating with the command headquarters (on the ground). In addition, there are limited entry points, making it difficult to amass the necessary units (search, guard, light, smoke extraction, etc.) In underground fires, often there are combustible materials within and an unknown number of people coming and going—hazardous elements that have the potential to create a disaster of unimaginable proportions. If the fire occurs during business hours in the underground arcade of a subway station, injuries can be caused by electrical shock, and chaos can result from a rush-hour panic. With a fire in an underground parking lot, one must be aware of the dangers of hazardous materials that can explode, gas poisoning by carbon dioxide due to the use of firefighting equipment, life hazards, and the high possibility of secondary physical injury occurring.

2. Keys to Searching

While the circumstances of underground fires are never exactly the same due to such factors as the type of fire and conditions of its spread, searches must be carried out rapidly and in line with the following points.

(1) Give priority to the area closest to the origin of the fire, and then to areas to which the fire is in danger of spreading next.

(2) Give priority to the ventilating side.

(3) Give priority to areas where the threat to life is high.

3. Cautions in Searching

Heed the cautions listed under searching in fires in mid-rise and high-rise buildings; also heed the following points.

(1) When entering, consider in all cases that the interior construction will be complicated and maze-like; do not act alone. If there is an entry point for sole use of the fire department, use it. If there isn't, try to avoid blocking paths that evacuees are using.

(2) After business hours, fire shutters may close, so contact arcade personnel and have them keep the shutters open or cut through them with engine-driven cutters in order to establish an entry point or create an outlet for smoke and heat.

(3) As necessary, have your squad discharge foam or spray, request this of another squad, or utilize reserve firefighting equipment of the facilities for cover or the venting of smoke or heat in conjunction with searching, or to secure an escape route.

(4) Determine and confirm a method of keeping in close communication with the field headquarters or command headquarters. Also utilize auxiliary radio equipment underground and above ground for radio communications.

(5) If a fire occurs during business hours in an underground arcade, there will be many people unfamiliar with the place who will be trying to evacuate amidst flames and smoke, heat, and the chaos of panicked crowds. So even after guiding people out, search thoroughly because it is possible that some people have become injured and are unable to get out.

(6) Underground theaters, underground station buildings and other facilities often have an interior construction that is complicated and maze-like. Also, due to power outages and thick smoke, lighting may not work, and one must proceed as if working in the dark. The firefighter must therefore make effective use of a floodlight, rescue rope, pole for searching and other equipment to prevent accidents and to quickly discover people who require rescue.

(7) Actively report to the field headquarters not only the progress and results of the search, but what you know about the construction, combustion pattern, combustible materials, degree of threat of the fire spreading, operability of firefighting equipment and other details to serve as reference in the firefighting effort.

Section 7 Searching in Special Fire Situations

1. Summary

Fires in vehicles, boats, aircraft, facilities that handle hazardous materials, or facilities that handle radioactive materials, for example, are special fire situations compared to fires in ordinary buildings or high-rise buildings. Searching for people in these situations requires special measures and action.

2. Keys to Searching

(1) Fires in Vehicles

Because of swift air circulation and tight openings, once a vehicle catches on fire, the danger to human life is extremely high. With fires on trains, as soon as one arrives at the scene, one must check if there is power transmission, open emergency exits, open windows or break them to shoot high-pressure spray into the train, put out the fire, search, and rescue all at once.

(2) Fires on Ships

Whether the ship is large or small, an oil tanker or other kind of ship, when a fire breaks out the ship's interior fills with thick smoke and fire gas, and is structurally difficult to evacuate and for firefighters to enter. For this reason, one must seek the cooperation of ship personnel for guidance into the ship, and to prevent falls during the search. Also there is the danger of secondary accidents due to explosive combustion or explosions from the opening or closing of watertight doors and other doors, so one must proceed with utmost caution. Because of high temperatures and high moisture, the deck is slippery, and because some people will jump overboard, they have to be rescued and one must try to prevent mass hysteria from taking over, which can lead to chaos and secondary life hazards.

(3) Fires on Aircraft

For searching in fires on aircraft, approach the aircraft while bringing the flames under control, and enter through the doors used for boarding and disembarking or use the emergency escape chute.

Quickly ventilate the cabin by making openings for the smoke to escape or by using a blower to push the smoke out.

Often the body of the aircraft and its cabin is markedly destroyed by a crash, so it is imperative that the search take place with multiple searchers. Proceed with rescuing while in contact with airline personnel and crew members, while using emergency rescue apparatus.

(4) Fires at Facilities that handle Hazardous Materials

Some hazardous materials and chemicals may spontaneously ignite if they absorb air or moisture. Other materials will ignite or explode when combined chemically or mixed. Yet others will generate toxic gas. It is necessary, therefore, to accurately assess the types of materials that are involved and their properties, and try to understand the severity of the accident. One must note the direction of the wind and the terrain, establish the danger zone, and tell people by using a loudspeaker or megaphone the direction in which to evacuate. Also be aware of secondary explosions from the buildup or infiltration of gas; measures must be taken to close off traffic, prohibit the use of fire, etc.

(5) Fires at Facilities that handle Radioactive Materials

In fires at facilities that handle radioactive materials, as soon as you arrive on the scene, actively seek to make contact with managers and handlers of the materials. For the detection of radioactivity, wear suits that offer protection from radiation and use breathing apparatus. Confirm the level of contamination using a Geiger counter, and determine the danger zone. Except for radioactivity detection personnel, no one is to be allowed entry into the danger zone. If a person has become contaminated, have them rinse off with water, or if only a small amount, wipe off. If heavily contaminated, wrap the person's body in a plastic sheet and take them to a hospital. Radioactivity detection personnel shall not have any contact with any firefighters outside of the danger zone. All delivery of tools shall take place at the boundary of the danger zone. After search-and-rescue and firefighting efforts have been completed, these personnel shall be examined, their bodies washed thoroughly, and be given another detailed examination at a hospital.

Section 8 Evacuation Guidance

1. Summary

When fires break out in department stores, theaters, hospitals, schools, inns, nursing homes, underground arcades, subway station buildings or other places that contain an unknown number of people, one can expect that there will be people trapped inside by flames, thick smoke and heat. Also one can foresee the possible occurrence of secondary accidents due to panicked confusion spreading through a crowd.

The action of leading those in danger of their lives to a place of safety is known as evacuation guidance.

As with searching, evacuation guidance is a priority action in the rescue effort that starts with a sequence of information gathering. It is an important task that must be carried out in close conjunction with searching.

2. Principles of Evacuation Guidance

The primary mission of the firefighting squad is to rescue those on the verge of a crisis at the scene of a fire, as noted earlier. Evacuation guidance begins upon arrival at the scene with the process of visual confirmation and information gathering focusing on the burning building and the results of this information gathering; or at the stage where the search is being carried out and people needing rescue are found who are able to evacuate under their own power.

Methods and means of evacuation guidance will differ according to the building's construction, its size, how the fire is spreading and the number of evacuees, as well as the number of guidance teams handling the effort, but there are basically two types of guidance. One method is indirect guidance using the loudspeaker system within a building, and the other is to directly enter the building and guide people out. Generally a combination of these methods proves most effective. Evacuation guidance is not usually commanded in advance (planned) but is carried out as the need arises at the scene by an extra duty. Because this is often the case, the firefighter must always be prepared to take quick action. In carrying out evacuation guidance, the following points should be followed as a rule.

(1) Using a Loudspeaker System

Use the loudspeaker system in the building with the fire, or when this system cannot be used, use the truck loudspeaker or a handheld megaphone to clearly announce the location of the fire, the situation of the emergency, its scale, in which direction to evacuate and how to evacuate. Directed by the firefighting squad, speak in specific terms so that the evacuation can be carried out in an orderly fashion. Make sure that evacuees do not all rush to one exit; guide them to open ground or other safe location.

(2) Directly Entering Building to Guide People Out

When directly guiding people to safety, appoint the necessary number of evacuation guidance personnel, taking into consideration guidance on vertical evacuation routes such as stairways, or flat evacuation routes through adjoining rooms, hallways, balconies, etc. Also allocate personnel appropriately in consideration of the floor where the fire started, floors above the one where the fire started, emergency exits, hallway corners, ascent and descent of all types of stairs, maze-like places and the places that contain large numbers of people, for example. Evacuation personnel should make effective use of floodlights, flashlights, handheld megaphones, ropes, etc., and should guide people out with authority. Also, shooting in a spray to provide a way out will make the people escaping from smoke and flames feel safe and will facilitate evacuation. (Fig. 6-5)

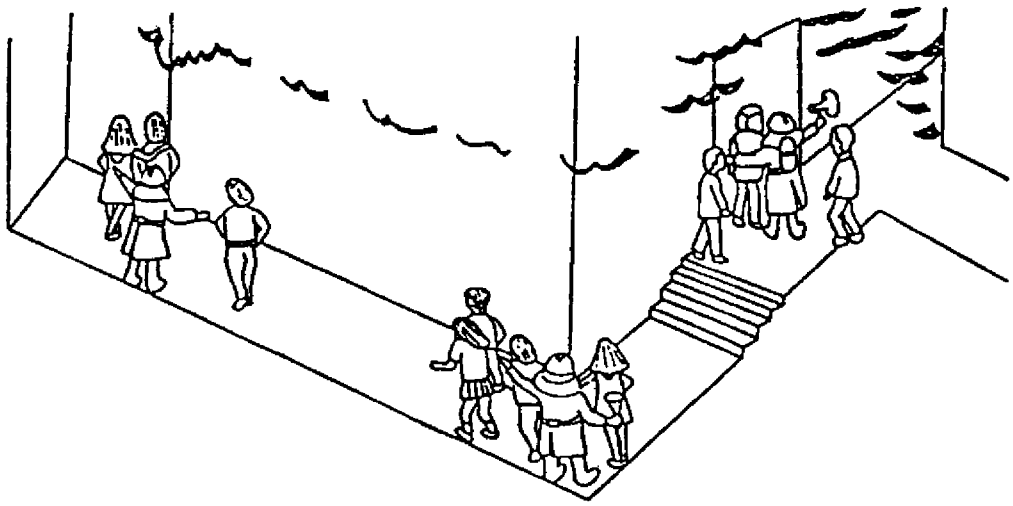

Fig. 6-5

3. Cautions in Evacuation Guidance

(1) Personnel in an evacuation must fully understand the building construction, scale and progress of the fire, and degree of threat of the fire spreading. They must maintain a dauntless attitude, provide information and give instructions according to the situation, calm the fears and worries of the evacuees, and prevent the spread of panic. They must have superb self-control, be good with crowds, and not get caught up in a panic situation.

(2) In hotels and inns where people are in private rooms, evacuation instructions are not completely effective, so instruct the manager to check each room without fail.

(3) In department stores, event halls, theaters and the like, people will rush all together to an exit or stairway exit, and a secondary threat to life is foreseeable, so evacuation personnel must be aware of stairs, inclines, and the width of an evacuation route. They must direct people so that no one stumbles and falls, having employees and managers lead the evacuation to control the evacuation and make sure it goes smoothly.

(4) When guiding a large number of people, it is necessary to have a person leading the evacuation who can take generalship. For this, one must enlist the support of other squads. Be aware that individual action has little effect.

(5) At locations that have a volunteer firefighting squad, the volunteer brigade knows the evacuation facilities very well, so they should be actively used to assist firefighters in utilizing the disaster prevention center, in venting smoke from the evacuation facilities, in opening and closing fire-retardant partitions, and other efforts.

(6) Cautions in special situations

a. At a school with many students, instruct teachers that no one is allowed to speak during the evacuation, and make sure that everyone proceeds to leave the building keeping both hands free with no break in the ranks, and at a walking pace. Also instruct the teachers to confirm that the last person has evacuated.

b. At hospitals and other institutions, find out from nurses which patients are in serious condition, who can walk under their own power, and who are unable to move. For those who are in serious condition or who are unable to move, always follow the advice of the doctors, and with the help of a paramedic crew, have them guided out by nurses and caretakers.

c. At psychiatric institutions, avoid direct guidance. Explain to caretakers the direction in which to evacuate and the location and have them do the guiding.

d. At public bathhouses and sauna houses, do not allow people time to change into clothes; have them evacuate immediately carrying their clothes.

Section 9 Rescue Efforts

1. Summary

Once a fire breaks out, conditions change from moment to moment as time passes, and the rescue grows more urgent. The rescue of people trapped under such circumstances, while based on established principles, also requires specific individual action in response to such factors as the construction of the burning building, the scale of the fire, its type and combustion pattern, as well as the number of people needing to be rescued and the worsening of the threat to life. Also, rescue methods will be limited by the rescue skills of the squad carrying out the rescue and by the equipment and materials that the squad has to use. Because of this, rescue at the scene of a fire requires one to gain a quick grasp of the situation, to gauge the condition of people needing to be rescued, and to determine the safest, surest, and quickest means of rescue using the equipment and materials that are available to one's squad. These rescue skills need to be learned through firsthand experience, and it is important to be aware that consistent training will lead directly to an exceptional rescue effort at the scene of an actual fire.

2. Principles of Rescue Efforts

Rescue efforts at the scene of a fire in most cases will depend on spot assessments of the situation, but the following principles will hold true.

(1) Rescue efforts must be carried out swiftly, safely and surely through logical actions based on an immediate assessment of situation.

(2) For a rescue, assess the situation of the person/persons needing to be rescued. If there are many people, give priority to those in the most danger and rescue them first, particularly the elderly, children, pregnant women, and those with serious injuries. As necessary, request needed personnel, equipment or materials.

(3) For the place to put a person who is rescued, choose a very safe spot away from smoke and flames, such as someplace outdoors, on the ground that can be reached quickly, an upwind vacant lot, etc.

3. Cautions in Rescue Efforts

(1) In rescue efforts, make the best possible use of vehicles brought to the scene and the equipment they carry, as well as other equipment procured at the scene, acting in close contact with firefighting company, special appratus company, etc.

(2) When transporting those who have been rescued, various methods can be used depending on the condition of the victim and the building's construction. Except at times when a hurried rescue cannot be avoided, a method needs to be chosen that will prevent the condition of the rescuee from worsening.

(3) Ordinarily, first aid is administered once the person has been rescued, but if necessary, it can be given upon finding the victim or as one is carrying out the rescue, so as not to lose the chance. In many cases the person being rescued will fall into a state of shock out of fear and pain, so one should take care to prevent shock and should offer words of encouragement.

(4) If the place where the person needing rescue is engulfed in smoke or flames, go in under fire hose cover, block or vent the smoke, and use all of your strength to rescue the person swiftly.

(5) During a rescue, be aware of more than what is in directly front of you; be aware of the surrounding situation. Keep firefighters and rescuers safe, reinforce and manage the equipment being used, and do everything to prevent secondary accidents from occurring.

(6) Even in a firefighting company, when a person needing rescue is discovered, immediately shift into a rescue effort and report the details to the command headquarters; request assistance as needed.