1 INTRODUCTION

1.1 Background

1.1.1 Throughout the nineteenth and early parts of the twentieth century, firefighters controlled and extinguished fires by projecting streams onto a fire from the exterior of a structure. As a result, firefighters would not be able to meet their objective until either unreachable areas burned themselves out, or collapse occurred, thus exposing the fire to outside streams. This often resulted in exposure protection as the primary objective. Major improvements have been made in the last half of the twentieth century. The use of breathing apparatus, ventilation techniques, and protective clothing has allowed firefighters to operate on the interior of structure fires. **It should be remembered that the primary function of today's engine companies is to obtain and deliver a sufficient quantity of water in the safest and most effective configuration to the fire area to extinguish the fire**.

1.2 Purposes:

- To provide guidelines and general information regarding engine company operations
- To describe the duties and responsibilities of the engine company
- To identify tactical and strategic considerations for engine company operations
- To establish guidelines for fire stream positioning
- To define the engine company officer's roles and responsibilities
- To establish guidelines for apparatus positioning on the fireground
- To establish procedures for engine driver/operator qualifications

2 PLANNING AND PREPARATION

2.1 Planning and preparation starts the moment members assigned to the engine company arrive at work. Members should check for any pertinent information such as street closings, hydrants out–of- service, water main repairs, and standpipe and sprinkler systems that are out-of-service.

2.2 All tools and equipment not specifically assigned to a particular firefighter shall be checked to ensure that they are present and functioning properly. Additionally, firefighters shall ensure that the nozzles are inspected for proper settings and are functioning properly

3 RESPONDING

3.1 Typical Response and Arrival Considerations

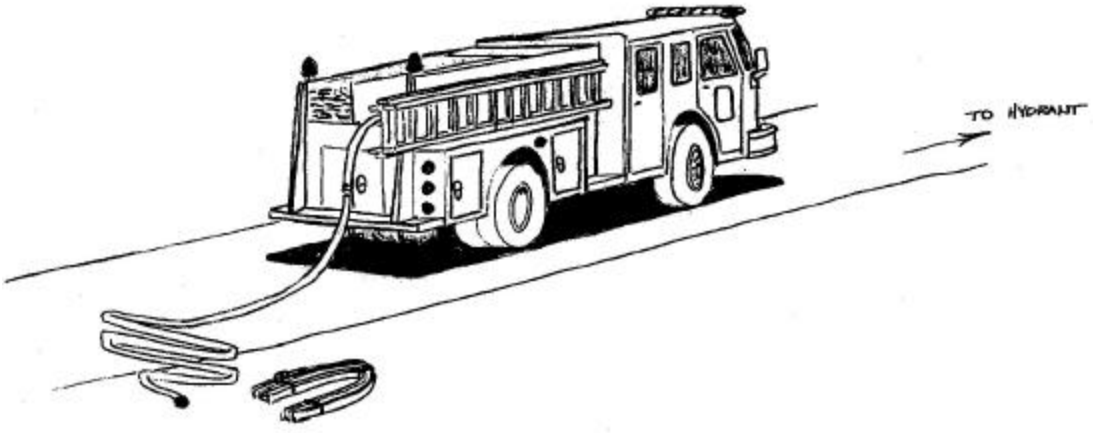
3.1.1 Whether an engine company is responding alone or as part of a larger assignment determines many of the actions, enroute preparations, and thought processes that take place during the response. Officers must be cognizant of assignments identified in specific operating books.

3.1.2 Engine companies must give the front of the building to the truck companies. Room should be allowed for aerial companies to deploy their tools and ladders. Engine company officers shall communicate the water supply locations along with the type and method of hose layout. Additionally, any other pertinent information that may affect the operations on the fireground must be communicated to other units that are enroute or on the scene.

3.2 Single Engine Response

3.2.1 In addition to all of the preparations generic to any call, members must be prepared to confront, for a variety of reasons, an incident that requires more than a single engine. This type of situation might then require the engine company crew to perform tasks not normally associated with engine company work, i.e. ventilation to facilitate rescue, ground ladder placement, etc.

3.2.2 In situations where an engine is operating by itself for some time, alternative hose techniques should be considered. As an example, one option would be drop off a sufficient amount of hose or standpipe pack at the fire, connect the supply line to that hose, and have the engine reverse lay to the water source.



3.3 Multi-Engine Response

3.3.1 The engine company's assignment is dependent upon where it is in the dispatch order for the alarm. In other words, the responsibility of the company is based upon it being first due, second due, etc. This assignment is paramount in determining the preparations to be made by the engine company crew while enroute to the incident. In most instances, the company assignments will fall in the dispatch order. If a unit is out of position or other circumstances indicate it will arrive on the scene significantly before or after it normally would, the unit shall communicate via radio with the controlling dispatch center and advise the change in assignments.

3.3.2 First-Due Engine

- Engine companies shall assess primary water supply needs and identify the source
- Current conditions should be assessed and reported to other units on the alarm. Give a preliminary "on-scene" radio report consisting of type of structure and evident conditions and a command statement
- Determine an initial strategy, mode of operation, and any additional resources needed
- Determine the tactics necessary to carry out the strategy after viewing as many sides of the structure as possible
- As a crew, take the actions necessary to implement the tactics. Communicate these actions in your "situation report" so all responding units are aware of your location and intentions

Example: "Engine 209 is on the scene of a two-story colonial with fire out of two windows, second floor, side A. We will be in an offensive mode of operation stretching a 1 ¾ through the front door to floor 2 with a crew of three. Need the truck to ladder the second floor on sides Adam and Charlie and commence primary search."

3.3.3 Second-Due Engine

- Closely monitor **all** radio traffic, particularly that of the first arriving unit(s)
- Provide water supply to other units or fire suppression systems
- Be prepared to assume command where appropriate
- Prepare to stretch a back-up line or to assist the fire engine with their hose deployment

3.3.4 Third-Due Engine

- Position at the rear of the structure where appropriate
- Lay supply lines from an alternate water source to the rear of the structure
- Monitor all radio traffic
- Continuously monitor and assess needs
- Keep the incident commander apprised of situation in the rear of the structure

3.3.5 Fourth-Due Engine

- Supply water to third engine if needed
- Report to command for any assignments
- Assume role of R.I.T., except on high-rise fires

3.3.6 First-Due Engine, Second Alarm

- In most cases, the first-due engine on the second alarm shall establish staging unless the unit has received different orders from command. The officer shall select and announce the location of staging unless the location was determined prior to their arrival. The driver of this unit should obtain the staging officer vest and assume that role. Note that in high-rise, mall, and some other special fire situations, this function will be known as “base” since “staging” is located within the building
- The officer and remaining crewmembers shall report to command for assignment, unless needed to manage staging
- It is recognized that many times greater alarm units are given tactical assignments before arriving at staging. In these cases, the responsibilities outlined above will fall to the first engine company that actually arrives in staging.

3.4 Monitoring Radio Traffic

3.4.1 Companies responding to alarms shall monitor radio traffic from the dispatch center as well as units that are operating on-scene. This will provide firefighters with vital information about conditions at the scene, and make them aware of the problems encountered by first arriving units.

3.5 Safety

3.5.1 All responses must be made consistent with all current Commonwealth of Virginia driving laws as well as departmental regulations. The response must be as rapid as is reasonable while at the same time maintaining a high level of safety. The knowledge of all members regarding the area and routes of travel is of utmost importance.

3.6 Altered Response Routes

3.6.1 When apparatus is available away from quarters, altered response routes must be considered. The officer shall voice this information to alert incoming units of possible changes in company assignments.

3.6.2 When a response route is changed, be aware of the apparatus responding from normal routes of travel.

3.6.3 Be alert to surprise meetings at intersections with other responding units. If units are responding from a location other than home quarters, the officer shall alert other responding companies via radio stating from the location from which they are responding, i.e. “Engine 249 from 51’s quarters.”

4 FIRE SCENE OPERATIONS

4.1 Objectives

4.1.1 The objectives of any firefighting operation are to protect life and property by performing rescues, protecting exposures, confining the fire, and extinguishing the fire. Water must be applied to the fire in conjunction with the simultaneous venting and primary search operations.

4.2 Strategy

4.2.1 Strategy is the general plan or course of action decided upon to reach the objectives. This is most often indicated by the mode of operation: offensive or defensive.

4.3 Tactics

4.3.1 Tactics are the operations or actions to implement the strategy of the officer in command.

4.4 Size-up

4.4.1 Size-up is an ongoing evaluation of the problems confronted within an emergency situation. Size-up starts with the receipt of the alarm and continues until the fire is under control. This process may be carried out many times and by many different individuals during the incident. The responsibility initially lies with the officer of the first company on the scene. However, all members on an incident must be constantly sizing-up the situation based upon their assignments and responsibilities.

4.4.2 Strategic factors that must be considered during size-up include:

- Time of day
- Life Hazard
- Area (square footage per floor as well as total square footage)
- Height (total building height and height of the fire within the building in relation to the street)
- Construction type
- Occupancy
- Location and extent of fire
- Water supply
- Street conditions
- Auxiliary appliances
- Weather
- Apparatus and equipment (responding and available to respond)
- Exposures (interior and exterior)
- Your resources
- Hazardous materials

4.4.3 If in a multiple-story occupancy, either residential or commercial, check the floor below the fire floor for the layout and location of the reported fire.

4.4.4 The engine company officer must make the decision as to which actions will benefit fireground operations the most. These actions could include rescue, confinement, or extinguishment. Every effort must be made to coordinate the attack with other operations, especially water supply and ventilation. A good rule to follow is:

- R – Rescue
- E – Exposures
- C – Confinement
- E – Extinguishment
- O – Overhaul

4.5 Rescue

4.5.1 Engine companies are often confronted with life saving operations upon arrival. Undoubtedly, it is the most serious factor at any fire. Life-saving operations are placed ahead of firefighting when firefighters are not available to do both (no truck or rescue company on the scene). The best life saving measure may be a prompt attack on the fire which, if allowed to spread, would trap occupants. Life hazard, visible upon arrival, has to be addressed.

4.5.2 Factors entering into rescue decisions are:

- Are occupants in the immediate vicinity of the fire and in danger?
- How many people are trapped?
- Are occupants threatening to jump?
- Are they above the fire?
- Are exits cut off by fire?
- Can they be removed via portable ladders?
- RISK vs. GAIN: Is it a true rescue or is it body recovery?

4.5.3 Actions the engine officer can take to protect the victims are:

- Send firefighters to remove occupants using portable ladders or building exits.
- Protect interior stairways.
- Get hose lines between fire and occupants.
- Extinguish the fire.
- Initiate ventilation to draw fire, heat, and smoke away from occupants.
- Provide assurance to occupants by verbal contact and initiating fire tactics.

4.6 Locating the fire

4.6.1 An exterior survey of the structure and immediate area must be made upon arrival. If the size of the building permits, a lap must be taken to observe as much of the building as possible. Otherwise, the engine officer must solicit reports from units whose vantage point allows a view of the other sides of the structure. If a truck or rescue company is on the scene and the location of the fire is not obvious, the engines should consider using those units to locate the fire and identify the best routes for hose line deployment. The following information must be determined or considered:

- Location of fire or smoke
- The building area and height
- The building entrance(s) and exit(s) such as fire stairs, fire escapes, etc.
- Exposures
- Possibility of obtaining building information from evacuees

4.6.2 An interior survey of the structure must be made for the following:

- Visible fire, smoke, and odors
- Sensed heat or the sound of fire (crackling, etc.)
- Occupants who may provide information
- Stairways leading to that part of the building in which the fire is known or believed to be located
- Structural stability of the interior
- Secondary means of egress

4.6.3 When the initial size-up is completed and the fire located, all pertinent information, and as necessary initial task assignments should be communicated to the affected companies.

4.6.4 There may be cases where lines should not be stretched until the location of the fire has been assured. Premature stretching can take place in the wrong street, into the wrong building, or up the wrong stairs or stairway.

4.6.5 If the engine is on the scene alone, it may be beneficial for the officer and one firefighter to proceed inside to locate the fire, leaving the driver and other firefighter to stretch the line once the fire is found.

4.7 Confinement

4.7.1 Confining the fire means to restrain or prohibit the fire from extending beyond the area involved upon arrival. Confinement of a fire must take into consideration the intensity of the fire as well as the anticipated or known direction of fire travel. In some situations, the mere closing of a door or window may act to confine the fire and permit life saving operations while lines are being stretched. An engine company officer must keep in mind that effective ventilation can help to confine the fire and limit its spread.

4.7.1.1 All members must understand that great care shall be exercised when ventilating so as not to cause unwanted fire extension that might hamper the initial attack line. Good communications are important for a coordinated fire attack. This is particularly true for engines pressing the attack and trucks supporting the attack with ventilation.

4.7.1.2 Exterior fire spread. Officers must be cognizant of the potential fire extension via the exterior to other areas of the structure. This can be one of the fastest means of fire extension. This is the result of fire venting to the outside through a window, door, or other opening, and re-entering the structure through the vented eaves or windows above. In areas where structures are in close proximity to one another, the problem may be even greater in that we now have fire extension to an adjacent building as well. There are several factors contributing to this problem:

- Combustible siding materials
- Distance between dwellings; newer single-family dwellings may be less than 10 feet apart and in some cases as little as 3 feet
- Windows above the venting fire which allow for auto-extension (leapfrogging to floor above)
- Vents in eave lines which lead directly into the attic or cockloft area
- Combustible roofing materials

4.7.1.3 A tactical consideration for addressing exterior fire spread includes a quick sweep of the eaves or siding involved prior to entering the structure. The objective is to drench the siding in order to delay and prevent vertical fire spread. This will delay extension into the exposure. Hose streams should not be directed into windows that are venting fire. Doing so will cause the fire to be pushed into the occupancy.

4.7.1.4 Aggressive firefighting usually means the first engine on the scene will pull the initial attack line to extinguish the fire. However, the first line deployed may not, and in some cases should not, be the line that actually conducts the initial attack. It may be necessary to use the initial line to confine the fire, protect exposures, and protect means of egress. In special circumstances, a number of other tasks may initially take precedence over fire attack.

4.8 Extinguishment

4.8.1 In order to properly affect prompt and efficient extinguishment in as safe a manner as possible, all firefighters must have a thorough knowledge of fire behavior. This includes the "phases of burning", and how they relate to various engine company operations.

4.8.1.1 Particular care must be exercised in dealing with fires that are beyond the transition between free burning and the smoldering phase.

4.8.2 Members must be aware that, due to the tremendous amount of stored heat energy found in many man-made products today, the potential for rapid fire growth as well as "rollover" or "flashover" is great. Therefore, firefighters must be constantly aware of changes in the fire environment during all operations. Engine companies should make every attempt to cool the ceiling and walls with water application utilizing a straight stream pattern to prevent flashover or rollover. Firefighters shall have a thorough knowledge of and know when to use the various types of attack (direct, indirect, and combination).

4.8.2.1 Direct Attack – The attack crew advances into the fire area and utilizes a straight or solid stream. The stream is applied directly onto the burning materials until the fire darkens down. This is the attack method most often used for interior firefighting. Straight or solid streams should be directed at the ceiling to cool the overhead, if necessary, and then direct the stream toward the fire itself in a "Z" pattern. Before advancing, sweeping the floor with the stream will cool embers and other hot material that could cause firefighter injury.

4.8.2.2 Indirect Attack – The crew attacks the fire from a doorway, window, or other protected area not entering the fire area. A narrow to wide-angle fog stream is directed into the fire room or area. The super-heated atmosphere will turn the water fog into steam. This method of extinguishment absorbs the heat and displaces the oxygen. <u>This method of extinguishment ***must not*** be used in areas where victims may be located or firefighters are operating</u>.

4.8.2.3 Combination Attack – This method utilizes both the direct and indirect methods at the same time. A narrow fog stream is used in a "T," "Z," or "O" pattern. The fog in the higher atmosphere turns to steam and the fog at floor level hits the burning material. As with an indirect attack, this method ***must not*** be used in areas where victims may be located or firefighters are operating.

4.8.3 Initial actions of hose lines should be to sweep the ceiling and walls to prevent flashover or rollover if needed. If the lose line cannot advance due to high heat conditions, the officer should call for *additional ventilation*. If the advance is being hindered by heavy fire, *additional lines or larger lines should be ordered*.

4.9 Determining Fire Flow

4.9.1 There are several means for determining fire flow, all of which are based upon the amount of heat released from materials as they burn, and the amount of heat that water absorbs while raising its temperature to that of vaporized steam. It must be recognized that these are general guidelines for determining the *amount* of water to be applied. Experience and logic must be employed in determining how the water should be applied.

4.9.2 Care should be taken not to characterize fire loads based solely upon occupancy. It should be remembered that not all occupancies are used for their designed purpose. Outward appearances can be deceiving. For example, excessive storage of combustible liquids or other materials in a single-family structure would obviously change the fire loading within the structure.

4.9.3 Light fire loads require a flow of 10 GPM per 100 square feet of involved area. This flow rate can most often be delivered using 1 ¾-inch hose lines.

4.9.3.1 A typically furnished home or apartment may be classed as a "light" fire load.

4.9.4 Medium fire loads require a flow of 20 GPM per 100 square feet of involved area. Use of 2 ½-inch hose lines should be expected.

4.9.4.1 "Medium" fire loads would be characterized as commercial occupancies containing moderate amounts of combustible materials.

4.9.5 High fire loads require a flow of 30 GPM per 100 square feet of involved area. Use of 2 ½-inch hose lines or heavy-caliber master streams will be needed.

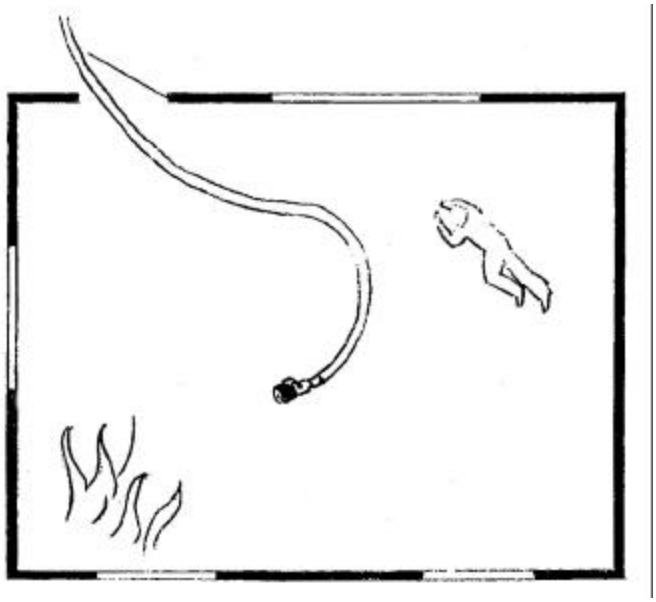
4.9.5.1 "High" fire loads would be characterized as storage facilities that house large quantities of combustible material or contents that are capable of unusually high rates of heat release.

4.10 Rules for Stream Positioning

4.10.1 It must be understood that more lives can be saved from fires by proper stream positioning than by any other fireground operation.

4.10.2 If the fire cannot be quickly confined and extinguished, then the following general rules for positioning streams shall apply:

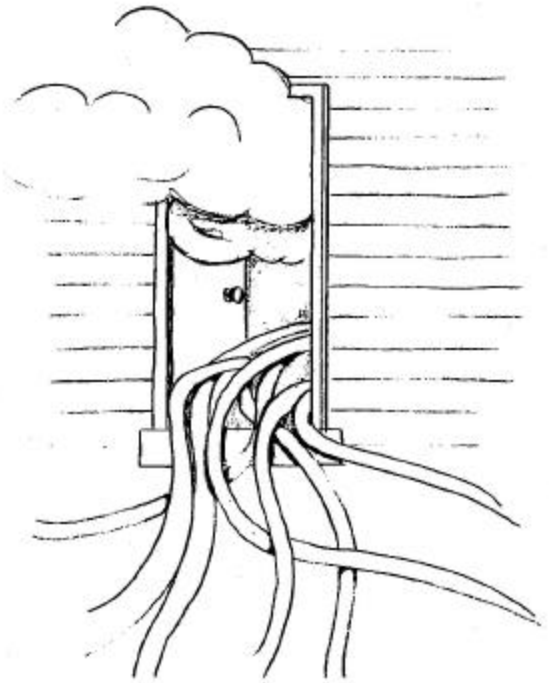
- When human life is endangered, the first stream is placed between the fire and persons endangered by it



- When human life is not endangered, then the first stream is placed between the fire and the most severe exposure

4.10.3 When a back-up line is deployed, it should be stretched to the same point as the first line or as otherwise directed. Normally, the back-up line is capable of equal or greater flow than the original line. However, a back-up line, at a minimum, should be capable of delivering the same amount of GPM as the original line.

- This hose line backs up the first in the event the first stream is inadequate or malfunctions. The second line is for support of the first line and to help ensure success
- This line must have enough hose to cover the floor above the fire floor
- Firefighters must not play two streams against each other
- If possible, attack should be made from the unburned side, however, this is often not practical.
- No more than two hose lines should be deployed through any one doorway.



4.10.4 When more than one line is deployed from a single engine, it is important to have a water supply established before the second line is charged. However, in almost every case, the attack engine is supplied by the 2nd due engine and the crew from the second engine deploys the second line. Water supply should be established concurrently with the deployment of the second line. The exception to this would include the “deluge blitz attack” where the 1st arriving engine opts to operate their master stream to knock down the bulk of the fire before a water supply is established.

4.10.5 Once water supply is established to any attack engine, the number of lines stretched from that engine is only limited by the amount of incoming water.

4.10.5 Additional lines may be stretched depending upon occupancy or fire situation. They may be deployed to:

- Cover secondary means of egress
- Protect persons trapped above the fire
- Proceed to adjoining buildings to protect exposures or operate through common horizontal openings
- Prevent and extinguish the vertical spread of fire
- Attack from the unburned portion of the structure and protect the stairway
- Other priorities as determined by the incident commander

4.10.6 It must be understood that in order to coordinate ventilation operations with fire attack, the engine must convey to the outside vent team that they are ready to advance. Ventilation openings should be made prior to fire stream application. This communication can be made either by radio, or face–to-face.

4.10.7 Members should consider the following points for proper stream application.

4.10.7.1 If it becomes necessary to conduct fire attack from the exterior of the structure, you must take into account members who might be operating inside the structure, i.e. search or ventilation crews. Additionally, any victims still in the structure must be considered. Again, effective communication via radio is of paramount importance in these situations.

4.10.7.2 When a direct attack cannot be made from the interior due to adverse wind conditions or excessive heat, consideration should be given to breaching the wall by making a hole in an adjoining room or compartment and conducting the initial attack in that way. In all cases, great care must be exercised in protecting the hallway or other means of egress. Maintaining the door to the fire room in the closed position until ready for interior attack will most likely be your best means of accomplishing this objective.

4.10.7.3 Fires that are free burning require a straight or solid stream to be effective. This technique is called the direct method of attack. A direct attack will be utilized on most interior fires. In order for the direct attack to be successful, coordination with the other units on the scene who are venting and searching, must be considered. The direct method would not be utilized when fire is in areas that are unoccupied and areas which due to intense heat conditions cannot be entered. Examples are attics, knee-walls, and other confined areas.

4.10.8 To determine the type of attack that should be utilized, the following factors need to be taken in consideration:

- Fire attack crews have access to the seat of the fire
- Other firefighters need to be in the fire area, such as performing primary searches
- Victims and firefighters present or suspected to be in the fire area that could be affected by steam production
- Inadequate ventilation that would not allow the smoke and hot gases to escape to the outside
- If all of the above items exist, the direct method of attack should be used

4.11 Engine Officer

4.11.1 Once the decision to advance a hose line has been determined, a properly trained engine company should be able to do the following without close personal supervision of the officer:

- Position the apparatus as necessary to effect an adequate water supply
- Estimate the amount of hose needed for the stretch
- Remove the hose from the apparatus
- Stretch the proper length of hose line to reach the objective
- Connect and utilize any appliances that may be needed

4.11.2 It is the first-due engine's responsibility to lay the supply line(s). When possible, the first-due engine company should forward lay the supply line. However, in some situations this may be impractical and a reverse or split lay may be utilized. The officer must make a proper decision to lay single or multiple lines. The old adage, "WHEN IN DOUBT, LAY IT OUT" seems to apply. It is much easier to lay dual lines initially than to try to hand lay a second one later.

4.11.3 If there is a known rescue situation, the officer should consider whether or not to stop at the water source and lay out, or proceed directly to the scene to avoid any delay to attempt rescue.

4.11.4 While the attack line is being stretched, the engine officer must be gathering information relative to the location and extent of the fire. The gathering of this information normally takes relatively little time. The advantages of proper line placement and rapid line advance are well worth the effort. The officer's size-up and tactical considerations for decision-making should include the following items:

4.11.4.1 Monitoring *all* radio transmissions.

4.11.4.2 The crew may need to locate the fire and search for victims without the aid of a hose line if no ladder or rescue company is present to accomplish this task.

4.11.4.3 If in a non-standpipe equipped, multiple story occupancy, the engine officer must use good judgement in determining whether to stretch the attack line wet or dry.

4.11.4.4 The engine officer should communicate to the nozzle team any information that might be critical, i.e. "straight down the hall, second door on the left." He should then ensure that the nozzle team is ready and initiate the advance. It is the engine officer's responsibility to ensure persons, either firefighters or civilians, are not adversely affected by the application of the fire stream. If there is *any doubt* as to whether there are victims or firefighters on the opposite side of the fire from where the attack is made, then a direct attack, utilizing a straight or solid stream, shall be used.

4.11.4.5 While the attack line is being advanced, the engine officer should monitor all radio transmissions. This affords him knowledge of any hazardous condition that may be developing, i.e. ventilation problems, fire extension, collapse potential, and "Mayday" transmissions. It is understood that this may not be possible under the noise conditions of the typical fire attack. Therefore, the engine officer should, when possible, initiate communication and expect acknowledgment. The engine officer, in initiating communications, will be providing important information for the incident commander and other officers and units on the scene. These messages should be short and concise, i.e. fire knocked down. They shall include current conditions inside the structure, as well as any resources that might be needed.

4.11.4.6 The engine officer should constantly monitor progress and conditions. He directs the nozzle team's advance and instructs them as to their next objective.

4.11.4.7 Firefighters should avoid the fire floor and unprotected areas where active fire is present without an attack line.

4.11.4.8 The engine officer should constantly be monitoring the welfare of the nozzle team, being vigilant of any thing or condition that might unnecessarily threaten their safety. He must be aware of the tendency of most firefighters to want to stay inside, well past the point when they should be relieved, and take action necessary to get other personnel to relieve them.

4.11.4.9 The engine officer should relay orders in concise and clear tones not higher than normal, dependant upon conditions, and in as few words as possible. He should keep his nozzle team informed of progress, giving estimates of what remains to be extinguished. It must be realized, due to the inevitable noise generated at a working incident, normal talking will be difficult to hear.

4.11.4.10 The engine officer *should* be with the nozzle or as close as possible. Due to the cramped quarters found at many incidents, the engine officer may find himself in the position of back-up person.

4.11.4.11 As the crew advances, the engine officer should be checking for fire extension in areas immediately adjacent to their position, such as adjoining rooms. Additionally, the officer must be looking for any victims that may be in the immediate area and always monitoring the structural conditions and fire behavior in their area of operation.

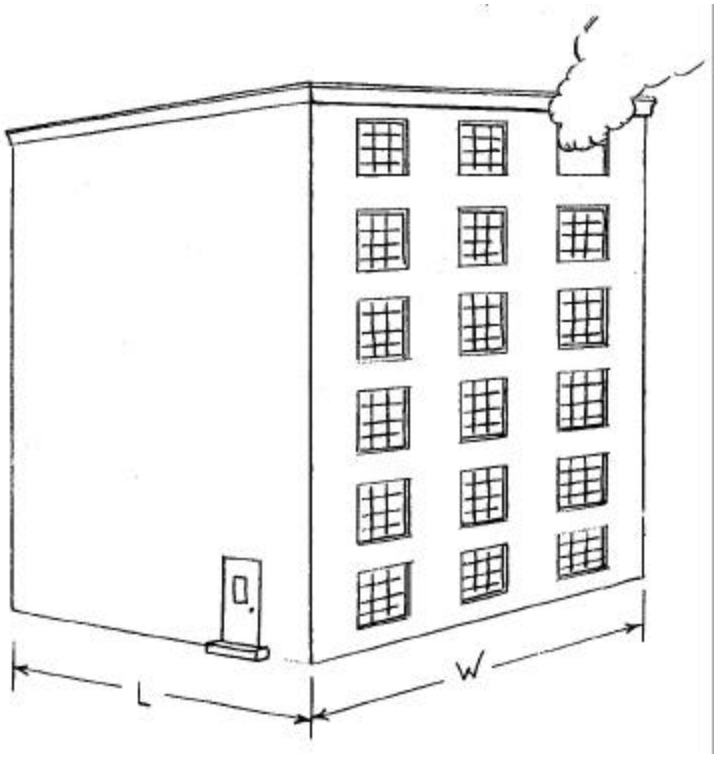
4.12 Booster lines are not normally considered for interior operations, other than to stand by during overhaul operations to assist the investigator in cooling down an occasional hot spot.

4.13 Hose Line Advancement

4.13.1 The following should be considered when choosing the correct length of hose for deployment:

- Engine position and distance to the building, known as “setback”
- Height of the fire floor
- The area of the building and the location of the fire within that area
- Amount of hose needed to reach the floor above the fire if the need arises
- Attack line should be long enough to have at least one length available at the point the attack commences. (One length meaning 50 feet of hose).
- One method of calculating the proper length of hose in commercial buildings: take the setback + length of the building + width of the building + one length for each floor above the engine + one length

at the point of attack = proper length of hose needed. Note that this formula would not apply to single-family dwellings.



4.13.2 Guidelines To Assist with Smooth Line Advancement

4.13.2.1 **Chock doors open**!

4.13.2.2 Ensure uncharged lines advanced into a structure do not become wedged under a partially closed door.

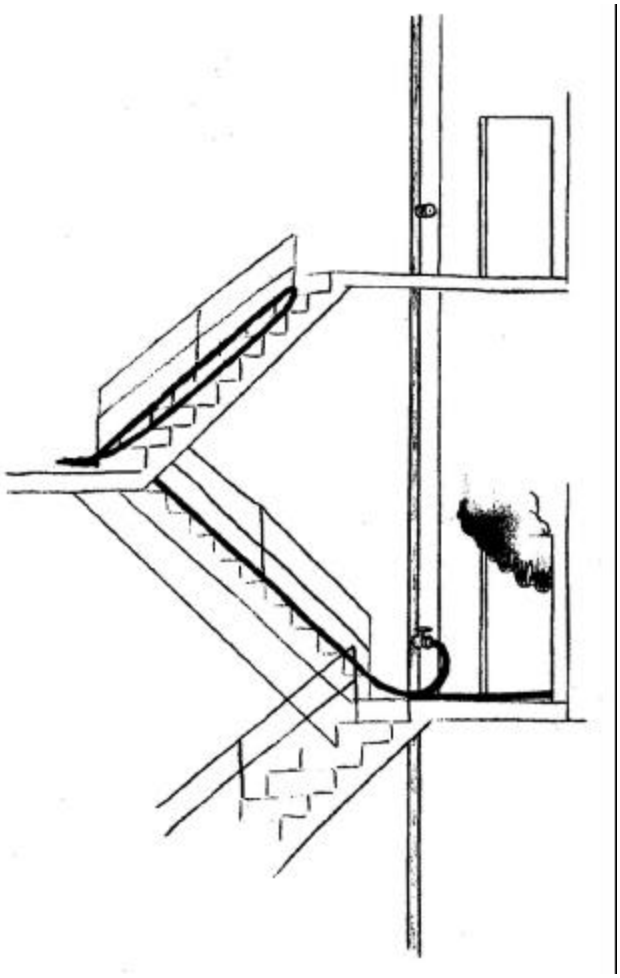
4.13.2.3 Stretching a line up a stairwell using the well-hole is very effective and uses only about one length per floor. However, if a crew is stretching up a narrow well-hole, ensure the line does not become wedged between the railing and the steps. Have additional members in the stairwell to advance the line into the hallway.

4.13.2.4 Limit the number of lines to no more than two through any one entrance. If additional lines are required, they should be advanced through alternate doors, windows, or upper floors, over ladders or by hoisting with ropes.

4.13.2.5 Use of the aerial as a permanent alternate standpipe is not generally advised. It should be free for other tasks, such as access to upper floors and the roof. More importantly, the aerial should be available to move into a position for emergency egress for firefighters or victims

that show at a window or balcony. However, the aerial can be used to move hand lines into position.

4.13.2.6 When working out of a stairwell, stretch the line to the upper landing to ease advancement onto the fire floor from the stairwell. The uncharged hose should be laid out in accordion style to ease advancement.



4.13.2.7 At times, the best point of entry for the attack line might have to be accessed by advancing the line up and over a ladder, or by entering the building and then hoisting the line.

4.13.2.8 Secure hose lines to the railings or windows on upper floor landings to prevent injuries to firefighters and occupants. This keeps stairwells free of clutter and prevents the hose from kinking.

4.13.2.9 When preparing to advance a hand line down a basement stairwell, ensure there is enough line poised at the top of the stairway to make a smooth unobstructed advance into the lower floor level.

4.13.2.10 When stretching lines inside a structure, ensure that firefighters are positioned at intervals over the length of the line in order to keep the line moving.

4.13.3 When multiple lines are required, consider utilizing more than one engine for attack positions. The entire operation would not be dependent upon a single attack engine if that engine were to malfunction. Reliance upon a single source of water supply should be avoided.

4.13.4 When the 2 ½-inch hose line is deployed, it will take two crews to properly advance this hose line into a structure. Firefighter positions on the line should have the nozzle person and back-up at the nozzle, and a member at approximately each coupling.

4.14 Rural Water Supply

4.14.1 In non-hydrant areas, engine companies have to rely on alternative water sources or utilize remote hydrants. Water supply is achieved by utilizing either a relay operation or a water shuttling operation.

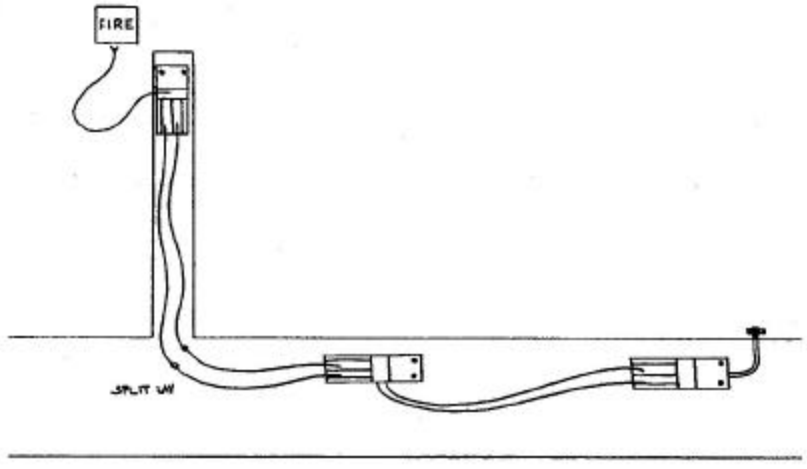
4.14.2 The standard relay operation will place an engine approximately every 800 feet from the engine providing the fire attack.

4.14.3 A standard relay would:

4.14.3.1 Begin with an attack engine at the fire scene. (In restricted narrow access areas, the attack engine will lay dual 3-inch supply lines or Large Diameter Hose (LDH) from the street and proceed to the fire).

4.14.3.2 A second engine would reverse or split-lay dual 3-inch supply lines (800 feet) or LDH toward the water source.

4.14.3.3 This sequence would continue until the water source is met and established ensuring an engine approximately every 800 feet.



4.14.4 Tanker shuttle

4.14.4.1 A guideline to use in deciding upon a relay or a shuttle is that if a relay requires more than 3 engines, in addition to the attack engine, a tanker shuttle should be considered.

4.14.4.2 Begin with an attack engine at the fire scene. (In restricted, narrow access areas, the attack engine will lay supply lines from the street and proceed to the fire).

4.14.4.3 The tanker will supply the attack engine as the portable folding tanks are set up at an accessible location, reasonably close to the attack engine, such as at the end of the driveway.

4.14.4.4 The supply engine will draft from the static source at the folding tanks and supply the attack engine. The supply engine shall position to allow complete access and egress for the tanker operations.

4.14.4.5 The tanker will begin to fill the portable tanks. In order to ensure that the supply engine has the capability to draft, one tank will only be half filled. When the supply engine obtains a draft, the tanker will completely fill the portable folding tanks.

4.14.4.6 The tanker would remain mobile and proceed to the closest reliable water source, refill, and shuttle water back to the folding tanks.

4.14.4.7 Additional engines and tankers could be added to the shuttle operation. If additional engines are used to shuttle water, a 100-foot supply line or lines should be placed near the folding tanks to be utilized by the shuttle engines to off-load. This will allow access for the tanker to operate without obstacles.

4.14.4.8 In order to fill the shuttle apparatus, an engine will be required to establish a water supply and fill site.

4.14.4.9 If the tanker is delayed or responds from a remote location, alternate supply methods need to be deployed.

4.14.4.10 When either a relay or shuttle operation is required, a water supply officer must be established.

4.14.4.11 To avoid obstructing the access of the shuttle operation where access to the structure is limited, it is advisable for the truck company to remain on the street and hand-carry equipment to the scene.