GUIDELINE #1400.20(12/09)

LADDER COMPANY OPERATIONS

Purpose:

The purpose of this guideline is to provide basic information about the District's overall approach to ladder company operations.

Planning and Preparation:

A. Due to the career/volunteer make up of the District it is important that all members be fully trained in basic firefighting skills and tactics so that appropriate (prioritized) actions will be taken as companies arrive on scene.

B. From career members that are assigned to the ladder company, to volunteer members that are signed up for a shift on the ladder company planning and preparing for a response begins the moment the member arrives for their assigned shift. The status boards in the apparatus bay should be checked for any information that may affect the response or operations of the unit. Situations such as street closings, equipment changes on the apparatus or mutual aid companies out of service should be noted and possible alternate courses of action considered and discussed.

C. Immediately after the start of each shift, members assigned to each of the apparatus positions (Apparatus Operator, Company Officer, Roof and Forcible Entry/Search) should check over their assigned equipment to ensure that the unit is ready for response. Each member should place their protective clothing at or near their respective riding position so that it can be donned prior to responding when necessary. Members responding back to incidents should give their equipment a quick check over prior to the response, to ensure that it is ready for the call they are responding too.

D. Successful fireground operations do not happen by accident. For a ladder company to perform well, each member responding on the apparatus must be involved in ongoing training. Company drills, multi-unit drills and critiques after each incident will ensure that a high level of performance and professionalism is maintained.

Response Considerations:

A. All responses to fires and emergencies should begin with proper receipt of the alarm. All responding members should be informed as to the type of alarm the unit is responding to and the location or address. This information will determine whether or not protective clothing is necessary and will prepare members for the type of action or tactics that might be required.

B. The only type of response that is helpful to the District and the public is one that is completed safely and accident free. Apparatus accidents can cause injuries to members and civilians and damage to the apparatus. Units unable to proceed to the alarm location are unable to render the assistance for which they were initially summoned. For these reasons a safe and reasonable response is necessary.

C. Units returning from previous alarms or available on the air must consider the potential hazards caused by responding from locations outside of quarters. Other units responding to the same incident may not expect to encounter this unit, which will be responding using other than its normal response route. This situation can cause surprise meetings at intersections and result in units arriving out of their normal response sequence.

D. Members responding to an alarm should monitor the radio, MDC or pager (members responding back to the station). This will provide the members with vital information about conditions at the scene and any problems encountered by earlier arriving units.

Apparatus Positioning:

A. In order to facilitate an efficient, coordinated operation, the ladder company should strive to enter the incident location before the first due engine company and from the same direction. This sequence allows the apparatus operator to place the unit at the best location for access, search, removal of occupants and venting.

B. If the ladder company arrives at the incident location before the engine, the company officer should give an arrival report and inform the engine company of the closest hydrant, leaving room for the engine to pass, if necessary.

C. The company officer is charged with the responsibility for proper placement of the apparatus. Generally, the apparatus should be placed the proper distance from the building with the turntable aligned with the objective.

D. The following should be considered when placing the unit at an incident:
   a. In most cases the corners of buildings are considered the strongest with regard to the collapse zone. In addition, by positioning the apparatus at a corner area of most buildings, you have the flexibility to be able to cover more then one side of the building, if needed.
   b. Generally, the preferential order for removal of occupants is via interior stairs, horizontal exits and then ladders. Occupants may be at windows calling for help or appearing ready to jump when we arrive, or as the operation progresses the search crews may find it necessary to evacuate victims through upper story windows and may require aerial apparatus to be used for removal whatever the reason.
   c. The apparatus may be used to perform ventilation, both as access for members to get to the roof for vertical ventilation and to reach upper level windows and doors for horizontal ventilation.

Riding Assignments/Operations – 1st Due:

A. Apparatus Operator (OVM) – Exterior – Team 2 – Secondary Search
   a. Duties:
      i. Drive the apparatus in a safe manner.
      ii. Position the apparatus in the front of the building or where appropriate for the incident.
      iii. Operate as the outside team.
      iv. Ladder the building, front and rear for egress.
      v. VES from exterior.
      vi. Roof ventilation, as needed.
      vii. Raise the aerial ladder for roof/waterway operations.
   b. Tools:
      i. PPE (Bunker Gear/SCBA)
      ii. Portable radio on the fireground channel.
      iii. Flashlight (Apparatus-Mounted)
      iv. Multi-Hook or Pike Pole

B. Company Officer (Search) – Interior – Team 1 – Primary Search
   a. Duties:
      i. Determine the proper route of travel and ensure proper apparatus placement.
      ii. Operate as the inside team.
      iii. Search for victims and fire.
      iv. Vent, as needed.
      v. Overhaul and check for extension.
   b. Tools/Equipment:
      i. PPE (Bunker Gear/SCBA)
      ii. Portable radio on the fireground channel.
      iii. Flashlight (Apparatus-Mounted)
      iv. Multi-Hook or Pike Pole
      v. Thermal Imaging Camera
      vi. Search Rope (Commercial Building)

C. Roof(OVM) – Exterior – Team 2 – Secondary Search
   a. Duties:
      i. Operate as the outside team.
      ii. Assist with setting up the aerial ladder
      iii. Assist with laddering the building, front and rear for egress.
      iv. Assist with VES from the exterior.
      v. Visual check of rear and sides.
      vi. Secure utilities.
      vii. Roof ventilation, as needed.
   b. Tools/Equipment:
      i. PPE (Bunker Gear/SCBA)
      ii. Portable radio on the fireground channel
      iii. Flashlight (Apparatus-Mounted)

iv. Saw, as needed
v. Multi-Hook or Pike Pole)

D. Forcible Entry/Search – Interior – Team 1 – Primary Search
   a. Duties:
      i. Operate as the inside team.
      ii. Forcible entry.
      iii. Assist with the search for victims and fire.
      iv. Vent, as needed.
      v. Overhaul and check for extension.
   b. Tools/Equipment:
      i. PPE (Bunker Gear/SCBA)
      ii. Portable radio on the fireground channel
      iii. Flashlight (Apparatus-Mounted)
      iv. Water Can Extinguisher
      v. Irons and/or Hydra Ram (Multi-Family or Commercial Building)

General Strategic Considerations:

A. Rescue – Depending on priorities, size-up will dictate where the first ladders should be raised. Initial ladders should always be raised to the victims in the most danger. Another high priority is laddering a means of egress for firefighters. This includes windows, roofs, balconies, etc.

B. Ventilation
   a. As with rescue, size-up of the fire will dictate where the first ladders should be raised. When placing initial ladders for ventilation, consider how they can be used to maximum benefit, reducing the need for too many additional ladders. Also consider the location of the fire, anticipated fire progress, the amount of work and time needed on the roof, and the strongest areas of the buildings construction.
   b. Consider placing a second ladder for an alternative means of egress once you are on the roof and the area of operation is known. Factors that may influence the decision for a second ladder are the type of roof, direction of fire change, and whether conditions on the roof are rapidly changing.

C. Building Construction
   a. One of the best areas to place a ladder is as close to the corner of the building as possible. Corners are considered an optimum placement area for the following reasons:
      i. No horizontal opening – Windows, doors and vents are not usually found in corners.
      ii. Strength – The strongest areas of a building are adjoining walls, hips and valleys.

iii. Location – When ventilation operations are complete, it is easy to find the ladder by looking at the corners. This is especially an asset at night, in smoky conditions or when immediate egress becomes necessary.

b. There are some exceptions to the advice on laddering corners with certain types of building construction:
   i. Tilt-ups – Most tilt-up buildings are large and have panelized or light weight roofs. The size of the building is an import factor. Consider placing the initial ladder close enough to the anticipated area of operation on the roof so that crews will not have to traverse a great distance.
   ii. Strip Malls – When making a decision about ladder placement in this type of occupancy, consider the location of the involved store(s), that is, is it in the middle or to one end of the building? Also consider which side of the building would sustain the greatest fire loss. Roofs are lightweight, and poke-through construction can be found in the attics.
   iii. Fascias – Fascias are usually constructed on the front and part of the sides of a building. Fascias normally hide or conceal the roofline, and are usually open or common to the attic of a building. Another common feature of fascias is a lack of firestopping. Fascias should never be laddered as they are often unsupported and lack the structural stabiabilty when exposed to fire.

Fire Ground Operations:

A. There are nine basic duties usually assigned to the ladder company:
   a. Rescue
   b. Ventilation
   c. Laddering
   d. Forcible Entry
   e. Check for extension
   f. Salvage
   g. Aerial waterway operation
   h. Utility control
   i. Overhaul

B. Except for rescue, the duties may not necessarily be performed in the given order, and it may not be necessary to perform all of the duties at every incident.

C. Crews performing the initial duties associated with the ladder company should be organized into inside and outside teams.

D. The inside team should be responsible for the following:
   a. Search for victims and fire.
   b. Vent, as needed.
   c. Overhaul and check for extension.

d. Forcible entry.

E. The outside team should be responsible for the following:
   a. Ladder the building, front and rear for egress.
   b. VES from the exterior.
   c. Roof ventilation, as needed.
   d. Raise the aerial ladder for roof/waterway operations.
   e. Visual check of rear and sides.
   f. Secure utilities.

F. Prior to performing forcible entry on a closed door to an involved or suspected involved area, members should identify an area of safe refuge for protection from rollover and flashover.

Ground Ladder Operations:

A. Introduction
   a. It cannot be overstated that selecting the proper ladder for the task improves the ladder company's efficiency.
   b. A number of factors influence the selection and placement of ladders. For instance, when laddering a building, the roof or floor where the operation is being performed dictates what length ladder to use.
   c. The following basic information will assist in choosing ladder length:
      i. Residential occupancies are approximately nine feet from floor to floor.
      ii. Commercial occupancies are approximately 10 to 12 feet from floor to floor.
      iii. The average windowsill height is approximately three feet above the floor. Windows are normally four feet high.
   d. These numbers also help calculate how far the base of the ladder should be placed from the building. The proper distance is one-fourth of the desired height of the raise. This ensures that the ladder will be at the proper climbing angle of 70 degrees.

B. Specifications and Applications:
   a. (1)-10-Foot Attic Ladder – This ladder is considered an inside ladder for gaining access to attics and similar restricted width areas. The closed length of this ladder is approximately 11' and it weights approximately 16 lbs.
   b. (1)15-Foot "A" Frame Ladder – This ladder is considered an inside ladder for gaining access to areas above dropped ceilings and/or areas that are out of reach the a member standing on the ground. The closed length of this ladder is approximately 8' and it weights approximately 35 lbs.
   c. (2)-16' Roof Ladders – These ladders are generally used on all pitched or sloped roofs where footing is precarious. This ladder will usually reach the roofs of most one-story residential buildings and the second-floor windows of most multi-story residential buildings. The closed

length of these ladders are approximately 16’ and they weigh approximately 50 lbs.

d. (1)-24’ Extension Ladder – Regardless of the type of roof, this ladder should reach the top of most two-story residential buildings, second and third floor windows and most two-story commercial buildings. The closed length of this ladder is approximately 12’ and it weighs approximately 80 lbs.
e. (1)-35’ Extension Ladder – This ladder will reach the top of most three-story multi-family residential buildings and the third floor windows of most commercial buildings. The closed length of this ladder is approximately 20’ and it weights approximately 135 lbs.

C. Placing Portable Ladders in Service – Initial Operations

a. All of the ladders carried on the apparatus are stored in the internal slide-in rack located at the rear of the unit. If another apparatus arriving at the incident scene is positioned closer than 20’ to the rear of the unit then removal of these ladders may be difficult.
b. The advantage of an extension ladder is that its height can be adjusted for safe and accurate positioning. Choosing the precise ladder length is not as critical when using an extension ladder as it is when using a straight ladder which has a fixed length.
c. Ladder Climbing Angle – Climbing angle for a ground ladder is approximately 70 degrees.
    i. The 70 degree angle allows the ladder to provide its maximum strength and best service.
    ii. An angle steeper than 70 degrees increases the chances of the climber falling off and sustaining injuries.
    iii. Ladders angled less than 70 degrees require a reduction in maximum loading.
    iv. A simple formula used t obtain a 70 degree angle is to place the base of the ladder at a distance from the vertical plane equal to ¼ the total working length of the ladder. The working length is the distance from the base of the ladder to the top of its support.
d. Ladder Placement – Proper placement of the tip of the ladder provides for easier and safer mounting and dismounting of the ladder and it allows the user to maintain his/her balance by providing a handhold.
    i. Placed at a window – tip should be level with or just below the window sill.
    ii. Placed at a roof – tip should be at least 2’ above the roof or parapet (approximately 3-5 rungs).
e. Butting and Securing the Ground Ladder
    i. In order to prevent slippage of the butt, or movement of the top of a raised ladder, it is important that it be butted by a member. In any case for fire, emergency or rescue work, a butt member should be used to stabilize the ladder and prevent slipping.

ii. The butt member must be aware of the force that causes the outward slippage of the butt of the ladder. This force is in direct proportion to the climbing member's weight, increases as the member ascends the ladder and is maximum at the top of the ladder. Because of this, extra care must be exercised when a member receives a victim at the top of the ladder.

D. Precautions:
   a. Ground ladders should be properly spotted, shifted or moved into position for raising prior to being raised. This is due to the following considerations:
      i. Ground ladders are most easily and safely maneuvered on the ground.
      ii. Once a ground ladder is in a vertical position, additional movement increases the chances of losing stability or striking wires.
   b. Keep all ladders away from electrical wires. Be aware of any wires in the vicinity when carrying, raising, and climbing.
   c. Ladder movement is simplified and safely enhanced when ladders are moved in the horizontal position – on the ground – rather than the vertical position – in the air.
   d. The base of an extension ladder may be shifted toward a building or to either side after it is lowered to the objective.
   e. When shifting extension ladders, capture the halyard on the front side to prevent the dogs from accidentally unlocking.
   f. When necessary, a ground ladder should be secured to its objective by ladder hose straps, rope, etc.
   g. When climbing, always keep one hand on the ladder. If you have a tool in the other hand, your free hand should be positioned behind the beam, maintaining constant contact with the beam and ready to pull you into the ladder in case of a mishap. If possible, the hand carrying the tool should be positioned behind the ladder, with the wrist cocked just against the beam.
   h. Do not overload ladders.

Aerial Ladder Operations:

A. Introduction:
   a. The ladder is constructed of welded, high strength steel tubing and fabricated "I" sections. Each section is trussed diagonally and vertically using rectangular steel tubing. Critical points are reinforced and K-bracing is used, thus providing a high strength-to-weight ratio. Rungs are covered with serrated, replaceable, heavy-duty rubber sheaths.
   b. Two (2) double-acting hydraulic lift cylinders provide elevation from 0 to 80 degrees above horizontal.

c. The apparatus is equipped with two (2) hydraulically extended out and down type stabilizers. The stabilizers extend 60.5 inches, thus providing a 17' wide stance. They are operated by individually controlled valves at the rear of the apparatus.
d. Consideration must be given to the tip-over stability of the apparatus in addition to the safe loading of the ladder itself. With the ladder at full extend:
    i. Below 45 degrees the load limit of the ladder is one person at the tip (250 lbs.) or 1,000 GPM.
    ii. Above 45 degrees the load limit of the ladder is one person at the tip (250 lbs.) and 1,000 GPM.

B. Safety Precautions:
a. Each person operating the apparatus must have a basic understanding of the equipment and the function of the numerous controls and instruments.
b. The operator must be thoroughly familiar with the apparatus height, width and road clearances, operating capabilities and limits.
c. Do not dismount the apparatus while it is in motion. Make sure the parking brake is applied and disengage the transmission whenever leaving the cab.
d. Never permit personnel to climb the aerial ladder until the operator indicates that the ladder is set for climbing.
e. Avoid moving the ladder while personnel are on it as this places a serious live-load on the ladder, and may also result in injuries if personnel are caught by moving parts.
f. Do not elevate or lower the ladder while personnel are climbing the ladder.
g. Do not allow personnel to use a leg lock on the aerial. Life belts or carabineer on harness equipped gear should be used.
h. Avoid forcefully extending the end of the ladder against a building.
i. Never use the aerial ladder as a battering ram. This may result in damage that could cause failure later in an emergency.
j. Operate the ladder with deliberate motions and smooth application of power. Jerky or erratic application of power is dangerous. Do not slam controls, as this will create erratic operation and induce severe stresses in the ladder.
k. Do one thing at a time, and in the proper operating sequence. Don't try to hoist, rotate and extend the ladder simultaneously. Always make certain that the apparatus is properly set for ladder operations before leaving the cab. See that the parking brake and steering axle brake locks are applied; see that wheel chocks are properly positioned. This is extremely important on hills.
l. Never use the ladder for pulling down walls or building members. Make certain that the apparatus is in a safe location where it will not be struck by debris.

m. In cold weather, keep the hydraulic circuits operating to prevent sluggishness or freezing.
n. Exercise great care when the ladder is coated with ice as this may cause failure of the ladder if moved before defrosting. To remove excessive ice from the ladder, best results will be obtained with a steam hose. Free the rungs first, then free the trussing, then free the main beams.
o. During aerial waterway operations, control the nozzle from the turntable whenever possible. Personnel at the ladder lip should have on SCBA and they should be used anytime they are in smoke.
p. Distribute the weight on the ladder by keeping personnel evenly spaced according to the load chart.
q. Never operate the aerial ladder without first setting the stabilizers and leveling the apparatus. Always use stabilizer pads under the vertical stabilizer feet, and always chock the front wheels.
r. Be sure that the vertical stabilizer travel stop pins are all in place through the housings before ever unbedding the ladder. Be sure the area on both sides of the apparatus is clear of people or obstructions which could result in injury or damage before operating the ground stabilizers.
s. Never move the apparatus while the outriggers are still in contact with the ground.
t. Never move the apparatus with the aerial ladder raised to one side. Retract the sections substantially and turn the aerial ladder parallel to its bed.
u. The aerial waterway should be pinned at the 3rd section and moved to the 4th (last) section only during waterway operations.

C. Operating Procedures:
   a. Setting the Ground Stabilizers:
      i. Engage the steering axle brake. This brake is not intended to be a parking brake, its intended purpose is to stabilize the apparatus for aerial operation.
      ii. Place the PTO switch in the “On” position to start the hydraulic pump.
      iii. Wheel chocks should be placed in the front and rear of the front wheels on both sides.
      iv. Starting on the lowest side of the apparatus, move the stabilizers extension/retraction control to the out position. Extend the stabilizers to full extension.
      v. Place the ground stabilizer pad under the stabilizers vertical stabilizer.
      vi. Move the stabilizer control to the down position until the stabilizer (and pad) is firmly seated.
      vii. Next, operate the opposite side stabilizer control, moving the stabilizer extension/retraction control to the out position. Extend the stabilizer to full extension.

viii. Place the ground stabilizer pad under the stabilizers vertical stabilizer.
ix. Move the stabilizer control to the down position until the stabilizer (and pad) is firmly seated, the apparatus is level and the rear tires have been raised off the ground.
x. Engine throttle may be activated by moving the throttle switch if more speed and pressure is required to position the stabilizers.
xi. Insert safety stop pins through the vertical stabilizer leg holes in each stabilizer as close to the outer housing as possible.

b. Returning Stabilizers to the Nested Position:
   i. Remove the stop pins from the stabilizer legs.
   ii. Move the stabilizers up/down control to the "Up" position until the stabilizers are fully raised.
   iii. Momentarily push the override button while starting to retract the stabilizers.
   iv. Move the stabilizers control to the "In" position one at a time. Fully retract the stabilizers. Make sure the stabilizers are fully nested. Store the stabilizer pads.

c. Operating Procedures for Ladder Maneuvering:
   i. Always move control levers at a slow deliberate speed to avoid jerky motions and consequent "whip" of the ladder which could cause personal injury and/or ladder damage.
   ii. Hoist the ladder by pulling back slowly on the hoist level. Raise the ladder somewhat higher than the estimated angle that will be required.
   iii. Rotate platform by moving level as required for proper direction and aiming at the point to be reached.
   iv. Sight along the ladder to see if the ladder has been elevated sufficiently.
   v. Push the extension/retraction level to extend to the desired length.
   vi. Engine throttle may be activated by stepping on the foot switch if increased operating pressure and speed is required for hoisting, rotating, and extending functions.
   vii. Be sure the rung alignment indicator light is on before permitting personnel to climb the ladder.

d. Operating Procedures Returning the Ladder to Bedded Position:
   i. Hoist ladder from building a short distance by pulling back slowly on the hoist lever.
   ii. Pull the extension/retraction level towards you slowly to retract the ladder sections.
   iii. Rotate the turntable with the rotation level, as required, to the bedding position.
   iv. Push the hoist level away from you slowly. Allow the ladder to settle in its bed.

e. High Idle – The high idle switch in the cab should be activated anytime the apparatus is going to be sitting on scene for an extended amount of time. The switch is located in the cab next to the master battery switch and can only be activated when the pump is not in gear.