Positioning Aerial Apparatus
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Instructor Guide

Title: Positioning aerial apparatus
Time Required: 3 hours

Teaching/Learning Materials: LCD projector, laptop computer, accompanying PowerPoint Slides, Aerial Ladder Truck, traffic cones

Motivation: Efficient and effective firefighting activities require the coordinated use of apparatus, equipment and available personnel. Improper positioning of the aerial ladder truck at the scene of a structure fire can create unsafe conditions for the personnel operating on the fireground or cause significant damage to expensive apparatus.

Student Performance Objectives: At the conclusion of this session, the aerial apparatus operator will be able to list the general considerations relating to aerial apparatus positioning, and the factors that influence the apparatus positioning decision, and the operator will be able to demonstrate the proper positioning of the aerial apparatus for a given fireground scenario.

Enabling Objectives:

- List the general considerations associated with aerial apparatus positioning
- Describe safety considerations
- Describe the tactical considerations affecting aerial positioning
- Describe aerial spotting considerations
- Demonstrate the proper positioning of the aerial apparatus for a given fireground scenario

Overview:

- Introduction
- Safety considerations
- General considerations effecting aerial apparatus positioning
- Tactical considerations effecting aerial apparatus positioning
- Spotting considerations
- Staging
- Practical evolution
I. **Introduction.**
   A. Local standard operating procedures and guidelines. All departments have specific policies and procedures relating to aerial apparatus positioning and operation. Review local considerations as part of this drill.
   B. Generally there are no specific rules that hold true for all fireground situations. The most effective method to ensure safe and functional use is to consider various factors such as:
      1. department standard operating procedures;
      2. weather conditions;
      3. road structures and conditions;
      4. obstructions;
      5. tactical operations to be performed;
      6. building designs; and
      7. fire conditions.

II. **Safety Considerations.**
   A. Safe apparatus driving, backing and positioning techniques.
      1. Attitude.
      2. Defensive driving.
      3. Driving in adverse weather conditions.
   B. Consider moving traffic while positioning. Personnel may be continuously obtaining equipment from the apparatus throughout the duration of the incident.
   C. Falling debris.
   D. Contact with energized electric power lines.

III. **General considerations affecting aerial apparatus positioning.**
   A. Position the apparatus in a position to minimize the required reach and operation of the aerial at low angles.
   B. Avoid uneven terrain when possible.
   C. Avoid positioning the apparatus where the aerial device will be required to operate beyond its structural and physical limitations.
   D. Avoid positioning the apparatus where the aerial device will be exposed to high temperatures and direct flame contact.
   E. Avoid positioning where the aerial must operate perpendicular to the truck longitudinal axis. This is the weakest loading position.
   F. Try to place the aerial device turntable in direct line with the desired target. This minimizes reach and twisting of the aerial device.

IV. **Tactical Considerations affecting apparatus positioning.**
   A. Rescue.
      1. Attempt to place the apparatus turntable near a building corner to provide access to two or more sides of the building.
2. If a rescue is to be made from an area threatened by fire, position hoselines to protect the victims, crew and equipment.

3. Consider wind conditions;
   a. When possible, place the aerial ladder up-wind from the window area or roof area where a rescue situation is anticipated.
   b. When a rescue attempt is being made from a down-wind position, the operator may have difficulty seeing through smoke to affect the rescue.

B. Positioning for access to upper floors.
1. Building coverage and aerial-device reach should be maximized and up-wind whenever possible. This may require positioning the apparatus on the building side opposite the active fire.
2. Consider the utilities the aerial device can provide to the upper floors of the building. Such as, providing water for attack lines, lighting and electrical power.
3. Aerial devices can be used as a means of escape for crews operating inside the fire building. Consider the fire location within the building and be prepared to position the apparatus and aerial for use by interior crews.
4. Apply many of the same principals discussed with rescue operations.

C. Positioning for Ventilation.
1. Proper apparatus position can greatly influence the effectiveness of ventilation operations.
2. Consider equipment needed for ventilation operations.
3. Position the apparatus as close as possible to the location where ventilation is to be performed. This will minimize the time required to perform the activity.
4. Consider roof collapse or the need to rapidly evacuate the roof operation. Watch youtube.com firefighters escape roof at: http://www.youtube.com/watch?v=Zm1WQb8Xq0
5. The aerial ladder should be positioned such that the ladder can extend above the roof level. This allows firefighters to safely enter and exit the ladder onto and from the roof. The ladder should extend six (6) feet above the roof level. Aerial platforms should be positioned level with the roof.
6. If the aerial is intended to be used to assist with horizontal ventilation, the rules for ground ladders should be followed, including placing the ladder on the up-wind side of the window.

D. Fire suppression activities (elevated master streams).
1. Do not use elevated master streams while crews are working inside in the building.
2. Position the apparatus so that elevated fire streams maximize reach into the building.
3. Consider deflecting the fire stream from the ceiling of the upper floors to extend the reach into the building.
4. Only use elevated master streams until the bulk of the involved fire is blackened. Once, blackened, consider the use of handlines, provided the building conditions are safe to do so.

5. Continually monitor the building integrity for collapse scenarios.

V. Spotting considerations.
A. Attitude of safety. Regardless of the apparatus position or function to be performed, the operator must observe safety precautions at all times when determining the aerial apparatus position.

B. Surface conditions.
1. Unless absolutely necessary, avoid positioning the apparatus on soft soil. If placement on soft soil is necessary, consider the use of cribbing or jack-plates to aid in stabilization for the aerial device. Continually monitor for settling. Thin layers of asphalt pavement may act similar to soft soils.
2. Loose gravel may create slippery conditions or damage outrigger jack-plates. Sweep loose gravel away.

C. Weather conditions.
1. Icy conditions may require rock salt, anti-skid material or sand under the vehicle tires and throughout the work area near the apparatus.
2. In extreme cold weather conditions, it may be necessary to spray the apparatus with de-icing fluids.
3. Moderate to high winds can affect the stability of the aerial apparatus. Consider wind conditions and natural wind blocks, such as high-rise buildings, trees, etc.

D. Electrical hazards/Overhead obstructions.
1. Overhead electric power lines present a serious risk to aerial operations. Caution should be exercised around and under these power lines. Articulating booms may be able to maneuver around wires easier than straight aerial ladders.
2. Operators should remind firefighters to avoid coincidental contact with the apparatus and the ground to avoid the creation of an electrical flow path should the aerial contact an overhead power line.
3. Trees and other overhead obstructions may effect operations and should be considered when positioning the apparatus.

E. Angle and location of aerial device operation.
1. The angle of placement may be affected by the type and manufacture of the apparatus. Consider reviewing the aerial apparatus manufacture’s suggested operating instructions.
2. Stability of the aerial can be improved by operating the aerial device in line with the longitudinal axis of the aerial apparatus. Increasing the angle from the apparatus axis decreases the allowable weight or load on the aerial ladder.
3. Tractor-trailer apparatus should be positioned to increase stability by jackknifing the apparatus. In this case, the greatest stability occurs when the angle between the tractor and the trailer approaches sixty (60) degrees.

4. Dangerous stresses are induced in the aerial ladder when the ladder rungs are operated nonparallel to the ground. This occurs when the apparatus is parked on an incline. Ladder stresses can occur from one or a combination of the following:
   a. Excessive degree of angle, both horizontal and vertical;
   b. Operation in supported versus unsupported positions;
   c. Length of aerial device extension;
   d. Personnel on the aerial device;
   e. Nozzle reaction from the elevated master stream;
   f. Weight of hose, water, and equipment; wind reaction; improper operation of the aerial device;
   g. Heat exposure; and
   h. Ice on the ladder.

5. When approaching from the uphill side, the apparatus should be positioned past the fire building, and the aerial device should be operated off the back of the truck.

6. When approaching from the downhill side, the apparatus should stop short of the fire building, and the aerial should be operated over the cab of the truck.

7. Avoid positioning the apparatus far distances from the building where the operating angle for the aerial ladder is low, generally considered to be less than thirty (30) degrees.

F. Fire building conditions.

1. Buildings that have been subjected to extensive fire damage or buildings in poor condition before the incidence of the fire may be subject to collapse.

2. If the fire has the potential to grow beyond the initial building involved. Position the apparatus so as to avoid trapping the apparatus and crew in a dangerous location, where damage, injury or death may occur. Avoid making the apparatus a fire exposure.

3. Consider falling debris when positioning the apparatus.

4. A building collapse zone should be considered equal at least to the height of the building.

5. Recognize the indicators that a building may be unstable.
   a. Bulging walls;
   b. Presence of stars or large bolts and washers on the exterior wall at the floor line;
   c. Large cracks in the exterior;
   d. Falling bricks, blocks or mortar, and
   e. Interior collapses.
VI. Staging
   A. Level I Staging.
      1. Level I staging is applied to the initial response and is used on every response.
      2. Follow local standard operating procedures for apparatus positioning.
   B. Level II Staging.
      1. Level II staging is used on larger incidents where multiple emergency vehicles are responding to the same incident and traffic congestion of the emergency vehicles could be a problem.
      2. Level II staging is located at a remote location, generally near the incident, where they can quickly arrive once called for.

VII. Practical Evolution.
   A. After completing the lecture review, depart the classroom for the training ground or site. At the site, stage the apparatus away from buildings or simulated buildings. Assign a crew consisting of an apparatus operator and an officer in the aerial apparatus. The operator shall be directed to proceed toward the building or simulated building area. Enroute to the demonstration area, the operator will be given a fireground tactical scenario to position the apparatus for operation. Based on the given scenario, the operator shall position the aerial apparatus in the most reasonable or best location to accomplish the tactical objective assigned. When the operator has progressed through the basic scenarios, additional obstacles may be placed in the area to simulate parked vehicles, overhead wires and obstructions and varying fire conditions.
   B. Practical evaluation considerations;
      1. Turntable aligned with the target as closely as possible;
      2. Aerial reach and extension, practical for the scenario given;
      3. Apparatus on stable ground; and
      4. Apparatus positioned correctly for the given scenario.

Summary: At the conclusion of this session, the aerial apparatus operator will be able to list the general considerations relating to aerial apparatus positioning, and the factors that influence the apparatus positioning decision, and the operator will be able to demonstrate the proper positioning of the aerial apparatus for a given fireground scenario.

Review:

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- Safety considerations
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- Tactical considerations effecting aerial apparatus positioning
- Spotting considerations
- Staging
- Practical evolution
Reference Material:

IFSTA Fire Department Aerial Apparatus, first edition, Chapter 4 – Positioning Aerial Apparatus, pp. 61-74.