

Aerial Apparatus Strategies and Tactics

Terms

Write the definition of the terms below on the blanks provided.

1. Strategy (300)
2. Tactics (300)
3. Stokes Basket (311)
4. Convection (316)
5. Exposures (316)
6. Radiation (316)

True/False

Write True or False on the blanks provided; if false, write the correct statements on the lines provided.

- _____ 1. Strategies are the actual procedures and actions taken to successfully carry out tactics. (300)
- _____ 2. Rescue operations are always the first priority on the fireground. (300)

- _____ 3. During situations that require using aerial apparatus for rescue, the first priority involves multiple victims who may be located in different parts of the fire building. (301)

- _____ 4. The driver/operator should try to keep the aerial device perpendicular to the victims. (302)

- _____ 5. When maneuvering any aerial device to reach a victim trapped in an elevated position, the aerial device should initially be aimed above the victim, and then lowered to meet the victim. (303)

- _____ 6. Extension locks increase the overall strength of the extended device, and greatly reduce the chance of failure. (304)

- _____ 7. When using aerial platforms for a rescue from a window, the floor of the platform should be even with the windowsill. (305)

- _____ 8. When rescuing victims off parapet style roofs, it may be necessary to use roof ladders to get over the parapet to the aerial device. (306)

- _____ 9. The “knee-sit” method is beneficial in that a smaller firefighter can easily carry a heavier person down the ladder. (308)

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- _____ 10. Evacuating down on an aerial ladder by the way of a basket type litter is the first option if the victim is unconscious. (311-312)
- _____ 11. An aerial device can be damaged if lowered into moving water during a water rescue operations. (313)
- _____ 12. Wind enhances the effects of radiated and convection heat transfer. (318)
- _____ 13. Directing fire streams into the air between the fire and the exposures will appreciably reduce the chance of an exposure catching fire. (319)
- _____ 14. During exposure operations, elevated master streams should be operated in natural ventilation openings. (321)
- _____ 15. The aerial device maybe used as the ventilation tool during ventilation operations. (321)
- _____ 16. Aerial ladders with piped waterways and water towers may both be equipped with remote controls that allow the fire stream to be manipulated from the aerial platform. (324)

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- _____ 17. An advantage provided by some water tower devices is the addition of video and thermal imaging cameras. (324)
- _____ 18. Solid stream nozzles provide wider coverage than fog stream nozzles, and they are able to break up the water to effect better stream conversion. (327)
- _____ 19. A 750 gpm (3000 L/min) fog nozzle discharging 750 gpm (3000 L/min) will perform more effectively than a 1000 gpm (4000 L/min) nozzle flowing 750 gpm (3000 L/min). (328)
- _____ 20. When elevated master streams are used in a blitz attack, they should only be flowed long enough to darken down the fire. (330)

Short Answer

Write the correct answers on the blanks provided.

1. List the steps for performing the knee-sit method. (308)

2. List the steps for rescuing a severely injured victim who is unable to physically assist in their own rescue down an aerial ladder. (309)

8. List five safety principles when using detachable ladder pipes. (326)

Multiple Choice

Write the correct answers on the blanks provided.

- _____ 1. When raising the aerial device to a victim, the aerial device should be placed ___ inches (mm) above the target spot. (302)
- A. 1 to 3 (25 to 80)
 - B. 4 to 6 (100 to 150)
 - C. 7 to 10 (180 to 250)
 - D. 12 to 14 (305 to 360)
- _____ 2. Which of the following statements regarding when the aerial ladder is extended at an angle is MOST accurate? (302)
- A. Beam on the building side of ladder is below and under objective
 - B. Beam on the building side of the ladder is above and over the objective
 - C. Beam opposite the building side of the ladder is below and under objective
 - D. Beam opposite the building side of the ladder is above and over the objective
- _____ 3. When positioning the aerial device for a rescue from a window, the ___ rung should be placed even with the windowsill. (305)
- A. first
 - B. second
 - C. third
 - D. fourth

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- _____ 4. When positioning the aerial device for a rescue from a roof, the tip of the aerial ladder should be placed at least _____ above the roofline. (306)
- A. 2 feet (0.5 m)
 - B. 4 feet (1 m)
 - C. 6 feet (2 m)
 - D. 8 feet (2.5 m)
- _____ 5. Which of the following is a type of aerial device that is well suited for below grade rescue operations? (316)
- A. Telescoping aerial device
 - B. Three boom articulating platform
 - C. Telescoping platform aerial device
 - D. Three boom articulating water tower
- _____ 6. Which of the following spreads fire by heat movement in all directions in the form of energy waves? (316)
- A. Radiated heat
 - B. Convection
 - C. Conduction
 - D. Direct flame contact
- _____ 7. During exposure protection operations, which of the following fire stream types will allow for maximum coverage of an exposure? (321)
- A. Fog
 - B. Straight
 - C. Solid master
 - D. Aerated foam
- _____ 8. The aerial device should be in which position during ventilation operations, with the firefighter at the tip of the ladder or in the platform breaking upper-story windows? (322)
- A. Above the window and slightly to the upwind side
 - B. Below the window and slightly to the upwind side
 - C. Above the window and slightly to the downwind side
 - D. Below the window and slightly to the downwind side
- _____ 9. Which of the following is NOT a category of an elevated water delivery system? (324)
- A. Elevating platforms
 - B. Aerial ladders with detachable platforms
 - C. Aerial ladders with detachable waterways
 - D. Aerial ladders with piped waterways and water towers

- _____ 10. Which of the following elevated water delivery systems should be operated from the turntable or ground level using ropes that are attached to the nozzle? (325)
- A. Elevating platform
 - B. Aerial ladders with detachable platforms
 - C. Aerial ladders with detachable waterways
 - D. Aerial ladders with piped waterways and water towers
- _____ 11. Which of the following statements regarding solid streams is MOST accurate? (327)
- A. Solid streams are used for exposure protection.
 - B. Solid streams are used for close-up blitz attacks.
 - C. Solid streams reach longer distances than fog streams.
 - D. Solid streams break up water to effect better steam conversion.
- _____ 12. Which of the following is the BEST way to effect a blitz attack with an elevated master stream? (329)
- A. Deflect water off the ceiling
 - B. Deflect water off the back wall
 - C. Straight into the seat of the fire with “fog stream”
 - D. Straight into the seat of the fire with “solid stream”
- _____ 13. What is the correct angle for water deflection during a blitz attack? (329)
- A. 20 degrees
 - B. 30 degrees
 - C. 40 degrees
 - D. 50 degrees
- _____ 14. Water adds weight to the structure at the rate of 1 ton per minute for every: (329)
- A. 150 gpm (567 L/min).
 - B. 250 gpm (946 L/min).
 - C. 350 gpm (1 325 L/min).
 - D. 450 gpm (1 703 L/min).
- _____ 15. Which of the following is NOT an indicator of a potential defensive attack? (330)
- A. Large amounts of water are needed to extinguish the fire
 - B. The Incident Commander opts to sacrifice part of the building to the fire
 - C. Fire or building conditions that prohibit safely advancing hand lines into the building
 - D. The aerial apparatus is positioned close to the building and the fire stream can reach the seat of the fire

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- _____ 16. Which of the following statements regarding standpipe operations is MOST accurate? (331)
- A. Aerial devices are not recommended for exterior standpipe operations.
 - B. Aerial devices are not effective exterior standpipe connections for fires in parking garages.
 - C. Aerial devices are an effective exterior standpipe connection when buildings are properly equipped with standpipe systems.
 - D. Aerial devices are an effective standpipe exterior connection when interior fire on an upper floor and building does not have an operable standpipe system.
- _____ 17. Aerial apparatus can be used to apply large quantities of foam to combustible: (332)
- A. gases.
 - B. liquids.
 - C. solids.
 - D. metals.
- _____ 18. The roll-on method directs foam _____ a burning liquid pool. (332)
- A. uphill of
 - B. directly on
 - C. on the back edge of
 - D. on the front edge of
- _____ 19. Which of the following foam application methods involves the foam stream being directed off an object, allowing the foam to run down onto the surface of the fuel? (333)
- A. Roll-on method
 - B. Bank-down method
 - C. Rain-down method
 - D. Direct attack method
- _____ 20. Which of the following foam application methods involves directing the stream into the air above the fire or spill and allows the foam to float down onto the surface of the fuel? (334)
- A. Roll-on method
 - B. Bank-down method
 - C. Rain-down method
 - D. Direct attack method

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Skill Sheet 10-1

Objective 5: Move victims down an aerial ladder raised to an elevated location. (NFPA® 1002, 6.2.3)

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will move victims down an aerial ladder that is raised to an elevated location.

Equipment & Materials

- Three firefighters to perform rescue
- Certified aerial apparatus driver/operator
- Firefighters, to play role of conscious victims
- Dummies to serve as unconscious victim (child-size and adult-size)
- Driver/operator candidate
- Aerial ladder apparatus
- Apparatus operator's manual

Task Steps

AERIAL LADDER RESCUE FROM A WINDOW — CAPABLE ADULT VICTIM

1. Raise the aerial ladder to the victim.
2. Seat the extension locks.
3. Assign firefighters to assist the victims in boarding and descending the ladder.
4. (Inside firefighter) Assist the victim through the window opening and onto the ladder. The victim should be facing the building.
5. Guide the victim down the ladder.

AERIAL LADDER RESCUE FROM A WINDOW — MULTIPLE CAPABLE ADULT VICTIMS

1. Raise the aerial ladder to the victims.
2. Seat the extension locks.
3. Assign firefighters to assist the victims in boarding and descending the ladder.
4. (Inside firefighters) Assist each victim through the window opening and onto the ladder. Victims should be facing the building, and should be spaced so that no more than one is on each ladder section.

AERIAL LADDER RESCUE FROM A WINDOW — INFANTS AND SMALL CHILDREN INCAPABLE OF DESCENDING THE LADDER THEMSELVS

1. Raise the aerial ladder to the victim.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Inside firefighter) Help load the victim.
5. Descend the ladder with the victim.

**AERIAL LADDER RESCUE FROM A WINDOW —
METHOD #1: LARGER CHILDREN AND UNCONSCIOUS ADULTS
INCAPABLE OF DESCENDING THE LADDER THEMSELVES**

1. Raise the aerial ladder to the victim.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Inside firefighter) Help load the victim.
5. Descend the ladder, grasping victim around knees. Use other arm to grasp ladder rail and assist with balancing.
Note: If it can be done without overloading the ladder, a third firefighter should back up the rescuer as the ladder is descended.
6. (Assisting firefighter) Back up carrying firefighter.

**AERIAL LADDER RESCUE FROM A WINDOW —
METHOD #2: LARGER CHILDREN AND UNCONSCIOUS ADULTS
INCAPABLE OF DESCENDING THE LADDER THEMSELVES**

1. Raise the aerial ladder to the victim.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Inside firefighter) Help load the victim.
5. Descend the ladder cradling the victim across both arms and close to chest. Place both hands on hand rails for support, and slide the victim down the ladder rails.
6. (Assisting firefighter) Back up carrying firefighter.

AERIAL LADDER RESCUE FROM A ROOF — CAPABLE ADULT VICTIM

1. Raise the aerial ladder to the roof.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Roof firefighter) Assist the victim onto the ladder.
5. Guide the victim down the ladder.

AERIAL LADDER RESCUE FROM A ROOF — MULTIPLE CAPABLE ADULT VICTIMS

1. Raise the aerial ladder to the roof.
2. Seat the extension locks.
3. Assign firefighters to assist the victims in boarding and descending the ladder.
4. Move off the ladder.
5. (Roof firefighter) Assist each victim onto the ladder.

AERIAL LADDER RESCUE FROM A ROOF — INFANTS AND SMALL CHILDREN INCAPABLE OF DESCENDING THE LADDER THEMSELVES

1. Raise the aerial ladder to the roof.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Roof firefighter) Help load the victim.
5. Descend the ladder with the victim.

**AERIAL LADDER RESCUE FROM A ROOF —
METHOD #1: LARGER CHILDREN AND UNCONSCIOUS ADULTS INCAPABLE
OF DESCENDING THE LADDER THEMSELVES**

1. Raise the aerial ladder to the roof.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Roof firefighter) Help load the victim.
5. Descend the ladder, grasping victim around knees. Use other arm to grasp ladder rail and assist with balancing.
6. (Assisting firefighter) Back up carrying firefighter.

**AERIAL LADDER RESCUE FROM A ROOF —
METHOD #2: LARGER CHILDREN AND UNCONSCIOUS ADULTS
INCAPABLE OF DESCENDING THE LADDER THEMSELVES**

1. Raise the aerial ladder to the roof.
2. Seat the extension locks.
3. Assign firefighters to assist the victim in boarding and descending the ladder.
4. (Inside firefighter) Help load the victim.
5. Descend the ladder cradling the victim across both arms and close to chest. Place both hands on hand rails for support, and slide the victim down the ladder rails.
6. (Assisting firefighter) Back up carrying firefighter.

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Skill Sheet 10-2

Objective 6: Use an aerial platform to remove victims from an elevated location. (NFPA® 1002, 6.2.3)

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will use an aerial platform to remove various victims from an elevated location.

Equipment & Materials

- Two firefighters, for rescue
- Certified aerial apparatus driver/operator
- Firefighter, to play role of conscious victim
- Dummy to serve as unconscious victim
- Training building of at least two stories with flat roof and windows
- Aerial platform apparatus
- Apparatus operator's manual

Task Steps

ROOF RESCUE

1. Assign firefighters to assist the victims in boarding and descending in the aerial platform.
2. Raise the aerial platform to the roof.
3. (Roof firefighter) Help load the victim.
4. Position victims in the platform.
5. Close and lock the platform gate as appropriate.
6. Communicate with the driver/operator, giving the go ahead for descent.

WINDOW RESCUE

1. Assign firefighters to assist the victims in boarding and descending in the aerial platform.
2. Raise the aerial platform to the window.
3. (Roof firefighter) Help load the victim.
4. Position victims in the platform.
5. Close and lock the platform gate as appropriate.
6. Communicate with the driver/operator, giving the go ahead for descent.

Skill Sheet 10-3

Objective 7: Lower a Stokes litter using an aerial ladder. (NFPA® 1002, 6.2.3)

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will lower a Stokes litter using an aerial ladder.

Equipment & Materials

- Aerial apparatus driver/operator candidate
- Certified driver/operator
- Two firefighters, as rescuers
- Appropriate length of life safety rope to use as guide rope
- Dummy lashed into Stokes litter
- Two pike poles
- Short sections of webbing or rope for lashing pike poles to ladder rails
- Aerial ladder apparatus
- Training building of at least two stories with flat roof and windows
- Apparatus operator's manual

Task Steps

METHOD #1: BETWEEN THE RAILS

1. Raise the aerial ladder to the victim.
Window rescue: Place first ladder rung even with windowsill.
Roof rescue: Extend ladder to at least 6 feet (2 m) above the edge of the roof.
2. Seat the extension locks.
3. Assign firefighters to assist in loading the victim and descending the ladder.
4. (Inside/roof firefighter) Prepare victim/Stokes litter for descent.
5. (Inside/roof firefighter) Help load the victim.
6. (Inside/roof firefighter) Assist with the descent.
7. Descend the ladder, placing the litter between the rails on the rungs of the ladder.
8. (Firefighters on aerial device turntable) Assist in removing the litter from the ladder.

METHOD #2: ACROSS AND ON TOP OF BOTH RAILS

1. Raise the aerial ladder to the victim.

Window rescue: Place first ladder rung even with windowsill.

Roof rescue: Extend ladder to at least 6 feet (2 m) above the edge of the roof.

2. Seat the extension locks.
3. Assign firefighters to assist in loading the victim and descending the ladder.
4. (Inside/roof firefighter) Prepare victim/Stokes litter for descent.
5. (Inside/roof firefighter) Help load the victim.
6. (Inside/roof firefighter) Assist with the descent.
7. Descend the ladder, centering the Stokes basket perpendicular to the ladder across both rails.
8. (Firefighters on aerial device turntable) Assist in removing the litter from the ladder.

METHOD #3: PARALLEL TO AND ON TOP OF LADDER RAILS ON PIKE POLES

1. Raise the aerial ladder to the victim.

Window rescue: Place first ladder rung even with windowsill.

Roof rescue: Extend ladder to at least 6 feet (2 m) above the edge of the roof.

2. Seat the extension locks.
3. Assign firefighters to assist in loading the victim and descending the ladder.
4. (Inside/roof firefighter) Prepare victim/Stokes litter for descent.
5. Lash two pike poles to ladder rails, perpendicular to the ladder and about 3 feet (1 m) apart.
6. (Inside/roof firefighter) Help load the victim.
7. (Inside/roof firefighter) Assist with the descent.
8. Descend the ladder, centering the Stokes basket on the pike poles.
9. (Firefighters on aerial device turntable) Assist in removing the litter from the ladder.

Skill Sheet 10-4

Objective 16: Deploy and operate an elevated master stream. (NFPA® 1002, 6.2.5)

Student Name: _____ **Date:** _____

Directions

For this skills evaluation checklist, students will deploy and operate an elevated master stream.

Equipment & Materials

- Aerial apparatus driver/operator candidate
- Certified aerial apparatus driver/operator
- Water tower or fire service aerial apparatus with piped waterway
- Apparatus operator's manual

Task Steps

AERIAL LADDERS WITH A DETACHABLE LADDER PIPE NOZZLE

1. Position the apparatus.
2. Transfer power from the drive train to the aerial device hydraulic system.
3. Set the stabilizers.
4. Prepare the ladder pipe for attachment to the aerial ladder.
Fog nozzle: Set for appropriate fire stream and flow rate as applicable
Solid stream nozzle: Place appropriate nozzle tip on end of nozzle
5. Attach the ladder pipe and hose to the aerial ladder.
6. Attach supply hose to aerial ladder, running hose down the center of the ladder and lashing the hose to the ladder once every 15 to 20 feet (4m to 6 m)
7. Attach a siamese appliance to the opposite end of the ladder pipe supply hose.
8. Attach a supply hose to the siamese.
9. Raise the aerial ladder to the desired operational position.
10. Engage the aerial ladder locks.
11. Check the ladder pipe control ropes.
12. Charge the ladder pipe supply hose and operate the fire stream.
Fog nozzle: 80 psi (560 kPa)
Solid stream nozzle: 100 psi (700 kPa)
13. Shut down the ladder pipe operation and stow the aerial device and all associated equipment.

AERIAL LADDERS WITH FIXED WATERWAY SYSTEMS

1. Position the apparatus.
2. Transfer power from the drive train to the aerial device hydraulic system.
3. Set the stabilizers.
4. Establish a water supply to the aerial ladder waterway system.

Quint supplying master stream from onboard water: Attach a large-diameter supply hose or multiple medium-diameter supply hoses from a pumper or hydrant to the pump intake on the aerial apparatus.

Pumper supplying master stream: Attach a large-diameter supply hose or multiple medium-diameter supply hoses from a pumper to the waterway inlet(s)

5. Raise the aerial ladder to the desired operational position.
6. Engage the aerial ladder locks.
7. Check the ladder pipe control ropes.
8. Charge the waterway and operate the fire stream.

Fog nozzle: 80 psi (560 kPa)

Solid stream nozzle: 100 psi (700 kPa)

9. Shut down the waterway system and stow the aerial device and all associated equipment.