

SAN DIEGO FIRE RESCUE DEPARTMENT  
TRAINING AND EDUCATION DIVISION  
TRAINING BULLETIN

NO.: 20-03  
DATE: December 22, 2020  
TO: All Personnel  
FROM: Willy Melendez, Battalion Chief, Training & Education Division  
SUBJECT: Ladder Pipe Operation (Pierce Tractor Drawn Aerial)

SUBMITTED BY: Captain James Laing, Driver Training Officer

**Introduction:** With the addition of the new Pierce Tractor Drawn Aerial (TDA) to our fleet, this truck does not have a pre-plumbed waterway and will take a different operation to place into service than any other apparatus in our department. This procedure has been developed and tested by the Training and Education Division. It is offered as an authoritative guide but is not intended to prevent an officer from making reasonable modifications necessary to fill particular needs as determined by the size-up, apparatus, available personnel, etc.

It is designed to be performed without the necessity of assigning specific duties other than a few obvious exceptions, e.g., tractor operator and tiller operator. Some of the steps are performed sequentially, while others are done simultaneously. Maximum efficiency will be achieved by each member understanding the procedure and the end result desired, performing the next step necessary to complete the procedure.

**Description:** The placement of the ladder pipe/nozzle appliance will need to be secured onto the ladder and supplied by the 3" supply hose carried only on the Pierce TDA. A 4" hose will be supplied by an engine connecting to a manual 4" to 2 1/2" gate valve that is also carried only on the Pierce TDA.

SDFD Pierce TDA Ladder Pipe Components:

- Akron 1494 Ladder Pipe Assembly with 2 1/2" coupling (1000 max. GPM)
- Akromatic Electric Master Stream Nozzle
- TFT In-Line Gate Valve 4" intake to 2 1/2" discharge
- Two hose straps with aluminum carabiner

## **OPERATIONS TO BE PERFORMED**

1. Spot apparatus considering optimal placement for the waterway.

- \*Tractor/Trailer jackknife position in-line (zero degrees) up to 30-degree jackknife for greatest ladder load capability. 30-59.9 degrees jackknifed position; the aerial ladder capabilities will be limited to the non-jackknifed side only.

SAN DIEGO FIRE RESCUE DEPARTMENT  
TRAINING AND EDUCATION DIVISION  
TRAINING BULLETIN

- In excess of 60 degrees jackknife, the apparatus is unstable in this position and could tip over, causing serious injury or death to personnel.

\*Consider the placement of the waterway hose coming off the turntable and down to the manual gate valve and to the supply engine. This makes working off the side of the apparatus generally preferred for hose placement.

2. Ensure spring and front brakes are both applied, then engage aerial master.

\*Aerial master will not engage if both brakes are not applied.

3. Chock the front and back of front tires on the Engineer and Captain side of the tractor.

4. Extend outriggers, Low side first, high side second. Then place outrigger pads in the center of the jack.

\*It is recommended to deploy outriggers from their respective sides to ensure they are clear of all obstacles.

\*Pierce's recommendations are to raise the rear tractor axle tires off the ground or take the bulge out of the rear tractor axle tires so long as the on-ground indicators are illuminated. Consider improved braking when maintaining contact with the ground with your rear tractor tires. By not removing enough weight from the rear tractor tires, outriggers may become unweighted in some instances, restricting aerial movements.

\*Lower outrigger jack located on the downhill/low side of the apparatus first. Continue holding the jack down switch until it automatically stops. Repeat the same process on the high side of the apparatus. Additional weight may then be taken off the rear tractor axle tires by adding additional down input to each jack while also properly leveling the turntable. The auto level switch may also be used for leveling, but the goal is to bring the apparatus level indicators into the green for slope and grade.

5. Ensure all green indicator lights are illuminated to activate ladder power.

6. Ensure outriggers are properly pinned.

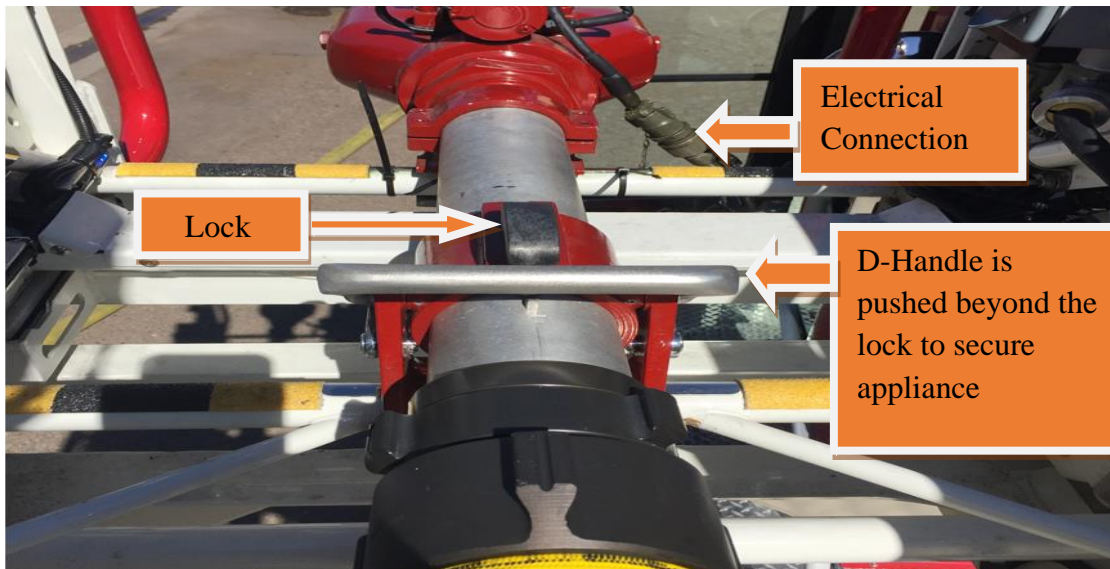
7. Prior to mounting the turntable, switch the hydraulic diverter from outrigger to ladder mode, and set the lock.

## **DEPLOYING THE MANUAL WATERWAY and AKRON AERIAL NOZZLE**

**\*\*\*ATTENTION\*\*\***

The ladder must be raised from the cradle and offset from the tiller cab in order to mount the waterway nozzle. This can be safely achieved by raising the ladder up to 2-3 degrees and then rotating left or right until the ladder beam is in line with the opposite corner of the tiller cab. Ensure clearance from obstacles along with the trailer while rotating the ladder. This movement of the ladder allows for the nozzle to be easily removed from the ladder pipe mount and then handed to an additional crewmember on top of the ladder. The nozzle is now secured to the top two rungs of the fly section with the manual locking clamp. It is preferred that two personnel are utilized to mount the nozzle (one on the ladder and one on the trailer) due to the weight and length of the appliance for safety.

1. Secure the waterway and mount it onto the top two rungs of the fly section. Connect electronic connections from the aerial ladder to the ladder pipe. (see pic. 1).

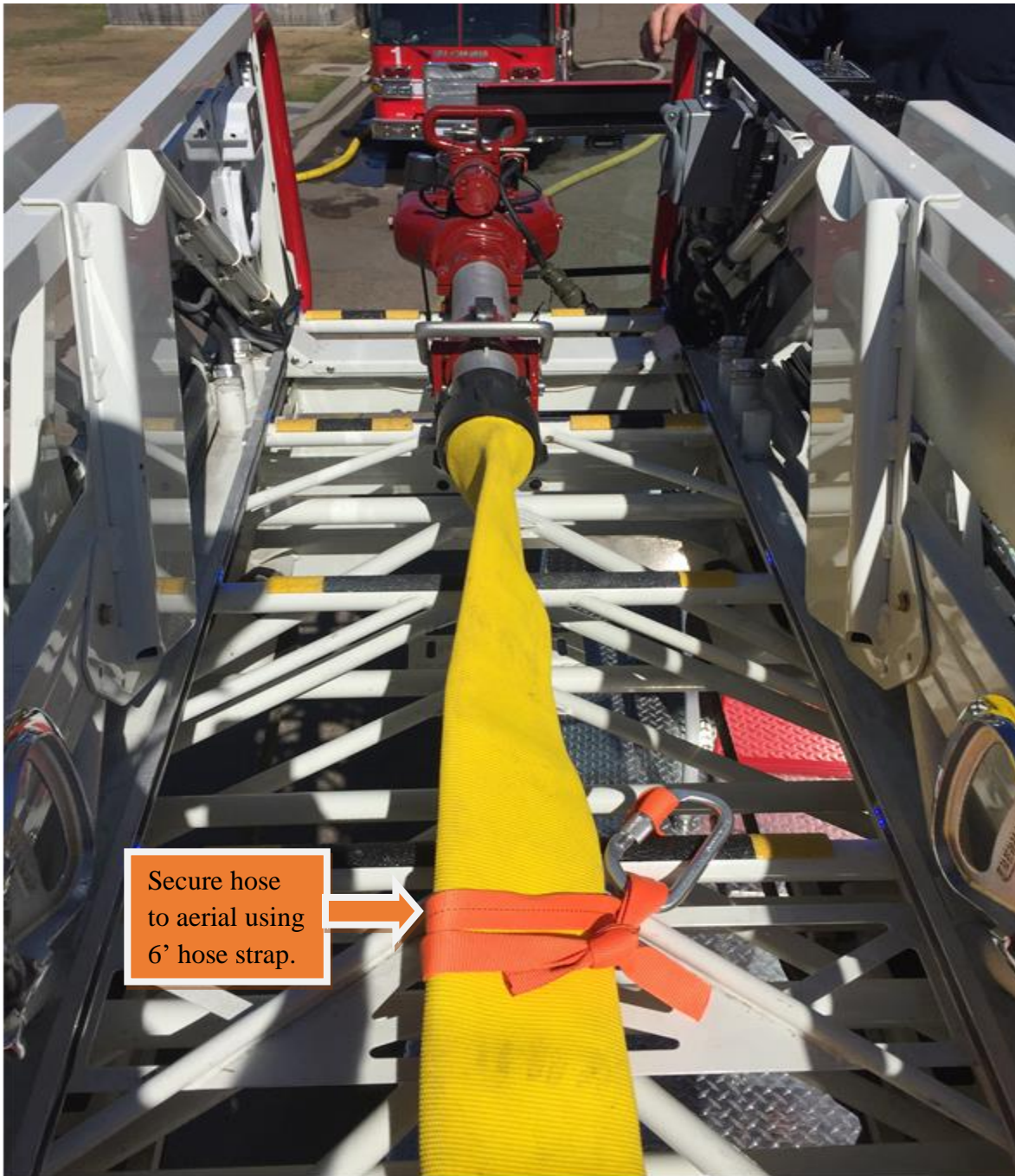


Pic 1

**\*\*\*SAFETY NOTE: There is no safety mechanism to prevent the attached nozzle from being moved into the tiller cab. Exercise caution while making movements near the tiller cab with the nozzle attached.\*\*\***

SAN DIEGO FIRE RESCUE DEPARTMENT  
TRAINING AND EDUCATION DIVISION  
TRAINING BULLETIN

2. Secure 3" waterway hose, lay it down the length of the ladder on the rungs (this may be done when originally walking out the ladder), and attach it to the mounted nozzle spanner tight all connections-nozzle and hose/coupling connections. Secure hose to the ladder utilizing hose strap to the hose with a cow hitch 2-3 feet from the coupling and around a fly section rung with the carabiner resting on top (see pic. 2). Personnel will now exit the ladder.



Pic 2

**CAUTION**

**\*\*Do not allow hose, couplings, hose-straps, etc...to become trapped between the rungs or equipment damage may result\*\***

SAN DIEGO FIRE RESCUE DEPARTMENT  
TRAINING AND EDUCATION DIVISION  
TRAINING BULLETIN

3. Elevate, Extend (deploying hose), then Rotate the ladder to the desired position for ladder tower operation. The Akron automatic fog nozzle does not allow for left and right movements, only stream adjustments (fog to straight stream) and movements up and down. Movements left, and right will be made by rotating the ladder.

\*Additional personnel will ensure the hose deploys smoothly from the hose storage box while the ladder is being extended and positioned by the aerial operator. After the aerial is positioned, remove the remaining hose from the storage box and connect it to the 4" x 2 1/2" waterway gate valve (see Pic.3) placed on the ground near the pedestal of the TDA. There is an additional 25' section of 3" waterway hose that can be utilized as needed. Consider the routing of your 3" hose to allow for elongation and movement when charged with water. Avoid hose and or coupling binding/damaging railings, floodlights, and body of apparatus as the hose is moved or charged



Pic 3

4. Ensure the 4" supply line has been connected to the "closed" 4" x 2 1/2" waterway gate valve and master stream couplings are all spanner tight. Water is called for to the closed gate valve.

\*Truck personnel should ensure that care has been placed into laying the 4" aerial supply line as flat and straight as is reasonable to minimize movement of the gate valve while it is charged. The supply line shall be charged slowly by the supply engine at idle pressure to manage the movement of the gate valve.

5. Truck Engineer will call for water. The firefighter will open the gate valve and monitor the hose charging on the ladder and near the turntable to reduce the risk of hose damaging apparatus, reducing nozzle/ladder reaction, or injuring personnel. After the hose is charged, water is flowing from the nozzle, ensure lines are free of kinks and resting in safe locations limiting movement or chance of damage, then secure second hose strap to the ladder near the base of the ladder (bottom 5 rungs).

**CAUTION**

**\*\*Do not extend or retract the Aerial ladder with a charged hose\*\***

SAN DIEGO FIRE RESCUE DEPARTMENT  
TRAINING AND EDUCATION DIVISION  
TRAINING BULLETIN

6. Pump Engineer will factor in the following for Hydraulic calculations

- NP= 80 psi (this is a low psi adjustable fog nozzle)
- TFL= 90 psi for 100' 3" Hose
- TFL= 13 psi per 100' 4" supply hose
- AL= 15 psi
- GL= .5 psi per 1 foot of elevation based on extension of ladder. (confirm this with the truck engineer)

## **Shutting down the manual waterway operation**

1. Ensure that the pump engineer slowly returns pump pressure to idle. Once at idle, the pump engineer closes the discharge to the supply line.
2. Firefighter closes the gate valve while the pump engineer continues to drain their supply line. Break the 4" side of the waterway hose line at the waterway gate valve. Then, slowly open the waterway gate valve to remove the remaining water from the aerial waterway hose. Disconnect 3" hose from the waterway gate valve.
3. Remove the bottom hose strap from the ladder and the hose. Utilize personnel to tend the 3" hose at and near the turntable as the ladder is retracted. The hose may be taken to the ground to roll and remove air, or if well-drained, it can be loaded into the storage box.
4. After the ladder is fully retracted, rotate and lower the ladder bringing the ladder and nozzle down near the tiller cab. A spotter shall be used to give the Truck Engineer hand signals showing the distance between the nozzle and the tiller cab stopping Aerial movement at least 3 feet from the tiller cab. **Reminder: there is no safety to prevent the nozzle from striking the tiller cab.**
  - \* When the ladder is within 8 degrees of elevation near alignment with the trailer, the ladder will enter the "bed assist" feature. While holding the ladder "down" control, the ladder will begin to make left or right adjustments coming to the midline of the trailer in addition to down movements in order to self bed. **This feature is not to be overridden**, be aware that it will move the nozzle into the tiller cab if the ladder operator does not stop their movements to prevent bed assist from moving the nozzle into the tiller cab.
5. After the ladder movement is stopped, a crew member may walk out the ladder to the nozzle. The hose shall be disconnected from the ladder pipe and set aside. The nozzle can then be unlocked and removed, and placed on the rungs of the ladder in the control of the



SAN DIEGO FIRE RESCUE DEPARTMENT  
TRAINING AND EDUCATION DIVISION  
TRAINING BULLETIN

firefighter standing on the ladder. The nozzle is no longer projecting beyond the tip of the ladder.

\*It is recommended that a crew member standing on the trailer assists the firefighter on the ladder with the removal of the nozzle by preventing the nozzle from tipping forward when the clamp is unlocked.

6. The ladder operator can now resume lowering the Aerial ladder with the crewmember riding inside the fly section of the ladder on the nozzle. When the ladder reaches two degrees incline, the ladder operator can again rotate left or right of the center until the beam aligns with the opposite corner of the tiller cab. The firefighter on the ladder can now pass the nozzle back down to the crew member standing on the trailer, where it will then be secured back onto the trailer nozzle mount.

\*Ladder operator must always visualize clearances around the ladder during movements to prevent contact or damage.

7. After the nozzle is secured and with all members off and clear of the ladder, the ladder can be completely stowed on its cradle.

Please direct any questions to Captain Jim Laing, Driver Training Officer,  
[jlaing@sandiego.gov](mailto:jlaing@sandiego.gov) or (619) 692-4981.

WM/jl