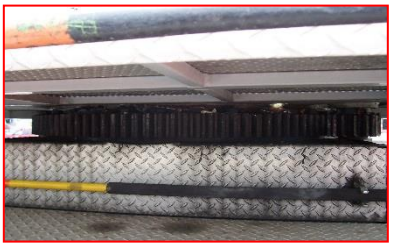
AERIAL INSPECTION

VISUAL

The aerial device, like other mechanical devices, is subject to failure when not properly maintained. The driver must closely inspect the operating parts of the aerial device to ensure functional operating order. After the general DOT inspection has been completed, a thorough visual inspection of the aerial and its working parts should be completed next.

Check the level of the hydraulic fluid in the aerial device system. This should be accomplished by checking the fluid level in the hydraulic fluid reservoir with a dipstick or site glass when the system is cold. The fluid levels should be checked when the stabilizers and the aerial are in the stowed position. If not, the fluid levels in the system will be lowered to supply hydraulic cylinders. Adding fluid at this point may over-fill the system leading to a hydraulic fluid spill or severe damage to system components

*Inspect the stabi*lizers. They should be checked for any sign of damage, evidence of hydraulic fluid leaks, damaged hoses, scoring on the sliding beams or the hydraulic pistons. Make sure all warning lights are clean and in working order. Check locking pins and locking pin holes for any cracks and elongation. Make sure stabilizer pads are in place and in good condition.



Inspect turntable assembly. Check the turntable gear teeth for visible damage, alignment, and proper meshing. Look for evidence of wear and adequate lubrication on all working parts. Check to see if all turntable bolts are present and are properly tightened.

Inspect the lower control pedestal. Check all lower control components for visible signs of wear and damage. All should move freely. Electrical connections should be tight and free of wear also.

Turntable controls

Inspect platform control console. If the aerial device is an elevating platform, make a visual inspection of the device controls on the platform console before testing.

Inspect the aerial device communication system. Check all components for visible damage and proper operation. It may be necessary to position a second firefighter at the tip to perform an operation check.

Check the status/operation of the breathing air supply system. Make sure there is adequate air in the storage cylinders and that all components are operating properly. Make sure the cylinders are not damaged or leaking and that the hoses, gauges, regulators and tubing are all in tact.

Inspect the aerial device extension and retraction system. Before operating the aerial, check the extension and retraction system for visible signs of damage or wear. Look specifically for fluid leaks along the hoisting cylinders. Inspect the cables for damage such as rusting, elongation or fraying. Check the sheaves, guides, guards, or anything that comes in contact with the cables for rough edges that may harm the cables.

Inspect the device elevating or lifting cylinders. Check for any visible signs of damage or insecurity. Look for signs of leaks and make sure that the end caps are secure and in place with no hardware missing.

Inspect each section of the aerial device. Check the device for signs of wear, cracks in the welds, loose or missing parts, and improper alignment. This includes all rails, beams, locks, alignment systems and truss work.

Inspect the elevating platform (if applicable) for signs of damage. Observe the deck, kick plate, heat shields control platform, standpipe connections, floodlights and the turret for any obvious signs of damage or missing parts. Inspect the platform leveling system for any visible signs of damage.

Inspect all ladder rungs for signs of looseness, loose tread covers (tripping hazard), or other potential problems.

Inspect the aerial waterway system. Check all pre-piped systems for any signs of visible damage to the connections or seals or other system components.

Inspect any equipment that is attached to the end of the aerial device fly section. Check for the presence and stability of axes, pike poles, roof ladders and lights that may be mounted to the end of the aerial device.

OPERATIONAL

Once the visual inspection has been completed, the operator must perform an operational inspection of the aerial device. The operation check satisfies two important components. First, it ensures the operational readiness of the equipment. Second, it serves as a review for the driver/operator in the set-up of the aerial device. By engaging in operation during inspection, the driver/operator will become more effective under emergency conditions.

Park the apparatus in a suitable location. Ensure that the chosen location is a stable parking area that is strong enough to support the weight of apparatus. There should be no over-head obstructions that might come in contact with the extended aerial.

Chock Drive Wheels

Transfer the power from the drive train to the aerial device hydraulic system. Check to make sure that the transfer indicator lights are illuminated after the transfer has been made.

Check the operation of the stabilizers. After lowering the stabilizers, check them for any signs of physical damage or leaks. Note if the truck sags toward any particular side after the stabilizers have been deployed for a while. Make sure all indicator lights are illuminated to facilitate the transfer of hydraulic power to the ladder bed.

Raise and extend the aerial device. Look for signs of jerky motion, unusual noises, or unusual bending or twisting of the aerial device. Once the device has been raised, further inspect the waterway system, rungs, and extension system for signs of damage or defect.

Rotate the aerial device. After fully extending or retracting the aerial device, rotate the aerial in a complete circle and observe any jerking action as it spins. Listen for unusual sounds and watch for leaking fluids during the rotation procedure.

Test the operation of auxiliary equipment. This includes any remote control devices, flood lights, generators, or cameras that may be mounted on the apparatus.

Once the visual and operational tests have been completed, the operator should document any damaged or malfunctioning equipment and/or components of the aerial. If necessary, follow the MCFRS procedures for placing the unit out of service if any of the checks yield a safety concern.

ELEVATED MASTER STREAM DEVICES

WATER DELIVERY SYSTEMS

Water delivery systems are used to discharge elevated master streams for fire attack from the aerial device. There are several different types of water delivery systems based on the type of aerial device.

Pre-piped Aerial Ladder Waterways

Many aerial ladder apparatus are equipped with pre-piped waterways that eliminated the need to lay hose up the ladder bed to a master stream nozzle. There are two common types of pre-piped waterway systems: the bed ladder system and the telescoping waterway system.

The bed pipe is a non-telescoping section of pipe, typically 3" to 3½" in diameter, attached to the under side of the bed section of the ladder. The master stream nozzle is attached directly to the tip end of the pipe. Its supply comes from a connection at the turntable end of the pipe. Bed pipes are typically equipped with solid stream nozzles due to their inability to be positioned in close proximity for effective fog stream application. Most bed ladder pipes are equipped with manually operated nozzles. These nozzles may be operated from the tip of the retracted aerial device or the ground using a rope or halyard system attached directly to the tip and the handle of the nozzle.

Bed Pipe

Many newer apparatus are equipped with a telescoping waterway that extends toward the top of the ladder. The telescoping system consists of three or four sections of aluminum pipe (or other metal) that reduce in size from the largest at the bed section of the ladder to the smallest attached to the fly section. Their internal diameter is usually about 4" with the bottom end of the piping connected to additional piping running through the turntable to water inlets usually found at the rear or the side of the apparatus. These telescoping waterways have swivel joints attached to the turntable pipes to permit continuous 360 degree rotation while flowing water. Pre-piped systems usually have remote-controlled fog nozzles operated by switches located at the tip of the fly section or at the operator's control panel at the pedestal.

Detachable Ladder Pipe Systems

Aerial ladders not equipped with pre-piped waterways have detachable ladder pipe systems. The primary components of these systems include a detachable ladder pipe, fire hose (typically 3½"), halyards or rope, hose straps, and a clappered Siamese. The ladder pipe is designed to be clamped on the top two rungs of the fly section of the aerial ladder. Most ladder pipes are equipped with either a solid stream or fog nozzle (use should be based upon tactical considerations). Detachable ladder pipes are rated for flows up to 1000gpm.

Detachable Ladder Pipe

The ladder pipe is typically supplied by a single section of 3½" hose which runs directly up the center of the ladder rungs (which reduces tensional stress) and is attached prior to elevating the ladder. Hose straps are attached to the hose while in the ladder bed to maintain its stability (approximately two to three are spread from the tip down to the base). The opposite end of the hose from the nozzle should be placed on the ground for attachment of the clappered Siamese which may be supplied by three 3" supply lines or a single LDH supply line with a Storz to 2½" adapter. ***SEE LADDER PIPE PROCEDURE.***

Supply hose tray

Because of rated tip loads, torsional stresses and the backward thrust of nozzle reaction, most aerial devices using detachable ladder pipes should only be operated in rotation not to exceed 15 degrees side to side. For quick set-up, the 75-80-80 rule maybe employed for ladder pipe use: 75 degree angle, 80 percent elevation of the length of the aerial ladder, and 80psi nozzle pressure (solid stream). *Always adhere to recommended manufacturer specifications before attempting any aerial operations*.

Elevated Platform Waterway Systems

Since elevating platforms typically have greater load capacities than aerial ladders, the piping on these systems may be larger in diameter and can produce flows up to 2000 GPM. Some elevating platforms are equipped with two nozzles or turrets attached to the platform that can provide multiple stream protection: one for fire attack and one for exposure protection.

Some elevating platforms are equipped with a 2½" discharge which provides flexibility for using the aerial platform to stretch attack lines to an elevated structure. *This tactic should not be considered if the primary consideration for the use of the aerial platform is rescue. The use of attack lines reduces the ability of the aerial device to be used for victim removal.*

MASTER STREAMS AND ELEVATED FIRE ATTACK

Large defensive operations with heavy fire volume requiring flows upwards to 700 gpm or larger often require the use of elevated master streams for aggressive knock down. As described earlier, different types of water deliver systems provide specific advantages or drawbacks by design. For example, piped waterways and towers may be equipped with remote controls that allow operation and direction of a fire stream from the safety of the platform control pedestal where detachable ladder pipes are manually controlled by a set of halyards which offer a limited margin of flexibility in the application of water. Elevated platforms offer the most efficiency in water application of elevated master streams:

- Because of their construction design, they are not as hindered by elevation and angle restrictions for safety. *Always adhere to recommended manufacturer specifications before attempting any aerial operation.*
- Once the platform is in position, the turrets permit a wider range of movement for fire attack.
- The controls may be operated with a firefighter in the platform bucket to direct the fire stream.
- Based on the manufacturer's tested capacity, some aerial platforms are designed to flow up to 2000 gpm.

When choosing between the fog nozzle and the smooth bore tip, each is a tool to be used in respect to its design capabilities. The straight tip nozzle offers better penetration and reach that may not be as affected by atmospheric conditions. Fog nozzles offer wider area coverage for exposure protection and faster steam conversion because the water has already been released from the nozzle in small droplets. In any event, whichever nozzle is chosen the appropriate nozzle pressure must be calculated to affect the maximum flow for optimum effectiveness.

BLITZ ATTACK

Engaging in an interior offensive attack to stop the forward progression of fire while using a master stream is called a **Blitz Attack**. This method requires the use of large caliber streams directed to the seat of the fire by elevated master streams or monitors which quickly darkens down the fire allowing interior crews to advance and fully extinguish the fire. For this mode of attack, conditions must be appropriate:

1. It must be confirmed that no interior crews or occupants are inside the structure. Changes in heat inversion or falling debris could cause severe injury.
2. The aerial apparatus should be positioned close enough to the structure so the stream can reach the seat of the fire but out of the collapse zone.

A Tower Ladder initiating a Blitz Attack

As the elevated stream is directed to the room of origin, the stream should be aimed at the ceiling to create a broken stream, thus creating large water droplets which convert to stream and further enhance extinguishment properties. As a large quantity of water is introduced to the inside of a structure, an un-designed live load is added to the building weakening the structure and increases the likelihood of collapse. Efforts should be made to channel and relieve trapped water in the structure to facilitate the advancement of interior crews safely.

DEFENSIVE ATTACK

A **defensive attack** is an all exterior assault on a structure typically determined when an incident commander has made the decision to give up part if not all of the structure. Other considerations include:

- When exposure protection is needed from a conflagration emitting high BTU's.
- When conditions prohibiting safe entry into a building for hose line placement are evident.
- When a large number of GPM's are needed to extinguish the fire.

Defensive Attack

During a defensive attack in a structure with heavy fire involvement, it is imperative that the fire not be spread to uninvolved areas. A good tactic would be to position the aerial, if possible, on the uninvolved side of the structure. This would keep all forces from the unburned portion thus helping to preserve part of the building.

EXTERIOR STANDPIPE OPERATIONS

Hose line advancement to upper floors of a building can be simplified by using an aerial device as an exterior standpipe. Examples of similar situations are:

- A malfunctioning standpipe system
- Impeded access into the building
- Fires in parking garages and other special structures

The nozzle tip can simply be removed and converted into a 2”1/2 adapter permitting a hose line attachment. Some aerial platforms have multiple hose connections that are designed to facilitate a pre-connected line for the circumstances outlined. *This tactic should not be considered if the primary consideration for the use of the aerial platform is rescue. The use of attack lines reduces the ability of the aerial devices use for victim removal.*

EMERGENCY PROCEDURES

MONTGOMERY COUNTY AERIAL TOWER

2003 PIERCE 100’ MID-MOUNT AERIAL PLATFORM

EMERGENCY PUMP UNIT (EPU)

If the main hydraulic system is not functioning, the emergency pump unit provides back-up power to the main hydraulic system pump. A momentary switch is provided to activate the pump itself.

PROCEDURE

At the turntable control console or the stabilizer remote control, hold the EPU switch in the ON position, then activate the desired function. At the manual stabilizer control station, the EPU will be activated as soon as the switch is held in the ON position. The proper sequence of operation is to activate the desired function, then place the EPU switch in the ON position until the operation is complete, then release the switch before returning the manual control handle to

the neutral position.

- ***The EPU should only be used when the main system hydraulic pump is not operable.***
- ***Do not run the EPU for more than 30 minutes without allowing an additional 30 minutes for cooling.***
- ***Load limitations and pressures will allow for more efficient use of the EPU, thus generating less heat***.

EMERGENCY STOP BUTTON

An emergency stop button is provided in two locations, one on the turntable control console and one on the basket control panel. Pushing down on either of these buttons will stop all output control functions from the microprocessor and disengage the transmission driven PTO.

The stop button has two positions for resetting. Pulling the button up to the first position will activate the PTO only. This will allow operation of the manual override controls only and still prevent the system microprocessor from providing an output to any function using the electric controls. The second momentary position will re-activate the PTO and the electronic controls

MANUAL OVERRIDE CONTROLS

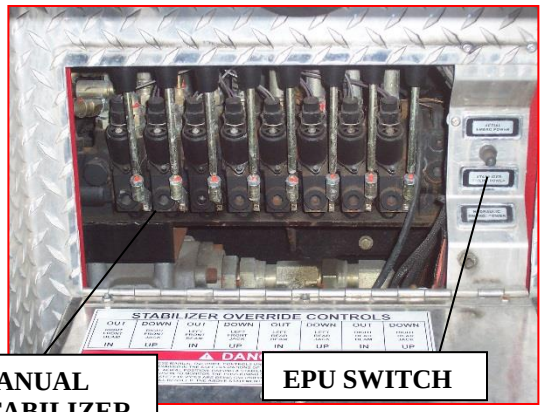
The manual stabilizer override controls are located behind an access door in the left rear step well. Opening the door will indicate to the Command Zone Information Center that an override is in progress (a message will be displayed at both the stabilizer and turntable displays).

PROCEDURE

Manually pushing or pulling on each of the handles will operate the stabilizer beams and jacks. A label indicating the function of each lever is attached to the inside of the door.

- ***No automatic high idle is provided with the function of these controls***
- ***The manual override door must be closed at all times during normal operation***

REMOTE STABILIZER CONTROLS



MANUAL STABILIZER CONTROLS

EPU SWITCH

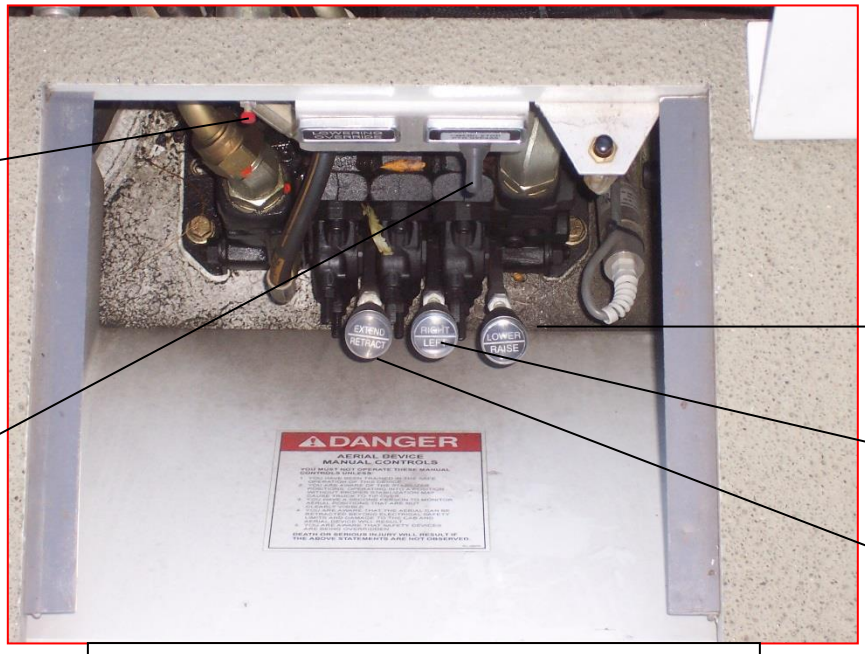
PLATFORM MANUAL CONTROL VALVES

The manual aerial controls are located under the aerial access step on the turntable. Lift and turn latches are provided for removal of the step. The ***valve handles*** are marked to indicate their function.

The ***Aerial Lowering Override Button*** is used only if a system failure causes the aerial not to lower during normal operation. Push and hold the override while operating either the electric or manual controls to lower the aerial.

The ***Emergency Stop Bypass Switch*** activates the engagement of the PTO, independent of the position of the Emergency Stop Switch.

AERIAL LOWERING OVERRIDE BUTTON



EMERGENCY STOP PTO BYPASS BUTTON

LOWER/RAISE CONTROL

LEFT/RIGHT CONTROL

EXTEND/RETRACT CONTROL

PLATFORM MANUAL CONTROL VALVES

MONTGOMERY COUNTY AERIAL TOWER

2002 PIERCE 100' REARMOUNT AERIAL PLATFORM "ALL-STEER"

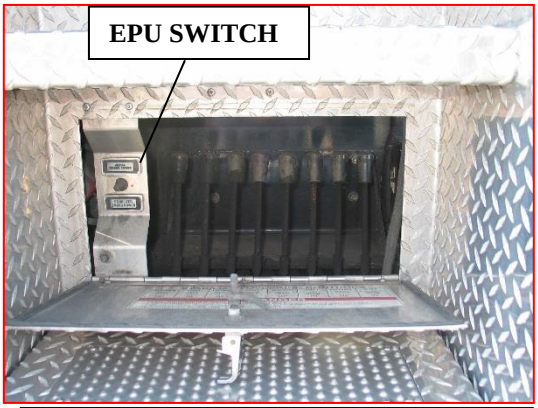
EMERGENCY PUMP UNIT (EPU)

If the main hydraulic system is not functioning, the emergency pump unit provides back-up power to the main hydraulic system pump. A momentary switch is provided to activate the pump itself.

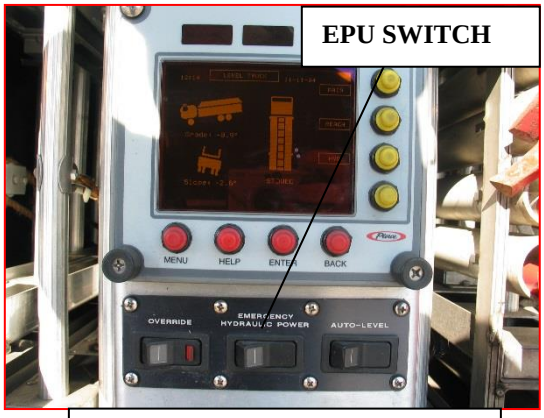
PROCEDURE

At the turntable control console or at the lower control station hold the EPU switch in the ON position, then activate the desired function. At the manual stabilizer control station, the EPU will be activated as soon as the switch is held in the ON position. The proper sequence of operation is to activate the desired function, then place the EPU switch in the ON position until the operation is complete, then release the switch before returning the manual control handle to the neutral position.

- ***The EPU should only be used when the main system hydraulic pump is not operable.***
- ***Do not run the EPU for more than 30 minutes without allowing an additional 30 minutes for cooling.***
- ***Load limitations and pressures will allow for more efficient use of the EPU, thus generating less heat***.



MANUAL STABILIZER CONTROLS



LOWER CONTROL STATION

EMERGENCY STOP BUTTON

An emergency stop button is provided in two locations, one on the turntable control console and one on the basket control panel. Pushing down on either of these buttons will stop all output control functions from the microprocessor and disengage the transmission driven PTO.

The stop button has two positions for resetting. Pulling the button up to the first position will activate the PTO only. This will allow operation of the manual override controls only and still prevent the system microprocessor from providing an output to any function using the electric controls. The second momentary position will re-activate the PTO and the electronic controls.

THE EMERGENCY STOP BUTTON AT THE CONTROL CONSOLE

STABILIZER OVERRIDES

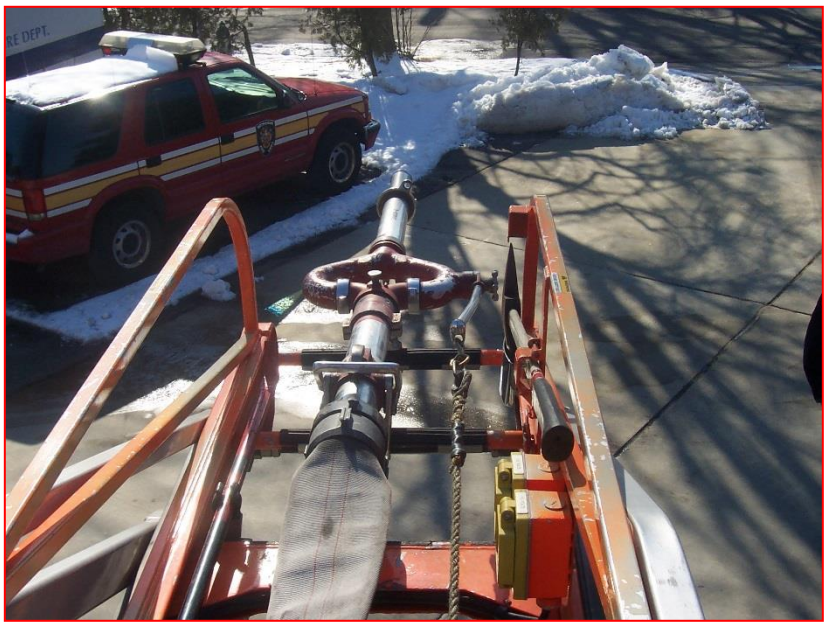
The manual stabilizer override controls are located behind an access panel in the right rear step well. Opening the door will indicate to the Command Zone Information Center that an override is in progress and a message will be displayed at the lower stabilizer controls, turntable and basket displays. Manually pushing or pulling on each of the handles will operate the stabilizer beams and jacks. Each lever has a corresponding label inside of the door.

MANUAL STABILIZER OVERRIDES

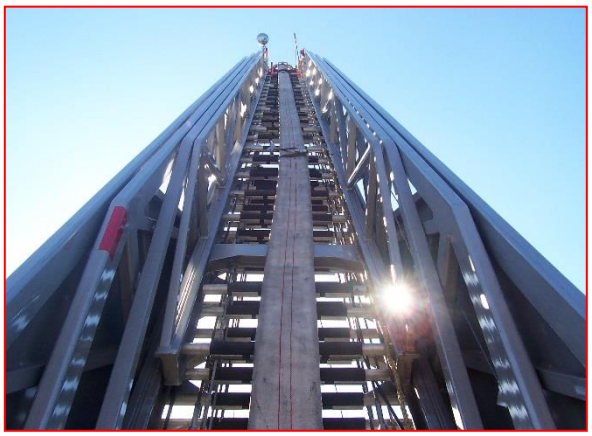
DETACHABLE LADDER PIPE PROCEDURE

1. Raise the ladder sufficiently to clear rear obstructions (tiller cab if applicable) then extend the fly section two to three rungs out.

2. The portable ladder pipe is to be placed on the tip of the fly section, centered, and securely clamped.



3. 100 ft. of 3 ½" hose should be attached to the ladder pipe with the other end of the hose positioned down the center of the ladder towards the turntable and attached to a Siamese and laid in the street positioned on the opposite side of the direction of flow.



4. Adjust control handle on the ladder pipe to an angle of 130 degrees (*the control handle should be marked in advance to facilitate quick and efficient set up*).

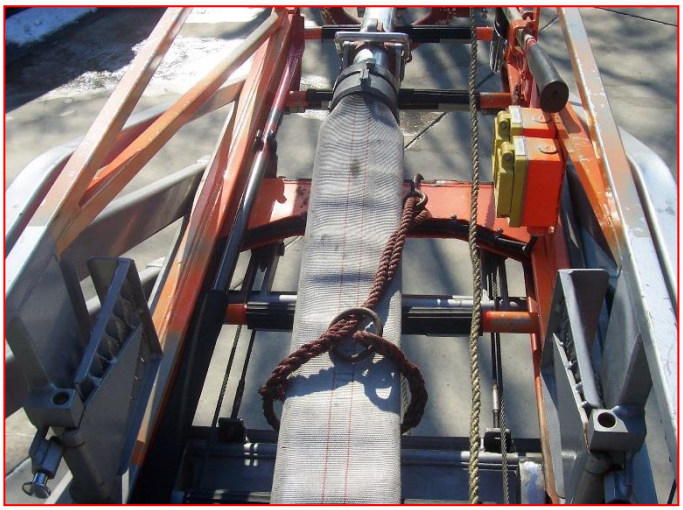
The proper angle between the ladder pipe and the control handle should be set at approximately 130 degrees

5. Secure halyards to the control handle and to the tip of the ladder pipe *(the control handle halyard should be brought down the inside of the ladder and not passed through the rungs while the ladder pipe tip halyard is dropped down to the street*).

WARNING

MCFRS Training Division does not recommend placing any rope though the rungs of a hydraulic ladder.

6. Secure hose to the ladder by adding three rope hose tools or hose straps; one at the tip approximately three to four ft. behind the coupling, one at the center (after extension), and one at the turntable.



WARNING

Place the rope hose tools at center of base after ladder is extended.

7. Raise, rotate, then extend ladder to safe ladder pipe operational perimeters (*75 degree angle, 80 percent extension, and 80 psi nozzle pressure for a solid stream*). **Always refer to manufacturers specifications before operating.**