Aerial Operator

 It’s late in the evening and the alarm comes in for a structure fire in the older part of town, buildings your familiar with. Tight streets, powerlines all over the place, balloon frame houses and many structures in less than ideal conditions. The radio reports from police while responding indicate you are going to work, fire showing with people trapped. You and your officer make the decision to go past the street and around the block to the address, this will get the truck to the front of the building behind the first due engine and will place your turntable at a corner for best access, yes you see the wires and leave room for your outriggers. The operations are well underway but the fire is in many void spaces. The chief tells you to get the aerial up and take out the front attic window for ventilation. Your concern is the many wires, chief says “I got you, get it up”. So you get the aerial up, in position with little difficulty, surprisingly, and take out the attic window, you leave the aerial in place. Then you hear the radio chatter from an Engine company “we can’t get out the interior stairs, we are blocked, we’re coming out the aerial”. Next thing you see is a firefighter at the attic window with black, turbulent, pre-flash over smoke pushing behind him. You stay at the pedestal as your officer goes up to assist as the firefighter climbs out the window, the officer of the engine company then follows. All three members then descend the aerial to safety, attic is clear of firefighters then shortly flashes, becoming involved in fire. This is a quick, but true story that had positive outcome because of proper apparatus positioning, aerial operator skills and determination and early recognition of a probable rapid fire event. This article will focus on considerations the aerial operator should be mindful of and have a basic skill level to perform their job successfully.

**APPARATUS SPECIFICATIONS**

 The aerial operator must be knowledgeable of the apparatus they are operating. From aerial construction, aerial load limits, outrigger construction and span as well as emergency operations. They also should be familiar with apparatus length, height, weight, short-jacking requirements, torque box and be a skilled driver. As we all know, rear mount apparatus work excellent for operating off the rear of the truck, not so much off the front due to the fact you lose reach because of the length of the vehicle. Mid-mounts work well off the side, tower ladders especially can get low to ground to act as a ground monitor. Many aerials, especially tower ladders have built in safety sensors which may prevent movement in a certain area, aerial operators need to be aware of what areas those are. Aerials build earlier than the early 1990’s may not have any short-jack safety features that aerials today have. Those older models will let you operate the aerial in any position and height as they have no outrigger sensors. One of the biggest improvements to aerial design has been “K-Bracing”. This adds strength which will help prevent a catastrophic collapse.

 Aerials today are either steel or aluminum and are known as “non-supported” aerials. This means that the aerial is designed to not rest on any object. Resting an aerial on an object especially at an angle changes the forces applied which may result in a collapse. Aerials today are of Truss construction, meaning the top of the beams or handrails are in tension and the base beams are in compression. Resting a “non-supported” aerial on an object will reverse these forces possibly leading to an aerial failure. It is recommended that an aerial is placed with about 6” to 8” of clearance over the roof or whatever platform you’re going to ascend to.

 Being familiar with the different parts of an aerial is very important. Knowing what the extension cylinder is; aids in extension and retraction of the fly sections. The Lift cylinders do the lifting and lowering of the aerial, the trunnion is the connection point of the lift cylinders and the aerial device. The aerial has beams, rungs, pulleys and cables much like a ground ladder. The rotating gear is located at the turntable, this is how aerial rotates 360 degrees. Interlocks hold hydraulic pressure to keep the aerial and outriggers in place. An overload sensor is also installed in the aerial as a safety feature. This senses overload of the aerial from weight based on how the aerial is positioned. Some aerials have the last 2 or 3 ft. set up as a removable section. If the tip is damaged in anyway, this section can be replaced simply by unbolting the old section and bolting a new one on. When it comes to emergency power unit operations or operating the aerial or outriggers during failure ALWAYS follow the manufacturers recommended guidelines. Each manufacturer and each aerial device is different, good idea is to have a copy of the operators’ manual onboard the apparatus.

**Outriggers**

Todays’ aerial trucks have generally three types of outrigger setups; H-style, A-Frame style or Straight down. There are pros and cons to all three types and need to spec’ed out based on the area you serve. If your area is very narrow streets with a lot of on the street parking, maybe an A-frame outrigger would be best for your apparatus. These outriggers come down and out from underneath the rig. They are good for tight spaces such as streets with constant parking. They cannot be short jack but with the down and out design they generally do not need to be. If the area you serve has fairly good room on the streets with limited parking maybe the H-type would be good, these can be short jacked but depending on the apparatus type, tiller vs straight truck, they may extend 4’ to 5’ from the side of the apparatus. Straight down outriggers are usually seen on aerialscope type tower ladders and have little to no cons when setting up.

 When setting your outriggers, they aerial operator must make sure the outrigger will not land on a “manhole” cover or any other street cover than may cause the outrigger to lose its stability or collapse. Another obstacle is curbs, to overcome this, crib up the curb so the outrigger plate and outrigger sit flat on the cribbing and curb. If cars are a challenge, make sure you can get the outrigger fully extended on the operating side, this is a must. Aerials built after the early 1990’s have a safety feature built in that will not allow the aerial to come past the side of the apparatus on the short jack side. On older aerials, this feature is not built in so as an operator you must know the capabilities of your device. Placing the outriggers between cars or other obstacles is perfectly acceptable, try and get the non-operating side outrigger extended as much as possible. Be sure that you “pin” the outrigger (if equipped) after placement. This is a safety feature that will catch the outrigger in case of catastrophic collapse preventing a complete outrigger collapse. A good tip for spotting outriggers for a rear-mount or mid-mount apparatus is to pick a spot on the side of the outrigger cover (some have warning lights)that you can see and make that your point of reference. At night, use the outrigger spotlight as a reference, pre-point them toward the ground where your outrigger will land. On tiller drawn apparatus, use your tillerman. They can see the turntable, the wires or any other overhead obstructions. The outrigger level gauge is set up with three colors: green, yellow and red. The green means you can operate the aerial at 100% capacity, the yellow is 50% capacity and the red mean the aerial is inoperable based on the level of the turntable. Stay in the green and within 5% of incline which is the industry standard with aerials.

**Aerial Positioning**

 As far as aerial positioning it is somewhat up to the operators experience level, skills and determination. A good aerial operator will always, one way or another get the aerial up and in position. Remember, when your pull into the scene it isn’t so much truck positioning, its turntable positioning. So, you have to pick what is going to work best for the situation. Going off the rear of the rig, off the side or just driving straight in. Each fire with determine what you will do but you have to understand what needs to be done. When you operate off the side, you have to improve your “scrub area”. This is the overall reach of the aerial based on the position that the apparatus is in. Place the cab AWAY from the fire building if possible. This will open up your scrub area and will allow the aerial to reach further towards the cab area of the scene. If the need is to operate off the rear then backing into the scene may be best. There’s some departments that “beach” there aerials. This is taking it off the road, mainly on the grass. If this is done you MUST make sure the ground can support the weight and that you keep the aerial within 30 degrees of the front or rear. Coming off the side, though it has been done placed a huge cantilever load on the outrigger and may cause a collapse of the apparatus. If you are dealing with powerlines it is acceptable to go above the lines or if needed bring the turntable underneath the lines so the aerial can be raised and rotated underneath the lines. Be sure to keep the recommended distance from the lines, which is 10 feet.

 So as far as aerial tip positioning, it’s really not complicated and again, use some imagination and ingenuity if you have to. When it comes to placing the aerial at the roof, be sure it is ‘non-supported’, aerial does not touch the roof. Place it about 6” to 8” above the roof line and about 3-5 rungs over the roof. A good trick to help with depth perception is to take a bright colored 3-8 mm prussik cord and tie it on the pedestal side of the last rung of the aerial. Once the rope makes contact with the roofline and moves your know you’re at the roof and only need to go a few rungs further. When placing the aerial at a window, there are several methods. What works for me is I take the top of the handrails and line them up with the bottom of the window frame then extend the aerial toward the window. The aerial being a bit lower than the widow seems to make an easier transition in and out of window. At night, using the tip lights to help judge your distance is a good trick. As the lights get tighter on the building you know that you’re getting closer, when they are at an almost perfect image you should be right at your target. When approaching a victim at a window, raise the aerial to above the window then bring it down to the victim. Victims have been known to jump on the aerial thereby shock loading it causing a potential aerial failure or the victim falls off the ladder. When ventilating with the aerial, which is an acceptable practice, raise the aerial to the top pane of glass, extend it through the glass, lower the aerial down to the windowsill then retract it. This will remove the glass, shades, curtains and sash, you may still have to ascend the aerial to finish the vent to get a complete removal but it will get you a ventilation opening. There are times when you may have to place the aerial next to the roofline so the members can step over the aerial on onto the roof or fire escape, work this out in training has to how this is going to play out.

 When access is not needed the most other common task is master stream operations. Most aerials are designed with a ‘pre-piped’ waterway. Meaning the waterway and nozzle are already attached and can be placed into position using minimal manpower. Most aerial master streams have a pin-able waterway. This design allows the nozzle to be kept at the tip of the aerial (for master stream operations) or set back one fly section so the nozzle is out of the way of the tip of the aerial (access or rescue mode). Some aerials also have a 2 ½” discharge next to the nozzle for standpipe operations. It is extremely important that the nozzle be “pinned” prior to charging the master stream. Improperly pinned nozzles have been known to disassemble themselves from the aerial and cause injury and death to firefighters. Aerials that are not pre-piped must be setup, this takes several firefighters using at least 150’ of 3” hose and a removable nozzle. The operation begins moving the aerial out of the cradle and off to the side of the apparatus, clamping the nozzle to the tip of the aerial, running the hose down the aerial and stretching it down the aerial off to the “non-operating side” of the truck. As the aerial goes up, the hose is deployed, the hose is then secured with hose straps, typically one per section. One last little trick, using the intercom system on the aerial to talk to victims at windows, its hands free at the top so the operator can talk into the intercom as a firefighter is ascending the aerial for rescue, hopefully calming the victim.

**Back To The Fire**

 There’s a lot to being a good, competent aerial operator besides driving. Understanding the aerials capabilities, practicing its use in different scenarios, being creative and always having the mindset of “I’m gonna get the aerial up” is going to make you a great aerial operator. Depending on your depts. S.O.P.s no doubt you will have other tasks to complete such as ground ladder placement, utility control, ventilation, lighting etc. Challenge yourself and your crew to practice with the aerial, it may save your life or your customers’ life someday.