

Safety First!

Part 3 — Climbing Safety.

This article is the third of a multi-part series on safety excerpted from the 2017 edition of The ARRL Handbook. Part 1 can be found in the November 2016 issue on pages 39 – 43. Part 2 can be found in the December 2016 issue on pages 39 – 41.

Tower climbing is a potentially dangerous activity, so you'll need to use the proper safety equipment and techniques. OSHA, the Federal Occupational Safety and Health Administration, publishes rules for workplace safety. Although amateurs are not bound by those rules, you'll be much better off if you follow them. The equipment and techniques you use are up to you.

Safety Awareness and Preparation

One of the most important aspects of safety is having the knowledge and awareness to do a job safely and efficiently. You must have the mental ability to climb and work at altitude while constantly rethinking all connections, techniques, and safety factors. Safely climbing and working on towers is 90% mental. Mental preparedness is something that must be learned. This is an occasion where there is no substitute for experience. The biggest obstacle for anyone is making the mental adjustment. Properly installed towers are inherently safe and accidents are relatively rare.

You should also check your safety equipment every time before you use it. Inspect it for any nicks or cuts to your belt and safety strap. Professional tower workers are required to check their safety equipment

every day, and you should check yours before each use.

One of the most important lessons for tower climbing is that you have four points of attachment and security — two hands and two feet. When climbing, move only one point at a time. That leaves you with three points of contact and a wide margin of safety if you ever need it. This is in addition to having your fall arrest lanyard connected at all times.

Another recommended technique is to always do everything the same

way every time. That is, always wear your positioning lanyard on the same D-ring and always connect it in the same way. Always look at your belt D-ring while clipping in with your safety strap. This way, you'll always confirm that you're securely belted in. Always look!

Personal Safety Equipment

The most important pieces of safety equipment are the fall arrest harness (FAH) you wear and the accompanying lanyards that attach to it (see Figure 1). The FAH has leg loops



(A)



(B)

Figure 1 — (A) The well-dressed tower climber. Note the waist D-rings for positioning lanyard attachment as well as the suspenders and leg loops. At (B) is an adjustable positioning lanyard. The climber also has workboots, gloves, safety glasses, and a hard hat.

and suspenders to help spread the fall forces over more of your body and has the ability to hold you in a natural position with your arms and legs hanging below you where you're able to breathe normally.

Two or more lanyards are used. One is the positioning lanyard (see Figure 2). That is, it holds you in working position and attaches to the D-rings at your waist. They can be adjustable or fixed and are made from different materials, such as nylon rope, steel chain, or special synthetic materials. An adjustable positioning lanyard will adjust to almost any situation, whereas a fixed-length one is typically either too long or too short. A rope lanyard is the least expensive.

Leather safety equipment was outlawed some years ago by OSHA, so don't use it. This includes the old-fashioned safety belt that was used for years but offers no fall arrest capability. If you drop down while wearing a safety belt, your body weight can cause it to rise up from your waist to your ribcage, where it will immobilize your diaphragm and suffocate you. On the other hand, you can use a safety belt for positioning when it's worn over an FAH. Just don't depend on it to catch you in case of a fall.

The other lanyard is the fall arrest lanyard, shown in Figure 3, which attaches to a D-ring between your shoulder blades. The other end attaches to the tower above the work position and catches you in case of a fall. The simplest is a 6-foot rope lanyard, which is inexpensive but doesn't offer any shock absorption. There are also shock-absorbing varieties that typically have bar-tacked stitches that pull apart under force to decelerate you. Don't cut corners on buying or using safety equipment; you bet your life on it every time you use it!

OSHA rules and good common sense say you should be attached to the

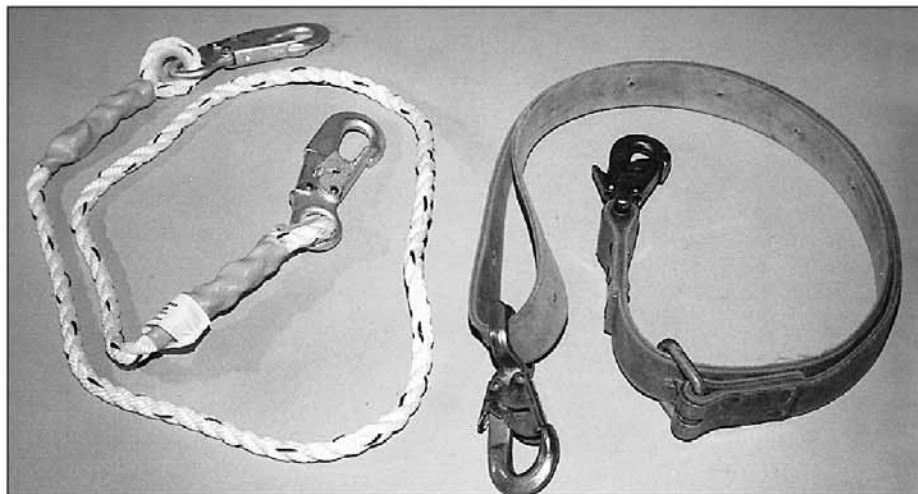


Figure 2 — A fixed-length rope positioning lanyard on the left and a versatile adjustable lanyard on the right.

tower 100% of the time. You can do this several ways. One is to attach the fall arrest lanyard above you and climb up to it. Use your positioning lanyard to hold you while you detach it and move it up again. Repeat as necessary. Another option is to use a pair of fall arrest lanyards, attaching one then the other as you climb the tower.

Boots should be leather with a steel or fiberglass shank. Diagonal bracing on Rohn 25G is only a $\frac{5}{16}$ -inch rod — spending all day standing on that small step will take a toll on your feet. The stiff shank will support your weight and protect your feet; tennis shoes will not. Leather boots are mandatory on towers like Rohn BX that have sharp X-cross braces. Your feet are always on a slant and that is hard on them.

A hard hat and safety goggles are highly recommended. Just make sure they are ANSI or OSHA approved and that you and your crew wear them. As you'll be looking up and down a lot, a chin strap is essential to keep the hard hat from falling off.

If you do a lot of tower work, your hands will take a beating. Gloves are essential — keep several spare pairs for ground crew members who show up without them. Cotton gloves are



Figure 3 — The fall arrest lanyard is above the climber so that the climber can climb up to it. The fall-arrest and positioning lanyards are then "leapfrogged" so that the climber remains attached to the tower 100 percent of the time.

fine for gardening, but not for tower work; they don't provide enough friction for climbing or working with a haul rope. Leather gloves are the only kind to use; either full leather or

leather-palmed are fine. The softer the gloves, the more useful they'll be. Stiff leather construction gloves are fine for the ground crew, but pigskin and other soft leathers are better for the climber, because you can thread a nut or do just about any other delicate job with these gloves on.

Safety Tips

- 1) Don't climb with anything in your hands; attach an item to your safety belt if you must climb with it, or have your ground crew send it up to you in a bucket.
- 2) Don't put any hardware in your mouth; it can easily be swallowed.
- 3) Remove any rings and/or neck chains; they can get hooked on things.
- 4) Be on the lookout for bees, wasps, and their nests. If you do run into a hornet, wasp, or other stinging insect, use Adolph's Meat Tenderizer on the sting — it contains the enzyme papain, which neutralizes the venom. Keep a small jar in your tool kit.
- 5) Don't climb when tired; that's when most accidents occur.
- 6) Don't try to lift anything by yourself; one person on a tower has very

little leverage or strength. Let the ground crew use their strength; save yours for when you really need it.

7) If a procedure doesn't work, assess the situation and re-rig, if necessary, before trying again.

8) Never climb a tower that is rusted, or otherwise has poor mechanical integrity.

Ground Crew Safety

The climber on the tower is the boss. Before tower work starts, have a safety meeting with the ground crew. Explain what is going to be done and how to do it, as well as introducing them to any piece of hardware with which they may not be familiar (for example, carabiners, slings, or come-along winches).

As part of the ground crew, there are a few rules to follow:

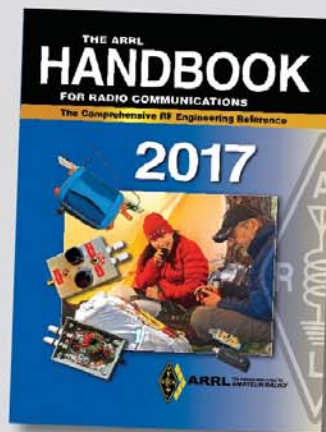
- 1) The climber on the tower is in charge.
- 2) Don't do anything unless directed by the climber in charge on the tower. This includes handling ropes, tidying up, moving hardware, and so on.
- 3) If not using radios to communicate, when talking to the climber on the

tower, look up and talk directly to him or her in a loud voice. The ambient noise level is higher up on the tower because of traffic, wind, and nearby equipment.

4) Communicate with the climber on the tower. Let him or her know when you're ready, if you're standing by, or if there is a delay. Advise the climber when lunch is ready!

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Strays

The Bloomington ARC Issues a Challenge

The Bloomington Amateur Radio Club (BARC) in Indiana challenges clubs to beat its effort to help ARISS (Amateur Radio on the International Space Station) replace its failed radio. After learning of the failure, the club voted to give \$100 to ARISS, then three members quickly matched that amount with their own checks, and others chipped in to make a total of \$600! BARC officers and others are (from left, front row) Vice President Tim Day, AC9ML; ARRL ARISS Delegate Rosalie White, K1STO; President Jimmy Merry, KC9RPX; Board Member Richard Phillips, WA9MTH; (from left, back row) Board Member Ray Stevens, KB9LGS; ARRL Indiana Section Manager Brent Walls, N9BA; Secretary Bill Wootton, KC9ACL; Public Information Officer Carol Emmons, KD9BSJ, and Board Member Bill Evans, N9SYL. [Rob Hamros, KB9RNB, photo]

