

TOWER SAFETY & AWARENESS

SHACOG TECHNICAL RESCUE TEAM

BACKGROUND

- What is the South Hills Area Council of Governments
 - 22 Municipalities
 - 300K+ Population Base
 - 220+ square miles
 - Career and Volunteer Public Safety Agencies (40+ Fire and EMS Agencies)
- Technical Rescue Team Founded 2008
- 2015 Rescue Service of the Year
- 3 hams on the team

OBJECTIVES

- Common Tower Type Overview
- General Hazards / Safety
- Proper Personal Protective Equipment
- Climbing Preparations / Proper climbing Technique
- Ground Personnel
- Types of Emergencies / What to do in case of Emergency

WHY ARE WE HERE?

- Tower Climbing is a High Risk Low Frequency Event from a rescue stand point
 - High Consequence + Low Margin for Error
 - Tower Climbing is not something any particular amateur is doing “every” day
- Lee Parsons III (N3LPJ) was killed in 2019 during a tower installation project
 - <http://www.arrl.org/news/pennsylvania-radio-amateur-dies-in-tower-installation-mishap>
- Rescues are challenging and can be labor intensive depending

FATALITY RATES: COMMERCIAL VS AMATEUR*

Commercial

- Est 300K commercial towers in US
- 5.2K FTE workers: 10,360,000 hours
- Deaths
 - 93 from '03-'11 (9 years)
 - 10.3 deaths per year
- 199 deaths / 100K FTE Workers / Year

Amateur

- Est 38K Amateur towers in US
- 24 hours / tower / year
- Est 456 FTE climbers: 912,000 hours
- Deaths
 - 4 in 12 months ('18-'19) (17 since 2000)
- 878 deaths / 100K FTE Workers / Year

*Data was taken second hand from Jim Idelson Presentation which sourced the data from OSHA and PBS Frontline Pro-Publica

COMMON TOWER TYPES: MONOPOLE

- Single Tube Structure
- Multi-Section
- 100-200 ft
- Hard to climb
- Difficult for rescue due to structure
- Limited Access



COMMON TOWER TYPES: SELF-SUPPORTED

- Triangular or Square Base
- Often Tapered
- 200-400 ft
- One leg typically has an integrated safety system in commercial
- Easiest of towers to climb and work on



COMMON TOWER TYPES: GUYED

- Rise from a single point
- Supported by guy wires
- Can reach in excess of 2000' feet
- Most common in amateur radio
- Rescue may be complex based on height.



COMMON HAZARDS

- Falls
- RF Exposure

| Physical | Cognitive |
|---|--|
| Fatigue, Chills, Dizziness, Burning Sensation, Extremity Tingling, Unusual Thirst | Uncertainty, Confusion, Concentration Loss, Memory, Poor Attention/Problem-Solving |

- Electrical
 - <https://hackaday.com/2020/04/16/a-dangerous-demonstration-of-the-power-of-radio/>

PROPER PERSONAL PROTECTIVE EQUIPMENT

- Helmet
- Eye Protection
- Gloves
- Fall Protection Harness
- Positioning
- “Good” footwear
- ARRL Handbook (2013 ed.) has fairly limited information on this topic
- OSHA 1926.502(d)(21) Personal fall arrest systems SHALL be inspected prior to each use for wear, damage, and other deterioration, and defective components SHALL be removed from service.
- 6.1 Inspection6.1.1 Equipment SHALL be inspected by the user before each use and, additionally, by a competent person other than the user at intervals of no more than one year.
- <https://falltech.com/training-education/fall-protection-topics-videos/>

100% ATTACHED + FALL ARREST

- 100% attached means that you are **always** connected to the tower by something other than your hands/feet.
- This isn't a guideline; It's a **NON-NEGOTIABLE** Requirement
- Fall Arrest reduces potential of major injuries
- [Proper Dual Fall Arrest Lanyard Technique](#)
- [Bad Example from DX Engineering](#)

PREPARATIONS BEFORE CLIMBING

Climber

- **DON'T CLIMB ALONE**
- Dress for Success
 - Proper PPE
 - Proper clothing for weather
 - Sunscreen
 - Pre-Use Inspection of PPE
- Have a Plan – What is going to be done, how is it going to be done.

Ground Support Person(s)

1. Tower Climber is in Charge
2. Don't do anything unless directed by climber
3. PACE Plan
4. ABCDEFG
Anchors, Bodywear, Connection, Devices,
Edge Protection, Force Check, Good to Go

EMERGENCIES!


- Climber Illness/Medical Emergency
 - Anaphylaxis
- Fall of a Climber
 - Suspension Trauma
- Equipment Misuse or Malfunction
- Trespasser/Unauthorized Access

Information to Gather

- 1) Reason for Response
- 2) Type of Tower
- 3) Height of Patient and Height of Tower
- 4) Patient Contact / Level of Consciousness
- 5) Secured to Structure
- 6) Known Medical Conditions
- 7) Known Hazards


WHAT IS SUSPENSION TRAUMA?

HARNESS SUSPENSION TRAUMA BODY MALFUNCTIONS AFTER A FALL ARREST




Brains

- Oxygen deprivation of the brain may lead to fainting and eventual death.




Heart:

- Drop in blood return to the heart.
- Oxygen supply to the brain and other vital organs is reduced.



Legs:

- Femoral veins compressed by harness leg straps.
- Skeletal muscle pumps in legs are less active or completely inactive.
- This causes blood to pool in the victim's legs.



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WHAT YOU CAN DO TO HELP!

Stop the Bleed

CPR

Call 911

- [Bleeding Control - Direct Pressure](#)
- [Bleeding Control - Wound Packing](#)
- [Bleeding Control - Tourniquet](#)

ADDITIONAL INFORMATION AND SOURCES

- SHACOG Website: <https://www.shacog.com>
- Elevated Safety: <https://elevatedsafety.com/>
- ARRL:
 - <http://www.arrl.org/news/new-england-radio-amateur-hosts-video-on-tower-safety>
 - ARRL Handbook Chapter on Safety (Chapter 28 2013 Ed.)
- Zero Falls Alliance: <https://zerofalls.org/>
- The Driven Element: <https://blog.thedrivenelement.com/>
- Text Resources Available:
 - <https://www.arrl.org/shop/Antenna-Towers-for-Radio-Amateurs/>
 - <https://www.championradio.com/UP-THE-TOWER-The-Complete-Guide-To-Tower-Construction.I>
 - ARRL September 2021 QST Magazine