ROPE AWARENESS

Technical Rope Rescues

February 2023

Course Outline

- **Introduction**
- **Standards and Procedures**
- **Safety**
- **Equipment**
- **Training and Proficiency**
- **Basic Skills**
- **Patient Packaging**

What are Rope Rescues?

- Life-safety technical rope rescue is defined as any rescue attempt that requires rope and/or rope systems and related equipment to safely gain access to – and remove a person from hazardous geographic areas / locations with limited access.
- Two Categories:
  - Non-Technical (having angles of inclination less than 40 degrees)
  - Technical (having angles of inclination from 40 degrees to 90 degrees)

Boundary Cone Climber

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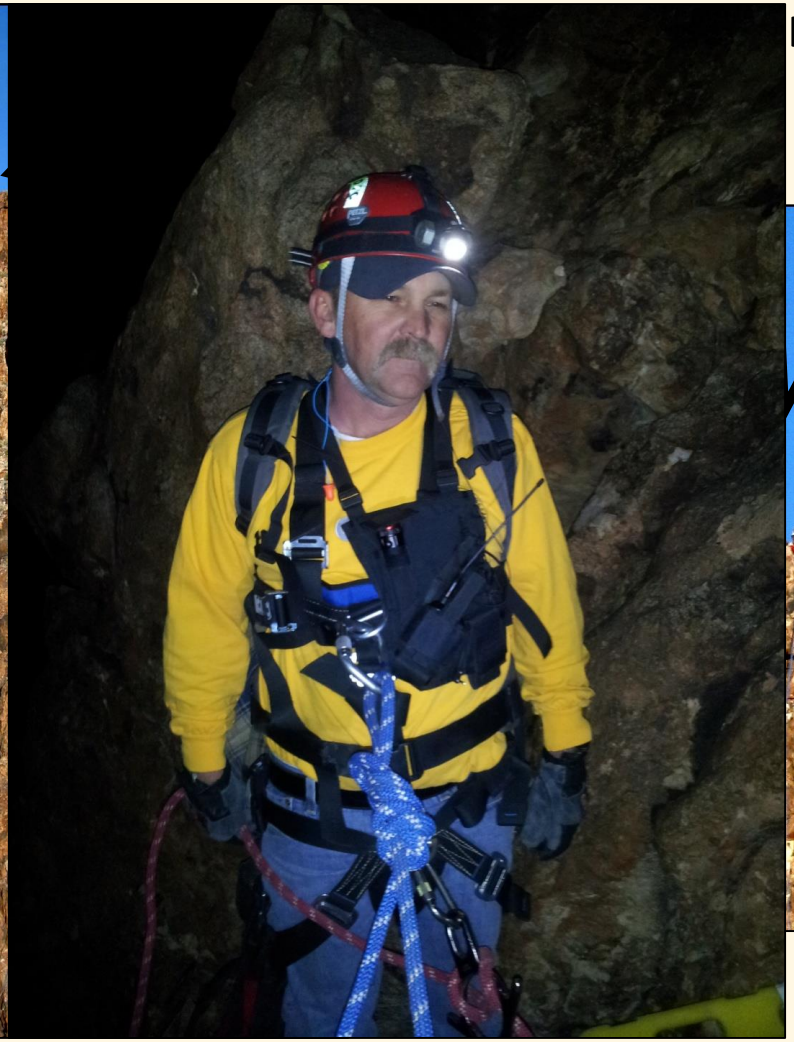
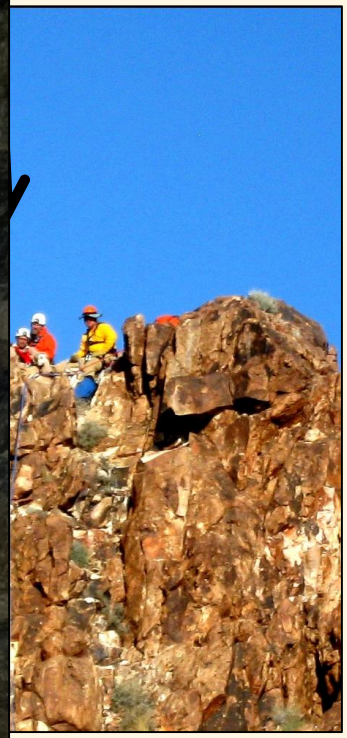




Industrial Rescues

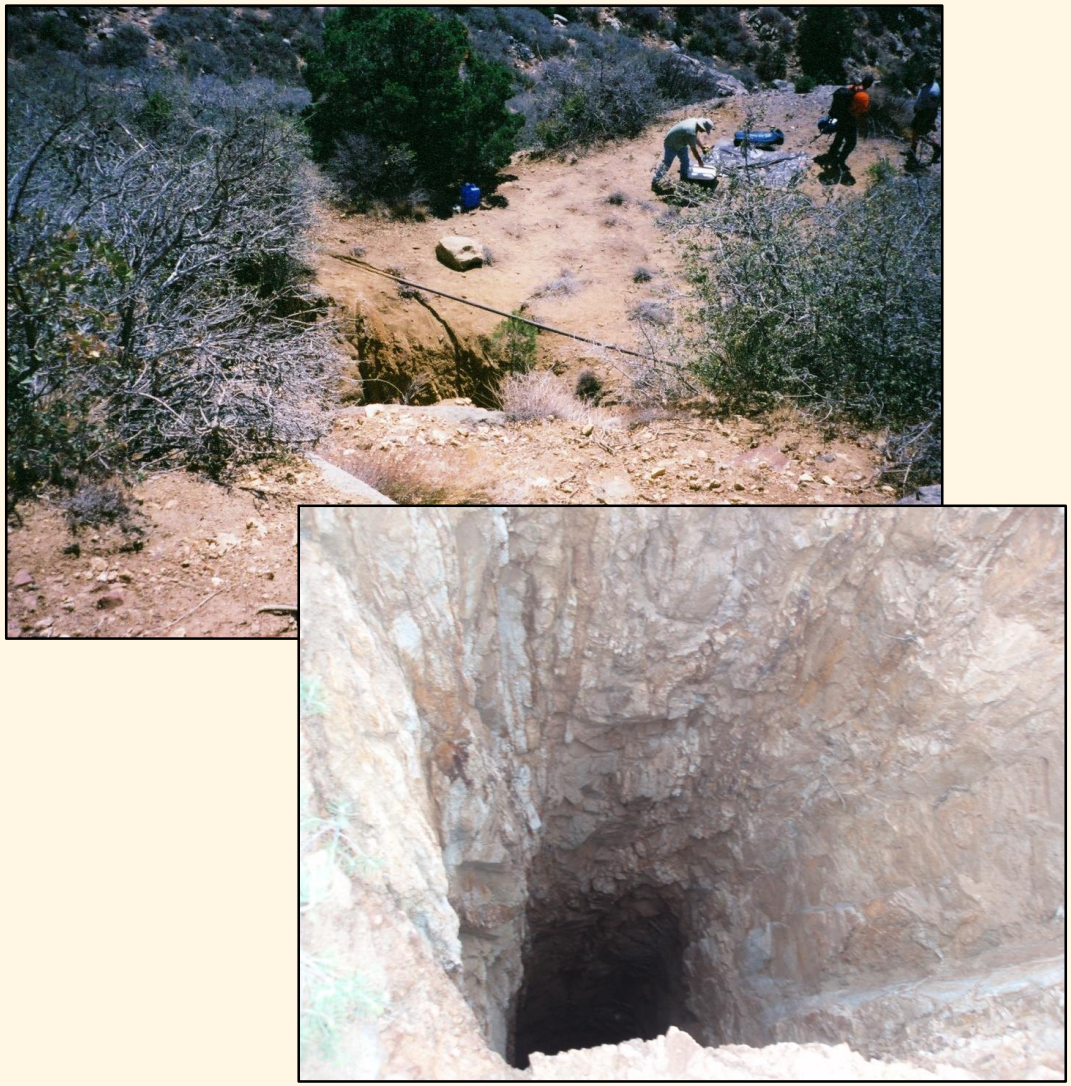
Windmill is approximately 300 feet tall to top of work area. The box at the top is the size of a school bus. The blades are approximately 150 feet long.

Height to hatch at bottom right is 280'-most likely rescue exit for lowering.

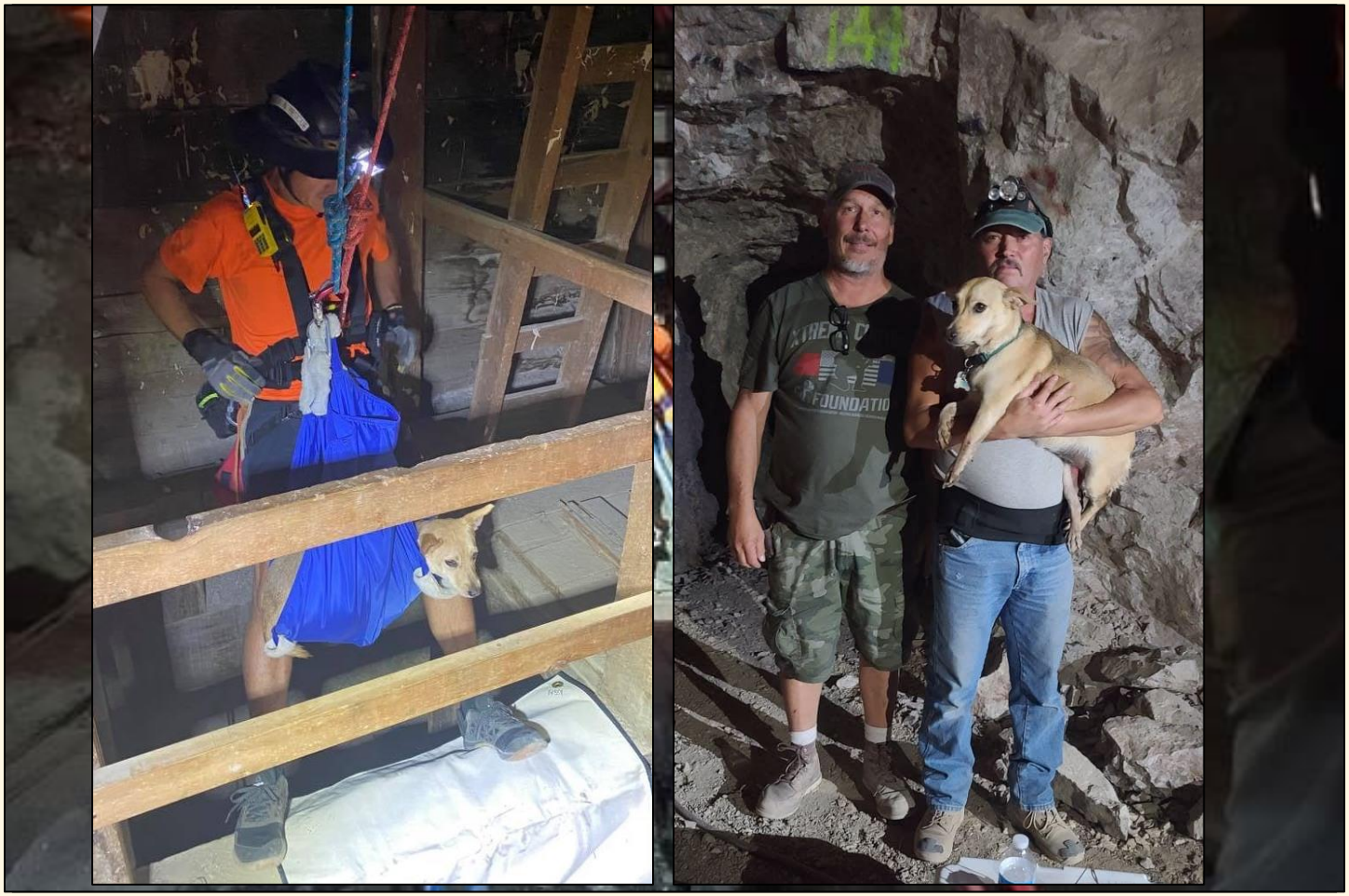
Accidents

Brighter Days Mine

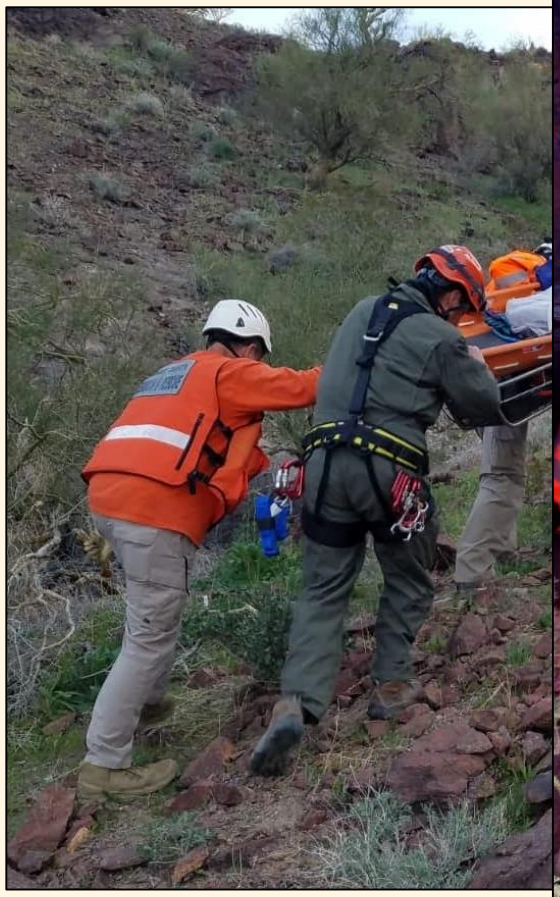
- Two girls drive into mine shaft while on ATV
- One deceased
- One injured

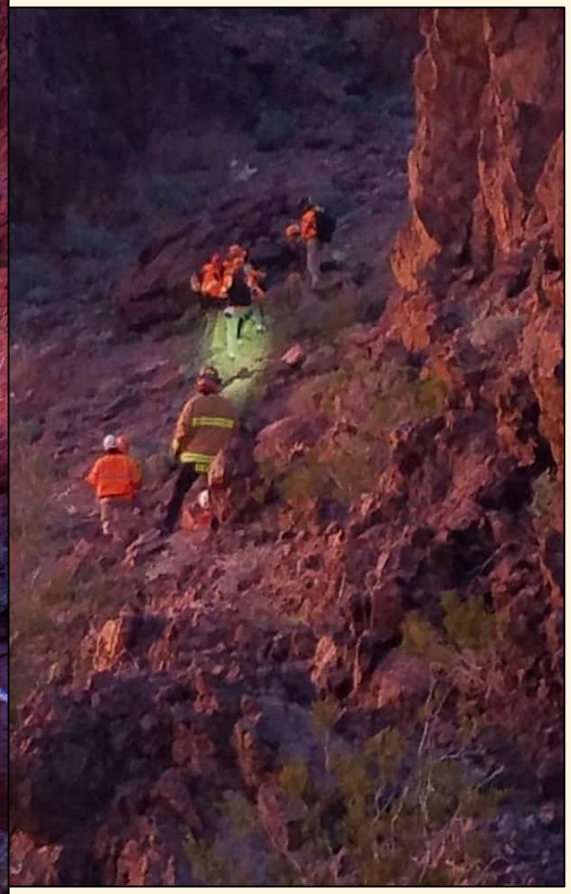


Mine Shaft Rescue (6/21)



Cliffed Out Climber (2/5/20)





Mine Shaft, Oatman (7/26/20)

Helicopter Support

Training

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Standards and Procedures

- All SAR members must be trained at the **Awareness Level**.
- At NO TIME may any SAR member perform a technical rope rescue beyond their level of training.

  If not trained – do not attempt a rescue!
- Members must have corresponding documentation of their level of training and continued proficiency in their files.

Who Sets the Standards?

- **OSHA** – Government agency that sets the general rules
- **NFPA** – Sets standards that agencies can use
- **AHJ** – Agency having jurisdiction – Has principal responsibility to ensure its members are properly trained

Awareness – Operational – Technician

- The **AHJ** for SAR is the Mohave County Sheriff's Office
  - **Rope Awareness**
  - **Ground Support** – SAR uses ground support as a modified operational level to meet our needs as volunteers
  - **TRTs** are the only ones that go over the side/edge
  - **Helicopter Short-Haul/Rappel Team**

National/International Standards

- National Fire Protection Association (NFPA)
- The American National Standards Institute (ANSI)
- The American Society for Testing and Materials (ASTM)
- European Committee for Standardization (CEN)
- Cordage Institute
- Deutsches Instituit fur Normung (DIN) The German Institute for Standardization
- The International Organization for Standardization (ISO)
- National Park Service Technical Rescue Handbook

Standard Operating Procedure

- MCSO SAR Technical Rope SOP – 6/16/2021
  - List of Instructors
  - Documentation required for certification (GS or TRT)
- Establishes a standard structure and guideline for all search and rescue personnel operating at incidents involving life-safety technical rope rescues
- Outlines responsibilities for all rescuers
- Procedures identify some of the critical issues which must be included in managing these incidents
- Requires strong commitment by personnel that will result in improved operational readiness.

Priorities

- SAR Team Priorities:
  - First – ME
  - Second – My Team
  - Third – By-Standers
  - Fourth – The Subject
- *The subject caused the problem*
- We are willing to risk a lot to save someone, but **NOTHING** to risk anything to recover a body (RESCUE versus RECOVERY)

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Safety

- ***Everyone has a voice when it comes to safety!***
- Rescuer safety is paramount in any rescue situation.
- Prior to conducting any technical rescue operation, a Safety Officer will be clearly identified.

Safety Officer

- Always assign a Safety Officer
- Responsible for:
  - Securing the area and ensure it is safe
  - Removing all non-essential personnel to the Cold zone
  - Identify any hazards in the rescue operating area
  - Establishes the Warm and Hot zones
  - Ensure all personnel are accounted for
  - Ensure all personnel are wearing appropriate PPE

Scene Safety

- Most of the people that die in rescues are the RESCUERS
- Important to maintain focus on the rescue
  - Discussions unrelated to the rescue should be taken elsewhere
  - Be alert to changes in equipment
  - Pay attention to your assigned role
- If you do not know how to do a job assigned to you, speak up
- Leave your ego at home – safety is more important than an ego

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Equipment

- Best advice – don't go buy a bunch of equipment!
  - Ask before you buy
  - Get your feet wet
  - Attend trainings
- Two Categories of Equipment
  - Unit Gear
  - Personal Gear (Units issue some personal gear)
- Specific guidelines on acceptable rescue gear
- Never bring unapproved equipment to a rescue!

Equipment

- Knowing how to use our Unit gear and your personal gear is critical in rope rescues.
- We should strive for clean rigging:

  EFFICIENT AND EFFECTIVE

  - Keep the equipment clean and organized
  - Use care when handling
  - Do not drop hardware

- Technical Rope Rescue is an expensive commitment!

Unit Equipment

- Standardized and packed in a similar fashion
- Maintained by the Units
- Must be cleaned, maintained and/or replaced according to the manufacturer's recommendation
- A log book must be maintained for all system equipment

Personal Equipment

- Harness
- Helmet
- Headlamp (with extra batteries)
- Eye protection
- Gloves
- Knife
- Carabiners
- Prusiks
- Ascending device
- Descending device
- Bear paw or anchor plate
- 100ft 9-mm rope
- 20-ft tubular webbing
- AZTec or EDGE kit

Clearly mark your gear!

Equipment

Equipment

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Training and Proficiency

- Required to maintain technical rope rescue skillset
- Training available at the Unit level
- Periodic County-wide training
- External agencies offer training at a cost, but you still have to complete the requirements for Mohave County.
- Certification by MCSO
  - Ground Support
  - Technical Rope Technician
  - Helicopter Short-Haul / Rappel Team
- New equipment requires training, proficiency and approval before being implemented for a rescue

Proficiency

- **Training** – Know how to use the equipment
- **Practice** – Need to maintain proficiency
- **Experience** – The situation is never the same, but the tools and techniques are common
- **Judgment** – Comes with training, practice and experience

- **Knowing how to use our Unit gear is critical in rope rescues**

Ground Support

- List of required skills
  - Knots
  - Learn how to build some systems
  - Learn basic concepts of mechanical advantage and loads placed onto anchors and systems
- Assigned a task and may be:
  - Edge person
  - Operating or assisting a raising or lowering line
  - Setting up or breaking down part of a rescue system
  - Safety Officer

Technical Rope Technician

- Required completion of Ground Support
- Expand knowledge of mechanical advantage and loads placed onto anchors and systems
- Learn how to build most systems
- Learn variations of systems to complete a rescue
- On a rescue, may have the following role(s):
  - Team leader
  - Rescuer(s) going over the edge
  - System manager
  - Safety Officer

Short-Haul / Rappel Team

- Required completion of TRT
- Additional contribution (advanced medical training)
- Recurrency training every 90 days
- Rescues from the helicopter using:
  - Long lines
  - Short-hauls
  - Rappelling

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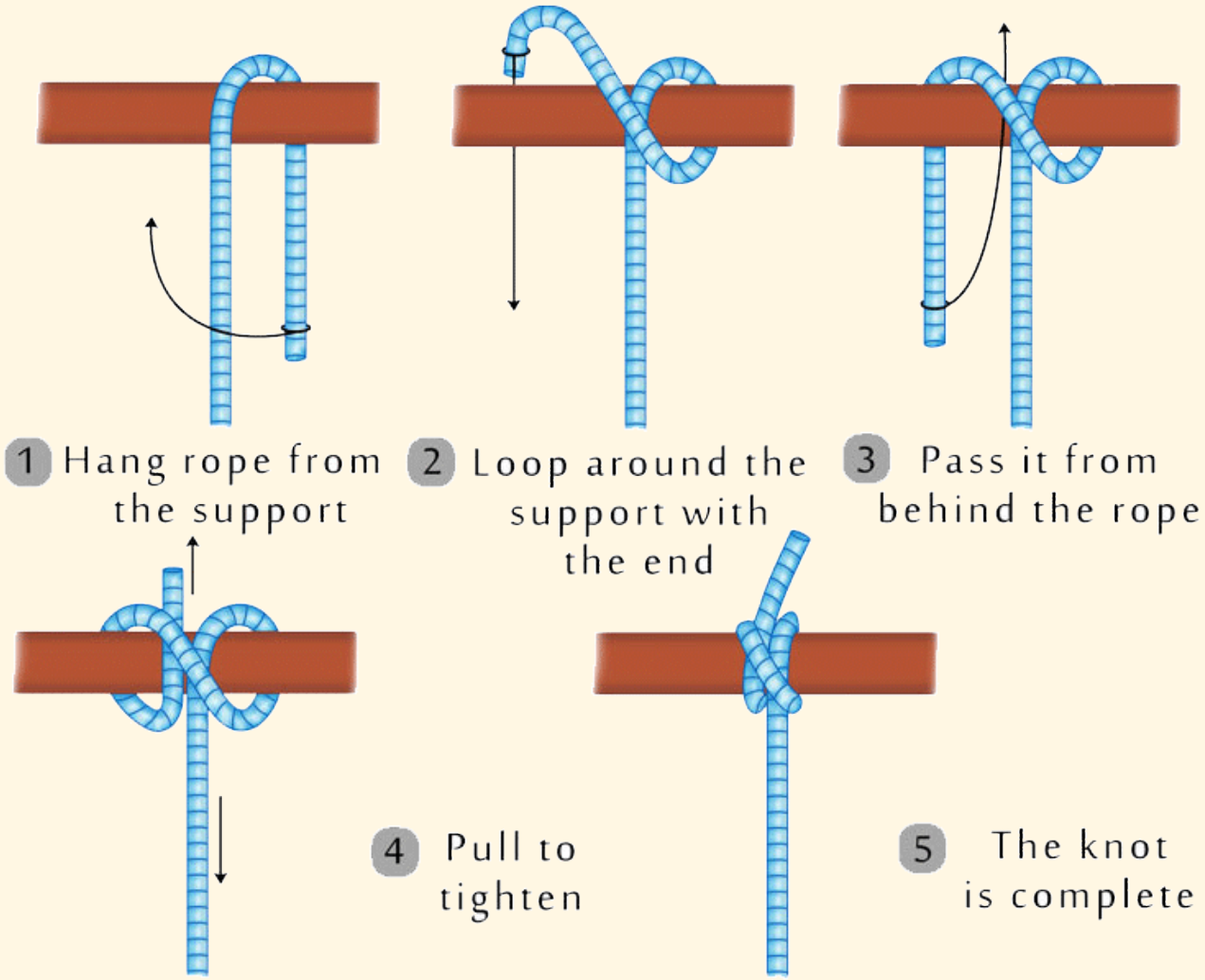
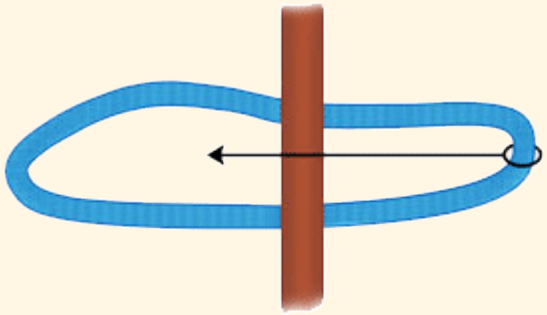
Knots

- Clove hitch (using rope and webbing)
- Girth hitch
- Prusik hitch (double and triple wrap)
- Overhand
- Double overhand
- Water knot
- Swiss seat
- Wilderness coil of rope

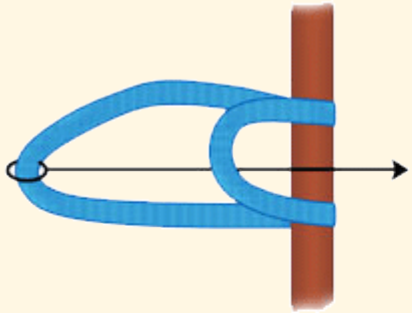
Clove Hitch


1 Hang rope from the support
2 Loop around the support with the end
3 Pass it from behind the rope
4 Pull to tighten
5 The knot is complete

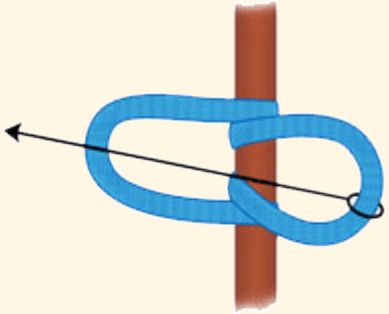
Girth Hitch



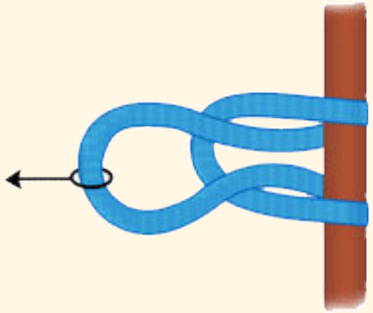
1 Wrap the pre-tied sling around the support



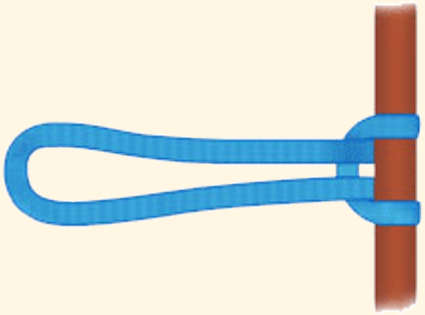
2 Pass the bigger loop through the smaller one



3 Take the right loop to the left side

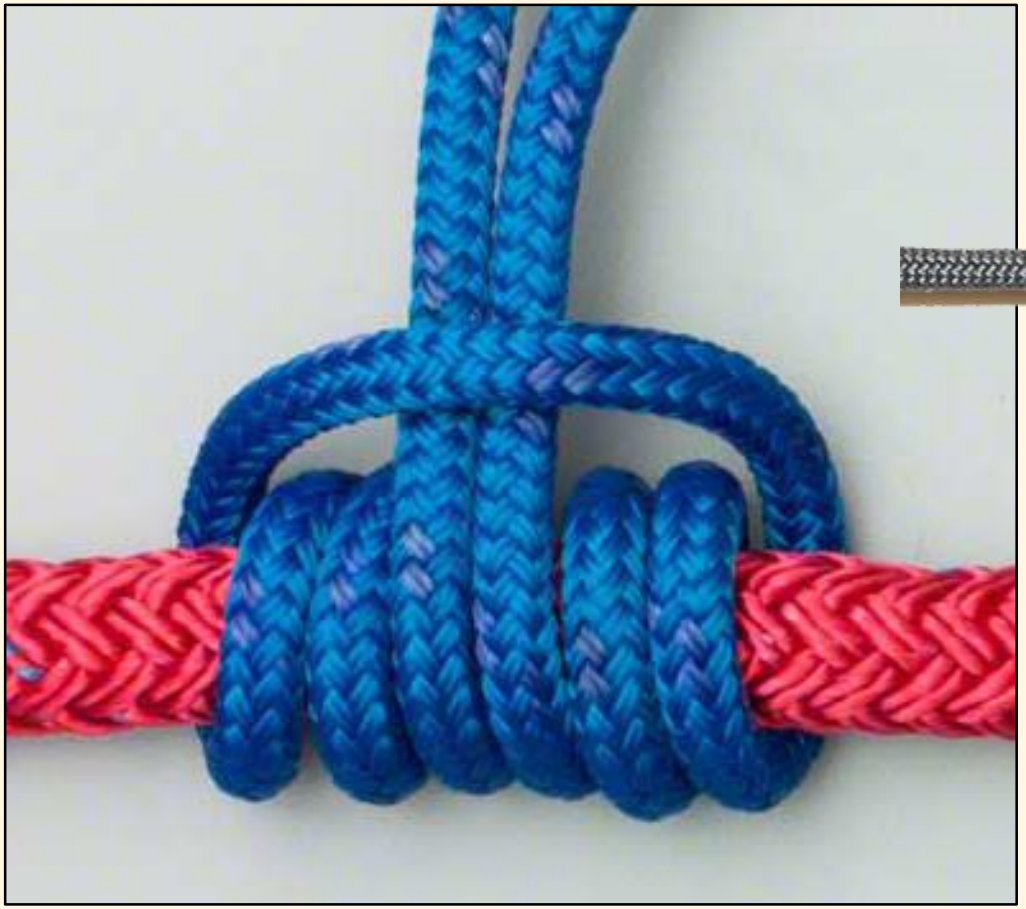


4 Pull it to tighten



5 The hitch is made

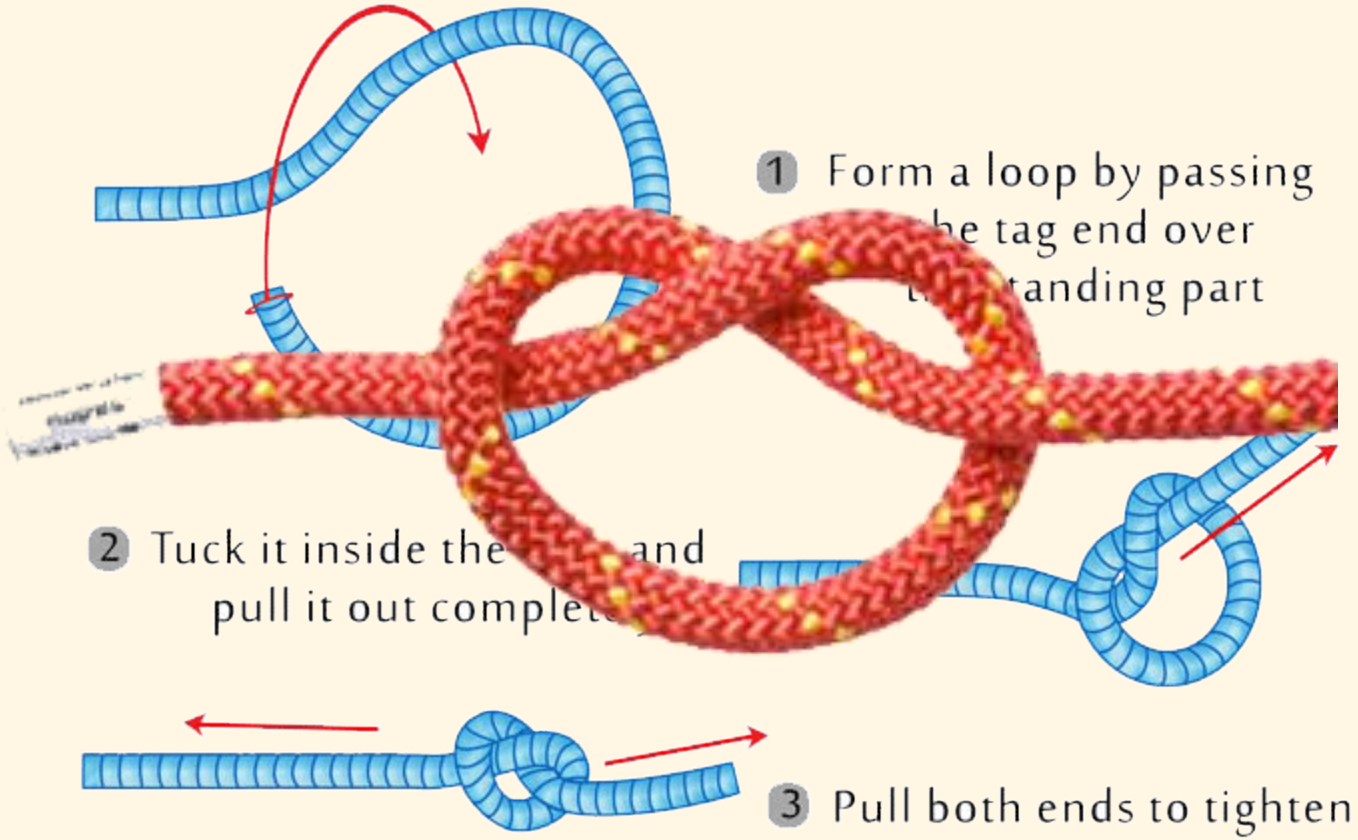
Prusik Hitch



Triple-Wrapped

Double-Wrapped

Overhand

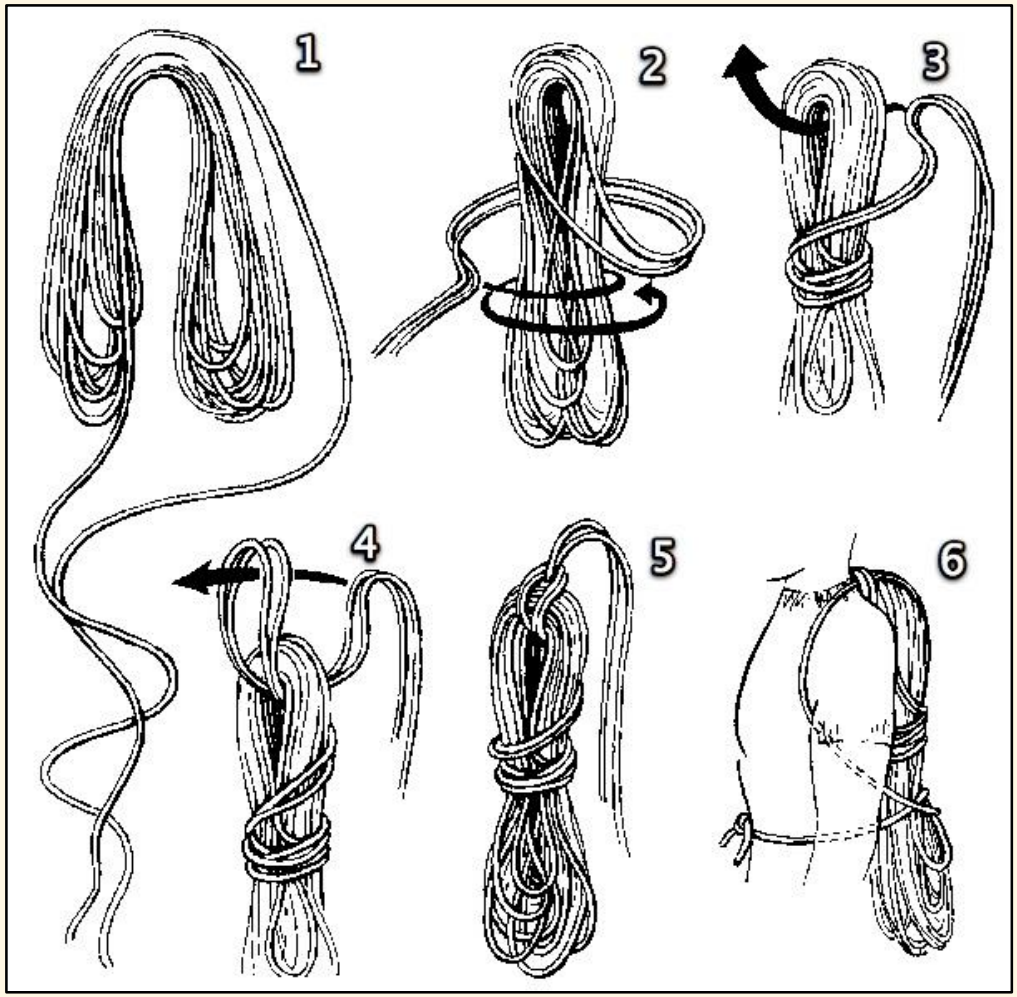

1 Form a loop by passing
he tag end over
tanding part
2 Tuck it inside the
and
pull it out
3 Pull both ends to tighten

Double Overhand

Water Knot

Swiss Seat

Wilderness Coil of Rope



Systems

- The type of life-safety technical rope systems used as largely based on situational circumstances
- Rescue systems should be performed using two life-safety lines
- Commons systems used in our rescues include:
  - Mirrored systems
  - Lowering systems
  - Raising systems
  - Rappelling
  - Highlines rescues
  - Skate-block rescues

Systems

- Rescue systems are situational dependent and include considerations of the following:
  - Safety
  - Medical (particular attention to injuries and to prevent further injury)
  - System safety factor
  - Available equipment
  - Available team members
  - Helicopter support

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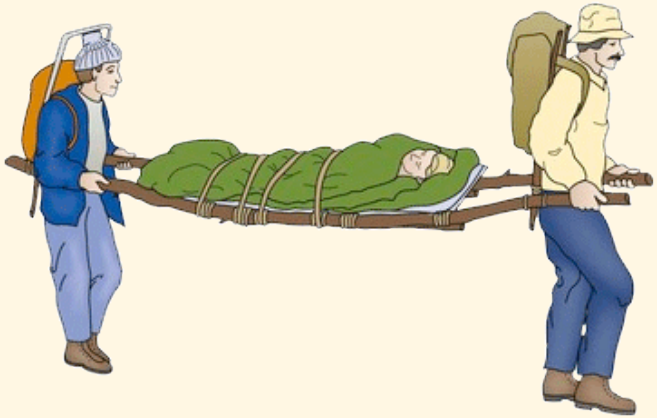
Patient Packaging

- Transporting injured persons from one location to another for further medical care is a frequent event in search and rescue
- Unless they can walk out, it usually involves some form of patient packaging and transport
- Make sure they are secure to avoid further injury



Patient Packaging

- Many ways to package a patient for transport
- Key criteria comes down to what gear is available
  - Stoke litter / basket
  - Big wheel
  - Sked
  - Bauman bag
  - Screamer suit
  - MegaMover
  - Backboard
  - Makeshift stretchers and harnesses
- Need to have a good understanding on how to secure an injured person for transport

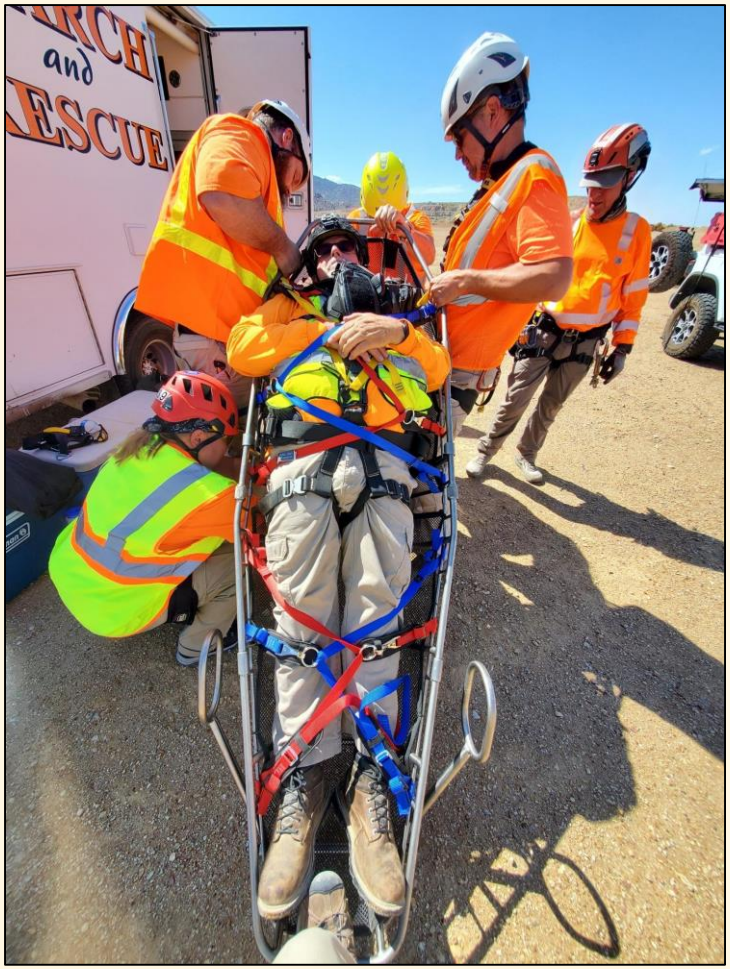
Titanium Stokes with Wheel

Ferno Litter

Sked

Tie-Ins

Webbing



Factory Straps

Bauman Bag

Screamer Suit

MegaMover

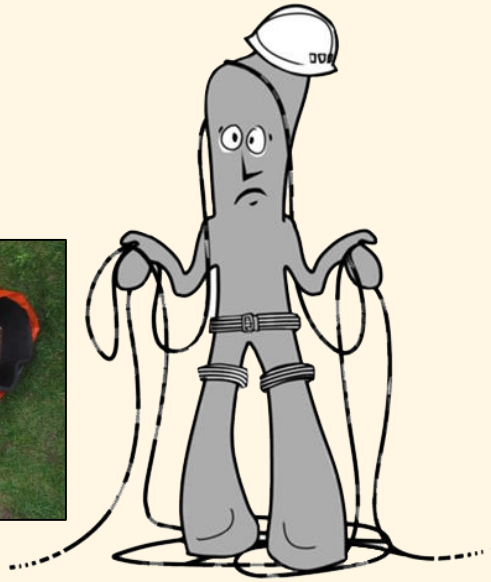
Make-Shift

Tarp

Backboard

Impromptu

Swiss Seat



Whatever it takes!

Hanson Harness

Technical Rope Rescues

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Rope Awareness

Questions???