

**INTRODUCTION TO ROUGH TERRAIN**  
**SAR TYPES 4/3/2**

**TYPE 4/3**

1. ROPE
2. WEBBING
3. HARDWARE
4. KNOTS - Figure 8; Figure 8 follow through; Double fisherman; Water knot
5. HARNESS - Swiss Harness - Webbing
6. COMMANDS – Hand - Voice
7. PATIENT PACKAGING – Use of Spider

\*\*\* DEMONSTRATION OF LITTER TRANSPORT (SATURDAY CLASS )

**TYPE 2**

1. BASIC LOW ANGLE SKILLS
2. ROPE KNOTS - Prusick hitch; Munter Hitch
3. WEBBING – Overhand knot; Round turn two half hitches
4. AWARENESS OF RAISING AND LOWERING SKILLS
5. EQUIPMENT - Leather gloves
6. HANDS ON ROPE
7. NO TALKING
8. SAFTEY

\*\*\* RAISING AND LOWERING SYSTEMS (SATURDAY CLASS )

## ROPES:

### kilo-newton

Is a unit is a unit of force---mass or amount of matter times acceleration or change in speed over time – equal to about .225 of a pound of force. kN

#### 1. Kern mantle

Design consists of a central core or kern of parallel fibers that support the load. This core is covered with a woven sheath or mantle. The rope is a static type which stretches only 2% to 3%. The size of this rescue rope is 7/16 or 11 mm. This is a rope rescue standard for the field and a minimum standard of rope for rescue. The rope breaking point is 6,000 pounds. **Please note: anytime you tie a knot in this rope you will loose 25% of its strength.**

#### 2. Prusik cord must be 8 mm and should have a minimum breaking strength of 13.3 kN (3,000 pounds).

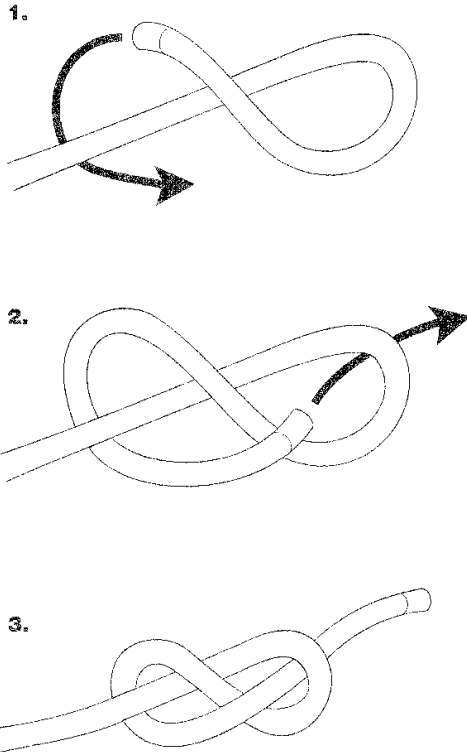
## WEBBING:

1. Webbing should be a minimum of 2.54 cm. or 1” wide and have a 4,000# breaking strength or 17.8 kN. It might be a spiral weave on a shuttle loom.
2. Anchor - Object or objects to which a load bearing system is affixed.
3. Low Angle - Slopes less than 40 degrees.
4. STOP - Command given at anytime by anyone
5. L. A. S. T. - **Locate Access Stabilize Transport**

# KNOTS

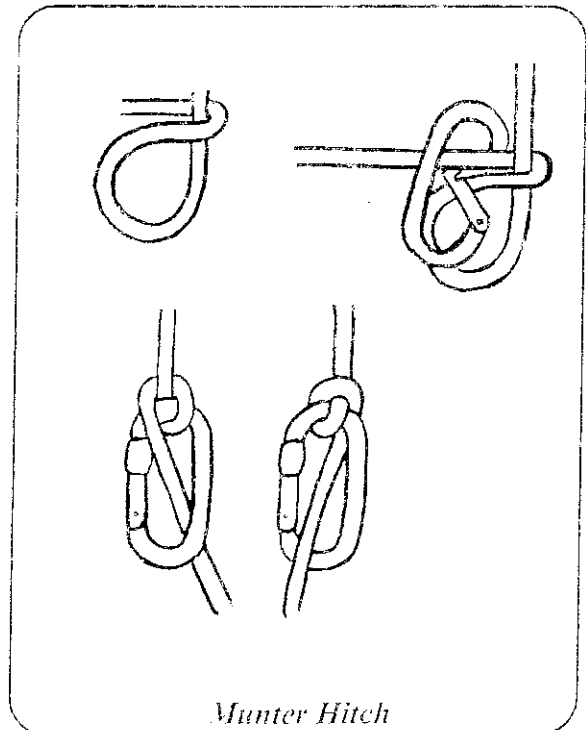
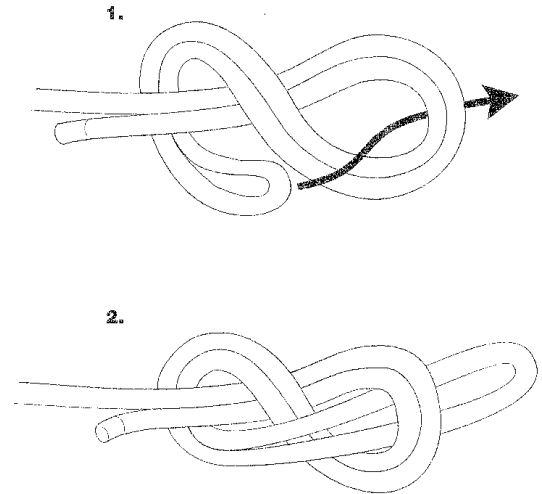
## FIGURE EIGHT

Used to tie other knots and as a stopper knot.



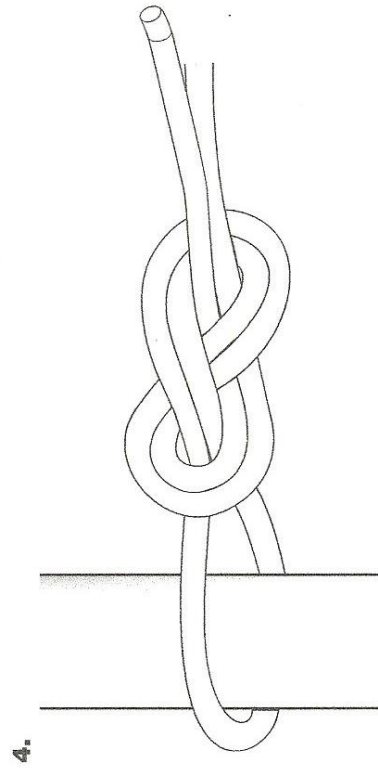
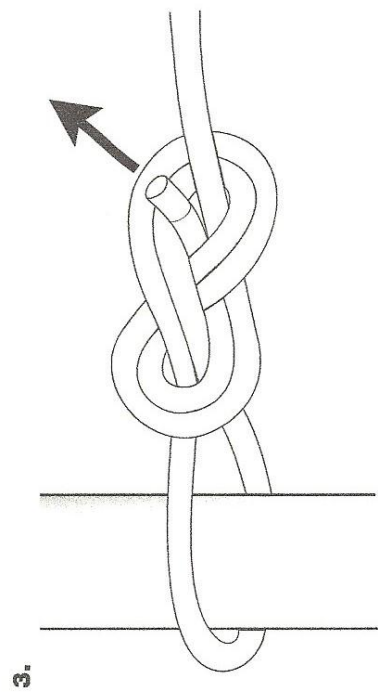
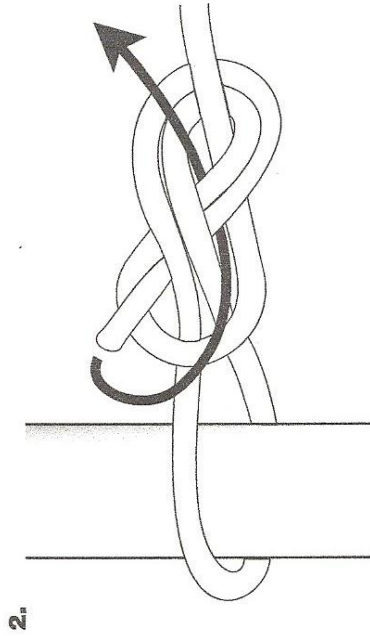
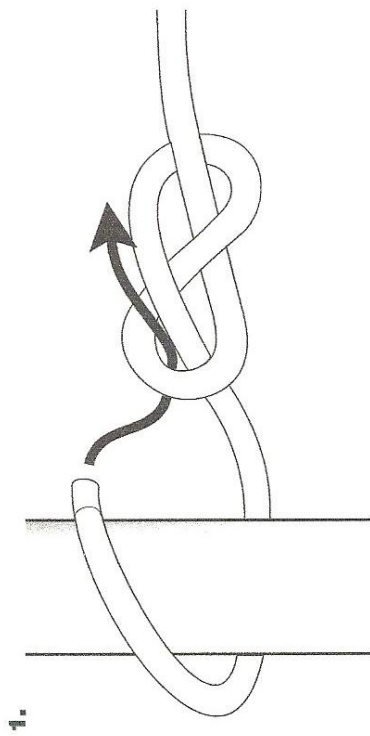
## FIGURE EIGHT ON A BIGHT

Used to make a loop in a rope.



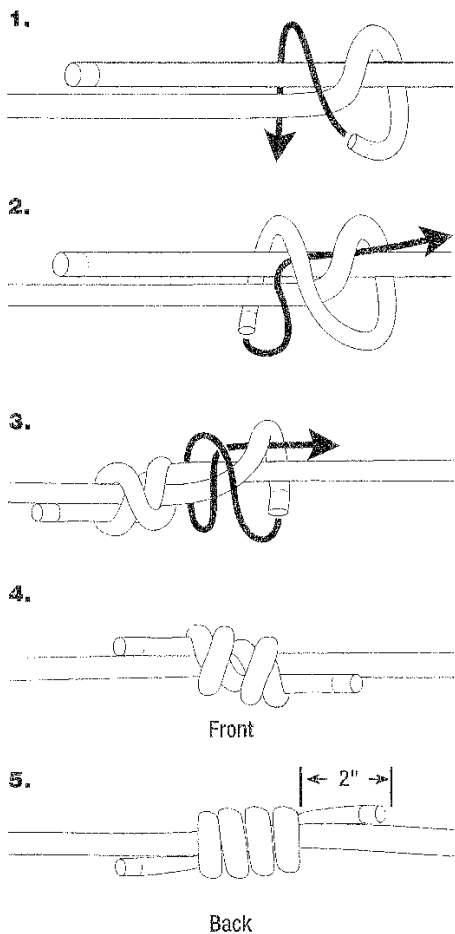
# FIGURE EIGHT FOLLOW THROUGH LOOP

Used to tie rope around an anchor.



# DOUBLE FISHERMAN

Used to tie Prusik loops.

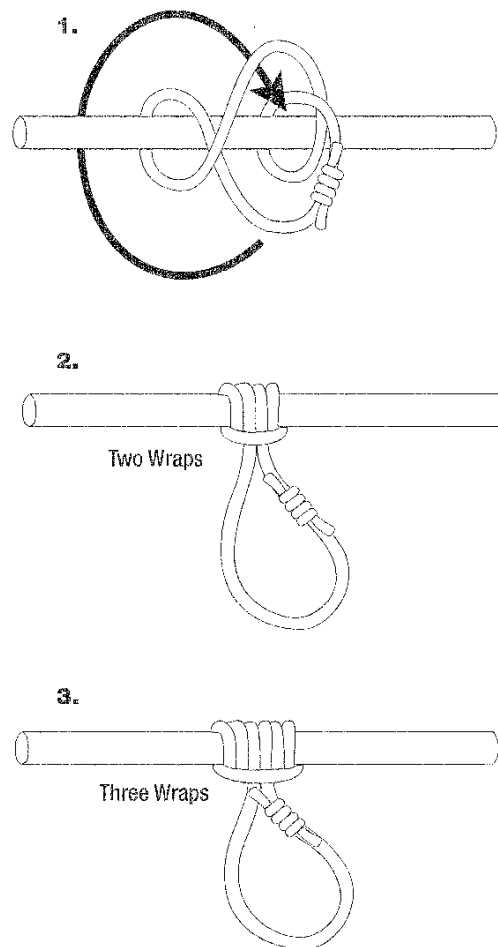


**NOTE:** The Double Fisherman Knot should have 2 inches (5 cm) of "tail" remaining from the knot when it is tied and pulled snug.

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# PRUSIK

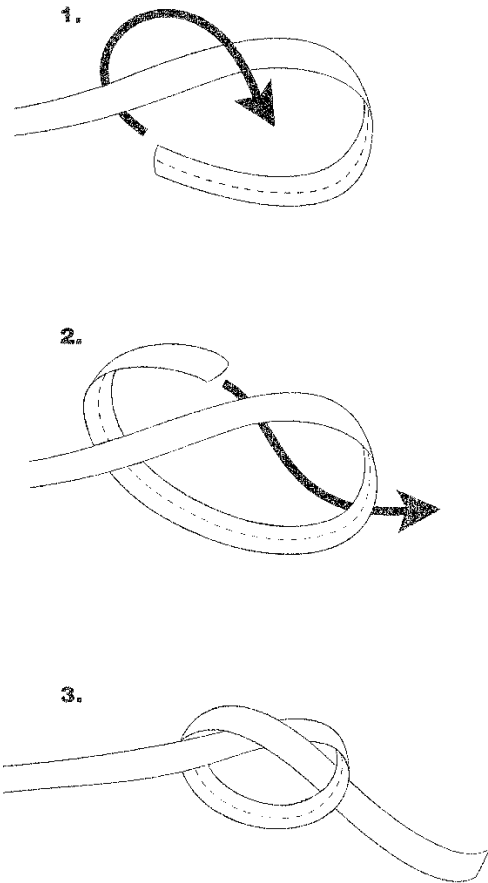
Friction knot



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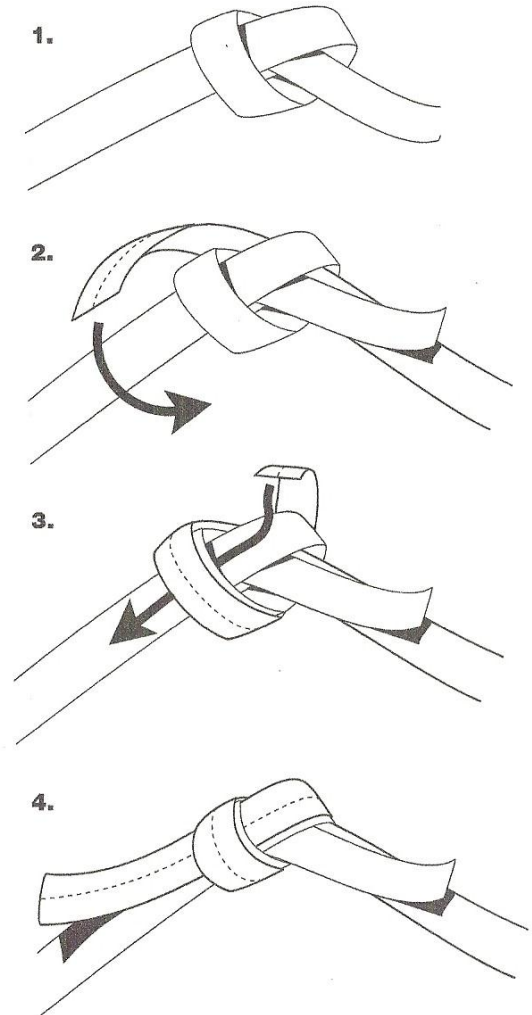
# OVERHAND KNOT

Used to tie off knots in webbing and for starting other knots.

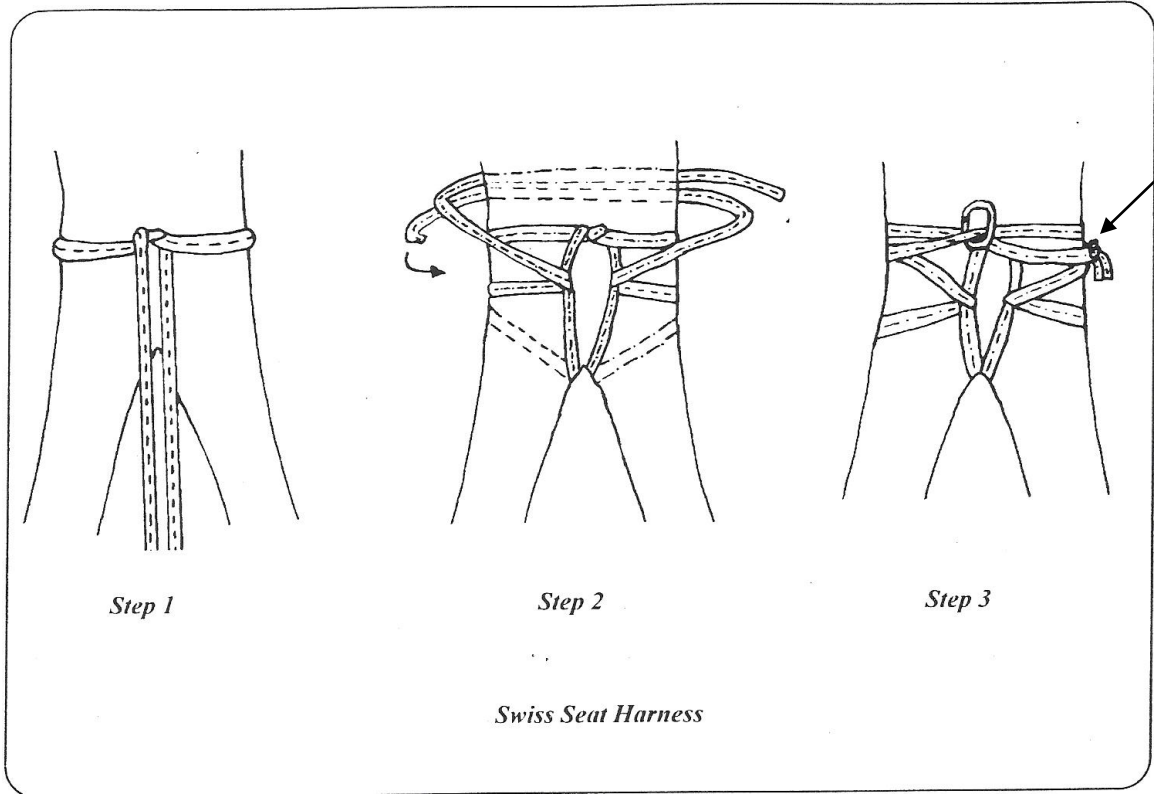


# WATER KNOT

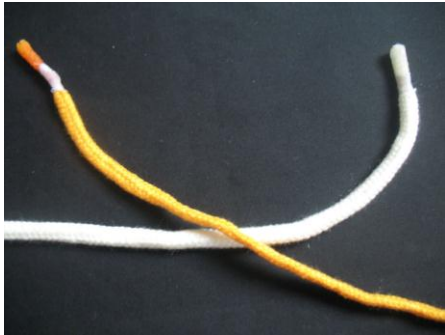
Used to tie webbing together, also called a Ring Bend or Overhand Bend.



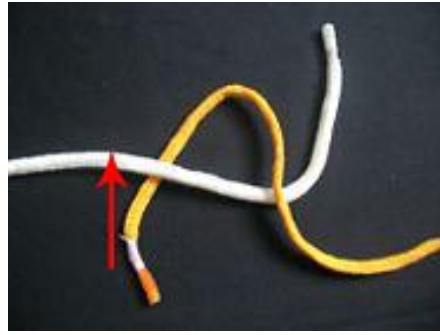
NOTE: The Water Knot should have 3 inches (8 cm) of "tail" remaining from the knot when it is tied and pulled snug.



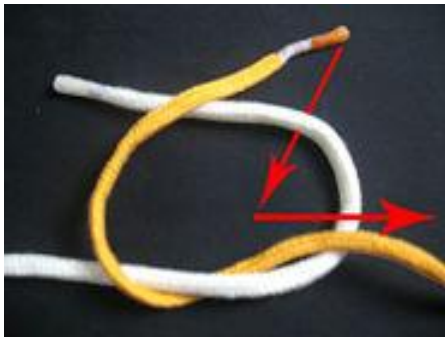
### Square Knot



Step 1



Step 2



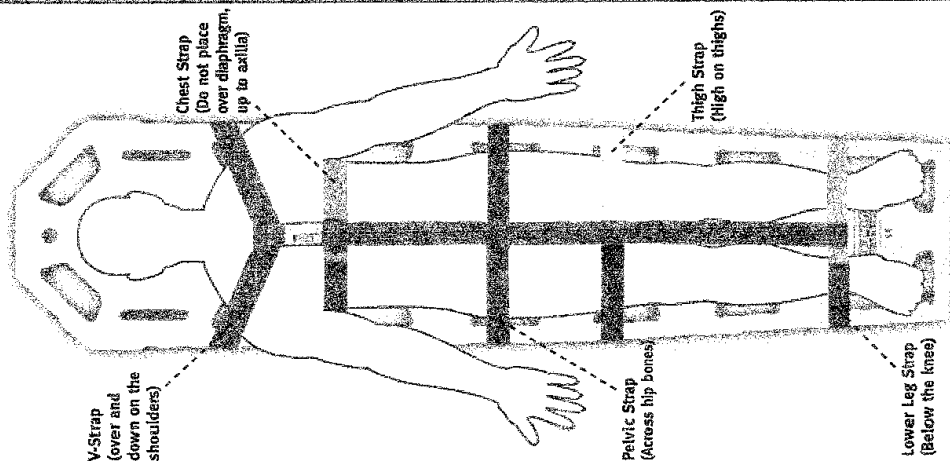
Step 3



Step 4

# SPIDER-STRAP™

Immobilization Strap



V-Strap  
(over and  
down on the  
shoulders)

Chest Strap  
(Do not place  
over diaphragm,  
up to axilla)

Pelvic Strap  
(Across hip bones)

Thigh Strap  
(High on thighs)

Lower Leg Strap  
(Below the knee)

For best results in the field,  
practice using the Spider-Strap™  
until you become thoroughly  
familiar with it.

## APPLICATION:

1. Hold folded strap above patient's chest with strap loops at bottom pointing to patient's feet.
2. Unfasten small retaining fastener which holds entire strapping system together.
3. Using both hands, divide the strap in the middle, letting it fall open naturally.
4. Place strap on patient's chest with the center strap folds pointing towards the patient's feet and the V-Strap on the patient's chest.
5. Pull the top cross strap (foot strap) towards the patient's feet. If it has been done correctly, you will see a solid color strap down the center of the patient. If you see any other colored straps crossing the center strap, that strap is inverted.
6. Unfasten the hook and loop on each cross strap and run through the holes in the backboard or scoop stretcher and then back around and fasten it to itself.

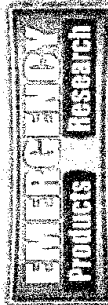
## REFOLDING:

1. Lay strap out as if on patient.
2. Fold cross straps back on themselves. Secure with hook and loop.
3. Position yourself at the foot end of the strap and grasp the right and left sides of the foot strap.
4. Pick up cross straps in sequence, half in your right hand and half in your left hand, beginning with the bottom strap. Align the center strap folds toward you.
5. When entire strapping system has been picked up, fold in half and secure with the small hook and loop fastener located on the V-Strap.
6. Store near backboard or scoop stretcher until next use.

## CARE:

1. Keep hook and loop clean; the hook and loop closures will support considerable weight and "safe use" if kept clean and lint free.
2. Hand wash. For machine washing, put strap in a pillow case, use cool water and a mild detergent and the gentle cycle.

For Professional Use Only!

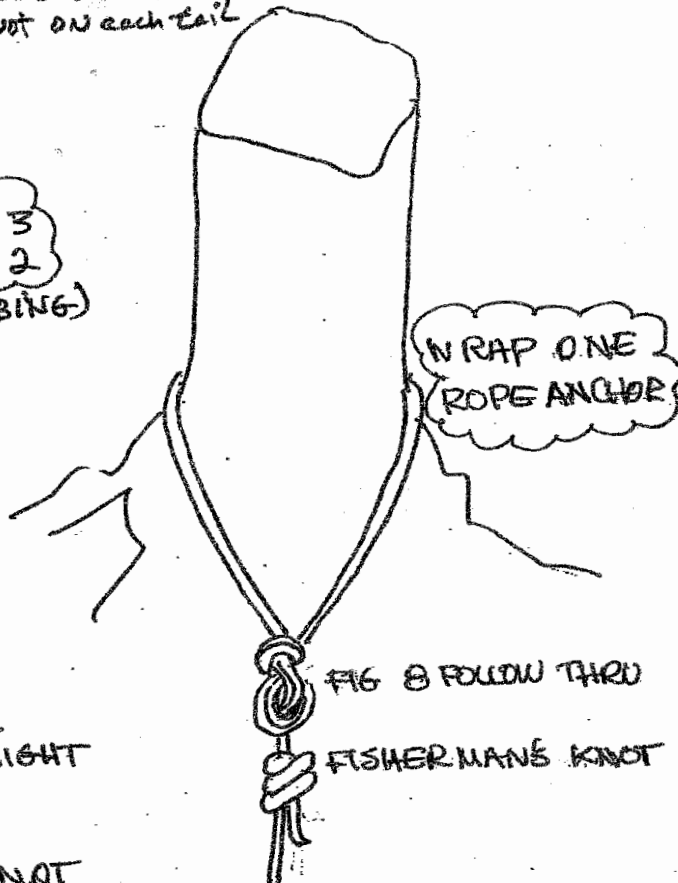
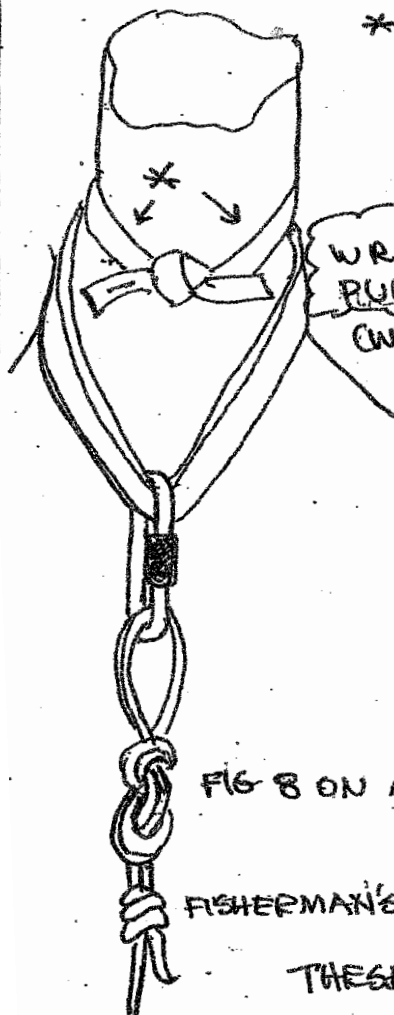


AIR DRY ONLY. DO NOT PUT  
IN DRYER. DO NOT AUTOCLAVE.



## SIMPLE ANCHORS

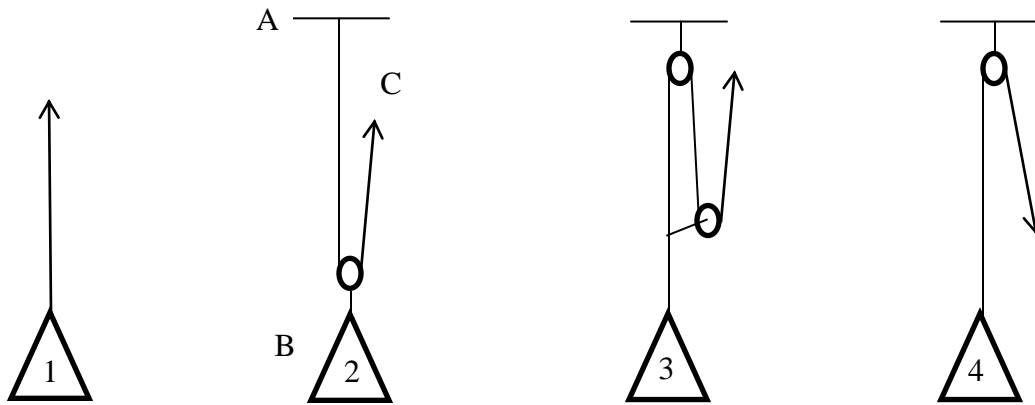
\* NEED OVERHAND  
KNOT ON each tail



THESE SIMPLE ANCHORS ARE USED FOR

- 1) HAND LINES
- 2) PROSIK LINES
- 3) 1 PERSON RAPPELL
- 4) EDGE LINES
- 5) EQUIPMENT MOVEMENT

## RAISING SYSTEMS



The above are 4 basic systems used to raise a load be it equipment, a litter or a stranded climber.

- 1) The first is called a “one to one” system. If the load is 300 lbs., the pullers on the rope must exert 300 lbs. of force to raise the load. There is no mechanical advantage (MA) in this system.
- 2) If a pulley is attached to the load, the pullers have a “two to one” (MA) system and the pullers have only to exert 150 lbs. of force to move the load. This **PULLEY** is a **MOVING PULLEY**. Only a **MOVING PULLEY** creates a mechanical advantage (MA).
- 3) If two pulleys are used and one pulley is attached to the rope, then the system is a “three to one” (MA) system. Now the pullers need only to exert 100 lbs. of force to raise the load of 300 lbs. Note that the pulley attached to the rope is a **MOVING PULLEY** exactly as if it were attached to the load. You are saving rope. It is only the pulley that is creating a (MA).
- 4) There is no (MA) to example 4. It is a “one to one” system. The pulley only creates a change of direction used when you cannot pull straight up from the load. The pullers must create 300 lbs. of force to raise the 300 lb. load.