

CSRC

Collapsed Structure Rescue Course Light Level



Pre Arrival Documentation 2007





Pre Arrival Documentation

The initial documentation for participants includes the following materials:

- Invitation Letter
- Course Registration Form
- Health Questionnaire and Food Allrgies
- Waiver Letter
- Course Description: Purpose, Training and Performance Objectives
- Schedule
- Course Content
- Reading Material
- Pre-Arrival Material
- Picture Glossary

On the first day of the course participants shall hand in their completed Course Registration Form, Health Questionnaire, Food Allergies and Waiver Form.

REQUIREMENTS FOR ADMISSION TO THE COURSE:

Hand in completed Pre-Arrival Work, consisting of:

1. Reading the administrative documentation and information attached.
2. Working with the Reading Material and Picture Glossary to answer all the items on the attached questionnaire.
3. Having learned and practiced the knots described in the Annex on ropes.

Participants shall be members of first response teams, they must have knowledge of first aid as well as knots and ropes. An admission evaluation will be carried out to guarantee knowledge of the topics.

REQUIRED EQUIPMENT:

- Safety Helmet (with 3 attachment points and chin strap)
- Coverall
- Cap
- Work Gloves (gauntlet or leather)
- Eye Protection (safety glasses or goggles)
- Ear Protection
- Dust Mask
- Safety Boots (steel toe)
- Knee Pads, Elbow Pads
- Canteen or personal potable water container, minimum capacity: one liter
- 6 meters of rope (6 mm caliber)
- Safety Whistle
- Waterproof Flash Light with spare bulb and batteries (manual or head-mounted)
- Raincoat



OPTIONAL EQUIPMENT

- Sun Block
- Insect Repellent

This course has been designed and developed following all safety, operations and logistics procedures from the OFDA/LAC Urban Search and Rescue Training Program and consists of the following aspects:

PURPOSE

The purpose of this manual is to train participants in the techniques and skills necessary to search and rescue patients found on the surface of collapsed structure events. Participants will learn to apply the most appropriate and safest procedures for their safety as well as for the patients.

PERFORMANCE OBJECTIVE

Upon completion of the course participants, as members of a first response team constituted by 10 rescuers, will be able to:

1. Conduct a primary scene assesment.
2. Apply the START triage patient clasification system.
3. Apply most appropriate search technique and the INSARAG marking system.
4. Apply debris removal, load lifting and shoring techniques for rescuing lightly trapped .
5. Correctly stabilize and extract patients.

Each working group will face a simulated scenarios and each team will have the respective tools and equipment complete the exercise. During the exercise, the techniques and procedures learned in the shall be exercised.

TRAINING OBJECTIVES

Upon completion of each lesson participants will develop the following skills:

1. List at least 15 safety standards to be followed duringa light rescue operation.
2. Explain the procedures followed during a a light rescue operation.
3. Describe the damages occurring to buildings from a set of photographs to be presented in class.
4. Apply call and listen and parallel search techniques in a given scenario. During the same scenario participants need to mark victim location in accordance with the INSARAG marking system.
5. Describe the tools, equipment and accessories to be used during a light rescue operation.
6. Describe the START triage patient classification systemand the steps for initial assesment and patient care.



Course Schedule		
Place: _____		Country: _____
Date: _____, 20____		

Day 1 _____ of _____		
Time	Lesson	Topic
8:00		Installation
8:30	Introd.	Introduction
9:30		Break / Equipment Check
10:00	1	Response to Collapsed Structures
12:00		Lunch
13:00	2	Safety Considerations
15:00		Break
15:30	3	Building Damage Assessment
17:00		Evaluation of the Day

Day 2 _____ of _____		
Time	Lesson	Topic
8:00		Evaluation of Lessons 1, 2 and 3
9:00	4	Search Strategies and the INSARAG marking system
10:30		Break
11:00	4	Lesson 4 Practice
13:00		Lunch
14:00	5	Hand Tools, Power Tools, Equipment and Accessories
14:30	5	Lesson 5 Practice (First Segment of Exercise)
16:00		Break
16:30	5	Lesson 5 Practice Continued (Second Segment of Exercise)
18:00		Day's Evaluation
18:30		Make-Up Lessons



Day 3 _____ of _____		
Time	Lesson	Topic
8:00		Evaluation of Lessons 4 and 5
9:00	6	Pre-Hospital Care
10:00		Break
10:30	6	Lesson 6 Practice
12:00	7	Surface Rescue Techniques
13:00		Lunch
14:00	7	Lesson 7 Practice
16:30		Break
17:00	8	Review
18:00		Day's Evaluation
18:30		Make-Up Lessons

Day 4 _____ of _____		
Time	Lesson	Topic
7:00		Evaluation of Lessons 6 and 7
8:00		Preparation of Final Exercise
8:30		Make-Up Lessons
9:00		Final Exercise (Phase 1)
9:30		Final Exercise (Phase 2)
10:30		Final Exercise (Phase 3) (Field Lunch)
14:00		Adjournment



COURSE CONTENT

Lesson 1. _____ Response to Collapsed Structures

Lesson 2. _____ Safety Considerations

Lesson 3. _____ Building Damage Assessment

Lesson 4. _____ Search Techniques and the INSARAG Makring System

Lesson 5. _____ Tools, Equipment and Accessories

Lesson 6. _____ Patient Care

Lesson 7. _____ Surface Rescue Techniques

Lesson 8. _____ Review

Final Exercise



Collapsed Structures Rescue Course – Basic Level	
Waiver Form	
Any participant shall fill out and sign this form and handed in to the Course Coordinator before the beginning of the course. Please print clearly.	
COURSE LOCATION	COURSE DATES
	START: _____ END: _____
FULL NAME (PRINT)	
PARTICIPANT PASSPORT NUMBER OR OTHER OFFICIAL DOCUMENT	
NUMBER	ISSUED IN:
WAIVER	
<p>The undersigned, legal identification number shown above, a participant of the Collapsed Structures Rescue Course - Light Level ("CSRC" Course). The course is being held on the dates shown above. The undersigned declares that he/she is fully aware of the risks and dangers to which they are been exposed which may cause a minor or major injury or death. The undersigned understands and accept that any agency dealing or teaching the course, the coordinator, instructors and support staff have taken all possible and prudent measures to prevent an accident from occurring during the development of the course.</p> <p>The undersigned agrees to comply with each and every safety standard handed and/or explained to him/her before and during the course, and to ensure the integrity and safety of the other participants.</p> <p>If an accident does occur during course, and injury or death is received by the undersigne, he/she hereby releases any agency dealing or teaching the course,the coordinator, instructors and support staff of the course, of any civil liability.</p>	
PLEASE SIGN AND DATE	
SIGNATURE:	DATE:
WITNESS SIGNATURE:	DATE:



Collapsed Structures Rescue Course

Health Questionnaire and Food Allergies

This questionnaire is an important part of providing you with the best health care possible. This form serves to inform the Course Coordinator about any important information about the state of your health or food allergies.

COURSE LOCATION

COURSE DATES

START:

END :

FULL NAME (PLEASE PRINT)

ARE YOU A VEGETARIAN OR HAVE ANY FOOD RESTRICTIONS? YES ___ NO ___

IF SO, PLEASE EXPLAIN:

ARE YOU ALLERGIC TO ANY FOODS?

YES ___ NO ___

IF SO, PLEASE SPECIFY:

ARE YOU CURRENTLY UNDER MEDICAL TREATMENT, DO YOU TAKE ANY MEDICATION OR DO YOU HAVE A PHYSICAL IMPEDIMENT?

YES ___ NO ___

IF SO, PLEASE SPECIFY:

PLEASE SIGN AND DATE

SIGNATURE:

DATE:



READING MATERIAL

Course Safety Standards

- It will not permitted to enter a work area without authorization from the Course Coordinator.
- Upon entering the work area, always remember to wear full personal protection equipment (PPE) correctly.
- All operations shall have a duly identified safety officer.
- Each team member shall also act as safety officer.
- Remember the emergency siganls: Three short signals (blasts) = EVACUATE IMMEDIATELY. One long signal (blast) = Cease operations. A long signal followed by a long means = Resume Operations (continue Working).
- Important: Participants should wash their hands after leaving the work area.
- The safety officer shall establish a safe area for evacuation
- There should be a first aid kit present at the site. There should also be present, communications equipment to call an ambulance service in case of a real emergency.
- A portable 20 lb. dry chemical powder fire extinguisher should be available during the refuling of all equipment.
- All team members must have a canteen with water and re-hydrate often..
- 30-minute shifts shall be established for normal rotation conditions.
- Do not leave trash in the work area.
- No smoking or eating in the work area.
- If the enviroment posses a threat to the rescuer, the safety officer shall make a determination on stopping or contining work.
- All areas and objects representing a hazard to rescuers shall be marked.
- Any person repeatedly causing an unsafe condition or involved in unsafe actions shall be removed from the area.
- The safety officer shall be responsible for the safety of all personnel.
- All tools and accessories shall be used, located, maintained, collected and stored in accordance with the established rules.
- All operations requiring the use of hand tools shall be carried out in pairs. One person will work with the handtool and the other shall ensure safet.



Search and Rescue Operations in Collapsed Structures

Search and rescue activities carried out in spaces designated for human use that, whether due to natural or man-made phenomena, suffer considerable damage or collapse. The structures fall due to damage to load-bearing structural elements and given their configuration and distribution, leave vital voids that may enable the survival among the debris.

Rescue in Confined Spaces

Rescue activity carried out in spaces with restricted entry and exit, without natural ventilation, which may contain or generate toxic pollutants, oxygen deficient and/or flammable atmospheres, not destined for human occupation and usually part of an industrial process.

USAR Team

An active element of the emergency response system, constituted by trained personnel and organized under the existing standards requirements for this purpose. With the USARA team follows their own operational plans, protocols and procedures, for the purpose of: searching, stabilizing and rescuing (or recovering, in case of death) people trapped in a collapsed structure. The USAR teams usually rely on the Incident Command System (ICS) as operational foundation.

Personal Protection Equipment (PPE)

Personal Protective Equipment (PPE) is composed of the various elements for the purpose of protecting the rescuer. The protection comes by, reducing exposure to external factors that may cause injury. Thus personal protection equipment (PPE) includes any device to be worn by a rescuer with which otherwise would receive injury or death.

This equipment should be considered to be temporary and immediate protection as long the hazardous conditions are not eliminated.

- Head protection
- Eye and face protection
- Ear protection
- Respiratory protection
- Corporal protection
- Limb protection

By grouping the attributes the personal protection equipment must feature and including others related with construction, durability and appearance, the essential requirements to be met by all personal protection equipment can be established.

1. The equipment must offer adequate protection against the risks to which rescuers are going to be exposed.
2. The equipment must provide maximum control as well as minimum weight, to be supported by the most appropriate part of the body.
3. The equipment must not restrict the movements of the rescuer or the pace of the task or work being carried out.
4. The equipment must be durable within reasonable margins.
5. The equipment must be constructed in accordance with the standards, taking into consideration the standards established for the work that is to be carried out.
6. The equipment must have an attractive appearance and inspire confidence in the bearer.

**Head Protection**

Protects against impacts, hair trapping, chemical substances, and electric shock.

Eye and Face Protection

Protects the eyes and the face against chemical substances, impact by objects, irritating gases, excessive light or hazardous radiation that may injure eyesight, depending on the type of protector.

Ear Protection

Protects hearing, the sense of hearing from foreign objects and noise, and in some cases may be attached to the helmet.

Respiratory Protection

Protects against inhalation of air contaminating elements or oxygen deficiency, depending on the type of protection offered.

Corporal Protection

Protects the body against elements that may cause injury, chemical substances, etc.

- Vests
- Body bags to recover corpses
- Rubber bags for HAZMAT
- Coverall (encapsulated) suits

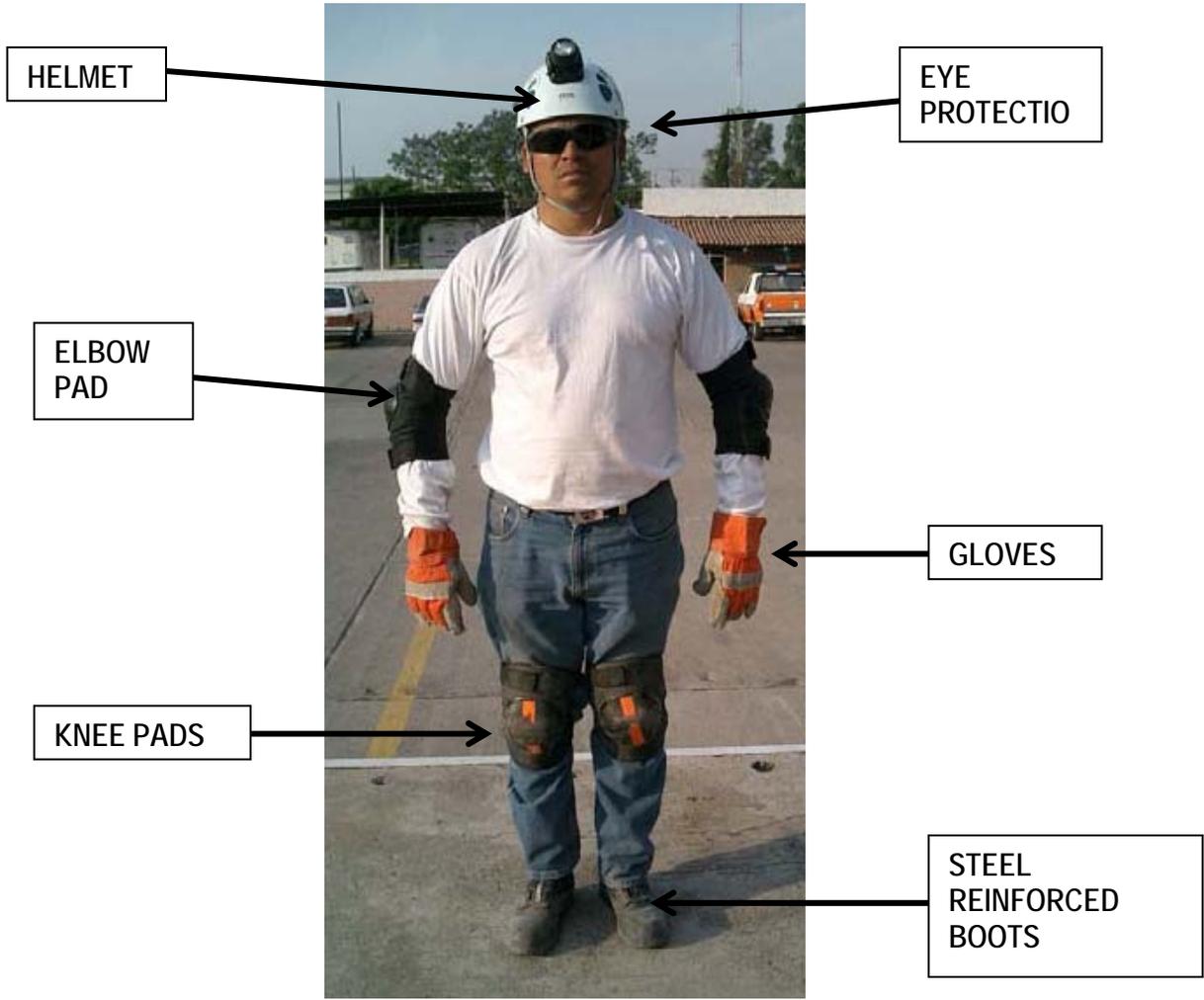
Limb Protection

Protects against impacts, compression forces, sharp objects, humidity, chemicals, communicable diseases, etc.

- Gloves
- Knee pads
- Elbow pads
- Reinforced toe boots



Personal Protection Equipment





EQUIPMENT, TOOLS AND ACCESSORIES

Hand Tool

Manual object used to carry out a task where the Operator supplies the energy directly.

Power Tool

Machine or device of some complexity used to carry out a task whose active principle consists in the transformation of energy to increase working capacity.

Accessory

Object that complements a tool in order to expand or improve operational capacities.

ROPES – KNOTS – ANCHORS

ROPES

An inseparable element of rescuers dating from the time of the pioneers and directly linked to their safety; rope evolution has been fast relative to manageability and resistance, accomplished thanks to the use of modern synthetic fibers in their construction. This is not to imply that this important resource should not be cared for, on the contrary, it requires good handling, careful cleaning and storage identifying it as “DELICATE MATERIAL” and should be treated with great care.

Ropes in rescue activities become lifelines linking the rescuer or the patient with the success of the maneuver. Therefore, any operation using ropes requires safety and awareness. In fact, the ropes now used in rescue activities are based on mountain climbing activities and, for this reason, are approved by the UIAA (Union Internationale des Associations d'Alpinisme), the French organization regulating the manufacturing of mountain climbing equipment and “Kernmantle” is the material approved by this organization. Kernmantle consists of a lining that covers the core, as shown in Figure 1. The material commonly used to manufacture certified ropes is Nylon6 (Perlon) and Nylon6.6 (Dupont).

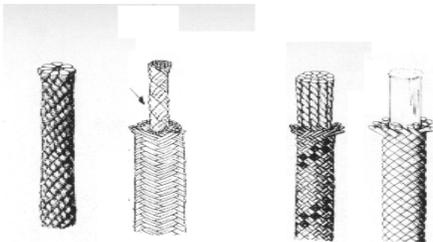


FIGURE 1

The history of many tragedies around the rescue world as well as the experience and various studies about the resistance of the rope to drops and snags have enabled a better understanding of the limitations of this important resource.

Basically, a rope is a set of artificial fabrics woven and joined in the shape of a cylinder. For rescue, only woven ropes are used, as wrung fibers do not perform well in sudden drops. Ropes consist of two parts, a lining or sleeve as exterior cover and protection and the core or soul that provides consistency. These two components comprise the load bearing capacity, as the core of the rope bears 70% of the load and the remaining 30% is supported by the sleeve.



Ropes are classified as static or dynamic and each one of them has a specific function in rescue operations.

DYNAMIC ROPES

The characteristic of these ropes is that they have an elongation percentage between 6% and 12%, i.e., they are designed to absorb the impact of a drop, protecting the user from injury. They are normally used as safety lines or for sports and recreational activities. In rescue operations, these ropes have an important function as alternate safety system for the rescuers involved in the operation. Maximum diameter is 11 mm and resistance is about 2500 Kg.

STATIC ROPES

The elongation percentage of these ropes is about 2%. In rescue operations, this type of ropes has the fundamental function of supporting the rescuer and handling of loads. The rope has a diameter of 12 mm (1/2") and the resistance is 4,530 Kg.

ROPE RESISTANCE

Static rope 12 7 mm:	4,503 Kg.
Rope 11 mm.	2,300 Kg.
Rope 8 mm.	1,700 Kg.

WEBBING

The webbing used for rescue operations is usually tubular type which allows double resistance. The webbing is used for anchoring and may also be used to improvise harnesses. One of the materials used to manufacture the webbing is polyamide fiber, the same used to manufacture harnesses, and therefore the same technical and care recommendations should be followed.

STRAP RESISTANCE

Straps 2.5 cm. (1")	2,300 Kg.
Straps 5.0 cm. (2")	4,500 Kg.

KNOTS

Knots have always been an essential element of mankind and contrary to what may have been expected, modernization and the emergence of new technologies have not made them less indispensable and, on the contrary, they are used even more. From the time the first navigators took to the seas, sailors have found many uses for ropes and knots, and these have become their natural allies.

The good use of knots in rescue procedures is of vital importance for the safety of any operation and the strictest criteria of safety and resistance should be followed. The people using knots have to have great abilities and skills and should follow the general rules to guarantee the safety of rescuers and patients.

However, a strong dose of common sense is also required, as well as the experience of the rescuer, since an excellent knot tied with the appropriate rope but anchored to a point of insufficient resistance, will become the means to the failure of the operation, with the associated consequences for the rescuer and the patient.



It should be said, therefore, that in rescue activities, knots and common sense are the basis for any system, as no safety or assistance system can be provided in a rescue operation to protect the rescuer or the patient.

Thus, all members of a team must know how to work with knots and develop such skill as to detect errors made by colleagues, thereby including the safety principles when working with knots.

Basic requirements of knots:

- Maximum resistance and safety of traction.
- Taking away as little resistance as possible from the rope used to tie it
- Should not become undone in the presence of traction.
- Should be easy to verify visually by the rescuer.
- Easy to untie once submitted to traction.
- Should not be hard to remember.
- Should be simple but safe

In addition, to make a knot it is necessary to take into account the following standards:

1. **Distribution of Workload or Parallelism.** The knot should work uniformly.
2. **Specificity.** Like all tools, each knot has a specific use
3. **Work Direction.** The knot has a direction for optimum operation.
4. **Simplicity.** This characteristic may comprise four areas: ease to tie the knot, ease to untie the knot, ease to inspect the knot and ease to teach the knot.
5. **Resistance.** Any knot tied on a rope diminishes the resistance of the rope, as the knot implies stress, rope on rope and folds which implies the rope in that part is more stressed than a clean rope (without knots).

CARABINERS

These are rings used to connect the various elements of a rescue system between them, thus we find the multiple use safety carabiners with closing mechanisms to prevent accidental opening during use.

In addition, there are three basic designs: oval, useful to handle wide straps without losing resistance, HMS or pear shaped, special for use with dynamic knots and figure “D” that offer greater resistance and most frequently used in rescue.

Carabiners should never be used in the open position nor for tri-axial forces, i.e., from three different directions, as their resistance is greatly diminished by this operation; traction should only occur along its longest axis. Their resistance varies between 2,300 kg. and 6,000 kg.; it is important to verify the manufacturer's recommended resistance of the carabiner, which is etched in the device itself.

There is no doubt these components are indispensable and versatile for rescue activities. Carabiners are links that join arrays, techniques and users. Thus the importance of being thoroughly familiar with this essential safety element in a rescue operation (See Figure 2)

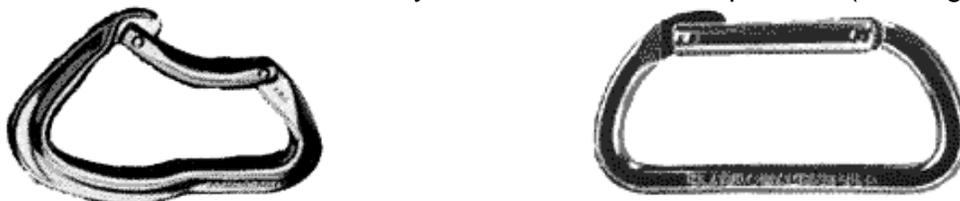


Figure 2

**CARABINER CARE:**

1. Should be used along its force axis
2. Make sure it is closed when in use
3. Should not be hit or dropped
4. Moving parts should be lubricated using graphite
5. should be thoroughly cleaned
6. A record of use must be kept

ANCHORING

In rescue activities, anchoring includes the maneuvers used to affix systems and/or techniques for safety purposes. Anchoring is possible in natural or artificial points, thus *Natural Anchors* are those made using rock structures or trees, structural components, etc.; artificial anchors involve the use of elements that are not part of the environment such as spikes, fasteners, expansion screws, etc. Regardless of the type of anchor used, certain parameters should always be used to guarantee the stability, dependability and safety of the technique used, and therefore anchors shall fulfill the following requirements:

a.- Safe Anchor Base

The base should support at least 10 times the load applied, should be unmovable and its shape should allow easy placement of the anchoring element (sling). The number of points for each anchor is an important criterion for the operation to be carried out and even more for rescuer and patient safety. Always take into account:

- One point anchor = “Psychological Anchor”
- Two point anchor = “Good Anchor”
- Three point anchor = “Excellent Anchor”
- More than three points = **Bomb-Proof**

This means there should always be at least two points of anchoring, and three is the recommended minimum for complex rescue situations.

b.- Friction Protection

Anchoring should always prevent any type of friction that may exist, whether in the sling or in the rope and necessary protection should be used to avoid it.

c.- Work Direction

Before anchoring, always take into consideration the direction of the maneuver and try to foresee any possible changes in the direction, to avoid force vectors inappropriate for the type of anchoring used. Compliance with these safety parameters ensures operation without accidents.

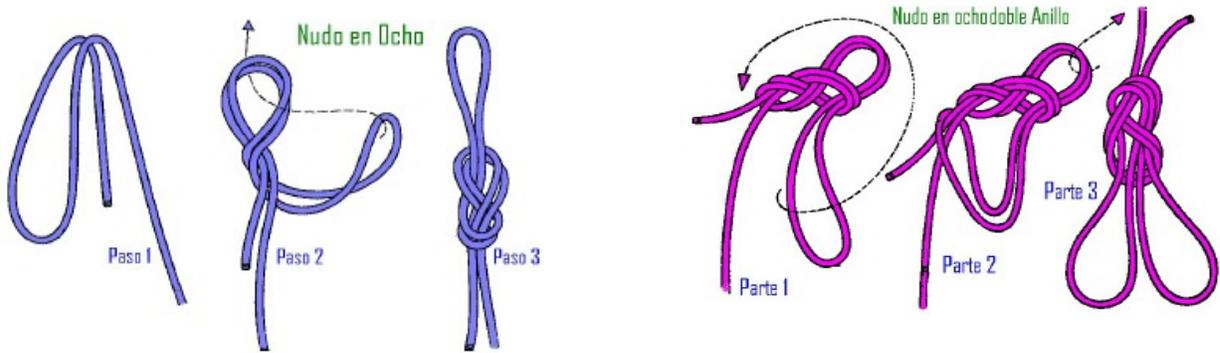
KNOTS TO BE USED

During the course, only a limited number of knots will be studied; however, we recommend participants learn, practice and develop skills and abilities in at least 6 knots, to be done with their eyes closed, with their hands behind their back or under extreme conditions, with or without gloves, in other words, it is up to the participants to guarantee their performance in handling ropes, knots and anchoring.



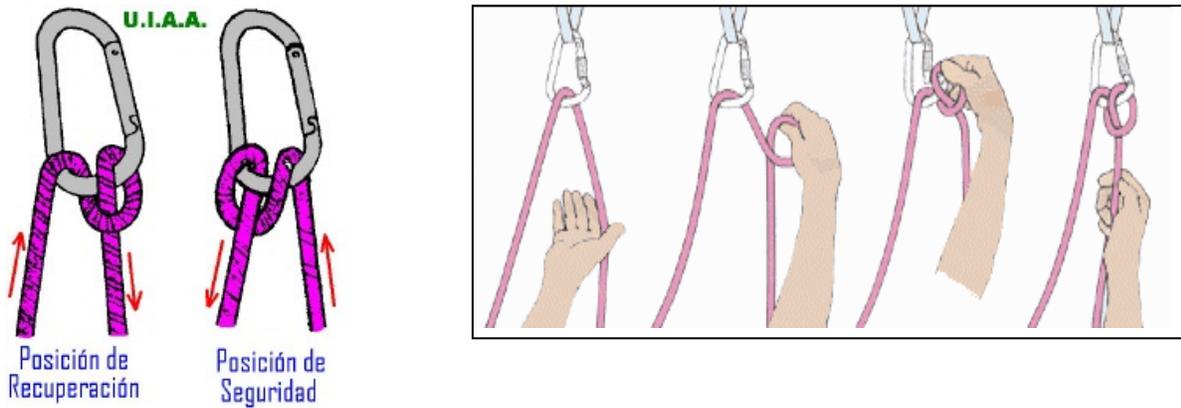
Figure Eight Knot

It is part of a family that groups a series of knots that follow the same construction principle. These are the most widely used around the world for rescue activities as they perfectly fulfill all safety requirements.



Dynamic Knot

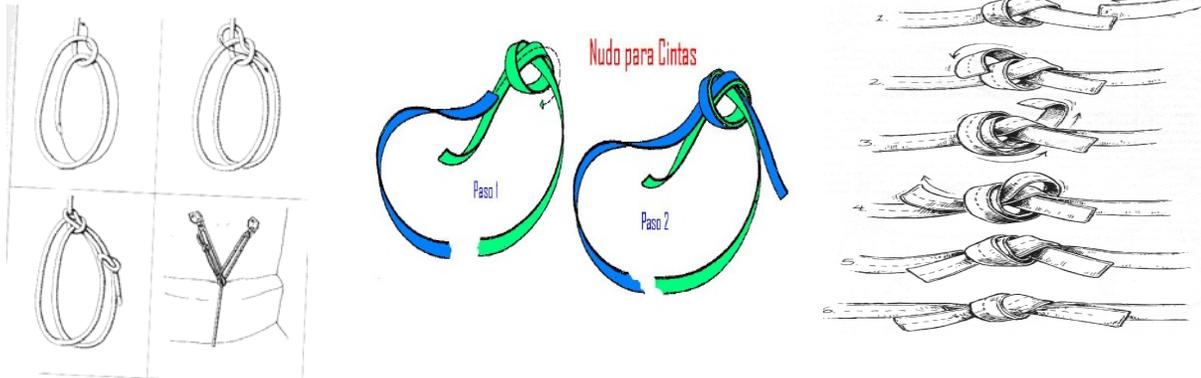
It is the simplest and most appropriate knot to provide safety to rescue team members when they are carrying out activities that require constant movement of the main rope with great security and for step by step progress. The most important characteristic of knot is the possibility of using in the two directions of movement of the rope.





Water Knot

The use of webbing requires perfect knowledge of a special knot to join them together. To tie both ends, first a knot is tied in an end without tightening it and then another strap is introduced into it and the same operation is repeated in the other direction. It is indispensable when using webbings as other types of knots may become undone.

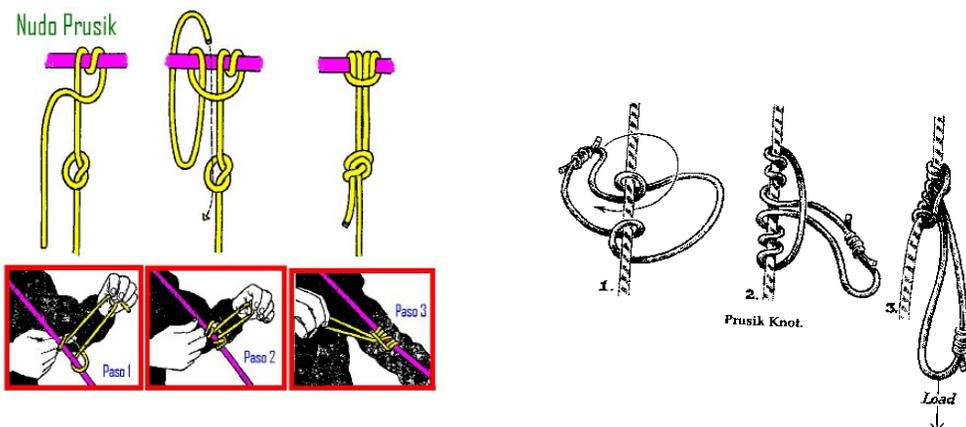


Prusik Loop

This knot is used for ascending procedures and its characteristic is that it provides traction in any direction, it does not displace, thereby guaranteeing the stability of the rescuer on the rope. For ascents, it can be accompanied by a carabiner that acts as a slider, and it is necessary to use footholds to maximize resistance capacity, thus diminishing the action of the force of gravity.

This knot presses the rope when under stress, effectively blocking it. the use of these knots is very frequent, but certain rules have to be kept in mind, among them: Removing the weight and untying the knot before moving it along the rope, being alert to rope burns, using at least two Prusiks when doing rescue, the difference in diameter between the Prusik ring and the rope should be equal or larger than 2 millimeters.

This is a bidirectional knot, that is, it works equally in both directions of the rope. It can generate substantial friction, and therefore it is advisable to displace it slowly over the rope.





As mentioned before, there are other knots participants should practice and have them available among their skills; among the relevant knots there are the following:

- Clove hitch
- Girth Hitch
- Fisherman's knot
- Bowline



PRE-ARRIVAL ASSIGMENT

1. Explain the difference between rescue operations in collapsed structures and rescue operations in confined spaces

2. Explain the difference between a light USAR Team and a medium USAR team.

3. Investigate a collapse occurrence in your country (town) or one that you are familiar with. Indicate what actions were undertaken to handle the emergency and what the positive aspects were and what could have been improved. (Prepare a description of the event selected)

4. Indicate whether the following are Hand Tool, Power Tool, Equipment or Accessory next to each item.

Flash Light	_____
Hydraulic Jack	_____
Pliers	_____
Electric Generator	_____
Tarp	_____
Canteen	_____
Extension Cord	_____
Machete	_____
Gas Container	_____



5. Indicate the use for each of these hand tools:

- Sledge Hammer _____
- Flash Light _____
- Hand Drill _____
- Measuring Tape _____

6. Indicate the use of each equipment:

- Electric Generator _____
- Lighting Equipment _____
- Hydraulic Jack _____

7. Indicate the use for each of these accessories:

- Canteen _____
- Extension Cord _____
- Gas Container _____
- Tarp _____

8. Define Personal Protection Equipment (PPE)

9. Describe the classification for personal protection equipment

10. Define the function of Eye and Face Protection Equipment



11. Describe the elements used for limb protection

12. Name five basic characteristics of knots

13. Explain the difference between dynamic and static ropes

14. On a model placed on 30 x 30 cm. cardboard, use curtain cord to tie the knots described in the pre-work and explain their function.