Massachusetts Firefighting Academy

Department of Fire Services

Rope Rescue Operations

Student Guide



Students will be able to:

- Identify applicable standards applicable to Rope Rescue
- Conduct size up procedures and identify needed resources.
- Select, operate, and inspect rope rescue equipment.
- Operate various systems used in rope rescue environment.
- Conduct patient care, packaging, and transfer of victims.
- Identify ICS structure in a technical rescue incident.
- Construct and operate mechanical advantage systems
- Tie knots, bends, and hitches.
- Setup and operate the Arizona Vortex in NFPA G configuration

Notes:

Regulations

National Fire Protection Association (NFPA)

NFPA 1006: Standard for Technical Rescue Personnel

Awareness - Recognize, non entry, assist, call resources

Operations - Anchors, belays, lower/haul, mechanical advantage, slope, litter with tag lines

Technician - Rappel, ascend, litter tender, perform rescue on rope, tensioned line systems, lead climbing

NFPA 2500: Standard for Operations and Training for Technical Search and Rescue Incidents and Life Safety Rope and Equipment for Emergency Services

Encompasses:

NFPA 1670 Training for departments and teams

NFPA 1983 Equipment manufactures

NFPA 1858 Selection, care, and maintenance of gear and PPE for Tech Rescue

American National Standards Institute (ANSI) Z87.1 and Z359.1 - Z359.7

Occupational Safety andHealth Administration (OSHA) 29 CFR 1910 & 29 CFR 1926

European Standards (EN)

European Conformity (EC)

Rope Rescue Equipment

Software: Rope, Webbing, accessory cord, harness



Rated Use: Type of rope construction and diameter will determine strength

NFPA 1983 standardizes equipment

Static and dynamic stretch most common for rescue

Webbing can be used for many components in a rope system and will vary in size and type

Accessory cord: Typically smaller than 1/2” or 12mm Used in a variety of applications

Harness: Class II and III most common. Chest harness of a class III offers more flexibility than a seat harness alone





Hardware

Carabiners, pulleys, rigging plates, DCD, etc.

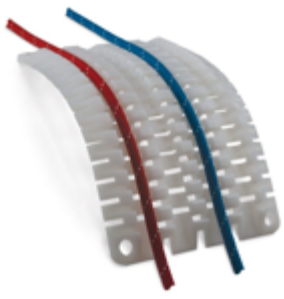






Edge Protection

Most common rope failure occurs with an unprotected edge.







Anchors

SERENE

S

E

R

E

N

E

Anchor Selection

Single

“Bombproof”

Multipoint

Change of Direction
(COD)
-force multiplier

Figure 6

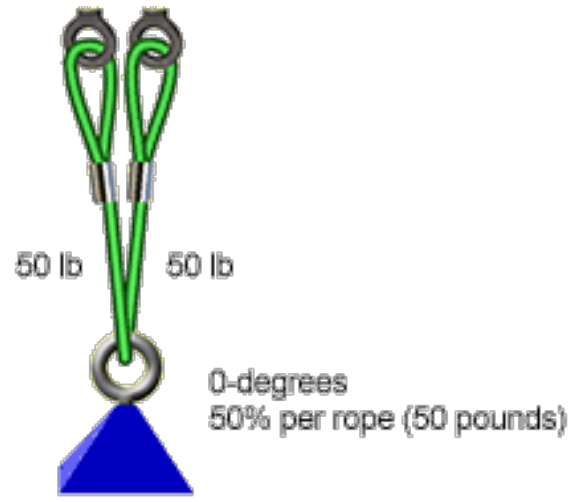


Figure 7

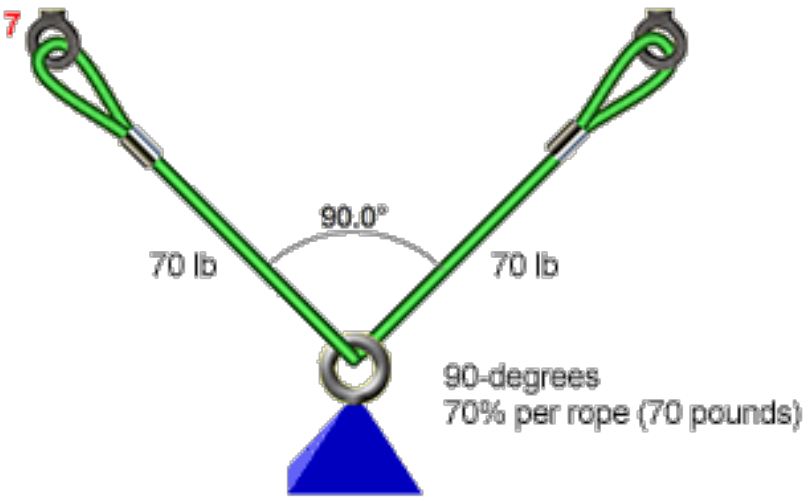


Figure 8

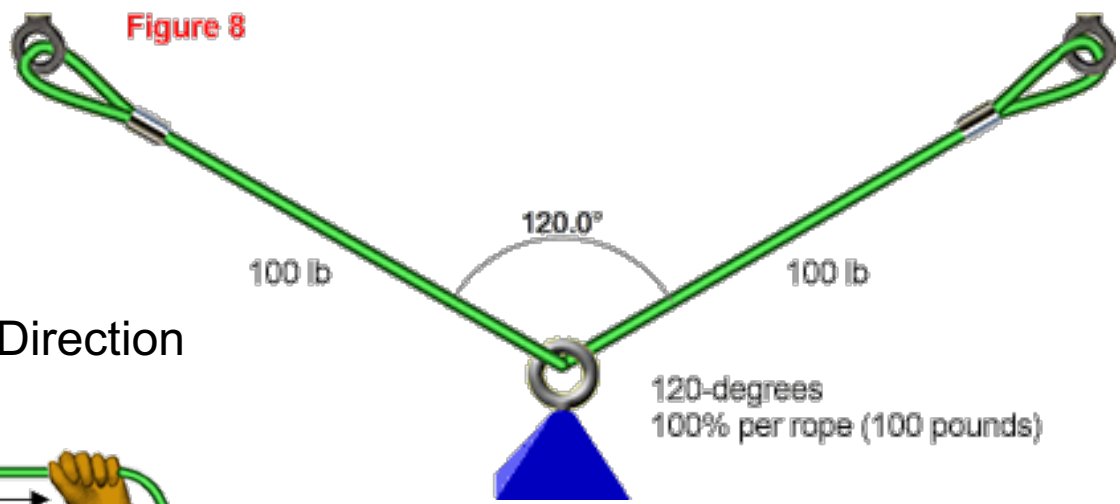
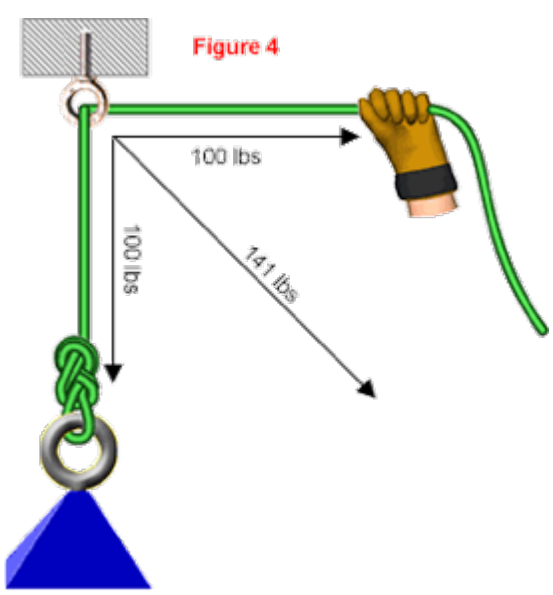


Figure 4



Rope Systems:

Two rope systems most common:

Dedicated Main and Belay (DMDB)

Fixed lines versus lowering lines

Twin Tension Rope Systems (TTRS)

Think about “Redundancy”

Pros and Cons:

Mechanical Advantage

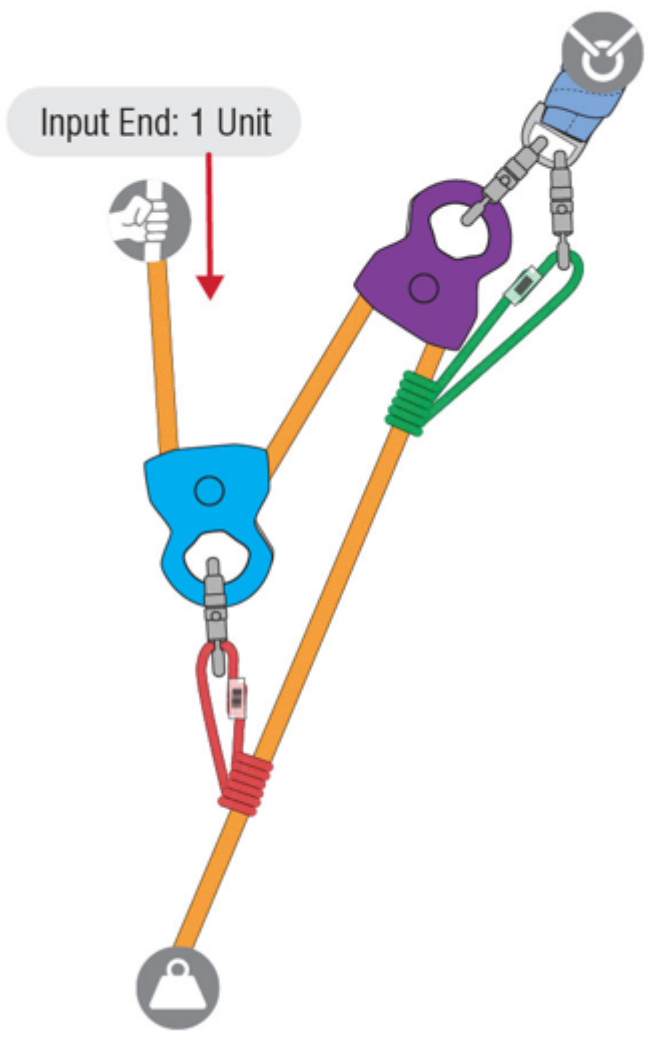
General rules:

Knot at the load system must be odd number

Knot at the anchor system must be even number

Moving pulley = MA

Static pulley = COD



CMC example of a 3:1

SAFETY

ABCDE

A - Anchors

B - Belay

C - Carabiner

D - Decent Control devices

E- Edge

FAILURE

F - Failure to understand of underestimate the environment

A - Additional medical complications not considered

I - Inadequate rescue skills

L - Lack of teamwork or experience

U - Underestimating the logistical needs of the operation

R - Rescue versus recovery mode not considered

E - Equipment not mastered

Event Matrix



Low Frequency/Low Risk

High Frequency/High Risk

Low Frequency/High Risk

High Frequency/High Risk

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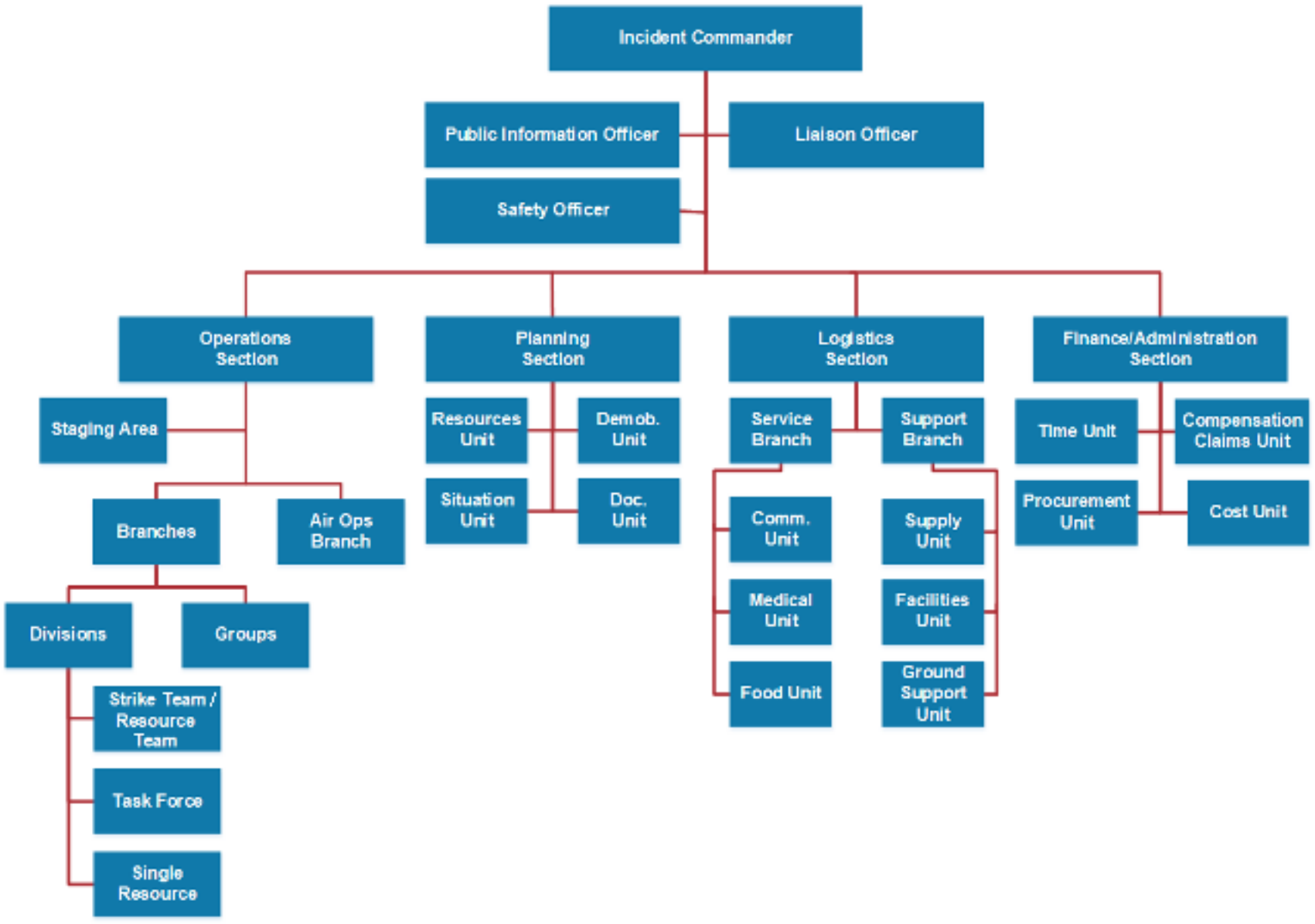
SIZE UP

Target Hazards, Preplan your response area





ICS


Incident Commander
Public Information Officer
Liaison Officer
Safety Officer
Operations Section
Planning Section
Logistics Section
Finance/Administration Section
Staging Area
Resources Unit
Demob. Unit
Service Branch
Support Branch
Time Unit
Compensation Claims Unit
Situation Unit
Doc. Unit
Comm. Unit
Supply Unit
Procurement Unit
Cost Unit
Branches
Air Ops Branch
Medical Unit
Facilities Unit
Divisions
Groups
Food Unit
Ground Support Unit
Strike Team / Resource Team
Task Force
Single Resource

Risk vs. Reward

Risk little to save little, risk a lot to save a lot

Rescue vs. Recovery

Source of information and validity of information

Resources

Who and what is available?

Reflex time

Patient Packaging

Stokes basket



SKED



Yates Spec-Pak



CMC Drag-N-Lift Harness



Communications

Common terminology:

STOP!

Slack

Tension

Rescuer Ready?

Reset

Haul

Means of conveyance:

Voice

Two way Radio

Hand signals

Horns

Whistle



PPE

Consider the same PPE you wear for your patient



Helmet

Gloves

Footwear

Eye protection

Thermal

Inspection & Maintenance

Competent person

Rope log

Manufacturer recommendations

Mild soap

Paper or App on a smart phone

Termination of Incident

Decon patient, responder, equipment

Document actions and equipment

Debrief, CISM

Return your people and equipment to a state of readiness