

## MARLINESPIKE ESSENTIALS

### Learning Objectives:

As a result of this session the participant should:

- Become familiar with the materials and types of rope
- Become familiar with the selection, care and use of rope for boating and sailing
- Be aware of the operational uses of line in boating and sailing
- Become familiar with fundamental knots used in boating and sailing
- Be aware of splicing and splicing techniques for rope

### Resources:

Boating Skills & Seamanship, Eleventh Edition, U.S. Coast guard Auxiliary, Chapter 9  
The Squadron Boating Course 2001, The United States Power Squadrons, Section 4  
Chapman Piloting Seamanship & Small Boat Handling, 62<sup>nd</sup> Edition, Hearst Marine Books, Chapter 13

### Material and Equipment:

Equipment Items  
Overhead Projector, as required by instructor

Marlinespike Tool Kit (“ditty bag”)  
Rigging Knife  
A large Fid  
Sailmaker’s Needles  
Sailmaker’s Palm  
Sharp-nosed Pliers  
Pair of Scissors  
Waxed Sail Twine  
Lacing Tape  
Piece of Bees Wax  
Heat Source  
Plastic Tape  
Liquid quick-dry Plastic

A piece of double-braided rope to demonstrate an eye splice  
Pair of Scissors  
Twine, 1 piece of rope with a raw end (For Whipping)

Rope Sets for Laboratory Session (2 sets per crew)  
1 1/8 inch diameter piece of rope about 3 feet long (with whipped ends)  
2 3/16 -1/4 inch diameter pieces of rope about 3 feet long (with whipped ends)

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Material Items

Provide one copy for each participant:

Marlinespike Terminology Handout

Marlinespike Tool Kit Handout

**Instructor Qualification:**

U.S. Coast Guard Auxiliary Trainer presence required for USCGAUX Certificate Program

U.S. Power Squadron Instructor, Council Venturing Trainer or equivalent

**Time Allocation:** 1.5 Hours

**Session Plan:**

**Classroom Session (45 Minutes)**

1. Module Introduction.
  - a. Introduce yourself and each member of the module staff.
  
  - b. Explain the objectives of this module.
  
  - c. Distribute the handout “Marlinespike Terminology” for reference use.
  
2. Rope Materials and Structure.
  - a. Discuss briefly the following rope materials:
    1. Synthetic Materials
      - (a) Nylon
      - (b) Polyester
      - (c). Aramid Fiber (Kevlar)
      - (d). Polypropylene
    2. Natural Fiber Materials
      - (a). Manila
      - (b). Cotton
    3. Stainless Steel Material
  
  - b. Discuss briefly the following kinds of rope:
    1. Laid (three-stranded, left or right handed weave)
    2. Braided
    3. Other Types of Rope
    4. Shock Cord
    5. Webbing
    6. Monofilament
    7. “Small Stuff”
  
3. Rope Characteristics.

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- a. Describe briefly the advantages and disadvantages of the following rope characteristics:
  1. Strength and size
  2. Selection
  3. Color Coding
  4. Choosing the size and strength
  5. Matching rope size and blocks
  6. Choosing quality rope
  
4. Proper Rope Care.
  - a. Discuss briefly the following care of rope for greater safety and longer life:
    1. Keep rope clean
    2. Don't let it kink
    3. Make small repairs promptly
    4. Guard against chafe and abrasion
    5. Avoid friction damage
    6. Inspect line (rope) and rigging
  
  - b. Discuss briefly the care of wire rope
  
5. Storage of Line.
  - a. Discuss briefly the following methods of storing line for operational use:
    1. Coiling a line
    2. Faking-down a line
    3. Flemishing a line
    4. Storing a coiled line
  
6. Block and Tackle.
  - a. Discuss briefly the sheave diameter size and diameter of the line going through it.
  
  - b. Discuss briefly the characteristics of the following types of tackle:
    1. Ratio 1 to 1 (Single Whip)
    2. Ratio 2 to 1 or 3 to 1 (Gun Tackle)
    3. Ratio 3 to 1 or 4 to 1 (Luff Tackle)
    4. Ration 4 to 1 or 5 to 1 (Two-Fold)
  
  - c. Discuss briefly the maintenance of blocks including:
    1. Lubrication of sheaves
    2. Inspecting for fatigued shackles
    3. Inspect for block cleanliness (especially the bearings)
  
7. Special Fittings for Securing Lines.
  - a. Discuss briefly the following methods fastening a fitting to a deck:
    1. Wood Screws
    2. Bolt through deck

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3. Bolt through deck with wood block reinforcement
- b. Discuss the following cleats commonly used with small boats:
  1. Horn Cleats
  2. Jam or Clam Cleats
  3. Cam Cleats
- c. Briefly mention the following cleats commonly used with large boats:
  1. Samson Posts
  2. Bow Bitts
  3. Chocks
- d. Briefly mention the follow hardware items to assist in securing lines:
  1. Winch
  2. Windlass
  3. Self-Tailing Winches
- e. Discuss briefly the technique of “Dipping the Eye” when mooring when another line is present.

**Marlinespike Laboratory Session (45 Minutes)**

1. Marlinespike Tool Kit.
  - a. Discuss briefly, show the items and their intended use in the Marlinespike Tool Kit.
2. Knot and Line Strength.
  - a. Discuss briefly the effect types of knots have on the percentage of retained strength to a line.
  - b. Discuss briefly the characteristics good knots.
  - c. Discuss briefly using specific knots and their effects on a specific application (examples follow):
    1. Knot works well with rough-textured rope and not with slippery synthetic rope
    2. Knot works well with small line
    3. Knot works well with stiffer and heavier line.
3. Whipping.
  - a. Demonstrate a plain whipping.
  - b. Have the members of the crew practice making a plain whipping on a piece of rope with a raw end.
4. Splices and Splicing.
  - a. Discuss briefly the following splices and their applications:
    1. Short Splice

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2. Long Splice
  3. Back Splice
  4. Eye Splice
- b. Demonstrate making an eye splice using double-braided rope.
5. Basic Knots Used Aboard Recreational Boats.
- a. Discuss briefly the following list of basic knots, bends, and hitches:
    1. Overhand Knot
    2. Figure-Eight Knot
    3. Reef or Square Knot
    4. Bowline
    5. Two Half-Hitches
    6. Clove Hitch
    7. Cow Hitch or Lark's Head
    8. Sheet Bend
    9. Becket Hitch (Modified Sheet Bend)
    10. Carrick Bend
    11. Slippery Reef Knot (Modified Square Knot)
    12. Rolling Hitch (Taut-line Hitch on land)
    13. Anchor Bend
    14. Buntline Hitch
  - b. Have the members of the crew practice making a few of the basic knots.
6. Specialized Knots Used Aboard Recreational Boats.
- a. Discuss briefly the following list of specialize knots and their use:
    1. Surgeon's Knot
    2. Reverse Surgeon's Knot
    3. Ashley's Stopper Knot
    4. Marlinespike Hitch
    5. Monkey Fist
    6. Cleating a Line
  - b. Have the members of the crew practice making a surgeon's knot and an Ashley's stopper knot if time permits.

## MARLINESPIKE TERMINOLOGY HANDOUT

### Rope Definitions

Bitter End	The end of a rope, that might be bent on a bitt or cleat.
Standing Part	That part of a rope between the bitter end and the working end.
Working End	The outboard or other end of the rope.
Bight	A bend or loop in rope or line.
Turn	A bight around an object or the rope itself.
Whipping	Small twine or tape wrapped tightly around the end of the rope to keep it from unraveling.
Seizing	A lashing of small stuff binding two parts of a rope together.
Parceling	To wrap a rope with heavy cloth to protect it from wear or chafing.
Locking place.	Sewing through the throat of a braided eye splice to hold it in place.

### Line or Rope Use Definitions

Halyard	A line used to hoist a yard, gaff, sail, or flags.
Painter	A short piece of line attached to the bow of a small boat used for towing or making it fast to a pier or piling.
Sheet	A line to control the sail's driving force whether attached to the sail or boom that holds the sail.
Shroud	A wire or line that leads from a mast to the side of a boat to support the mast. (Part of Standing Rigging).
Stay	Line or wire from the deck to the mast and used to support a mast along its fore-and-aft axis.
Vang	A steadying line that prevents a boom from lifting or accidentally jibing when sailing off the wind.

### A Line Color-Convention for Racing/Cruising Sailboats

- Mainsail sheet and halyard      White
- Jib/Genoa      Blue
- Spinnaker      Red and Green for guys
- Vangs and Travelers      Black

Traveler      A track bolted to the deck along which a slide that holds the sheet can ride when a boom is shifted

Note: The lines may be solid color or have colored tracer. Color-coded line can also be used on powerboats.

## MARLINESPIKE TOOL KIT HANDOUT

### Marlinespike “ditty bag”

- **Rigging Knife** A good sharp knife with a built-in marlinespike
- **A large Fid** Used for separating the strands of laid rope when splicing
- **Sailmaker’s Needles** Used for making whippings and repairing sail slide attachments and jib hank fastenings  
Keep several sized needles on hand and in a small plastic bottle
- **Sailmaker’s Palm** Used to push the needles through the rope. Even if you don’t expect to repair sails, it’s a good hand-tool to have
- **Sharp-nosed Pliers** Multi- purpose uses
- **Pair of Scissors** Used for cutting tape and twine etc.
- **Waxed Sail Twine** Used to make whipping on the ends of lines
- **Lacing Tape** Is flat and plaited, and used to make whippings
- **Piece of Bees Wax** Used for waxing twine
- **Heat Source** Used for melting and sealing ends of synthetic rope
- **Plastic Tape** Used for temporary whippings. White tape, black electrical tape, water-proof sail repair tape or first-aid tape will do.
- **Liquid quick-dry Plastic** Used for dipping rope ends into as a substitute for twine whipping or other end finish for a line

#### *Nice to Have Items*

- **Electric Rope Cutter** Uses a hot wire to melt the rope and seal the ends quickly and smoothly
- **Electric Soldering Gun** Used with a special cutting head for melting and smoothing the fine strands of rope that are left after a splice is made.

Note: Electric rope cutters or hot knives and soldering guns require 120-volt AC power.