Techs on Deck

Amber Boettiger

SIO Resident Technician

who am i? why am i here?

- restech out on deck
- let's talk about over boarding & deck accessories (but make it slightly intertidal)

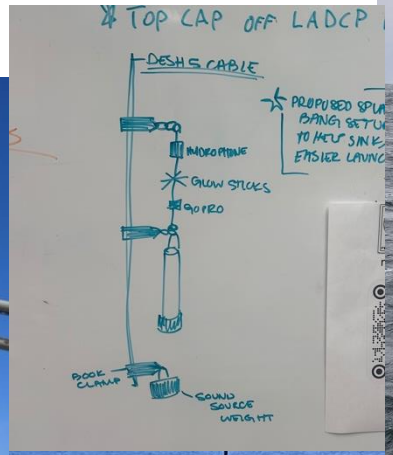

i am a slug, what is over boarding!?

~over boarding ~

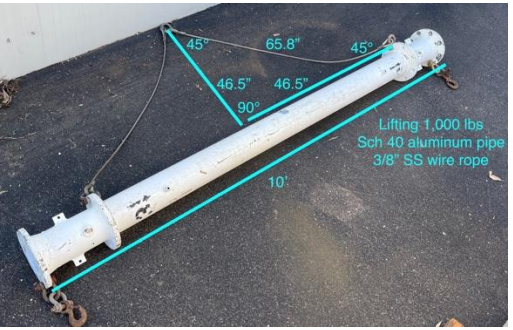
line
wire
cable


I can go in and out
of the water too,
big deal!

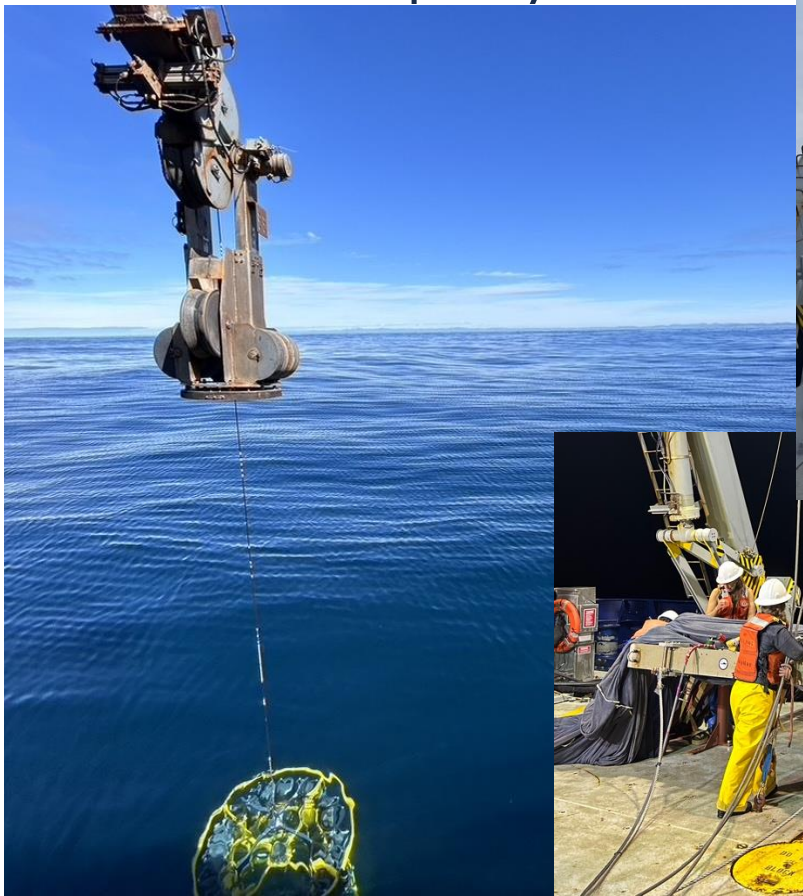
wire ~braided metal rope~

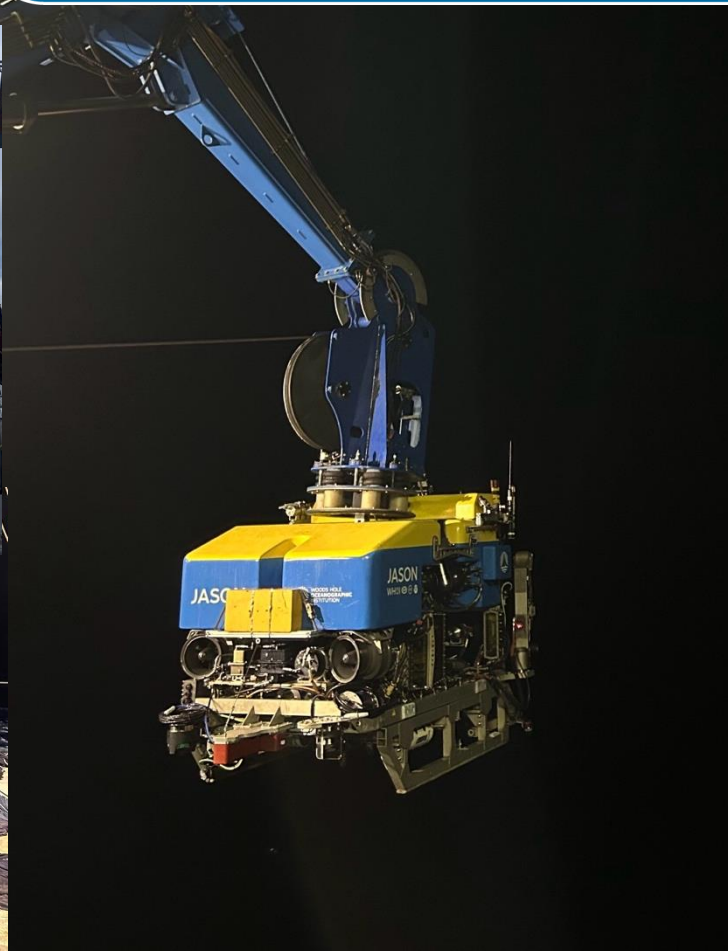


end of the wire



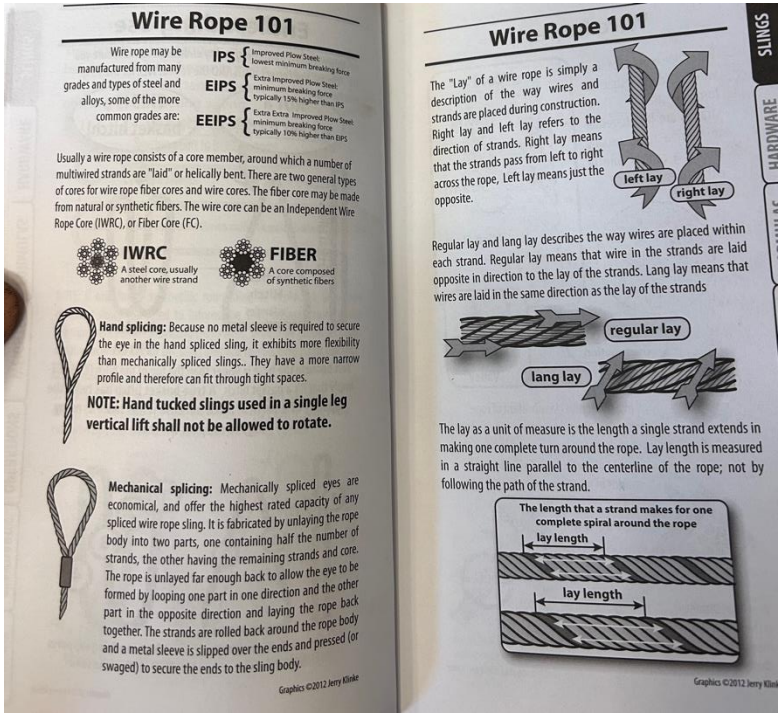
cable ~spicy wire~






maybe its because I don't
really have eyes, but I don't
see a difference in these two

~braided?!~



Wire Rope 101

Wire rope may be manufactured from many grades and types of steel and alloys, some of the more common grades are:

- **IPS** — Improved Plow Steel: lowest minimum breaking force
- **EIPS** — Extra Improved Plow Steel: minimum breaking force typically 15% higher than IPS
- **EEIPS** — Extra Extra Improved Plow Steel: minimum breaking force typically 10% higher than EIPS

Usually a wire rope consists of a core member, around which a number of multiwired strands are "laid" or helically bent. There are two general types of cores for wire rope fiber cores and wire cores. The fiber core may be made from natural or synthetic fibers. The wire core can be an Independent Wire Rope Core (IWRC), or Fiber Core (FC).

IWRC — A steel core, usually another wire strand

FIBER — A core composed of synthetic fibers

Hand splicing: Because no metal sleeve is required to secure the eye in the hand spliced sling, it exhibits more flexibility than mechanically spliced slings.. They have a more narrow profile and therefore can fit through tight spaces.

NOTE: Hand tucked slings used in a single leg vertical lift shall not be allowed to rotate.

Mechanical splicing: Mechanically spliced eyes are economical, and offer the highest rated capacity of any spliced wire rope sling. It is fabricated by unlaying the rope body into two parts, one containing half the number of strands, the other having the remaining strands and core. The rope is unlayed far enough back to allow the eye to be formed by looping one part in one direction and the other part in the opposite direction and laying the rope back together. The strands are rolled back around the rope body and a metal sleeve is slipped over the ends and pressed (or swaged) to secure the ends to the sling body.

Graphics ©2012 Jerry Klinke

Wire Rope 101

SLINGS HARDWARE

The "Lay" of a wire rope is simply a description of the way wires and strands are placed during construction. Right lay and left lay refers to the direction of strands. Right lay means that the strands pass from left to right across the rope, Left lay means just the opposite.

left lay right lay

Regular lay and lang lay describes the way wires are placed within each strand. Regular lay means that wire in the strands are laid opposite in direction to the lay of the strands. Lang lay means that wires are laid in the same direction as the lay of the strands

regular lay

lang lay

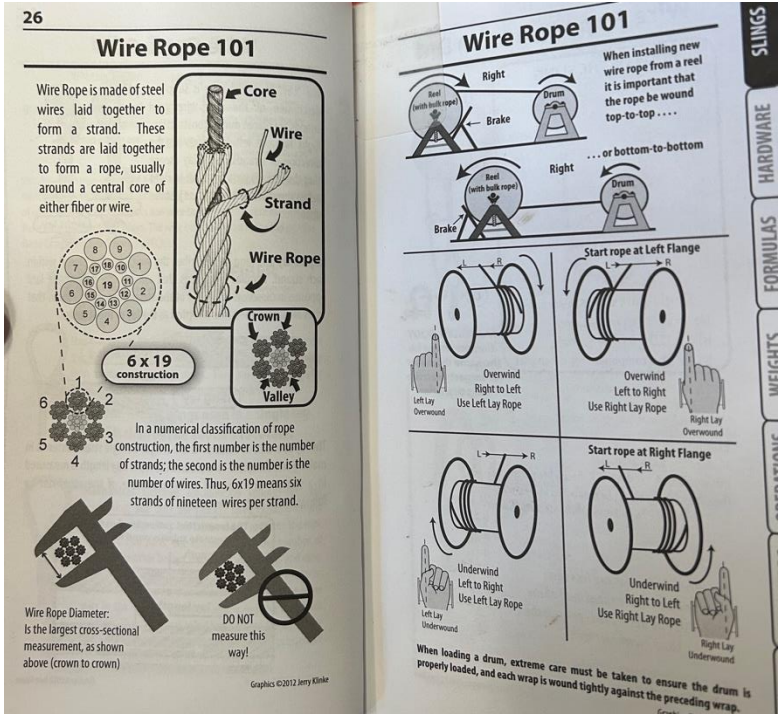
The lay as a unit of measure is the length a single strand extends in making one complete turn around the rope. Lay length is measured in a straight line parallel to the centerline of the rope; not by following the path of the strand.

The length that a strand makes for one complete spiral around the rope

lay length

lay length

Graphics ©2012 Jerry Klinke



26

Wire Rope 101

Wire Rope is made of steel wires laid together to form a strand. These strands are laid together to form a rope, usually around a central core of either fiber or wire.

Core

Wire

Strand

Wire Rope

Crown

Valley

6 x 19 construction

In a numerical classification of rope construction, the first number is the number of strands; the second is the number is the number of wires. Thus, 6x19 means six strands of nineteen wires per strand.

Wire Rope Diameter: Is the largest cross-sectional measurement, as shown above (crown to crown)

DO NOT measure this way!

Graphics ©2012 Jerry Klinke

Wire Rope 101

SLINGS HARDWARE FORMULAS WEIGHTS

When installing new wire rope from a reel it is important that the rope be wound top-to-top . . . .

Reel (with bulk rope) Right Brake Drum

. . . or bottom-to-bottom

Reel (with bulk rope) Right Brake Drum

Start rope at Left Flange

Overwind Right to Left Use Left Lay Rope

Left Lay Overwound

Overwind Left to Right Use Right Lay Rope

Right Lay Overwound

Start rope at Right Flange

Underwind Left to Right Use Left Lay Rope

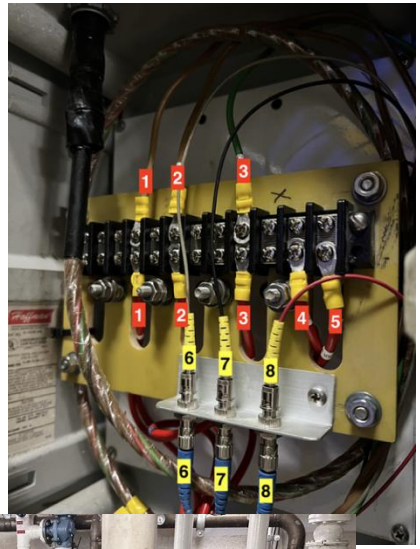
Left Lay Underwound

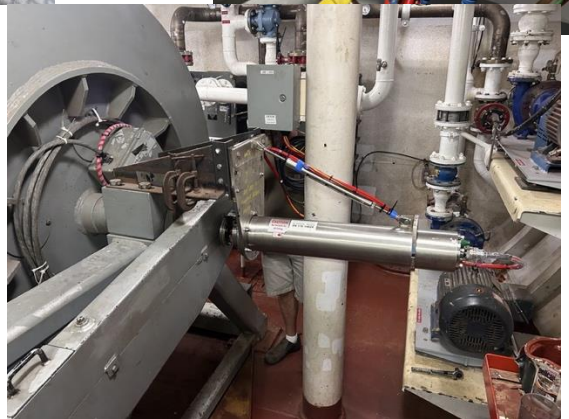
Underwind Right to Left Use Right Lay Rope

Right Lay Underwound

When loading a drum, extreme care must be taken to ensure the drum is properly loaded, and each wrap is wound tightly against the preceding wrap.

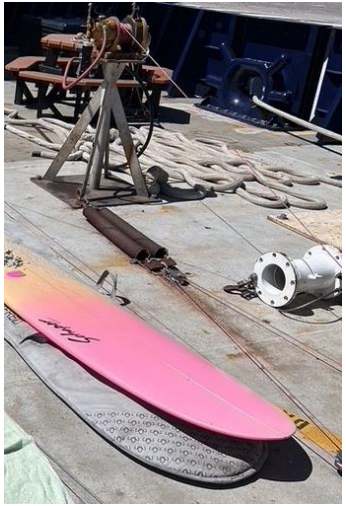
cable ~spicy wire~

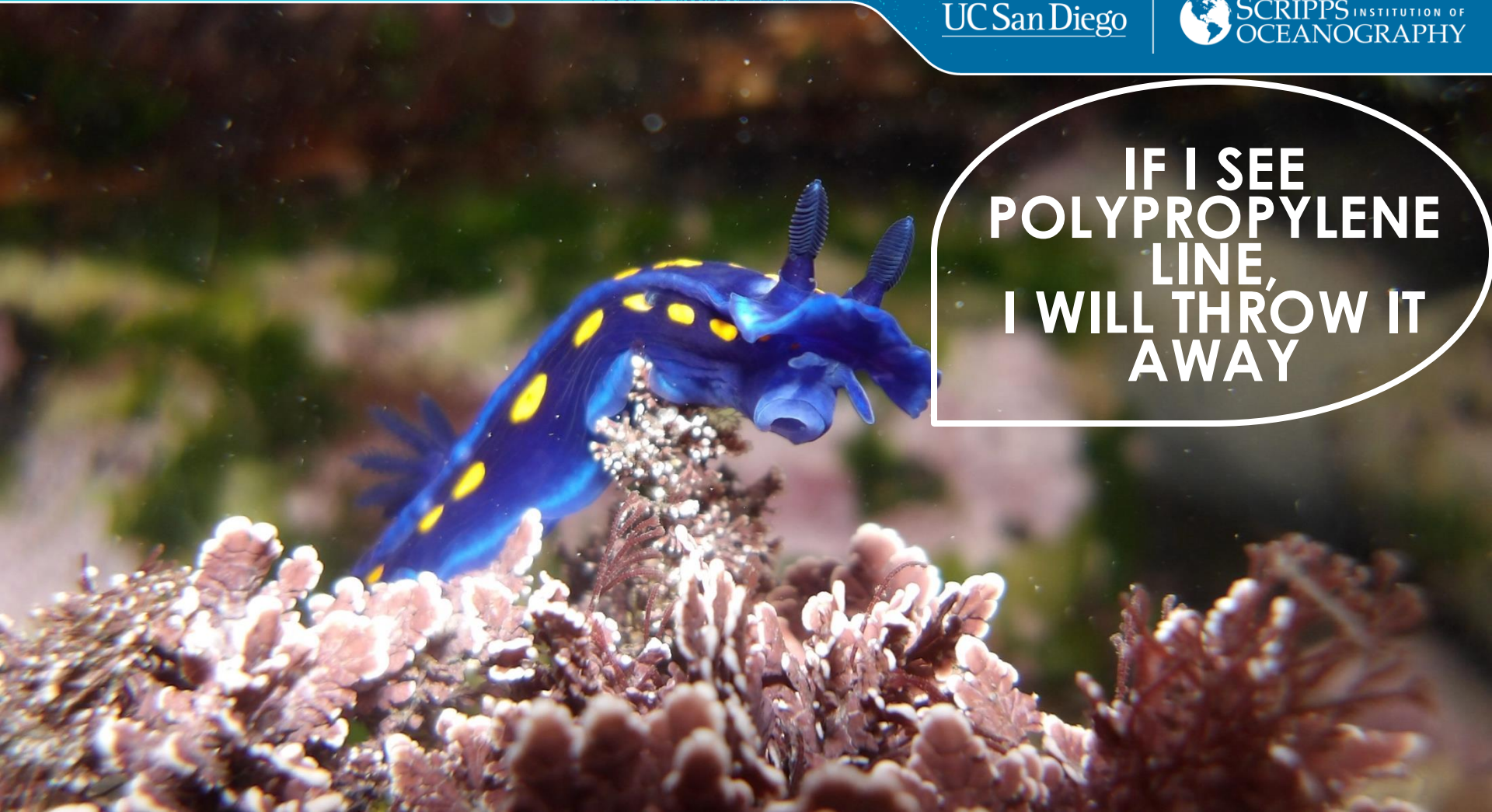





w t f !
that looks so complicated

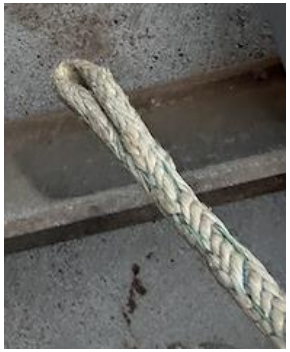
line ~braided fiber~



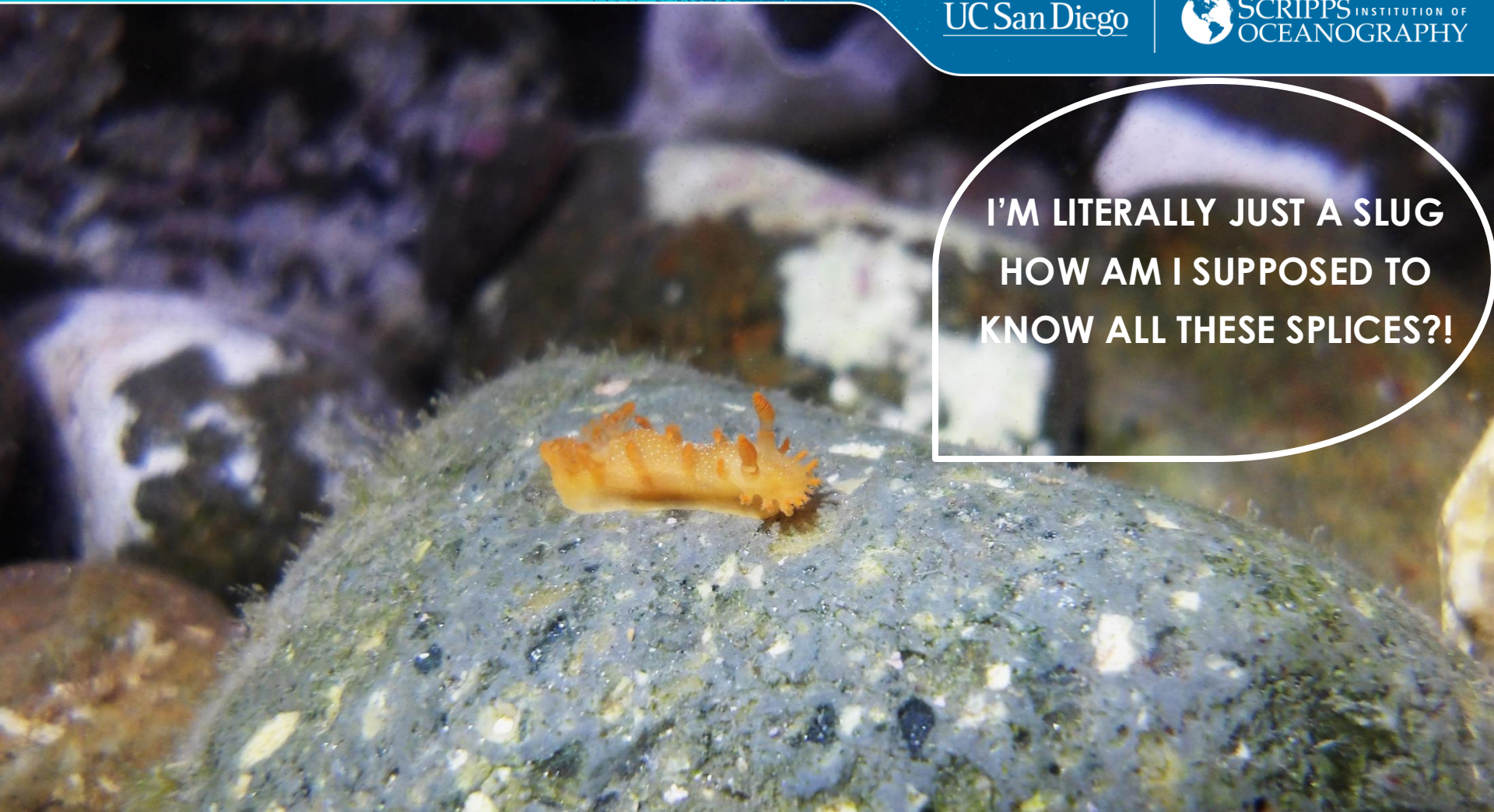

IF I SEE
POLYPROPYLENE
LINE,
I WILL THROW IT
AWAY

end of the ~line~

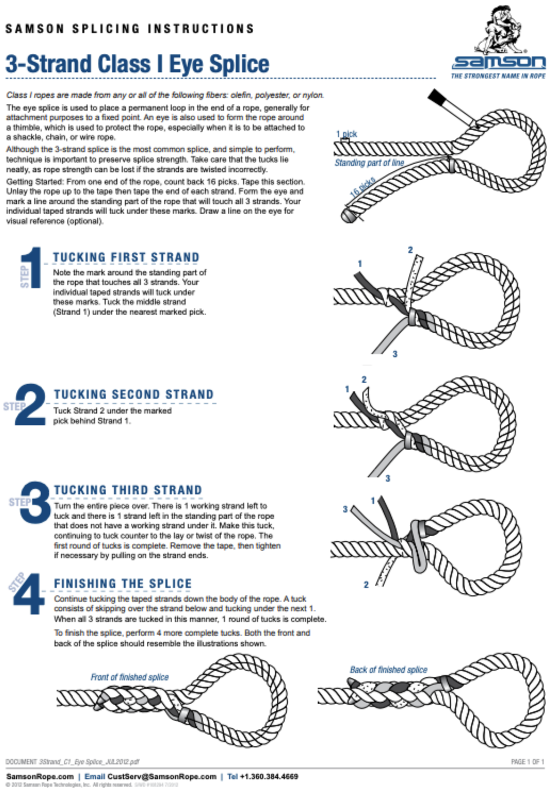
fids!



braided vs. cored


I'M LITERALLY JUST A SLUG
HOW AM I SUPPOSED TO
KNOW ALL THESE SPLICES?!

~use your resources~



SAMSON SPLICING INSTRUCTIONS

3-Strand Class I Eye Splice

Class I ropes are made from any or all of the following fibers: olefin, polyester, or nylon.

The eye splice is used to place a permanent loop in the end of a rope, generally for attachment purposes to a fixed point. An eye is also used to form the rope around a thimble, which is used to protect the rope, especially when it is to be attached to a shackle, chain, or wire rope.

Although the 3-strand splice is the most common splice, and simple to perform, technique is important to preserve splice strength. Take care that the tucks lie neatly, as rope strength can be lost if the strands are twisted incorrectly.

Getting Started: From one end of the rope, count back 16 picks. Tape this section. Unlay the rope up to the tape then tape the end of each strand. Form the eye and mark a line around the standing part of the rope that will touch all 3 strands. Your individual taped strands will tuck under these marks. Draw a line on the eye for visual reference (optional).

STEP 1 TUCKING FIRST STRAND

Note the mark around the standing part of the rope that touches all 3 strands. Your individual taped strands will tuck under these marks. Tuck the middle strand (Strand 1) under the nearest marked pick.

STEP 2 TUCKING SECOND STRAND

Tuck Strand 2 under the marked pick behind Strand 1.

STEP 3 TUCKING THIRD STRAND

Turn the entire piece over. There is 1 working strand left to tuck and there is 1 strand left in the standing part of the rope that does not have a working strand under it. Make this tuck, continuing to tuck counter to the lay or twist of the rope. The first round of tucks is complete. Remove the tape, then tighten if necessary by pulling on the strand ends.

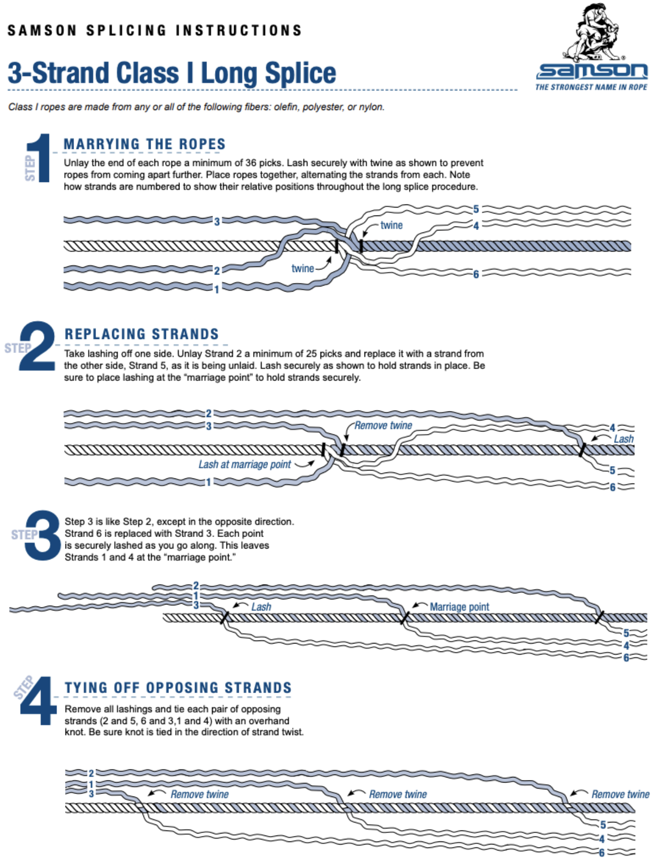
STEP 4 FINISHING THE SPLICE

Continue tucking the taped strands down the body of the rope. A tuck consists of skipping over the strand below and tucking under the next 1. When all 3 strands are tucked in this manner, 1 round of tucks is complete.

To finish the splice, perform 4 more complete tucks. Both the front and back of the splice should resemble the illustrations shown.

DOCUMENT 3Strand_C1_Eye Splice_JUL2012.pdf PAGE 1 OF 1

SamsonRope.com | Email CustServ@SamsonRope.com | Tel +1.360.384.4669



SAMSON SPLICING INSTRUCTIONS

3-Strand Class I Long Splice

Class I ropes are made from any or all of the following fibers: olefin, polyester, or nylon.

STEP 1 MARRYING THE ROPES

Unlay the end of each rope a minimum of 36 picks. Lash securely with twine as shown to prevent ropes from coming apart further. Place ropes together, alternating the strands from each. Note how strands are numbered to show their relative positions throughout the long splice procedure.

STEP 2 REPLACING STRANDS

Take lashing off one side. Unlay Strand 2 a minimum of 25 picks and replace it with a strand from the other side, Strand 5, as it is being unlaid. Lash securely as shown to hold strands in place. Be sure to place lashing at the "marriage point" to hold strands securely.

STEP 3

Step 3 is like Step 2, except in the opposite direction. Strand 6 is replaced with Strand 3. Each point is securely lashed as you go along. This leaves Strands 1 and 4 at the "marriage point."

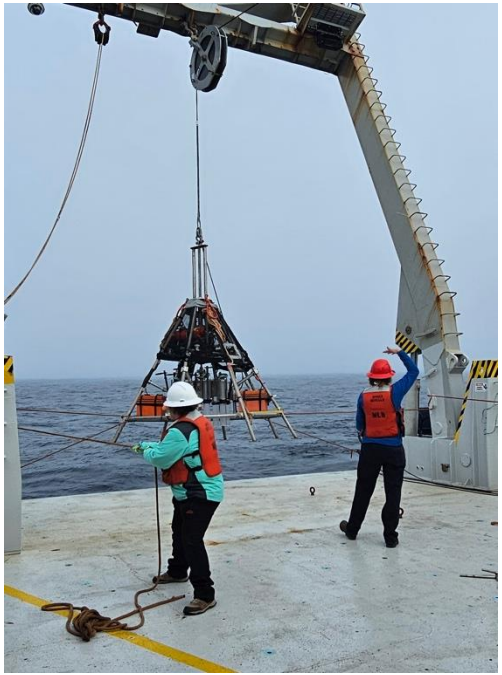
STEP 4 TYING OFF OPPOSING STRANDS

Remove all lashings and tie each pair of opposing strands (2 and 5, 6 and 3,1 and 4) with an overhand knot. Be sure knot is tied in the direction of strand twist.


NOT TO GET ALL
EXISTENTIAL, BUT WHY
DOES IT MATTER

lines in deployments ~slips~

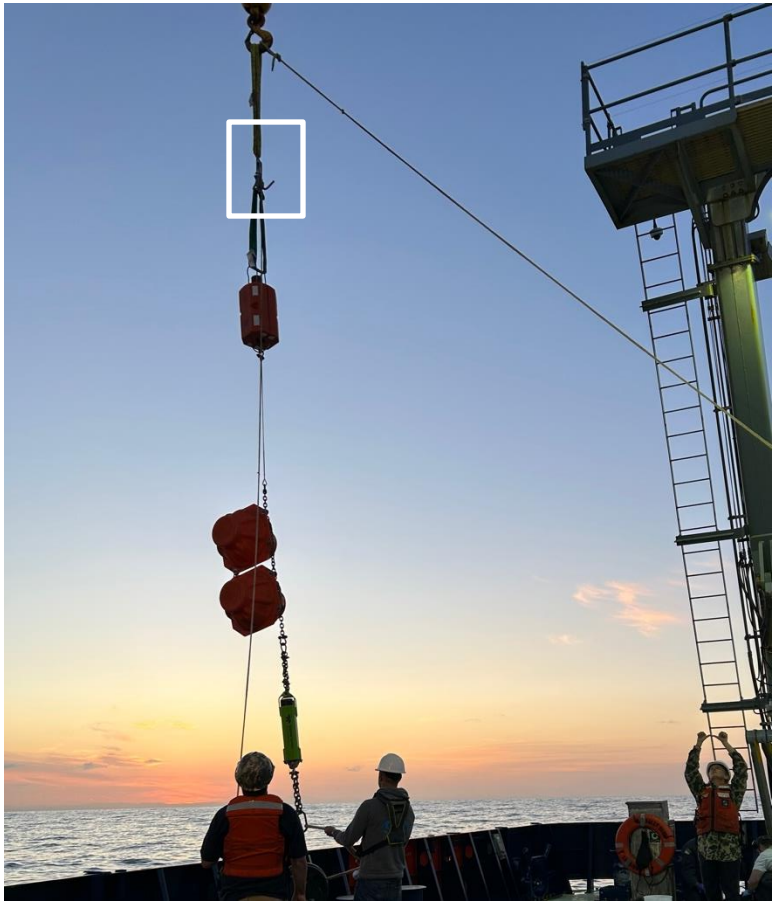
traveling block lines



slips on mc800

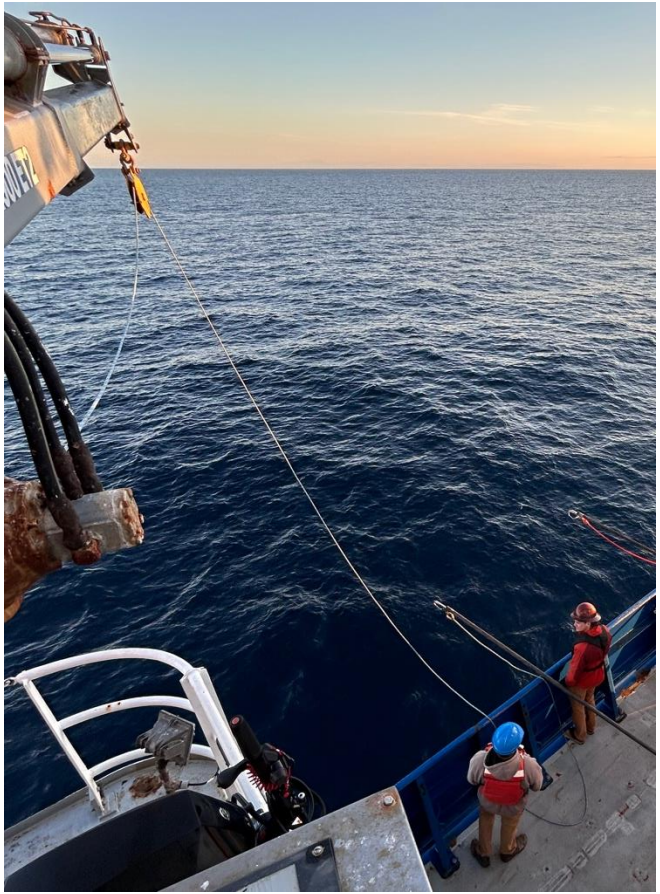
slips on 1m mocness

~drop it like its hot~

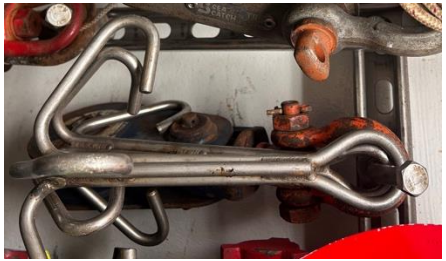


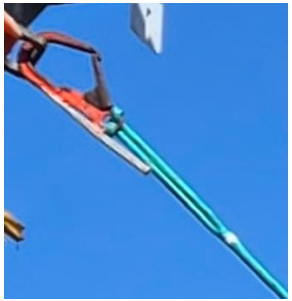
lines in recoveries ~tags~

synthetic whip on cranes to tag straight into a pick point



lines in recoveries ~tags~

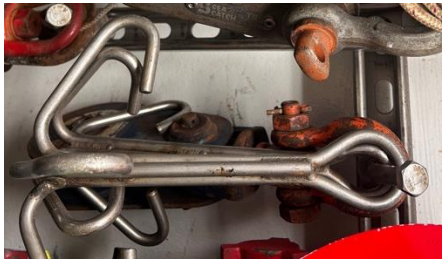


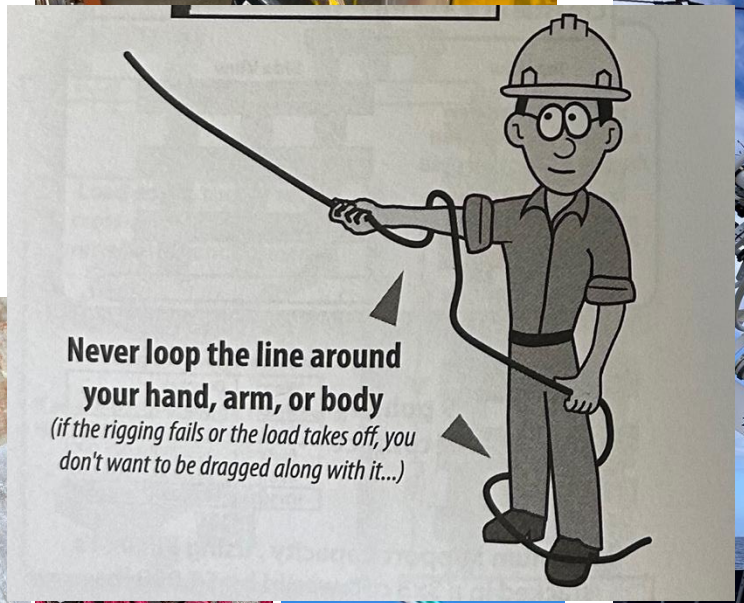


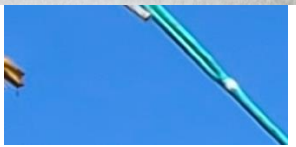
backing lines & me hiding from my scientists

4x tags for this bodacious buoy

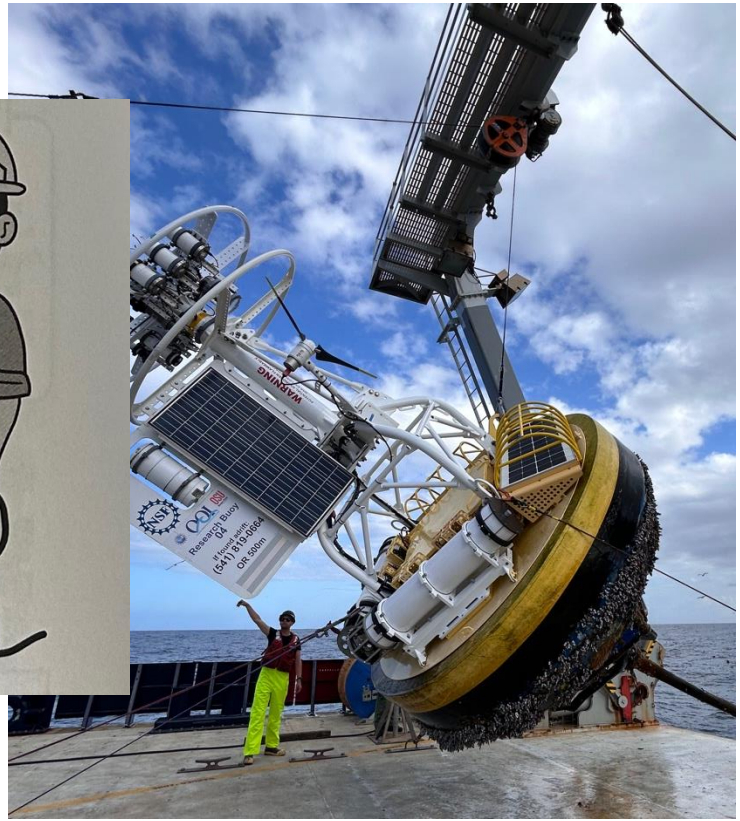
lines in recoveries ~tags~







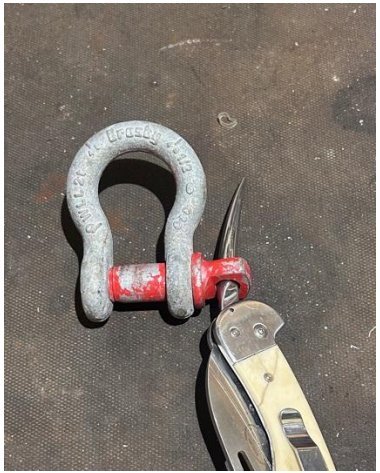
backing lines & me hiding from my scientists



4x tags for this bodacious buoy

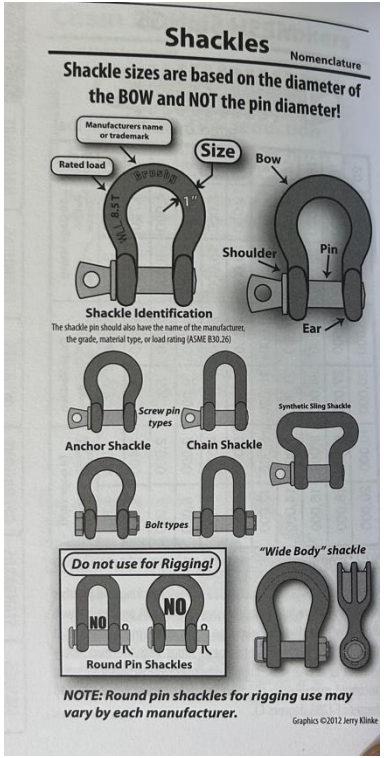

what else can i use to save my appendages?

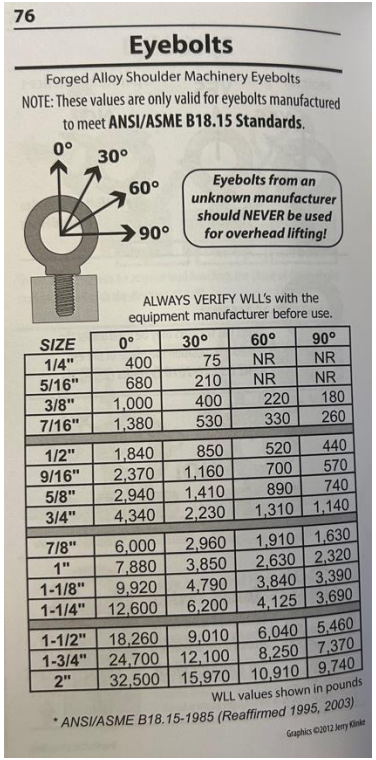
~line leaders~



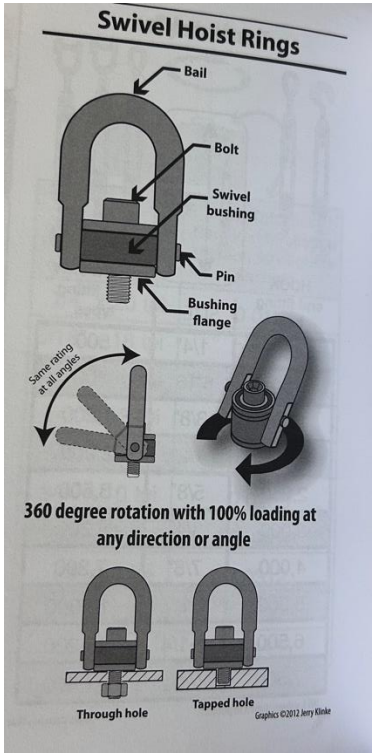
chocks, h-bit, d-ring, rollers, stanchions…
know your diameters and get your glostens!!

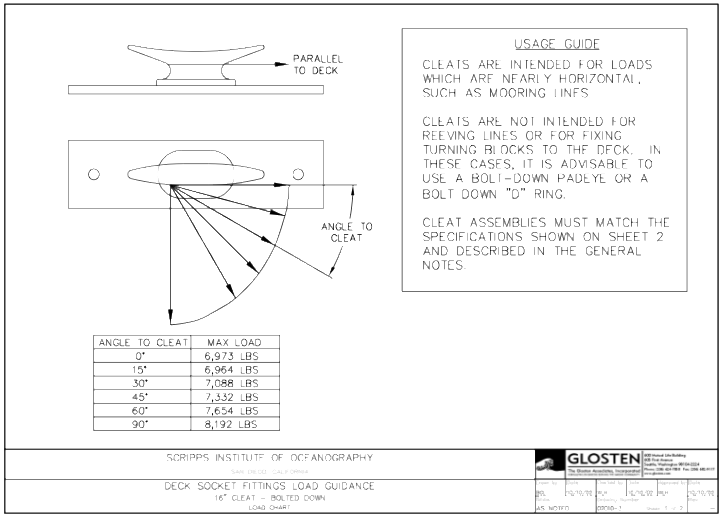
~check yo self before you wreck yo self~





SIZE	0°	30°	60°	90°
1/4"	400	75	NR	NR
5/16"	680	210	NR	NR
3/8"	1,000	400	220	180
7/16"	1,380	530	330	260
1/2"	1,840	850	520	440
9/16"	2,370	1,160	700	570
5/8"	2,940	1,410	890	740
3/4"	4,340	2,230	1,310	1,140
7/8"	6,000	2,960	1,910	1,630
1"	7,880	3,850	2,630	2,320
1-1/8"	9,920	4,790	3,840	3,390
1-1/4"	12,600	6,200	4,125	3,690
1-1/2"	18,260	9,010	6,040	5,460
1-3/4"	24,700	12,100	8,250	7,370
2"	32,500	15,970	10,910	9,740





ANGLE TO CLEAT	MAX LOAD
0°	6,973 LBS
15°	6,964 LBS
30°	7,088 LBS
45°	7,332 LBS
60°	7,654 LBS
90°	8,192 LBS


…all of this is great but, i don't have hands, i cannot knot!!

bowline





make a loop towards the END of a line

alpine butterfly

make a loop ANYWHERE !!

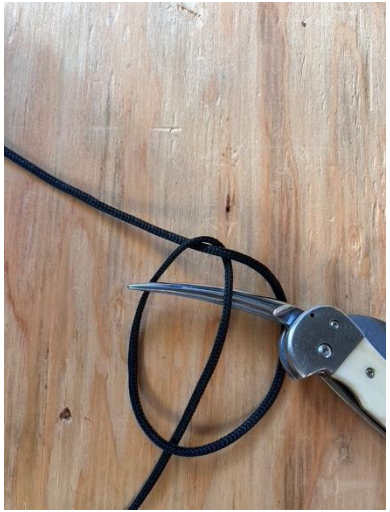
no book clamp needed **sunglasses emoji


if you can't tie a knot, tie A LOT!!

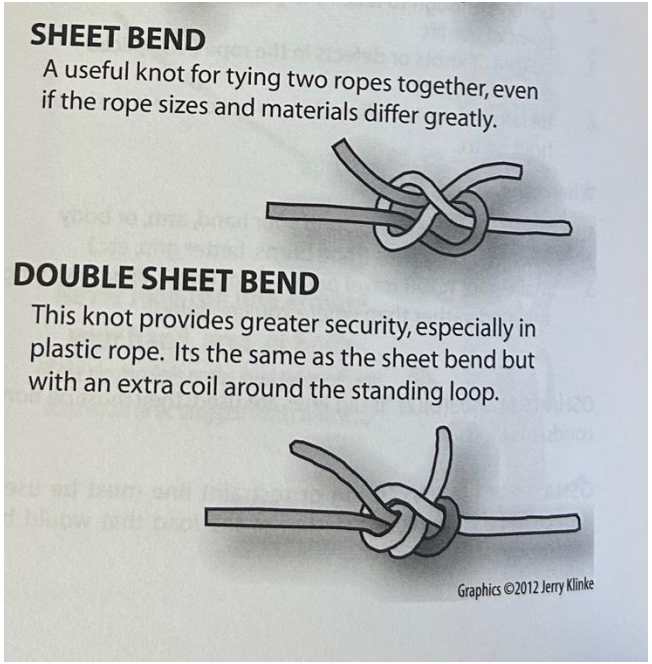
clove hitch

tie up lines/ secure tarps

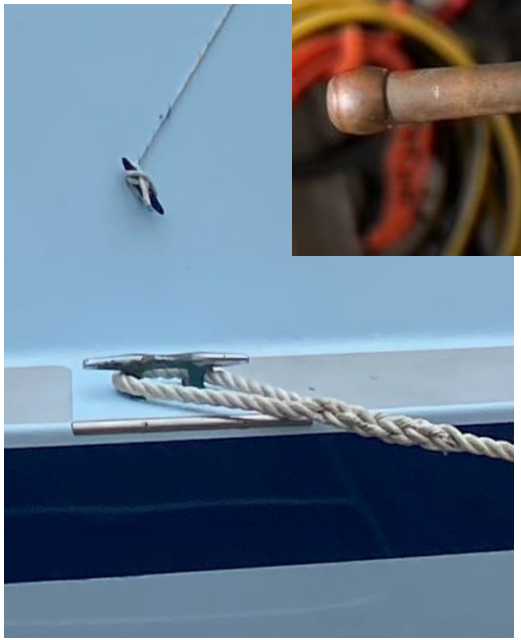
Marlin spike hitch



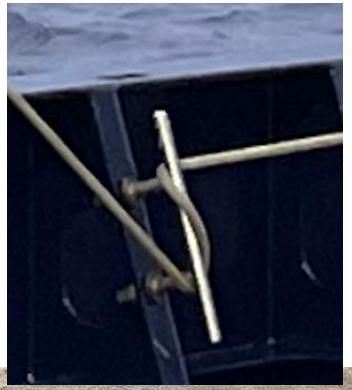
~joining the lines of friendship~



cleats



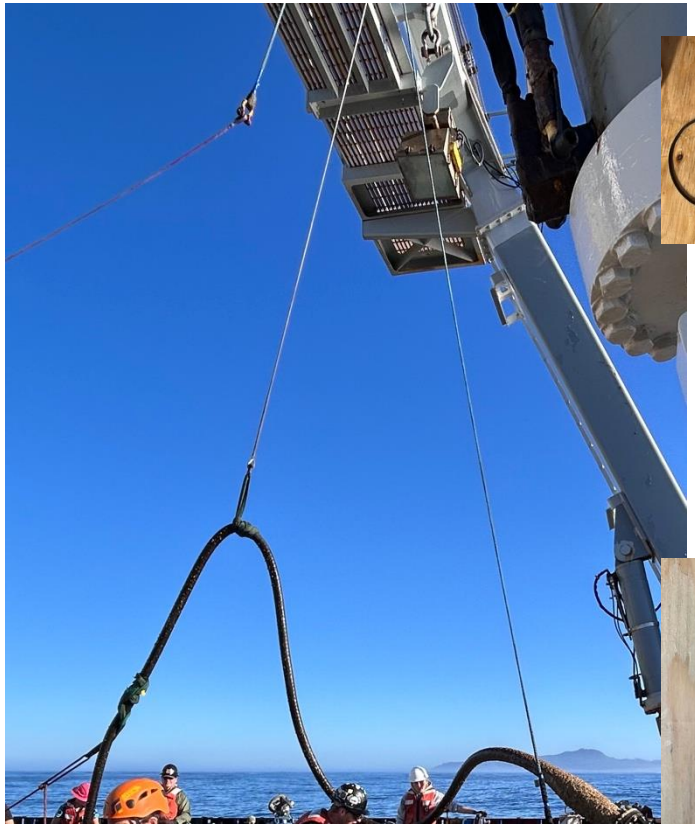
s-cleat

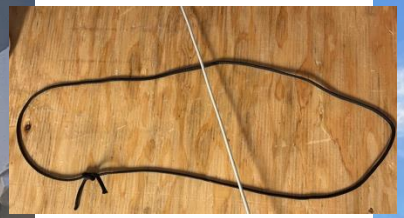


chain recovery


Oh no… I tied too many, too tight, everything is heavy, HELP!!!!

~tension transfers for wuzzles~





tie off black line & get your marlin spike in there!!

UC San Diego | SCRIPPS INSTITUTION OF OCEANOGRAPHY

leave it better
than you found it,
we live here

THANK YOU, TECHS
GO GET ON DECK!

low tide 11/5:
01:39 1.23ft
14:57 -1.18 ft
FULL MOON THIS AM ☺