Plasma Rope Assembly Splicing – Trainee Packet

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DRAFT

SOP-WH-013C

Plasma Assembly Manufacture

Revision/ Review Log

Revision Date	Approved by	Reviewed by	Revision Details/ Proposal Notes
10 May 2013 Revision #1	Dr. Jim Brooks	Dr. Jim Brooks Dr. Bernie Bernard Dr. James Howell	Establishes company policies and procedures the manufacture of plasma rope assemblies for the field

1.0 Introduction

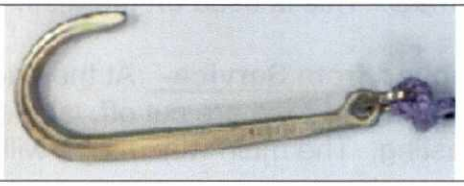
Plasma rope assemblies are a critical part of TDI-Brooks operations. The purpose of this SOP is to establish specific procedures for creating these assemblies, a quality assurance inspection before they are shipped and documentation of those steps. It will also assign responsibility for these tasks.

2.0 Definitions

Assembly- is a group of parts or sub-assemblies that, when assembled, comprise a complete tool designed for a specific task. Each assembly has specific manufacturing requirements, technical drawings and a part number.

Brummel hook- Manganese Bronze or Stainless Steel hook pairs of various sizes- most commonly used to connect the core weight to the trigger assembly on the PC or JPC rig	

Certified Splicer- is a person who has completed TDI-Brooks in-house Plasma Splicing training and has a certificate as proof.

Double Action Snap Hook- is a snap hook that requires pressure on both sides simultaneously to open. Most commonly used on fall protection gear and on the JPC Liner Puller Assembly.	
J-Hook- is an 18 inch J shaped hook used to catch the top of the piston core.	

JPC Rig- Jumbo Piston Core rig with a 4 inch diameter barrel that runs on a track on the back deck

JPC Trolley Tugger Assembly- is a set of two 156 foot long plasma rope assemblies with a loop on each end. They are used on a tugger at each end of the track to move the trolley back and forth on the deck and are detailed in **drawing #1225. Part # ????_____**

Liner Extraction Tugger Assembly- is a small winch used to remove the core liner from the Jumbo Piston Core rig. Plasma rope is used on this tugger to remove JPC core liner. Should be terminated with a loop through a double action snap clip per **drawing #3004**. **Part # ????_____**

JPC Trigger Tugger Assembly - is 40 foot rope with a magnesium bronze Brummel hook at one end and is detailed in **drawing #1208**. **Part # ????_____**

JPC Deploy/ Retrieval Tugger Assembly - is a 125 foot rope with a loop in each end and is detailed in **drawing #1207**. **Part # ????_____**

PC Rig- smaller Piston Core rig with a 3 inch diameter barrel that is lowered by main winch and positioned off the vessel by a-frame. The PC rig uses two plasma rope assemblies:

PC Corehead Assembly- is a 40 foot rope with a loop on one end and an 18" J hook at the other. It is used to hook onto the core head to lift it from the cradle and is detailed in **drawing #1209. Part # ????_____**

PC Trigger Tugger Assembly - is 20 foot rope with a stainless steel Brummel hook at one end and is detailed in **drawing #1210**. **Part # ????_____**

Plasma rope- an ultra high strength synthetic rope this is used by TDI-Brooks in place of steel wire for most coring operations. It has no weight in water, is resistant to most oils and fuels and is significantly safer to use than wire rope. It is subject to UV degradation and should be covered with a dark tarp when not in use. Brand names are Spectra® and Plasma®. This is used on the main winch of all TDI-Brooks vessels.

Removed from Service- At the end of each cruise, the eye splice on the main winch and 10 feet of rope are cut off, labeled with vessel and date and sent back to the office for testing. The main winch rope will need to be re-terminated with an eye splice.

Sheave- a wheel with a groove for a rope to run on. An integral part of a block.

Shock Load- a rapid application of force (such as impacting or jerking), or the rapid movement of a static load.

Termination- the loop at the end of the mainline Plasma rope to which equipment is attached, or the act of splicing that loop

Trigger Assembly- is a set of parts that compose the trigger arm of either the PC or JPC rig

Trigger Tugger- is a small winch mounted near A-Frame for lifting the trigger assembly and core weights during PC and JPC operations.

USBL Pole- a long, pivoting pole mounted on the side of the vessel that properly holds the USBL transducer below the vessel during coring operations. Plasma rope should be on the hand crank that lowers and raises this pole.

WLL- Working Load Limit- the maximum working load permitted by a specific piece of equipment (often used interchangeably with Safe Working Load) On smaller pieces it may be stamped into the metal or raised on the surface. This one is on the J hook.	

3.0 Responsibilities

It is the responsibility of the Master Terminator/ Plasma Specialist to do a quality inspection of all assemblies before they are load tested and to train anyone who will be splicing these assemblies.

It is the responsibility of the Logistics Manager to ensure there are sufficient spares in stock, to arrange load testing of each assembly and to sign a cert stating the gear has met required specs, then to ship assemblies to vessels with the associated documents.

4.0 Manufacturing Steps

- Requests for Plasma rope assemblies must be made to the Logisitics department by sending an e-mail to resupply@tdi-bi.com.
- Logistics department should provide the rope and parts needed for the assembly to a Certified Splicer.

- Upon completion, the assembly should be submitted to the Plasma Specialist for quality inspection.
- Plasma Specialist will give inspected assemblies to Logistics department for in-house load testing
- Logistics will create a proof of load test cert for each assembly, which will be shipped with the assembly.

Splicing Plasma Rope

Updated May 2013

These notes are intended to supplement the "Plasma Rope Splicing" video.

This set of instructions is for splicing instruction and repair on the vessel. To manufacture plasma assemblies for coring equipment, refer to SOP-WH-013C.

How to calculate the lead needed for a tuck splice:

3.14 x diameter = circumference
circumference x 7= lead amount
lead amount x 1.5= how many inches needed before loop begins (Make it a few inches longer just to be sure – extra is better, but can't be shorter.)
****** The lead length is only the part of the rope to be re-tucked –- it does not include the length needed to make the loop.**

Recommended lengths for leads based on that formula:

1" diameter rope= allow 34" per lead (32.97 per formula)
3/4 diameter rope= allow 30" per lead (24.72 per formula)
5/8 diameter rope= allow 25" per lead (20.60 per formula)
1/2 diameter rope= allow 20" per lead (16.48 per formula)
3/8 diameter rope= allow 15" per lead (12.36 per formula)
1/4 diameter rope= allow 10" per lead (8.24 per formula)

To calculate length of rope:

Length of rope needed = total length of finished rope + (lead length x 2) + (length needed to make loop x 2)

Required materials for PC set

Size	Purpose	Cut length	Final Length	Additional Parts needed	Configuration
1/2"	PC-Corehead	To allow 20" for each loop + 20" for each lead= 6 ft 8 inches + 40 ft total length= 46 ft 8 inches -- **cut 47 ft**	40 ft	18" J hook	Loop each end Then Lark's head into the J hook
1/2"	PC-Trigger Tugger	To allow 20" for each loop+ 20" for each lead = 6 ft 8 inches + 20 ft total length=need 26 ft 8 inches- **cut 27 ft**	20 ft	Stainless steel Brummel hook	Splice one end around the Brummel hook. Loop on other end.

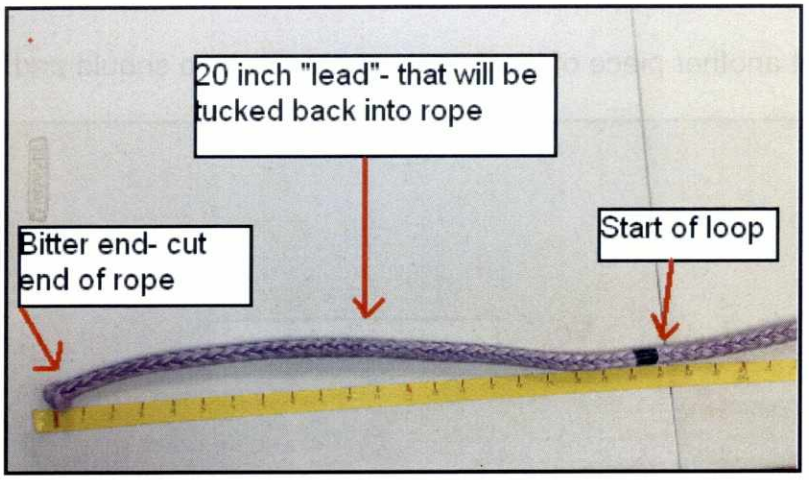
Required materials for JPC set

3/8"	JPC-Trolley Tuggers	To allow 20" for each loop+ 15" for each lead = 70 inches or 5 ft 10 inches + 156 total length -- need 161 ft 10 inches- **cut 162 ft**	156 ft	none	Loop each end
1/2"	JPC-Deploy and Retrieval Tuggers	To allow 20" for each loop+ 20" for each lead = 6 ft 8 inches + 125 ft total length=need 131 ft 8 inches- **cut 132 ft**	125 ft	none	Loop each end
1/2"	JPC-Trigger Tugger	To allow 20" for each loop+ 20" for each lead = 6 ft 8 inches + 40 ft total length=need 46 ft 8 inches- **cut 47 ft**	40 ft	Magnesium bronze Brummel hook (part BH-02 on www.elishawebb.com) 	Splice one end around the Brummel hook. Loop on other end.
1/4"	JPC-Liner Puller	As needed	As needed	Double action snap hook (Yates part # 839S) 	Splice one end through the snap hook. Loop on other end.

**Allow an average of 50 minutes to complete each termination.

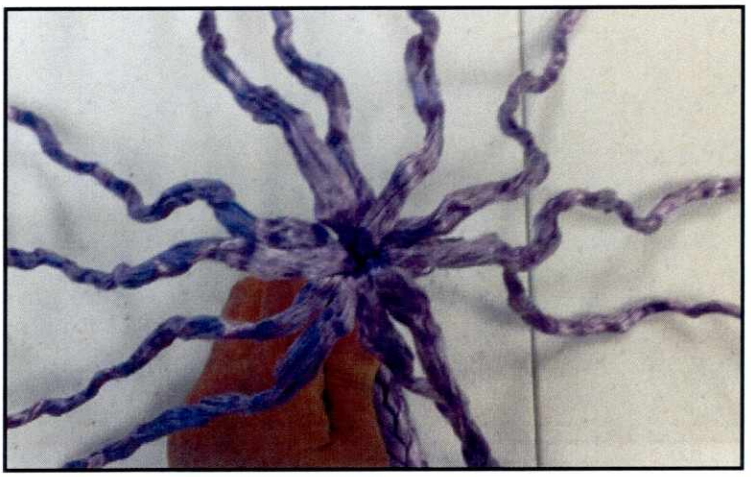
Directions:

1. Using the above calculations, measure the lead length required from the bitter end (the cut end) of the rope and mark it with electrical tape.



2. You will need to unravel the rope strands from the bitter end up to the tape mark and tape the ends tightly with black electrical tape. (The loop will begin immediately on the other (long) side of the tape mark.)

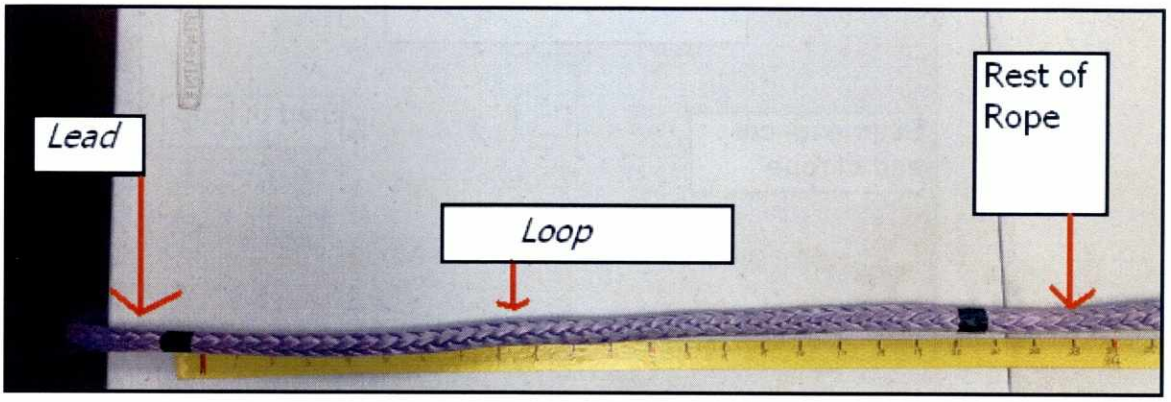
3. Splay them open (like a flower) so you can see them all from above.



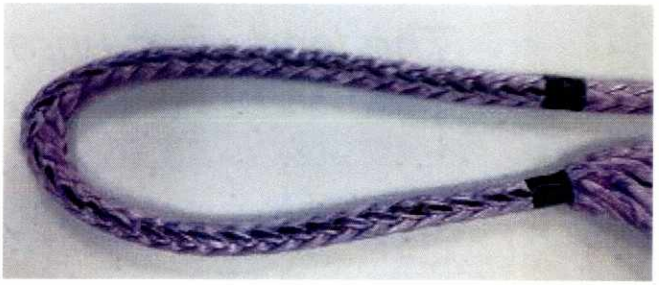
4. Match two strands next to each other that twist in opposite directions.

5. Tape the opposing strands together at the loose end. You should get six pairs of opposing strands

6. Put another piece of black tape where the loop should end.

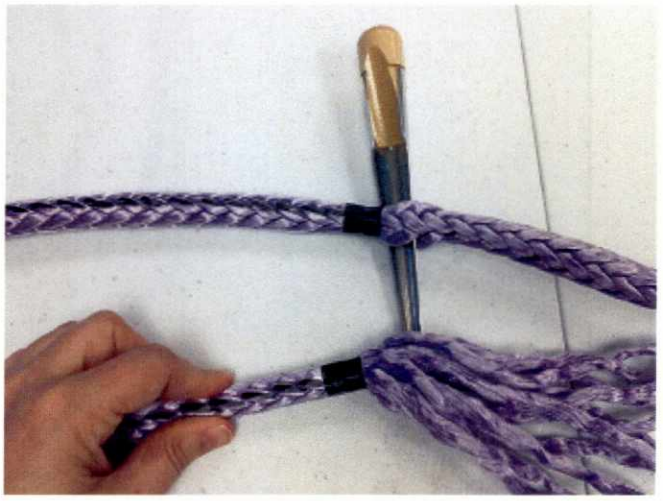


7. Between the tape marks, use a Sharpie and mark one strand over the entire length of the loop. Form the loop on a table surface so that the Sharpie mark stays on top (to indicate rope isn't twisted)

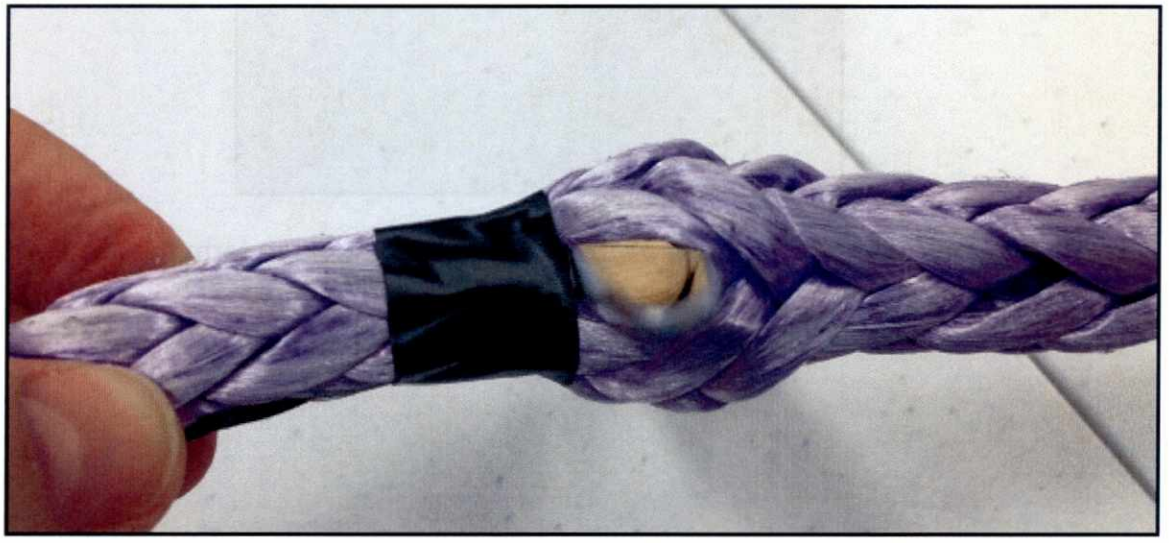


8. Push the rope together to open the weave. Then put the fid through the long end (rest of rope) just below the black tape marking the end of the loop.

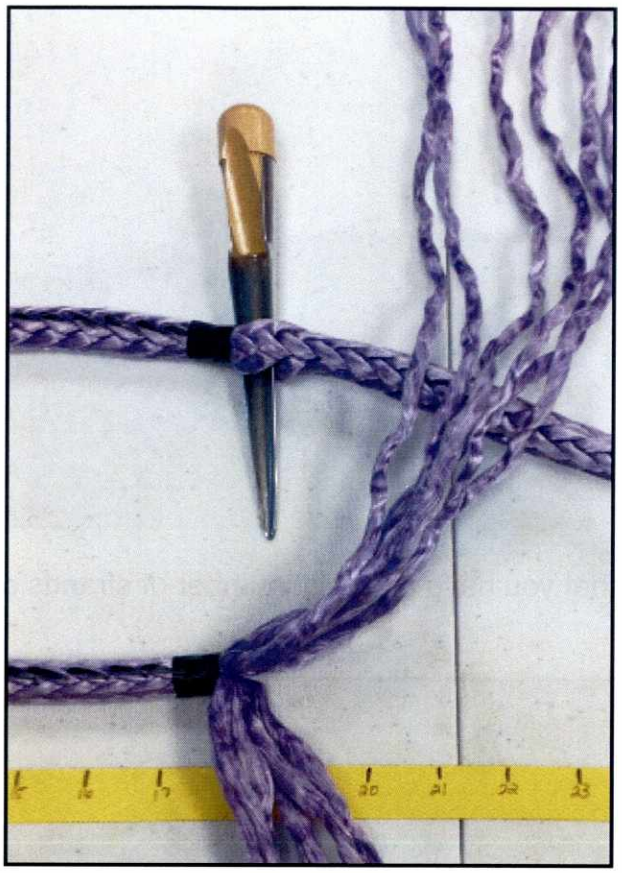
9. Keeping the black lines up, insert the fid between the strands below the end of the loop as close to the tape as possible.



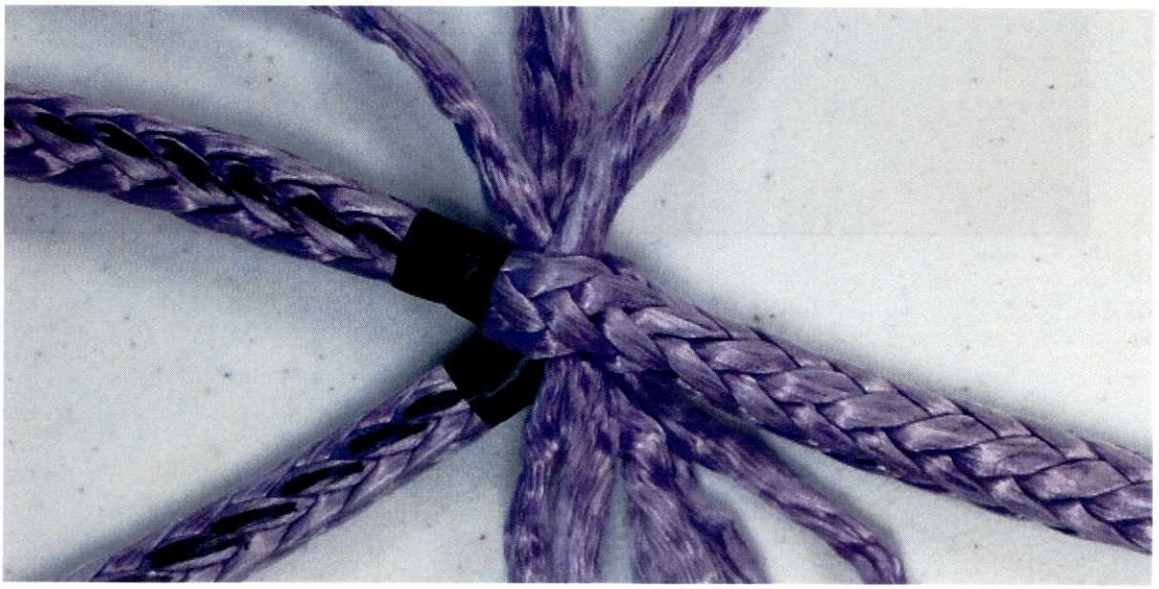
10. Be sure that you have an equal number of strands on either side of the fid.



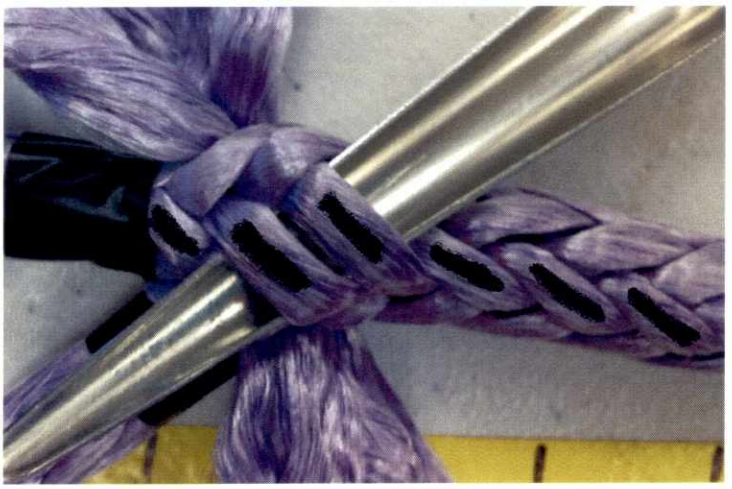
11. Keeping the black sharpie lines up, split the 6 paired strands of the lead into the three closes to the rest of the rope and the rest.



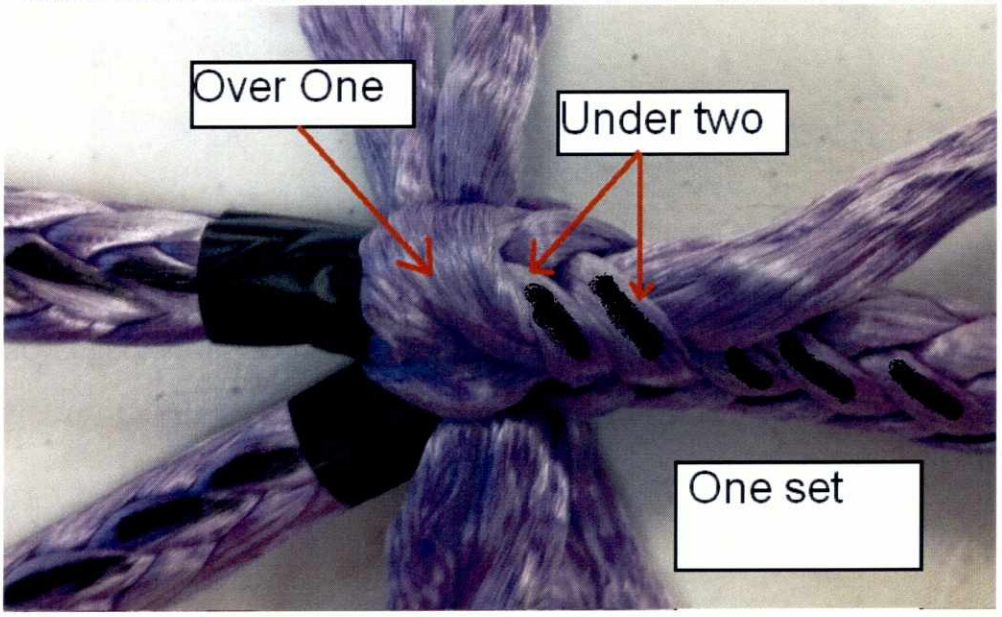
12. Slip the closest three pairs all the way through the fid to form the loop.



13. With a Sharpie, mark one strand of the rope about ten inches down.



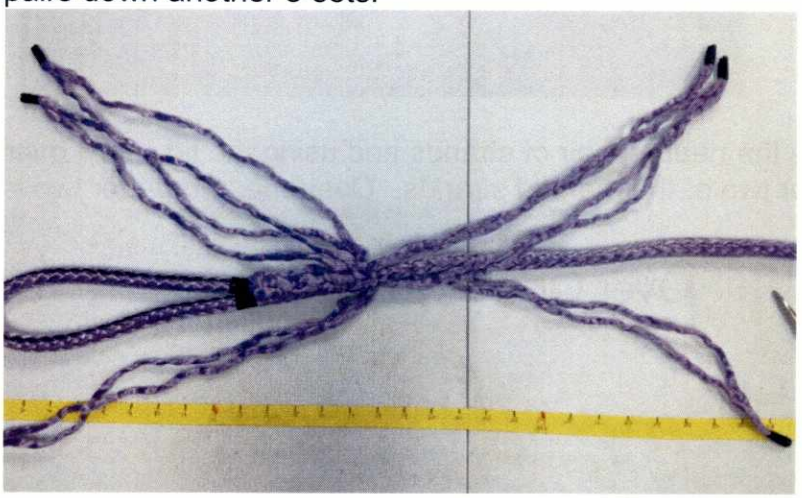
14. Take the nearest pair of strands and using the fid, slip it over one and under two of the marked strands. Over one and under two = one "set".



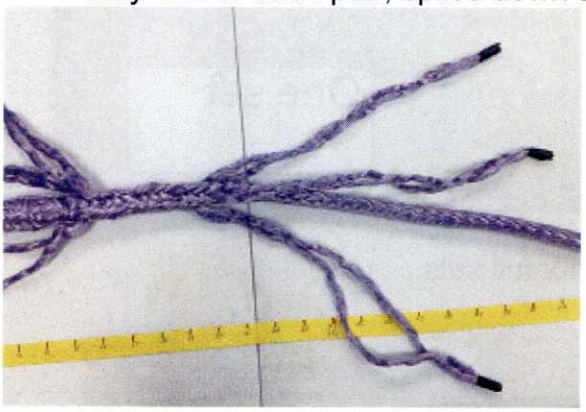
15. Continue until you have made four full sets.

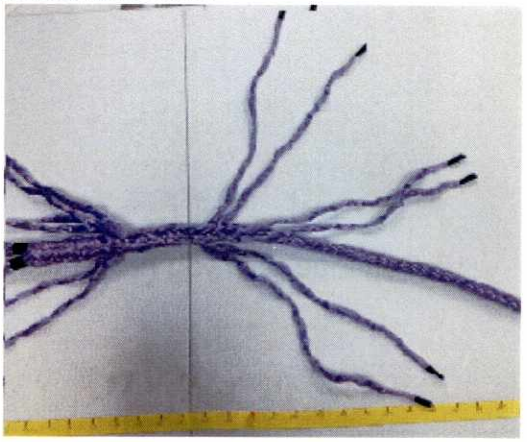
16. Repeat with remaining pairs of strands until all 6 pairs have made four full sets.

17. Leave 3 alternating pairs of strands at that point and splice the remaining three pairs down another 3 sets.

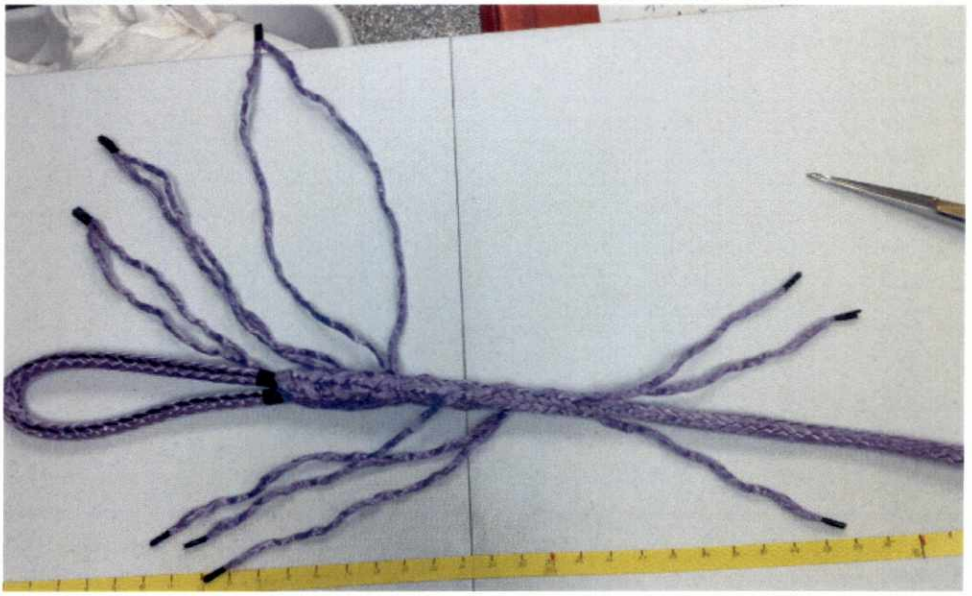


18. When that is complete, untape the remaining three strand pairs. Using only one of each pair, splice down another two sets.

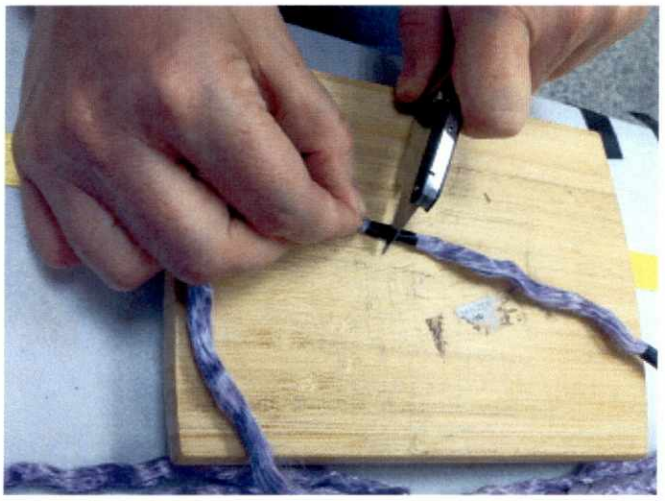




19. You want to leave about a 6 inch tail on each of the sets.



20. To cut off excess rope, tightly tape the spot you want to cut with electrical tape. Place the taped section on a firm, non-slippery surface and cut with a utility knife.



Pattern is: 4-3-2
Over one and under two= one set of tucks

- 4 sets of tucks- separate three alternating strands
- 3 more sets of tucks using the remaining strands
    - split remaining three strand pairs
- 2 more sets of tucks – using one strand from each pair.