

WATERFRONT FACILITY OPERATIONS GUIDE

US ARMY CORPS OF ENGINEERS
PITTSBURGH DISTRICT
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PITTSBURGH, PA 15222

WATERFRONT FACILITY OPERATIONS GUIDE

A Waterfront Facility Operations Guide should provide straight-forward practical written guidance to facility workers concerning the minimum standards of care for moored vessels and the facility waterfront under all conditions. The guide should provide sufficient information to workers to prudently manage the waterfront facility.

While each facility will be somewhat different, primarily due to location and structures involved, there are items which every manual must address. The following subjects should be included:

- I. Barge Fleetings Under Routine Conditions**
 - A. Barge Receiving and Departure Procedures
 - B. Facility Watchperson Responsibilities
 - C. Mooring Hardware
 - D. Communications

- II. Procedures in High Water Conditions**
 - A. General
 - B. Emergency Procedures
 - C. Disaster Recovery

The following outline should be used to ensure that vital information is included in the Facility Guide.

I. Barge Fleeting Under Routine Conditions

A. Receiving and Departure Procedures

1. State any special instructions as to where barges should be moored on delivery. Who decides where barges are to be moored? Are separated areas designated for loads and empties? (Barge mooring width restrictions should be included in this section)
2. State the policy for inspecting barges of delivery.
3. State any special handling necessary for leaking barges (pumps, moving to shallow water, unloading immediately, etc.)
4. Do facility personnel have to be present to receive a barge, or do you allow unattended delivery? Do you require a daily status sheet to summarize barge positions and expected arrivals/departures?
5. State any special procedures for releasing barges to the care of a towboat. Do facility personnel have to be present when barges are removed?

B. Facility Watch Person Responsibilities

1. How often is each barge at your facility checked during normal conditions? (Checking lines, leakage, etc.)
2. What lighting requirements are necessary to be checked?
3. How do you handle leaking barges? Who repairs the pumps?
4. List the Emergency equipment available at the facility: Pumps, hoses, major tools, batten material, first aid materials, riggings, etc.

C. Mooring Hardware

Prior to addressing the following procedural questions, evaluate the facility's fixtures; mooring cells, "dead men," fixtures, rings, ice cells, "timberheads," etc. Are they in good condition? Are they adequate number? Is construction

consistent with the present use/output? Has the facility been impacted by a surveyor or competent contractor?

1. What types of mooring rope or cable are used at the facility?
2. What minimal mooring-line configuration is allowed under normal river conditions? How many headlines, breast lines or springlines do you expect to be used?
3. Are there any conditions under which cable must be used instead of rope?
4. State the facility policy for adding lines to the mooring configuration. (Is extra line available at the facility)
 - i. When are additional lines required between barges and fixed points? (As fleet width increased? As conditions deteriorate?)
 - ii. When are additional lines needed between adjacent barges? (Barges side by side?)
5. State the criteria for use of headlines. Is the need for headlines affected by ice conditions or the river level? By the width of the moored fleet? By the type of line you use?
6. When it is anticipated that the river rise will make the barges and cells inaccessible, what adjustments can be made?
 - i. Adjust headlines
 - ii. Add lines to deadman rigging
7. Graphically depict the facility's safest mooring arrangement (barge locations) in normal and high water conditions. (This information should be graphically displayed in a conspicuous location visible to the facility personnel.) Include a simple display of headlines, spring lines breast lines, and riggings between barges.

D. Communications

1. What communications equipment is available at the facility? Are appropriate personnel trained and licensed in its use? The ability to communicate with vessels in you harbor, with passing traffic and other waterfront facilities is highly recommended. Is equipment available 24 hours a day?
 - i. UHF-FM
 - ii. CB Radio
 - iii. Telephone
 - iv. Pagers
2. When waterfront personnel are busy securing equipment in an emergency, they will not have time to look up names and phone numbers of people to notify. Prepare a list of telephone numbers including other local facilities, towboat companies, supervisors, weather, and river stage recording telephone numbers. (This information should be posted near the facility's phone.)
3. Training. How do you handle training of facility personnel?

II. **Procedures in Rising/Falling River Conditions**

A. General

1. Under usual conditions, when hourly checks of the fleet are required, what should be checked?
2. When the facility is continuously manned due to unusual conditions what special steps should be taken?
3. How do you, as an owner/operator, ensure that facility watchmen get the needed weather, flood, and lock information?
4. How often should barge-to-fixed point moorings be adjusted (in terms of water level changes)?

B. Emergency Precautions

Establish some criteria by which precautionary measures will be automatically taken. Perhaps the best criterion is the river level as shown on the facility's gauge board. While a gauge board may not be required by regulation, it is recommended that some means of clearly evaluating the river level be in place. An upstream gauge can be useful in providing additional time to reconfigure, add lines, dispatch a towboat, etc. If you use a gauge board to trigger your precautions:

1. Designate a gauge level at which facility operations are to be stopped to allow personnel to begin precautionary measures.
2. Designate a gauge level at which facility operations are to be stopped to allow personnel to begin precautionary measures.
3. Designate a gauge level at which the facility must be continuously manned.
4. Designate a gauge level at which triple or loading point must be cleared.
5. Designate the gauge level at which moorings adjustments must be thinned to the least vulnerable configuration.
6. Designate the gauge level at which mooring adjustments must be made in anticipation of cells becoming submerged or inaccessible.
7. State the gauge level at which facility mooring points/rings/cells become submerged.
8. State the gauge level at which your fleeting tug can no longer clear the closet barge spans.

C. Disaster Recovery

Briefly describe the most important steps to be taken after a major problem has occurred. Examples: notify towboats and UHF-FM, advise Coast Guard, Downstream Lock, Police, adjacent facilities, bridge owners, etc.

After the “Committee’s” review of Waterfront Facility Operations Guides for facilities received to date, the following were frequently found to be deficient in either content or degree of detail:

1. Gauges should be tied into elevations by reference (normal pool elevation, upper or lower gauge of L/D, opening of the dam in the case of gated dams) should be indicated in feet above the base elevation.
2. In the communications section, a list of phone numbers should be included, not just names. Under the last section, Disaster Recovery, a list of phone numbers, in order of importance, must be included.
3. At what stage does the facility go from “normal” to “high water” procedures (elevation, gauge reading, or both)?
4. The graphic display of the fleet arrangement should indicate the location of all mooring devices, cells, clusters, deadmen, etc., and the normal and high water arrangement of mooring lines and barge configuration.
5. At what river stage you can no longer access your barge mooring facilities?

The “Waterfront Facility Operations Guide” as the “Committee” envisions it should be straightforward, accurate, plainly written document that can be read and easily understood by anyone (even if they are not familiar with the facility) and implemented. Each person responsible for barge handling at the Facility should be given a copy of the plan and steps taken to insure that the Plan is understood. Input to the plan by those involved in day-to-day barge handling operations is encouraged.

Attachment

IS YOUR LANDING
SECURED



Mooring Barges to Landing Cells

1. Good foundation (inside string of barges)
2. Tie barges up with good lines, at least 1.5" to 2" line depending on the size of the fleet.
3. On upper end of fleet use 1 5/8" to 2" poly or nylon line from barges to the ice breakers.
4. On the second cell down river, tie line opposite of hold up lines. This will keep barges from surging up and down the river.
5. When securing a line to timberhead, take at least three round turns and tie with at least 2 half hitches and pull hitches up tight. Leave about 12" of line after the hitches.
6. Wire all barges up solid. Wires not on tight will just work off the pelican hook and fall between barges.
7. If splicing eye in mooring lines, use NO LESS THAN three tucks and serve the other end so it will not unravel.
8. If a ring is missing from a cell, you can make temporary repairs by replacing the ring with a large shackle.
9. DO NOT tie your cell lines to timberheads that are bent over and loose.

Mooring Barges in Landing with No Cells

1. Good foundation string is the most important thing when tying barges in a fleet without cells.
2. At least two good 1" wires on each barge of the inside string should be used.
3. Make sure there are long leads on head wires, tied to deadman, on the bank.
4. Use head wires, breast wires, stern wires, and spring wires.

Rising River

1. Check all cell lines and replace worn lines with new or good 1.5" to 2" poly or nylon lines (use long lines).
2. Make sure lines are not fouled, so they can be moved up to higher rings if needed.
3. Reverse your upriver backing lines to downriver tow lines, fleet will not run upriver in the current.
4. IMPORTANT: Narrow fleet down as many widths as possible.
5. Never tie loads to empties. If possible, tie empties to loads.
6. Have a gauge board, that way you will know how fast the river is rising.
7. IMPORTANT: Wire all barges up solid. On the upstream end of each fleet, put a breast wire or crosswire on and tighten it to prevent drift and current from spreading the barges.
8. Report and breakaway barges in this order – first, to landings and locks located below you landing, then to the Coast Guard.
9. If at all possible, have a towboat around for the safety of your landing.
10. Landing should be checked no less than three times every shift and the gauge board should be checked every hour.

Falling River

1. Keep lines changed down as river falls.
2. DO NOT let you lines foul. This will get you in trouble.
3. Landing should be checked NO LESS THAN three times every shift and the gauge board checked every hour.

Daily River Information

For a 24 hour information service that gives a recorded message on river gauges, prediction and weather forecast given at 7:00 AM and 1:00 PM update, you can call these numbers:

- | | |
|---------------------------------------|--------------|
| 1. Emsworth Lock & Dam, Ohio River | 412-766-4555 |
| 2. Pike Island Lock & Dam, Ohio River | 304-277-4646 |
| 3. Maxwell Lock & Dam, Ohio River | 724-785-3247 |
| 4. Lock 4, Allegheny River | 724-224-0228 |

Phone Numbers for Locks on the Monongahela River

<u>Lock</u>	<u>Mile & Bank</u>	<u>Phone</u>
Braddock	11R	412-271-1272
3	23R	412-384-4532
4	42 R	724-684-8442
Maxwell	61 R	724-785-5027
Grays Landing	82 L	724-583-8304
Point Marion	91 L	724-725-5289
Morgantown	102 L	304-292-1885
Hildebrand	108 L	304-983-2300
Opekiska	115 R	304-366-4224

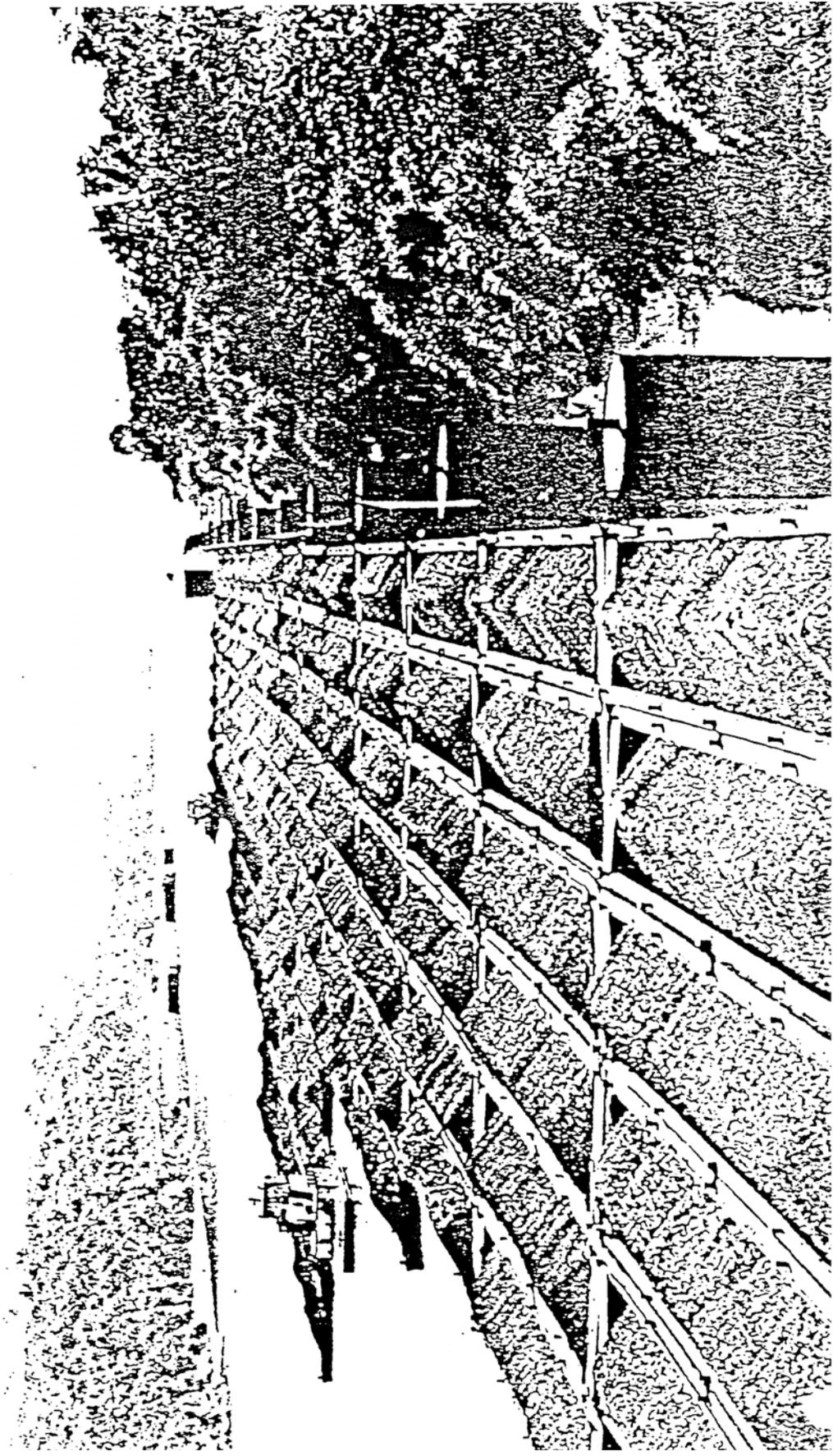
Phone Numbers for Locks on the Allegheny River

<u>Lock</u>	<u>Mile & Bank</u>	<u>Phone</u>
2	7 L	412-661-2217
C.W. Bill Young	15 L	412-828-3550
4	24 R	724-224-2666
5	30 R	724-295-2261
6	36 R	724-295-3775
7	46 R	724-543-2551
8	53 L	724-548-5119
9	62 L	724-868-2486

Phone Numbers for Locks on the Ohio River

<u>Lock</u>	<u>Mile & Bank</u>	<u>Phone</u>
Emsworth	6R	412-766-6213
Dashields	13 L	724-457-8430
Montgomery	32 L	724-643-8400
New Cumberland	54 R	740-537-2571
Pike Island	84 L	304-277-2127
Hannibal	126 R	740-483-2305

With a good fleeing procedure, landings can hold large flocks



SAMPLE

This is a good sample of fleeting procedures at a landing with a raising river. Develop one for you landing and post it.

High Water Procedures at Dravosburg

1. Normal pool is around 19 feet on the gauge board.
2. When the gauge is 22 feet, wires are to be put on the ramp on Duquesne Hull and left on until the gauge falls below 22 feet.
3. When the gauge is 24 feet and above, there will be two Fleet Wachmen on each working shift.
4. The Watchmen is to notify the Manager of Maintenance or the Landing Foreman when the gauge hits 24 feet.
5. With a 24 foot gauge, traffic is to keep a towboat at the Landing if at all possible for the safety of the Landing.
6. With a 24 foot gauge, the Watchmen and towboat, if available, will inspect the entire fleeting area every hour of their work shift.
7. Mooring requirements for one or more barges with a 24 foot gauge:
 - a. Barges end on end will be wired together with fore and aft wire and tightened.
 - b. Barges side by side will be held together with a tow line at the upstream end and a backing line at the downstream end. These lines are to be in good condition and NO LESS THAN 50 feet long.
 - c. When there is two or more barges abreast in any fleet the upstream end of each fleet will have a breast wire or cross wire put on and tightened to prevent drift and current from spreading the barges.
 - d. Two inch head line will be used on the ice breakers of each fleet on less than 200 feet long.
 - e. One and a half inch breast line will be used from cells to barges on less than 50 feet long.
 - f. All fleets will be narrowed down as much as possible.
8. If a problem does arise, contact these people:

SAMPLE

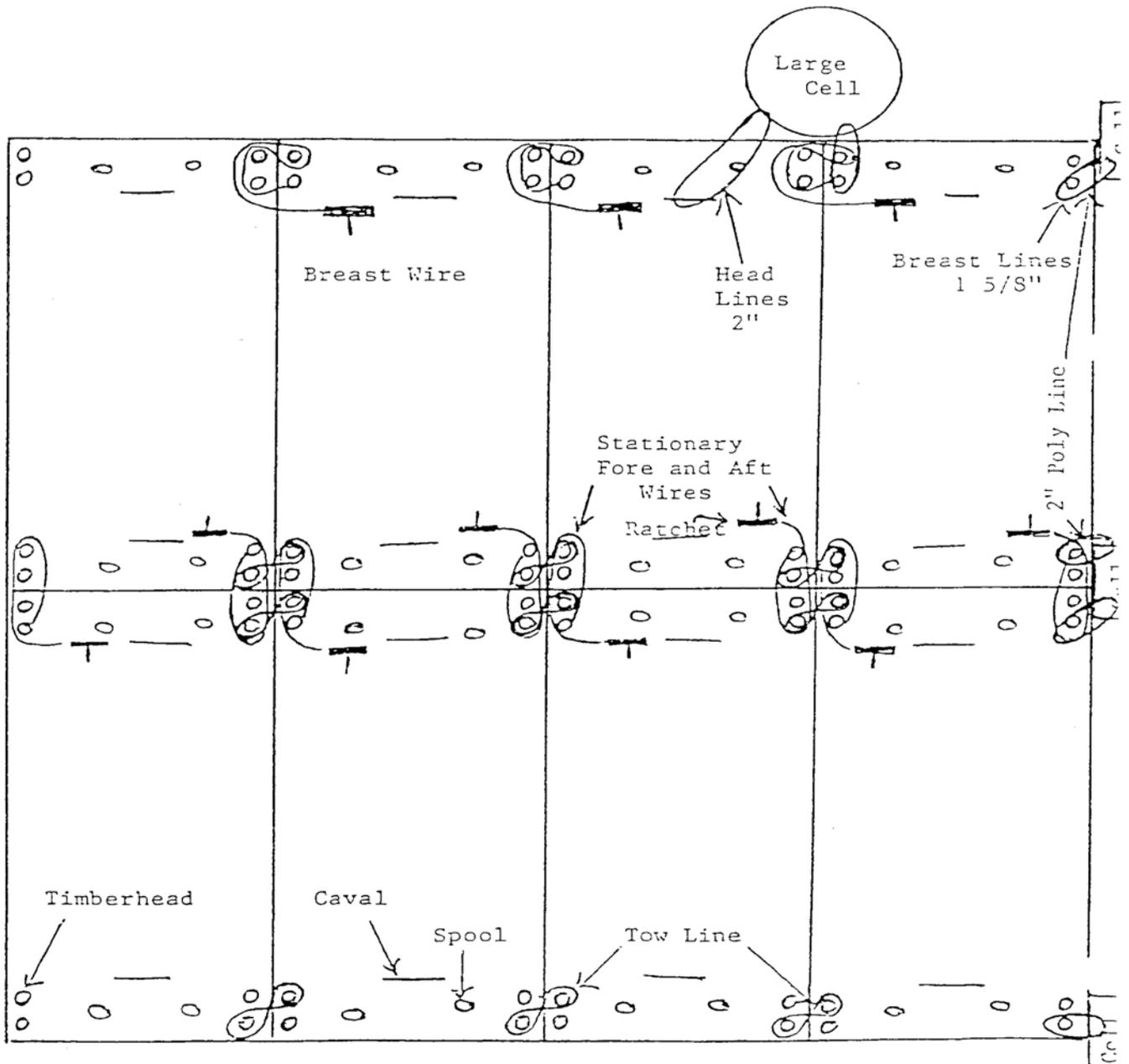
This is a good sample of fleeting procedures under normal conditions. Develop one for you landing and post it.

Fleet Watchmen Barge Fleeting Procedures at Dravosburg

1. Watchmen – at the beginning, middle, and end of a shift, physically board and inspect all floating equipment.
2. Please signal lanterns out on the fleets before dark and remove them after first light.
3. Make out a fleet diagram on all fleets and keep a record of boats and barges arriving and departing.
4. Check all lines and wires and make sure all fleets are secured. **YOU ARE RESPONSIBLE!**
5. Pump any barge that needs pumped and if possible, batten leaks.
6. Tow arriving at Dravosburg
 - a. Check all barges for water
 - b. Check with boat to see if they have had any problems with any barges
 - c. Have the boat deliver and spot barges where you want them. Remember, **YOU ARE RESPONSIBLE.**
7. All loaded cover top barges arriving at Dravosburg must be inspected and the inspection sheet filled out.
8. All loaded cover top barges departing Dravosburg must be **INSPECTED AND SEALED** and the inspection sheet filled out.
9. If a problem does arise, contact these people:

Mooring requirements for one or more barges with a 24 foot gauge at Dravosburg Landing.

Up River End



Down River End

Page 3

SAMPLE

LANDING OPERATIONS GUIDE

I. Barge Fleeting Under Routine Conditions

A. Barge Receiving and Departure Procedures

1. When barge deliveries are expected special arrangements will be made by Management Personnel and the Tower. The landing superintendent will advise management with information about mooring locations.
2. It is not necessary for Landing Personnel to accept an incoming barge.
3. Incoming barges will be checked for condition and leaks within 6 hrs. of delivery.
4. Leaking barges will be pumped and battened if possible. In cases where a batten can not be installed and depending on severity the barge will be placed in shallow water or an electric pump installed.
5. When barges are to be taken from our Landing by outside towers, arrangements will be made by Management Personnel. Landing crews will place the barge on the outside of the fleet to avoid the disturbance of our fleet moorings.

B. Landing Watchman's Responsibilities

1. Watchman is to check the Landing Fleet 3 times per day. Special attention MUST be given to:
 - a. Lantern placement
 - b. Lantern operation
 - c. Number of lines mooring the fleet
 - d. Condition of lines
 - e. Check for leaking hulls
 - f. Pump if necessary
2. Watchman is to check the yard gate and parking area 2 times per day. Check and replace light bulbs as needed in the driveway, parking area, and landing shop boats.

3. Landing shop boats have the following emergency equipment:
 - a. 1 - 6" pump (gasoline)
 - b. 1 - 3" pump (gasoline)
 - c. 1 - 1.5" electric pump
 - d. 1 coil of 1.5" poly plus line
 - e. Oakum, 2 x 4's, and shingles
 - f. Welding machine
 - g. Burning torch
 - h. First aid locker
 - i. Stretcher
 - j. Fire extinguishers
 - k. 100' of 1.5" fire hose
 - l. 40' of oil boom
 - m. 1 case of clean up towels
 - n. 1 Jon boat with outboard and oars
 - o. Weather channel radio

C. Mooring Hardware

1. Spud hulls comprise our base mooring structures.
2. Lines used to moor barges and other equipment are 1.5 poly plus minimum.
3. Barges must be tied in 2 places with 4 part lines (minimum).
4. Landing shop boats are secured to deadmen with 1.5" cable. This is in addition to their spuds. The 1.5" cable has an eye with a 12" mooring ring of 2.5" stock enclosed.
5. Lines leading from the deadmen mooring rings will be 6 part minimum.

D. Communications

1. Insurance
2. Communications
 - a. VHF-FM Radio in the office stands by on Channel 18 during office hours.
 - b. VHF-FM Radio on landing shop boat Beaver stands by on Channel 13 - 24 hours per day.
 - c. Beaver also has a telephone. Emergency phone numbers are listed on the wall by the phone.*

* See Appendix A

II. High Water and Ice Procedures

A. General Procedures

1. Due to our location, with respect to Emsworth Dam our first indication of high water is a low water condition with swift current. During this time our Fleet inspections are made 4 times per day. In addition to the normal impaction items the watchman will check spud movement.

B. Emergency Precautions

1. When the crest predictions or point gauge for the point is 23 feet or above our flood watch is activated:

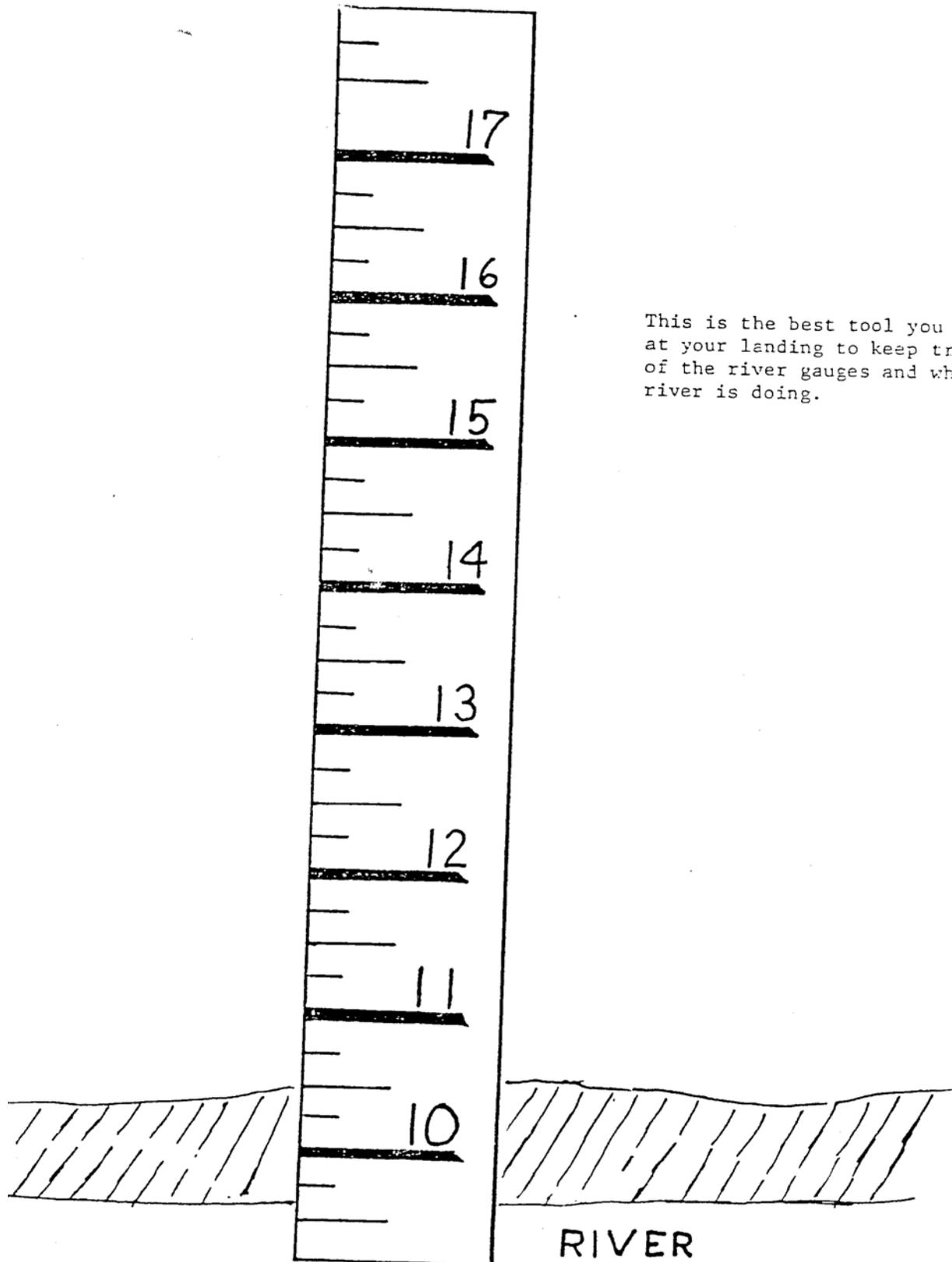
FLOOD WATCH

- a. 2 men on duty 24 hours per day
 - b. Watchmen carry life lines on their rounds
 - c. At a point gage of 23 feet the walkway to the Beaver will need adjusting
 - d. Spud hand up must be checked
 - e. If crest prediction is 25 ft. or above at the point, a towboat and crew are added to the flood watch.
2. When ice run outs are imminent a sheer barge will be placed at the upstream end of our Landing. This barge will deflect the ice away from our fleet.
 3. The outside edge of our fleet will be made as straight as possible.

III. Disaster Recovery

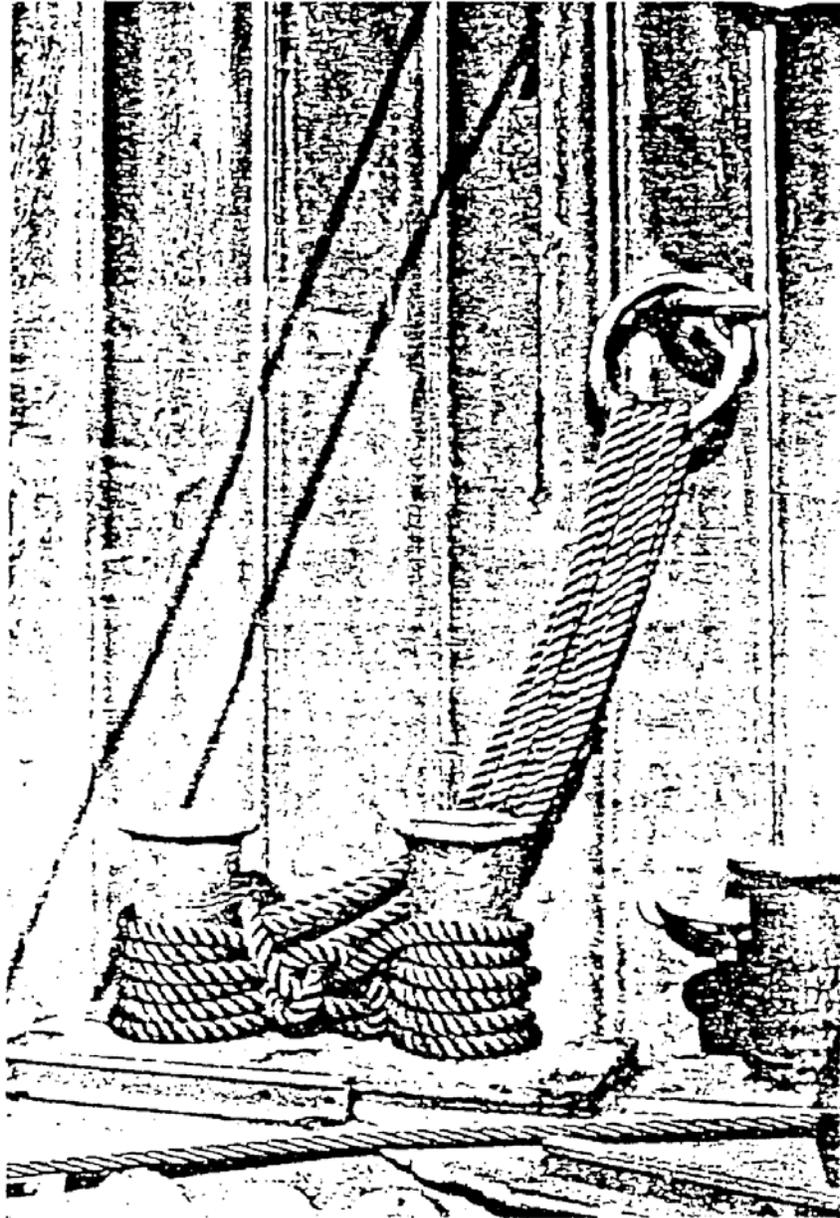
1. See that all people are accounted for.
2. Notify:
 - a. Nearest downstream lock and River Area Office (SEE PAGE 11)
 - b. U.S. Coast Guard 412-644-5808
 - c. USCGC Osage 412-741-1180
 - d. USCG Ohio Valley 1-800-253-7465
 - e. National Response Center
(Hazardous material/oil spills) 1-800-442-8802
 - f. Waterways Association of Pittsburgh 724-684-2315
Mike Somales 724-355-4101
 - g. West View Water Co. 412-331-4723
 - h. DEP Southwest Regional Office 412-442-4000
 - i. Ashland Chemical Corporation 412-778-6300
 - j. Allegheny Co. Public Works 412-350-4005
Department of Road, Bridge, & Park Maintenance
 - k. PA DOT 717-783-2026
Eric Madden

ALL LANDINGS NEED A GAUGE BOARD



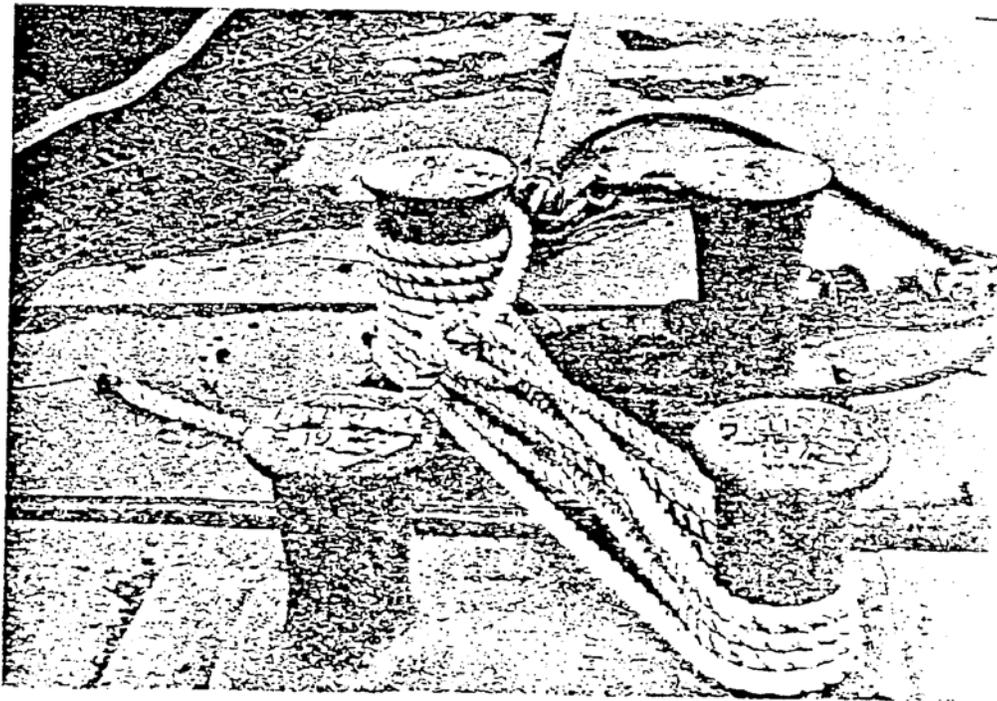
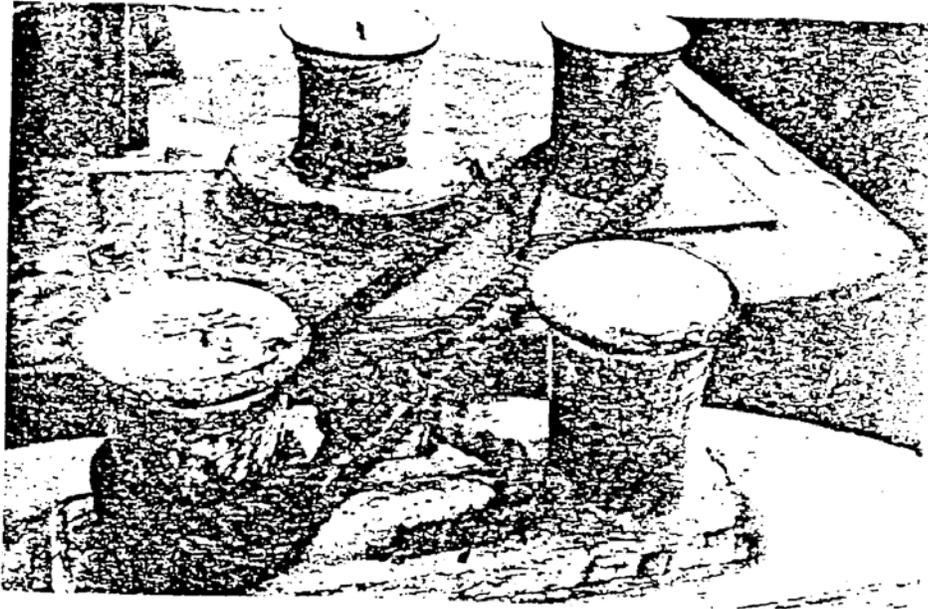
This is the best tool you have at your landing to keep track of the river gauges and what the river is doing.

BREAST LINE

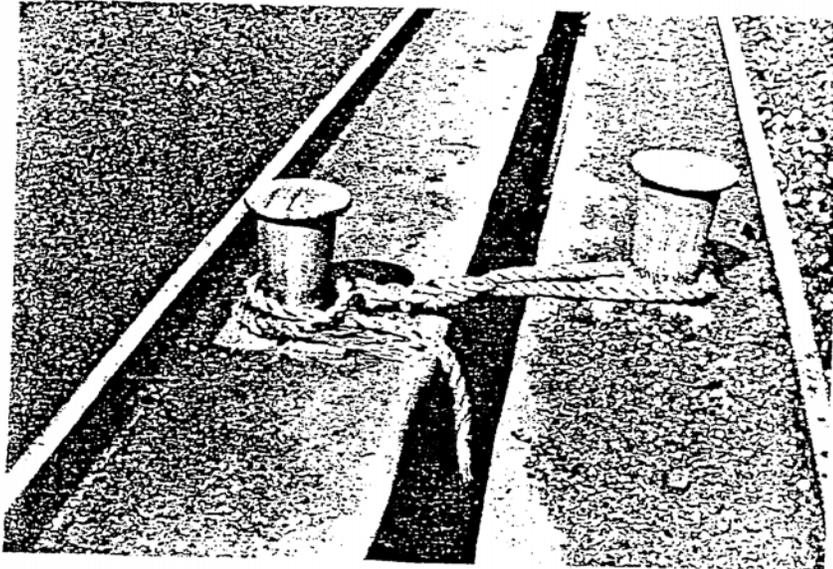
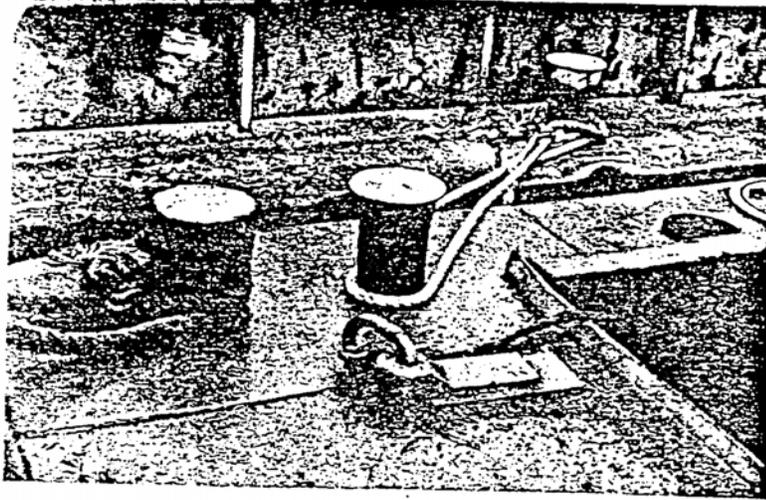


Excellent example of breast line tie-off to a cell.

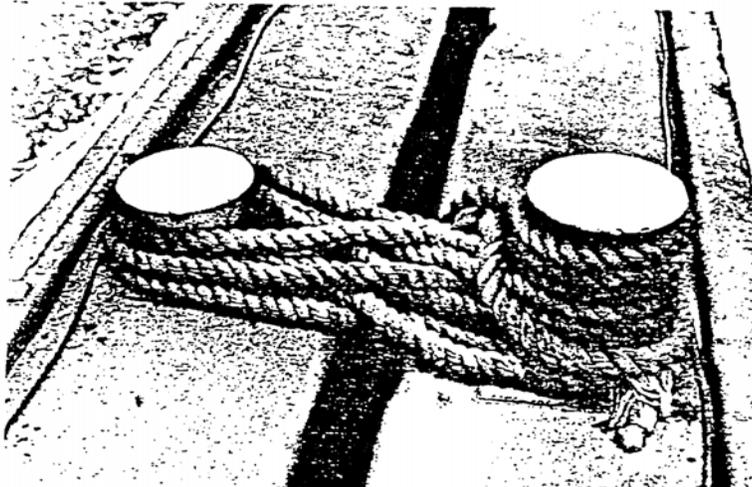
THIS CAUSES BREAKAWAYS



THIS WILL PREVENT BREAKAWAYS

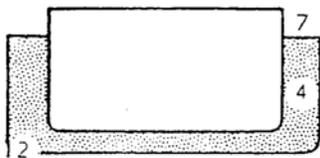
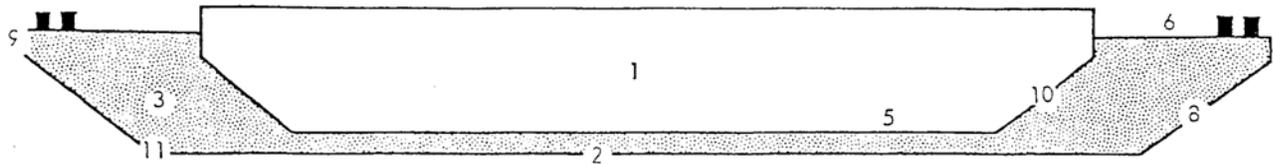


W
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G



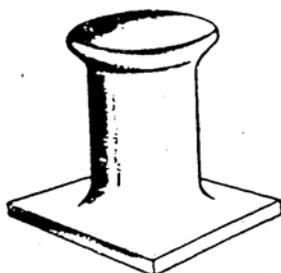
THIS IS A
CORRECT
TIE

SECTIONS OF COMMON BARGE



- | | |
|---------------------|------------------------|
| 1. CARGO HOLD | 7. GUNWALE |
| 2. BILGE | 8. RAKE |
| 3. RAKE COMPARTMENT | 9. HEADLOG |
| 4. WING TANKS | 10. COLLISION BULKHEAD |
| 5. CARGO FLOOR | 11. RAKE KNUCKLE |
| 6. LINE DECK | 12. BILGE KNUCKLES |

Various types of equipment attached permanently to boats and barges for fastening-----



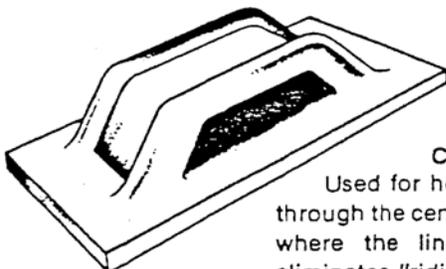
TIMBERHEADS

The timberhead or bitt is designed to be used with line for making fast, checking, mooring, etc.



SPOOL

Designed primarily for wire rope. Requires an eye to be used for tying or may be used as a pulley. Normally placed on line deck or towboat.

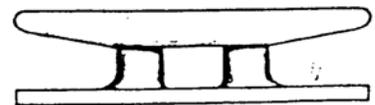


CLOSED CHOCK

Used for holding down line by running it through the center of the chock. Ideal in cases where the line is made fast below and eliminates "riding up" on the head.

CAVEL OR KEVEL

Designed also for line. This fitting requires a criss-cross fashion of your line when making it fast. Check (a braking action) is also done on this fitting in the absence of timberheads.



BUTTON

Found mostly on lock walls designed to hold the eye of a line or wire. Is also used as deck fitting on boats.



KNOTS THAT ARE USED ON THE RIVER



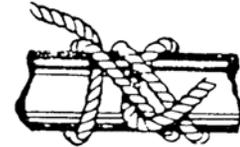
Overhand



One half Hitch



Two Half Hitches



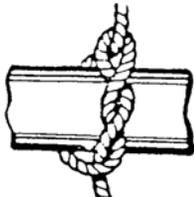
Rolling Hitch



Single Blackwall Hitch



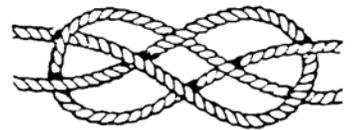
Reef or Square Knot



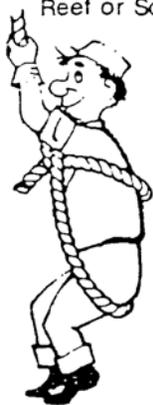
Timber Hitch



Sheet or Becket Bend



Double or Carrick Bend



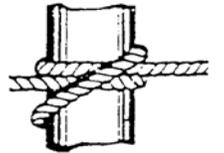
French Bowline



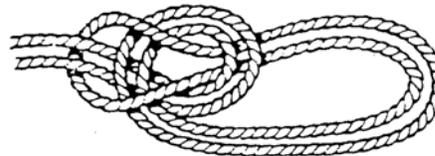
Cat's Paw



Bowline



Clove Hitch

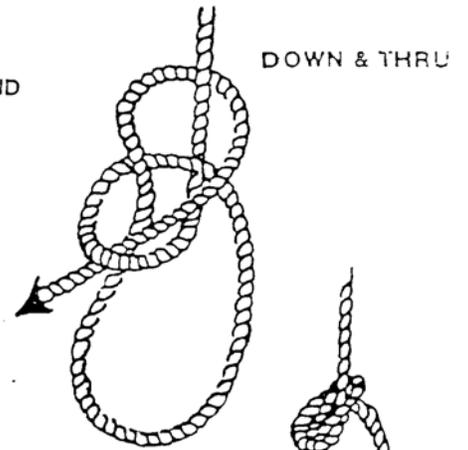
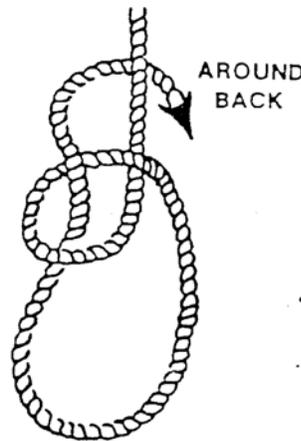
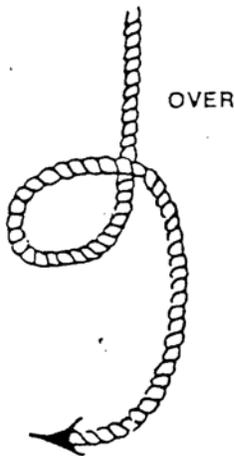


Bowline on a Bight



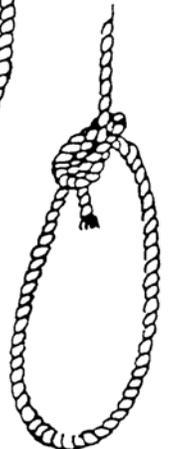
Fisherman's Bend

How to tie bowline

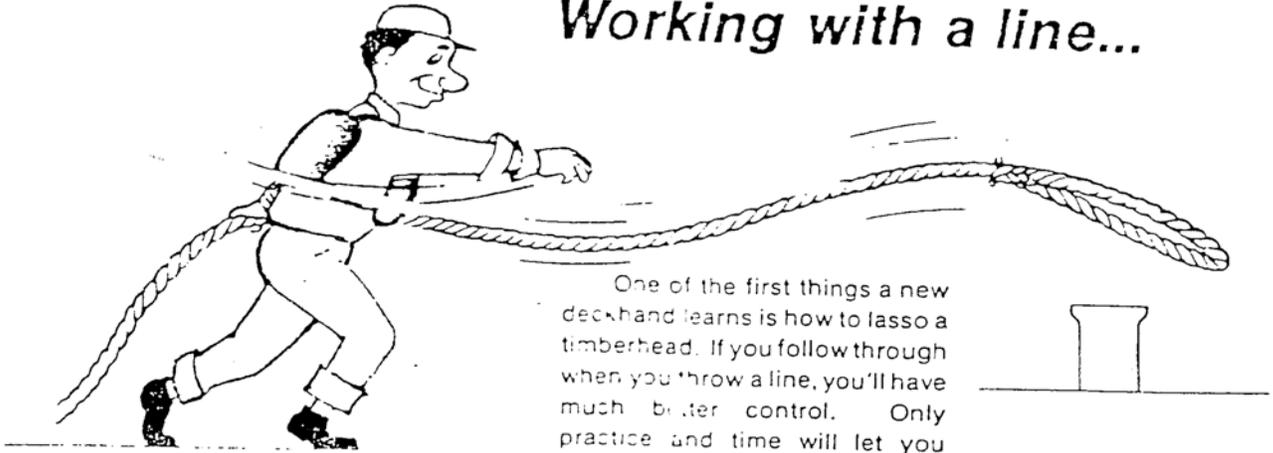


SIMPLE METHOD: Make "hole"...
The rabbit came out
of the hole, went around
the tree and back into the hole.

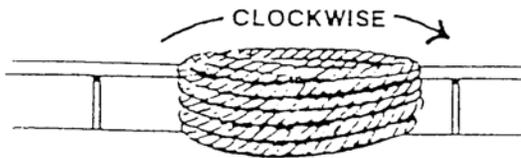
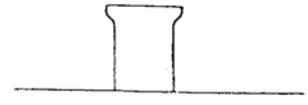
PULL TIGHT
KNOT WILL
NOT SLIP



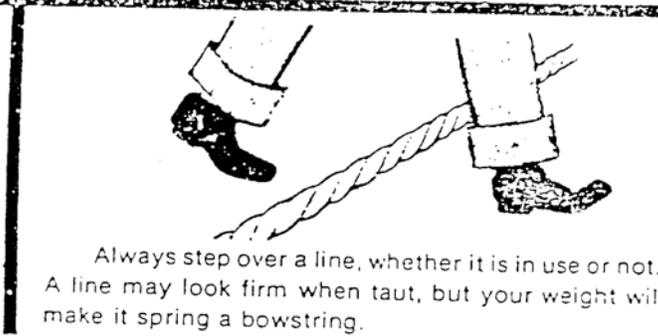
Working with a line...



One of the first things a new deckhand learns is how to lasso a timberhead. If you follow through when you throw a line, you'll have much better control. Only practice and time will let you become good at this.

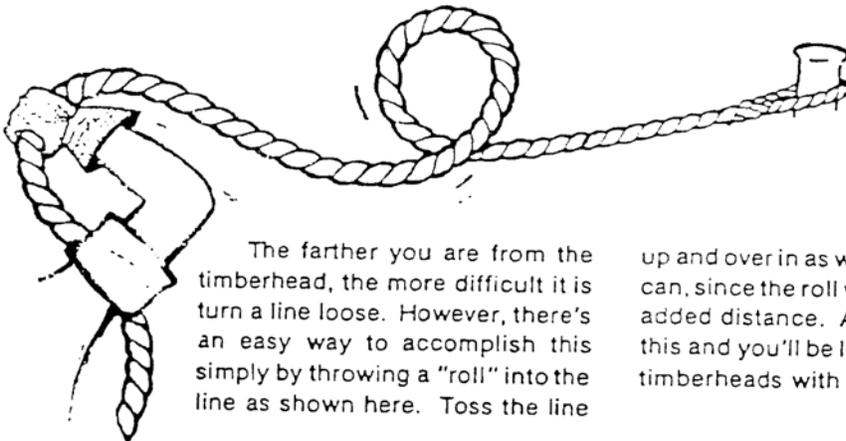


When you are through using a line always coil it clock-wise neatly out of the way on the line deck.



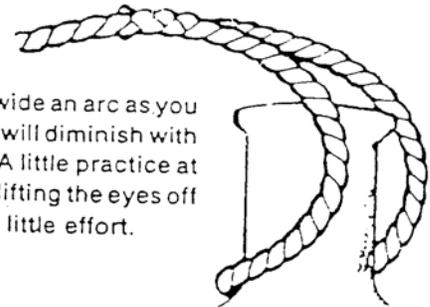
Always step over a line, whether it is in use or not. A line may look firm when taut, but your weight will make it spring a bowstring.

Turning a line loose can be easy...



The farther you are from the timberhead, the more difficult it is to turn a line loose. However, there's an easy way to accomplish this simply by throwing a "roll" into the line as shown here. Toss the line

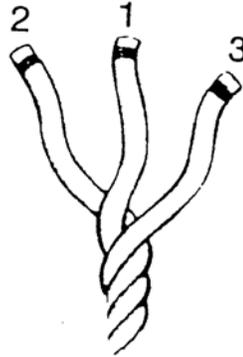
up and over in as wide an arc as you can, since the roll will diminish with added distance. A little practice at this and you'll be lifting the eyes off timberheads with little effort.



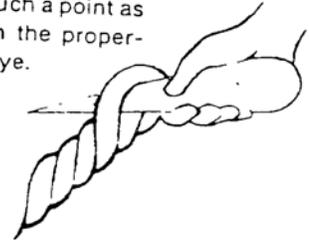
Everybody likes a determined individual but this lad is going overboard (in more ways than one). If it's too late to turn the line loose, or the line isn't long enough...let it go!

SPLICING EYES

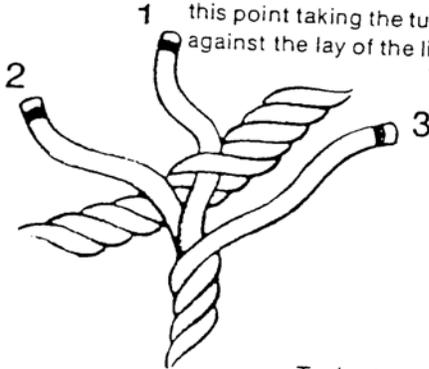
Separate the three strands and "serve" (binding the ends with tape) each one. We'll refer to these strands as 1, 2, and 3.



Start your splice with the aid of your fid at such a point as to form the proper-sized eye.



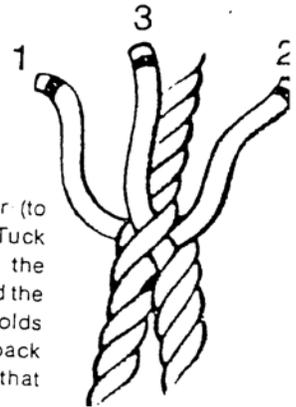
Tuck in strand #1 at this point taking the tucks against the lay of the line.



Tuck strand #2 over the strand which holds #1 and under the one adjacent to it.



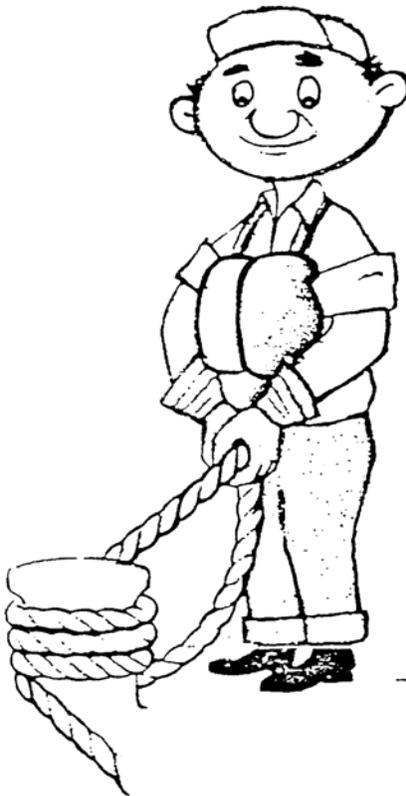
Turn your line over (to the left) at this point. Tuck strand #3 between the strand which hold #2 and the strand which thus far holds none. Turn your line back over and repeat tucks in that order.



WORK ON THE DRY SIDE

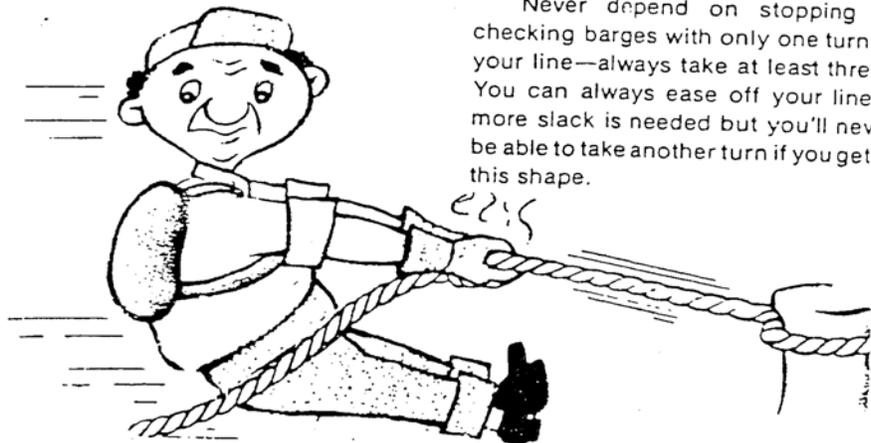
Work your line from directly behind the timberhead, "feeding slack" as required. You should lay your line out properly beforehand so that it won't get tangled, when you are using it. Keep your feet well clear of the line so that you don't wind up

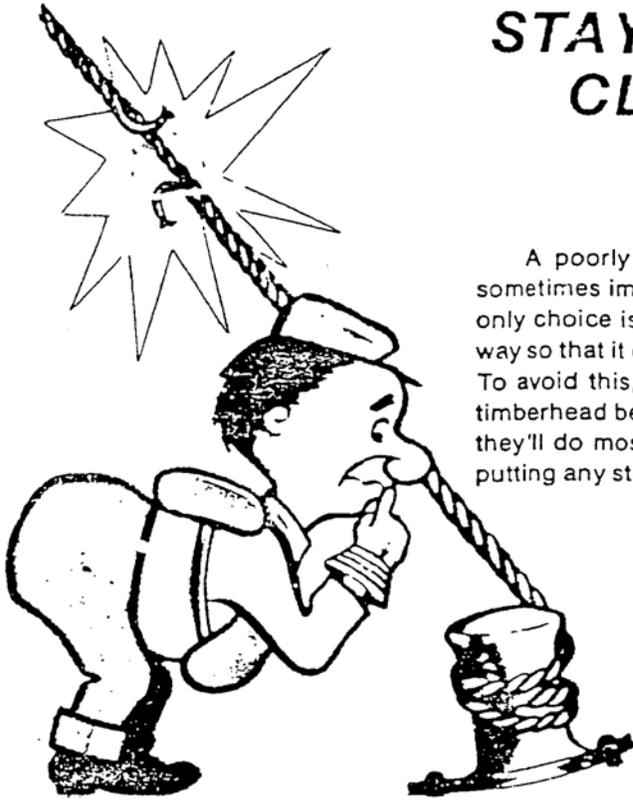
taking a turn around the head yourself. Remember, your feet cannot be caught in the line if you don't move them. By stepping back or forward you invite being caught in a loop of rope.



TAKE ENOUGH TURNS

Never depend on stopping or checking barges with only one turn of your line—always take at least three. You can always ease off your line if more slack is needed but you'll never be able to take another turn if you get this shape.



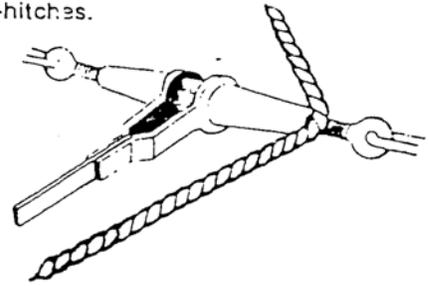


STAY CLEAR

A poorly tied line that is taut is sometimes impossible to unfoul. Your only choice is to stand well out of the way so that it doesn't hit you if it parts. To avoid this, take more turns on the timberhead before you make it fast and they'll do most of the holding without putting any strain on your half-hitches.

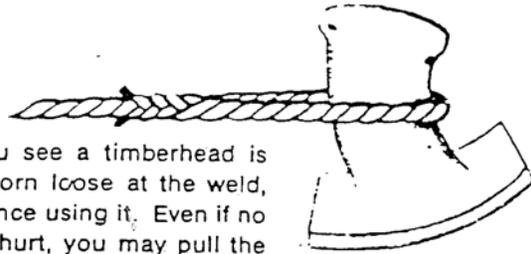
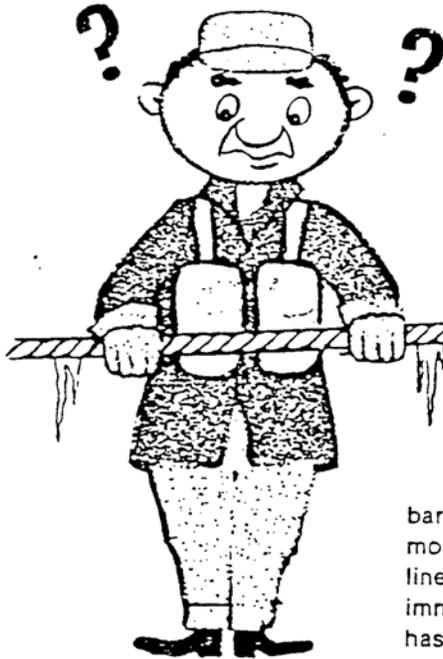


NEVER STEP IN THE BIGHTS OF LINES



...OF LINES FOULED—UP ON RIGGING

Don't check on weak timberheads...

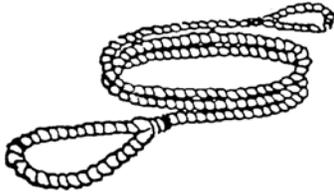


If you see a timberhead is partially torn loose at the weld, don't chance using it. Even if no one gets hurt, you may pull the head loose from the barge. Report a damaged timberhead to your superior immediately.

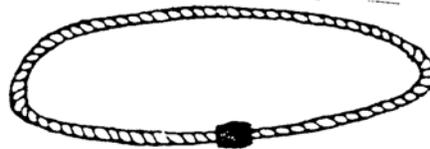
Suppose you needed a line in a hurry to "catch" a barge and you picked up this thing. During the winter months you'll have to make doubly sure you don't drop a line in the river. If you do, replace it with another one and immediately dry the wet one back at the boat. A line just has to touch the water in the winter and it'll become stiff and useless in minutes.

FORE AND AFT WIRE

35' ft. wire with eyes in both ends used for making couplings between barges. The ratchet is hooked to the small eye and the large eye is placed over a timberhead.



HULA HOOP

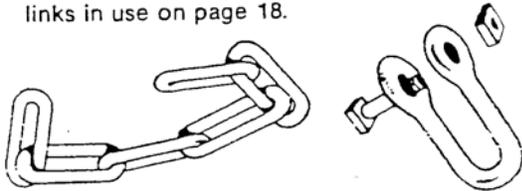


CHAIN SLING



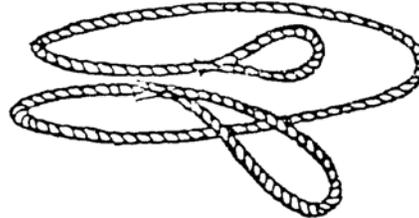
CHAIN LINKS AND SHACKLE

Chain links are attached directly to the "deadeye" by inserting a bolt (pin). Added length can be given by means of a shackle, which allows you to join sets of chain links together. See chain links in use on page 18.



DOUBLE EYE WIRE

Used chiefly for mooring fleets of barges, can also be put into use as a cross or towing wire by inserting a shackle in the one eye, and then adding chain link and ratchet.



LIFT AND CARRY RIGGING PROPERL



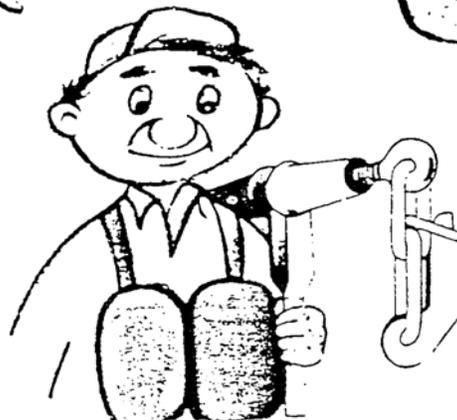
WRONG

Hook your pelican hook to its keeper before you carry a ratchet and carry it over your shoulder in the manner that this fellow is doing. A flopping hook can cause injuries.

You'll do a lot of lifting heavy equipment. Even a deckhand's "toothpick" weighs about 10 pounds. Always lift as the man is doing here at the right, using his legs to help him hoist the ratchet. Lifting as is shown in left illustration puts all the load on your back. To prevent strains, lift properly. Get help with heavy loads.

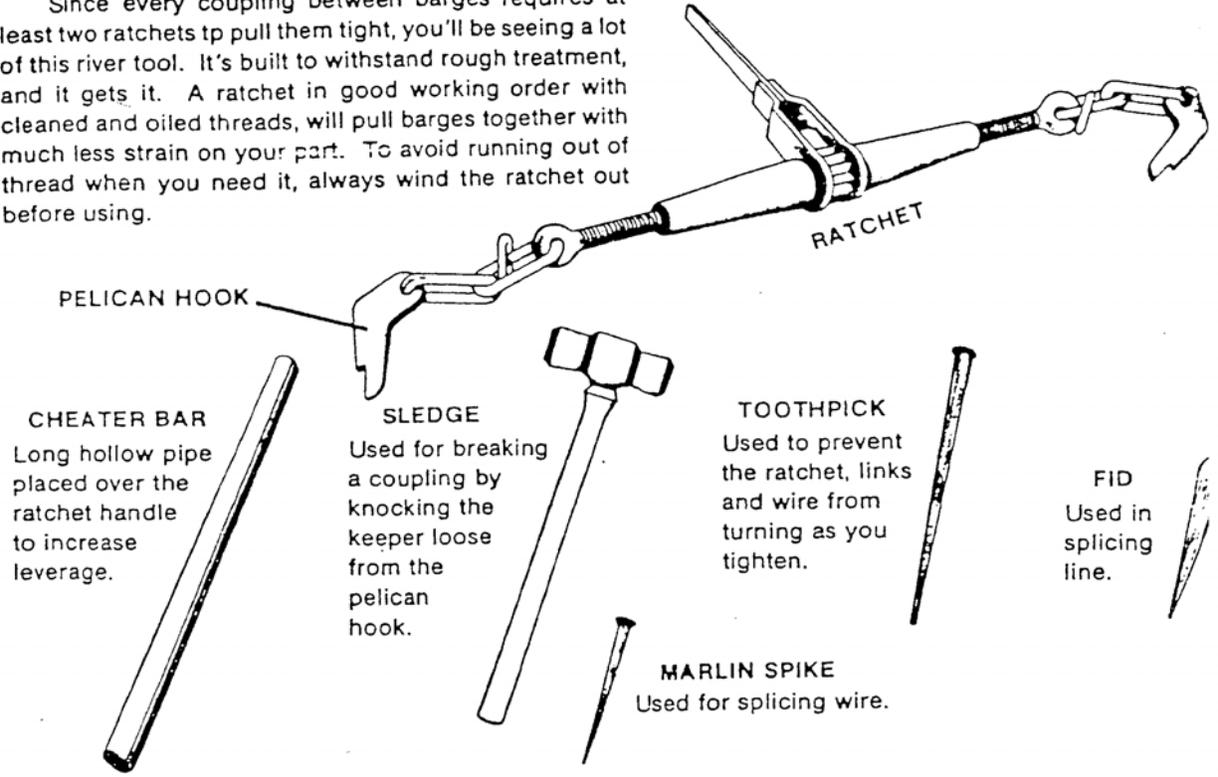


RIGHT



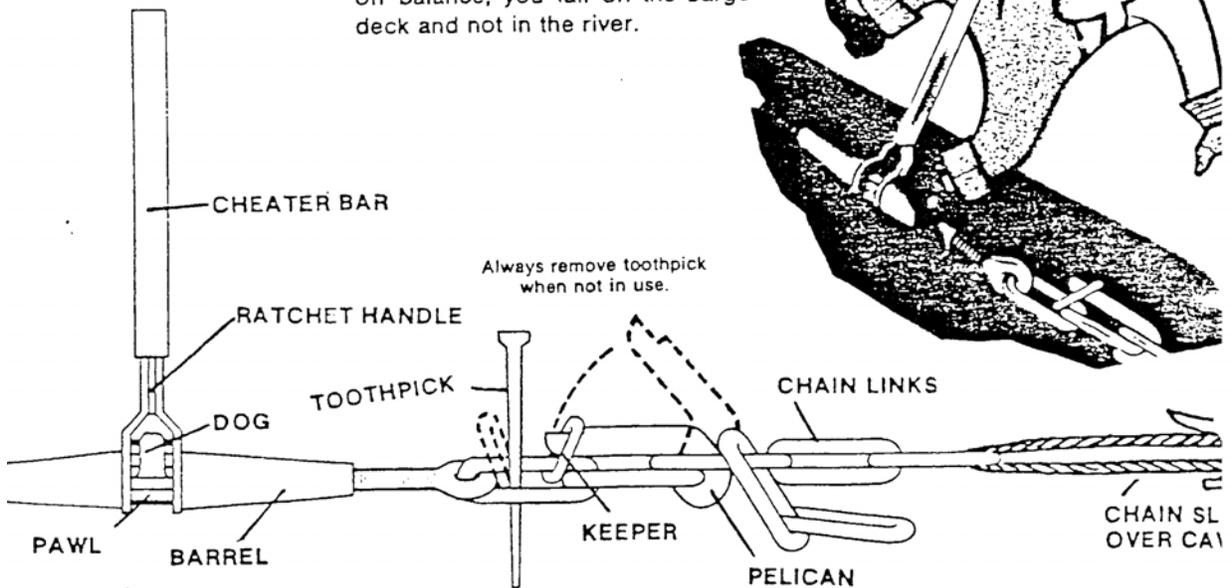
The Ratchet

Since every coupling between barges requires at least two ratchets to pull them tight, you'll be seeing a lot of this river tool. It's built to withstand rough treatment, and it gets it. A ratchet in good working order with cleaned and oiled threads, will pull barges together with much less strain on your part. To avoid running out of thread when you need it, always wind the ratchet out before using.



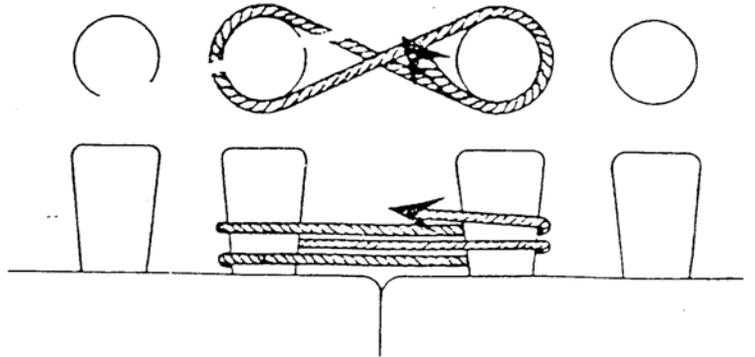
Never tighten ratchets outboard!

Always tighten ratchets inboard, so that if you get sudden slack in the wire and it catches you off balance, you fall on the barge deck and not in the river.

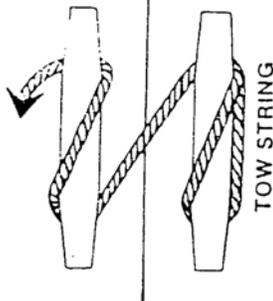


Know your fittings...and how to use them

The illustration at right shows a criss-cross fashion of putting on a lashing. This method allows as much of the ~~elimination of slack~~ from the line as manually possible. Lashings may be put over the top of a tightened coupling as a safety precaution. Heavy strain from steering and the chance of a faulty rigging might result in "parting" a wire or chain but the tow will remain intact when safeguarded with lashings.



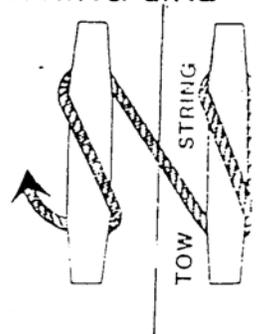
CAVEL | TOWING LINE



Run the lead of your line from the forward end of the cavel on the tow string (pushing string) to the aft end of the cavel on opposite barge as shown. Repeat this back and forth as much as required. When the tow-string moves forward your towing line becomes effective immediately.

CAVEL BACKING LINE

Reverse the lead of your line as shown here and you have a backing line. As soon as the tow string begins to back, this line will take effect. Towing and backing lines keep your barge from running ahead or dropping back.



Over your shoulder is the way you'll carry most rigging, but....
always carry it outboard!

Never walk the "notch"

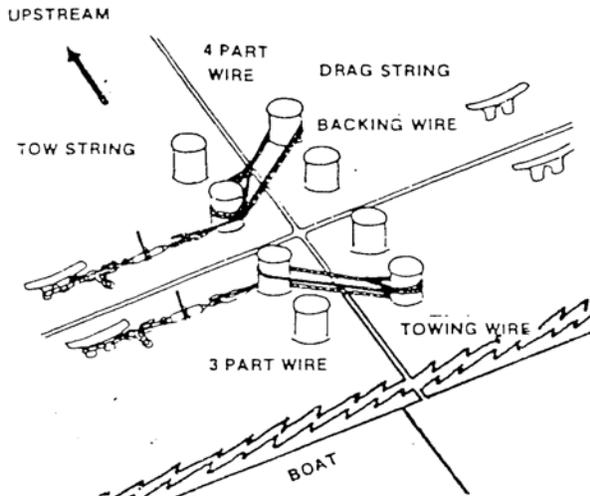
A Notch (void or opening) is any place where barge headlogs do not meet, or, when they are not even with each other...or when no other barge is faced to it.



Always carry rigging on your outboard shoulder. This is one of the oldest rules. If there is a sudden movement of the tow or "bump" and you lose your balance, you can get rid of the rigging quickly by dumping it overboard.

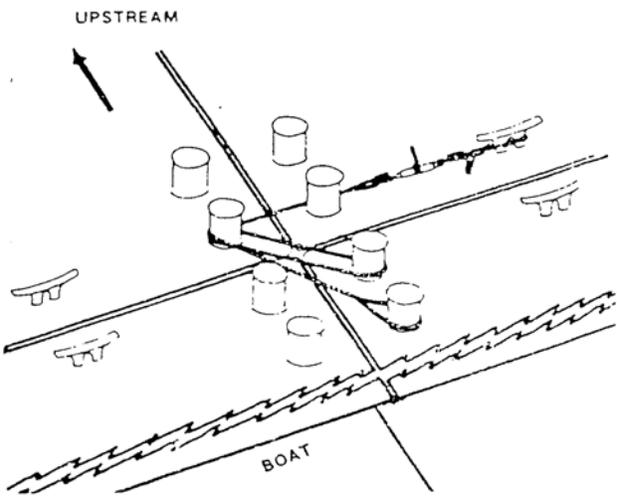
BACKING & TOWING WIRE

These wires are used to back or tow the "drag string."



SCISSORS OR BREAST WIRE

Used to breast two barges together and give towing or backing lead.



BASIC FORE/AFT WIRE

This is the coupling used to couple the barges end to end. It can be either a 3 or 4 part wire.

3 PART WIRE: With 3 parts the eye of the wire is placed over a timberhead on the barge opposite on which the ratchet is placed.

4 PART WIRE: With 4 parts the eye of the wire will be placed over a timberhead on the same barge on which the ratchet is placed.

