

Procedure for Setting a Mooring

The information below was provided by DSC member Jim Simons.

Here's a note he sent to *Good Old Boat* magazine a couple of years ago, which hits the high points.

1. All components should be hot-dipped galvanized, and sized for 3/8" chain. Based on the expected loads, a smaller chain could be used. However, it would fail sooner from corrosion.
2. All the components were available at Sabel Steel in Montgomery (Wholesale Center, 589 N. Court Street, Montgomery, AL 36104, phone 263-0234 – added by Ron). Their fittings are hot-dipped, but their "hot-dipped" Chinese chain is just a step above electroplated.
3. Sam McLemore once put in a mooring with all stainless fittings, but as I recall, it failed at about the same frequency as the galvanized.
4. The mooring ball is sized to support the weight of all the chain. On the deeper moorings in the middle of the slough, this weight can be significant. As I recall, a 16" ball is marginal with an 18" being better. I prefer the hard mooring balls that have the tube through the center of the ball, allowing for the connections to all be on the top of the ball, rather than in the water, and subject to corrosion.
5. At full pool, you only need 6 feet or so of scope, as you are not expecting the drums to "set", they are just mass.
6. Only the top and bottom 12 feet need to be chain. Using chain for the entire rode just adds expense, and weight.
7. The middle can be nylon line, 3/4" minimum. Larger line would require larger thimbles, which would require larger shackles and swivels. That's ok; you just need to lay everything out so they can all make up in a system.
8. All line connections are made with spliced-in thimble eyes.
9. There are 2 swivels; one at the chain-to-line and one at line-to-chain connections.
10. Any cotter pins, such as those on the swivels, MUST be stainless steel.
11. Mooring failures usually occur from heavy rust and wear in the top 10 ft. Thus, hot-dipped galvanized thimbles, shackles and swivels. My theory is that there is more chemical action due to dissolved oxygen close to the surface. I dived down to recover failed moorings, and the bottom connections were in good shape when the top connections were gone.

12. As a matter of preventive maintenance once the water is down to winter pool so you can shorten the mooring for that level, I'd suggest inspecting the top 10 ft of chain down to the top swivel. Every 2-3 years you will need to replace the chain as it corrodes. Obviously, if you are going to inspect the rode, have the replacement parts at hand, so you don't have to do it again.

13. Always wear heavy gloves, as the rust scale on the mooring chain can be sharp. The rust on the brake drums, is really sharp.

At Dixie Sailing Club on Lake Martin in Alabama, we use semi-trailer brake drums as dead weight anchors. These brake drums are similar to car brake drums, except they weigh from 65 to 80 pounds. The drums are sourced from local shops that repair semi-trailers.

The galvanized chain anchor rode is looped through the first drum and shackled to itself. The drum is lowered to the bottom. Then, the second drum is threaded onto the rode, and allowed to settle down onto the first drum. It's helpful to hold the rode taut as the second drum runs down to the bottom, so the drums nest together. The nesting drums should probably be concave up. Then, repeat with as many brake drums as necessary to reach the desired deadweight. We typically use 5 drums. The drums will settle like a caterpillar on the bottom conforming to the bottom.

The drums are rusty, rough and abrasive. So, you'll have to work from a boat that can be protected from the drums.

Since used truck brake drums are scrap, they cost \$5 or less. (I hear the discarded drums are being sold for \$0.12 per pound. Therefore an 80 to 100 pound drum will cost you roughly \$10 to \$12. - RD) The cost is thus attractive.

The ground tackle should be heavy galvanized and swiveled top and bottom. If the depth is over 20 feet or so, we use large diameter nylon line 10 feet above drums and 5 feet below the buoy. This minimizes the float size, since full chain rode would require a larger buoy. It's important to have chain above the drums, so the nylon rode doesn't rub the drums.

Our lake draws down 10 – 15 feet each winter. So we configure the rode with an extra shackle to shorten it for low water.

The system life of 5-8 years is limited by the life of the rode components.

The drums will last a long time in fresh water.

Additional notes from Jim:

Details of the rope chain connections:

In each case where the 3-strand nylon connects to the swivels, it is spliced around a thimble. Never just run the line through the swivel bail, or the friction will cause the assembly to fail quickly. All friction points are metal on metal.

The swivels may be closed or pinned, or one end of each. Closed are probably cheaper and more available, but will require opening the thimble, slipping it over the thimble bail and then twisting it closed. Thimbles will not open easily, but they can be twisted much easier. Use a large vise for safety. Obviously, the thimbles are installed on the swivels before the line is spliced.

I always just put a shackle on the end of the chain at the top of the buoy, since the shackle would not slip through the sleeve. Then, that shackle would be the ideal means of connecting the boat mooring line to the system. Once again that connection should be thimbled. Then, you would always leave that short line connected to the system. I tied a milk jug to it, so the end was always floating when I returned.

I'm not sure if I mentioned it, but it's important to determine the exact mooring site, measure the depth at that site, and mark the site with a simple float [milk jug] with your name. That way all the rig lengths can be accurately determined. There are few things as bad as making up the rig, setting the drums and then finding the buoy is submerged. Of course, too much scope is also bad, but not the same level of problem.

Another consideration is the chain/rope mix. If your selected mooring site is in 20-30 feet during the summer, then I'd suggest you check the feasibility of an all chain rode. There are two reasons to use rope; it's cheaper than chain and it's lighter than chain. If the buoy will still float above the centerline with a full chain rode, then it's a matter of economy and security.

One other caveat is to fit all these pieces together at Sabel's, so that you know all the pieces fit together, especially the shackle pins in the chain.

I added the following shopping list to Jim's procedure to give you an idea of the costs associated with setting a mooring. (Ron)

Shopping list:

1 – 16" or 18" mooring ball (18" is recommended) (West Marine - 15" ball is \$118 to \$150; 18" ball is \$160 to \$175)

x feet of 3/8" hot-dipped, galvanized chain (Sabel Steel - \$4.09/foot. Home Depot had a box of 30 feet of grade 30, galvanized chain for \$92)

x feet of 3/4" nylon line (minimum recommended diameter) (Home Depot – \$1.14/foot)

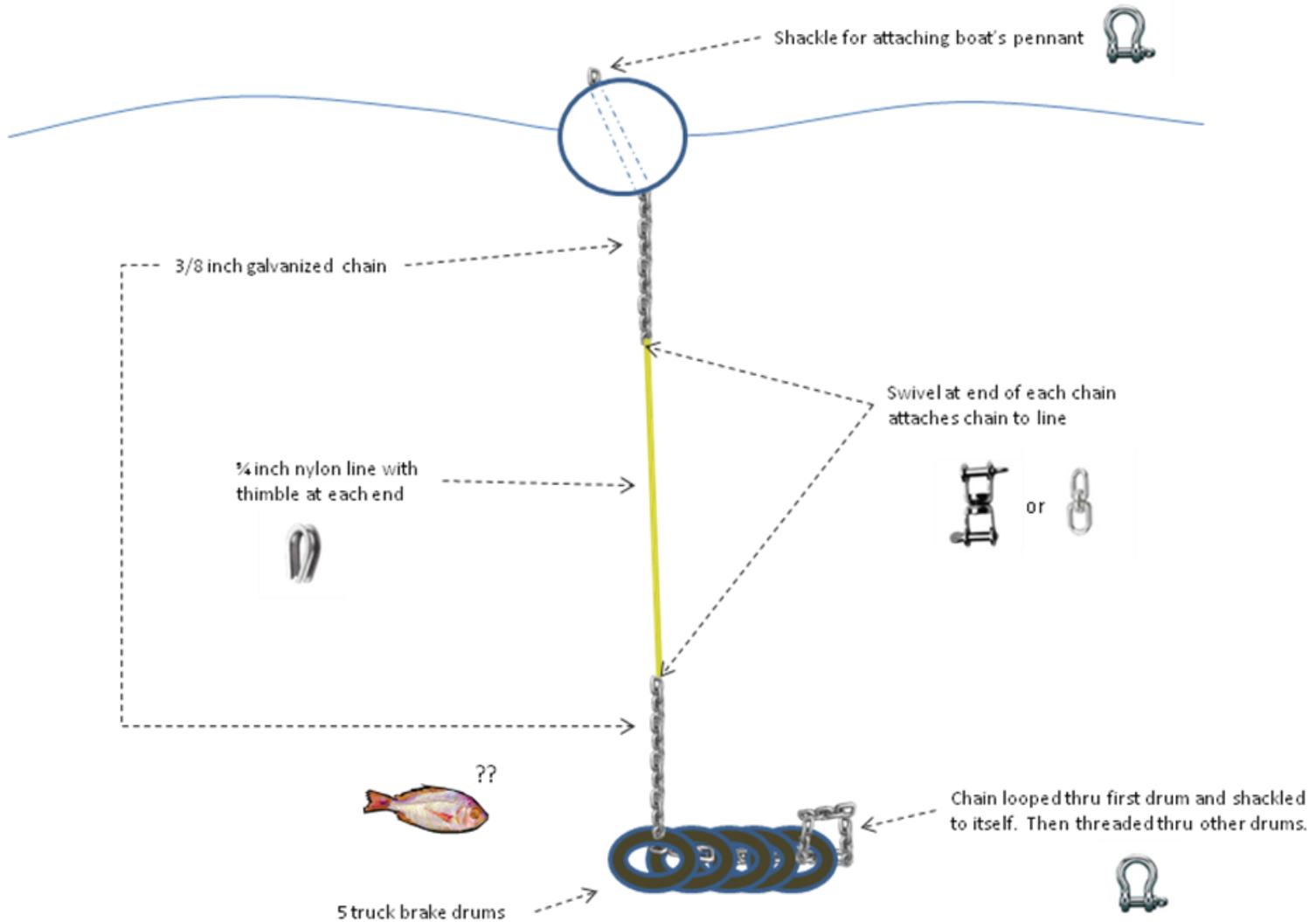
2 - 3/4" galvanized thimbles (one for each end of the nylon line) (Sabel Steel - \$4.60 each)

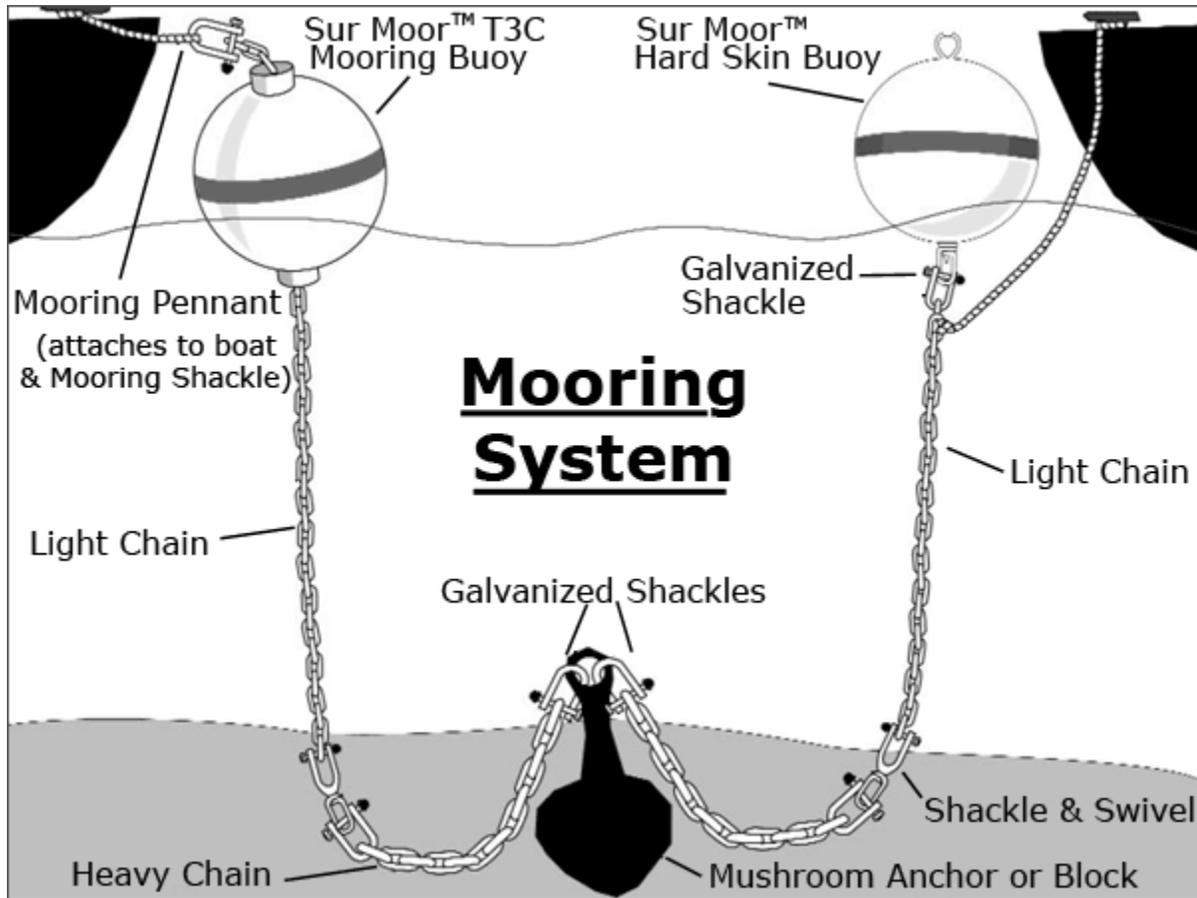
2 – 3/8" galvanized shackles (one to shackle chain to itself around the first brake drum and one at the top of the mooring ball to attach boat's pennant to) (Sabel Steel - \$2.95 each) (Home Depot - \$2.69)

2 galvanized swivels (one at the chain-to-line connection and one at line-to-chain connection) (Sabel Steel - \$9.40 each)

5 truck brake drums (recommended) (~ \$0.12/lb. Each drums weigh between 80 and 100 pounds)

I added the following graphic to give you an idea of how all the components come together to make up a mooring. (Ron)





The above diagram is from West Marine's web page, "Constructing a Permanent Mooring"

<http://www.westmarine.com/webapp/wcs/stores/servlet/westadvisor/10001/-1/10001/Mooring-Systems.htm> . Just wanted to give you another perspective of how everything fits together. Obviously, the above example uses an all chain mooring. On the deeper moorings we recommend a chain/rope combination to reduce weight and cost.

Example: 35' depth + 6' of scope for a 41' mooring

18" mooring ball \$160 - \$175

~ 23' chain @ \$4.09/foot = \$94 (~ 6' lying on bottom thru brake drums with 10' above drums. Two feet thru ball with 5' hanging down. (16 + 7 = 23))

~ 25' - 3/4" nylon line at \$1.14/foot = \$29

2 - 3/8" shackles @ \$2.69 = \$5.38

2 swivels @ \$9.40 = \$19

2 thimbles for 3/4" line @ \$4.60 = \$9.20

5 truck brake drums @ \$10 to \$12 each = \$50 - \$60

Total cost for a mooring in 35' of water with 6' of scope is approximately \$360 - \$390