

# USPS BOAT OPERATOR CERTIFICATION BUOY KIT

## Preparation

Assemble all the parts, including the locally required items, using the parts list. Before you cut your supplied 240 foot rode, determine whether you may be operating in Tidal areas and the depth of water where you will be setting buoys. Even if you operate where there is no or very little tide, you should include the "Sentinel" configuration at least 4 feet below the buoy for safety to keep the rode vertical at prop depth. The buoys must be set in water deeper than the total depth at maximum tide, so it doesn't float away or pull the buoy under at high tide. It should not be set in charted water deeper than the total length of rode less the Range of tide. (For example with a 29 foot rode and an 8 foot range of tide, set the buoy in no more than 21 feet of charted water.) If you anchor your buoys deeper than about 30 feet maximum including tide, you will have to obtain more 3/16" nylon rode. If 30 foot maximum depths are OK for you, cut the supplied Rode into approximately 8 sections of 30 foot lengths, one for each Buoy. Burn the end and smooth it out using leather gloves.

### Kit Assembly:

1. Thread the rode through the float attach point and tie it around the standing end of the line below the float with a taught-line hitch followed by a clove hitch, followed by a stopper knot, so you can adjust it from the surface for minimum scope (close to 1:1) to maintain position and keep it out of the props. You may have to snug it up after it is deployed so the upper section of rode is less than 1.15:1 (30° from vertical maximum).
2. Tie the rode to the anchor bag handles. Two full turns through the handles with a Bowline, or a figure 8 on a bight through the handle loops works fine. Leave about 2-3 feet on the bitter end to tie the bag closed.
3. Fill the bag with 16 lbs. gravel or 22 lbs. sand, and tie the mouth closed with a simple square knot, followed by a securing knot and a stopper knot, like a clove hitch and a figure 8 stopper. Make sure the line holding the bag mouth closed is longer than the rode from the handle to the bag mouth, so it does not pull off when deployed.
4. Inflate the 9" buoys to only about 8.5" diameter (27" circumference) to allow for air expansion.
5. Make a small "low tide" anchor/sentinel. Put about 2 Lbs. of gravel or 3 lbs. of sand in a long sports sock and tie a figure 8 knot in the sock cloth near the rocks. Down the rode at least 4 - 5 feet from the buoy, or if the Range of Tide is greater, at almost the "Range of tide", tie the rode to the sock with a simple slip knot or figure 8 on a bight between the sock knot and the rocks. Snug the knot up, twist the sock at the sock knot, and pull the sock inside out back on itself. Tie another slip knot around the 2 sock layers. An option is a plastic quart container with a handle, filled with rocks or sand, with a simple figure 8 on a bight through the handle and around the jug. Fill the jug with water. Make sure no air is in the jug, or it has holes top and bottom to let air out and water in when deployed.
6. To minimize buoy drift with current, plan to set in the minimum charted depth of water that is safe. We recommend at least 6 feet. If the total length of rode is significantly longer than the maximum depth of water at high tide, at the anchor bag, push the rode back through the anchor bag handles, making a new loop, then continue making loops back through each successive loop, so it looks like a chain, until the total rode is at least the maximum high tide



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water depth plus anticipated wave action, and tie the last loop off to the rode in a clove hitch using the double line of the loop tying it as if it were one line. If you need still more shortening, attach the last protruding clove hitch loop down the "chain" near the bag handles.

### Deployment

\*\*\* For safety reasons, do not anchor buoys in less than 6 feet of water. To minimize drift with tidal currents, set up in as shallow of water as is reasonable and safe. The total amount of Drift due to Tidal current is 1 - 2 times the length of the rode from the Sentinel to the Anchor bag.\*\*\*

1. Set the Slalom course in line with the current to minimize "Relative Drift off a straight line." Use a crew of three. One to drive, one to time, and 1 to prepare, set, & deploy buoys. Run at a slow speed in a straight line. Drop the buoy and anchor assembly at a timed period equal to about 2-3 boat lengths. Three knots is 5 feet per second. So, for 17-20 foot boats while setting at 3 knots drop a buoy/anchor set about every 10 seconds. To preclude tangled lines, prepare & coil the rode neatly & "hand deploy" the anchor bag 1st, Sentinel bag 2nd, and buoy last.
2. After buoys are deployed, to avoid the props, from the bow, simply "snug-up" the taught line hitch so the sentinel is off the bottom at low tide, the float and upper rode are erect but not "pulled under" at high tide, and the Sentinel is below maximum prop depth. Last, after the bubbles from the anchor bag have ceased, move the large anchor bag as necessary to form a slalom line by simply lifting it off the bottom until it is vertical below the buoy, move it and simply let go, resetting the position. A little lateral offset from a straight line is acceptable. Clever students will observe that, and take advantage of the small offset to improve their chances of making it through the slalom. Encourage them to think independently, but communicate as a team. To keep lines out of props, keep the upper scope vertical. Do not allow it to get greater than about 1.15:1 (30° from vertical), so that lines are outboard of a vertical line below the gunnels, offset a distance greater than the prop offset at prop depth. Normally it should not be a slalom problem because when executed properly, the boat will heel the prop outward, away from the buoy. Problems usually occur during setting and retrieval of buoys.
3. In a similar manner, safely away from the slalom, set the 2 "Range", and 1 "Anchor Buoy". Attach about a 6 foot length of yellow floating Poly line with a bight in the end to the Anchor Buoy as a "Pennant". Note that the kit includes 8 Buoys, even though slalom can be set up with less (4 – 6) buoys. Having 8 buoys allows for an adequate supply in case any get lost or damaged.

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### Kit Parts List

#### Included:

- 240 ft. of 3/16" dia. Nylon 3 Strand (mfg. p/n 7050-06) (<http://www.ropeinc.com/cat-premium-nylon-lines.html> (888) 596-7673)
- 8 Yellow Watersport Buoys – 9" (<http://www.meoestore.com/polyform-water-slalom-buoy-yellow-p-17425.html>)
- 8 Yellow Tote Bags (<http://www.discountmugs.com/nc/tote-bags/1615/small-grocery-tote-bags.htm>)

#### Locally Obtained:

- 1 calf length sport sock **-or-** 1 home-made quart cloth bag **-or-** 1 empty quart plastic bottle (Ex: milk, juice, oil, etc.)
- 150lbs. gravel (coarse) **-or-** 200lbs. ordinary beach sand

### Purchasing/Replacement Options:

- Initial distribution of one set to each qualified unit. Unit is responsible for upkeep, additional units, maintenance, and replacement costs.
- If you replace kit parts, or make your own, do not use heavy line, chain, or a heavy solid anchor or a concrete block in case props get tangled in the rode. In case of prop contact, we want the small line to break, bags to shred, and the sand or small rocks to drop before damaging the boat, engine or prop.
- Some Marine supply sources will provide a USPS member price discount for modest quantities.
- Line Options: Preferred line is 3/16 "Nylon 3 strand. Can be any diameter from 1/8 inch to 1/4 inch (3 mm to 6 mm). May not be floating line, Polypropylene, or line subject to taking a "set" for kinks and hockles. Should have a maximum breaking strength of at least 300 lbs. to allow for degradation and wear. For handling purposes, need not be braided, but should not be natural fiber with "nettles".
- Bags must be man-made polypropylene, nylon or equivalent "Open weave" type material that will dry quickly, with a heavy insert bottom (at least 30 mil) , strong enough to hold 40 lbs. of rock or dry sand. Construction must readily pass water, but hold sand. Should be sturdy enough to withstand abrasion, UV, salt or fresh water damage. Some Grocery stores sell "Environmentally Friendly Green" bags for \$1.00 each.
- Buoys need not be Polyform brand, but must be sturdy enough to withstand boat use. (No "balloon thickness" quality). Color should be bright yellow or International orange. Do not use Red or Green buoys that might be confused with USCG approved lateral Buoys.

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### Precautions on Replacement with Home-Made Parts

- We have designed and tested this "SIMPLE, SAFE" system that is available in USPS Ships Store. Our tests indicate that more complicated systems invariably fail! If you replace or make your own, do not use heavy line, chain, and something bulky like a heavy solid anchor or a concrete block in case props get tangled in the rode. Multiple anchor rode lines, "pulley systems", etc., tend to tangle. Tag lines tend to tangle and Poly rope floats. In case of prop contact, we want the line to break, the bags to shred, and the small rocks to drop away before damaging the boat, engine or prop. With 8 Buoys, you have enough for replacement to continue operations.
- Larger Buoys are OK. If temporary replacement for lost items or local availability or cost is an issue, consider temporarily using visible brightly colored yellow 1 or 2 gallon plastic Oil, Antifreeze or Orange "Minute Maid Orange juice" jugs. Do not use Red or Green Buoys that could be mistaken for USCG approved lateral Buoys. Do not use very thin floats like "Pool Noodles" because despite their height, they do not have sufficient width to be visible from a distance. If necessary, make a bright yellow or International Orange round draw string bag to cover your other colored balls, bulky, generally round, cylindrical or rectangular buoys with at least 60 square inches of visible area. Exterior bags do not have to be heavy material.
- A gallon float barely displaces 16 lbs. of dry round river rocks, or dry sand weighing about 22 Lb. in air. The intent is that the major anchor bag weighs about 8 - 9 lbs. underwater. Do not use porous rock like sandstone, pumice, etc. The relative density should preferably be over 2.5
- Sixteen pounds of dense rocks, in a porous container, or filled with water weighs about 9 pounds underwater, just barely sinks a gallon container displacing 8 pounds of water, so the 1 gallon buoy will float below the surface at high tide, but generally stay in position, and can be recovered with drag lines.
- If you make home-made buoys, or want larger floats, or if "Tacky" is an issue for you, replace the float with a more professional looking or larger Buoy. Feel free to replace the 9" float with a larger Buoy. There is very little difference in horizontal pull in Inland Navigator qualification wave and wind conditions, using up to a 2 foot diameter ball. Anchor bags can remain about the same size because vertical pull is not a significant factor, as long as you have a total scope greater than 1:1, including wave action. The anchor rode below the sentinel should deploy generally on the bottom at low tide.
- To keep lines out of props, keep the upper scope vertical. Do not allow it to get greater than about 1.15:1 (30° from vertical), so that lines are outboard of a vertical line below the gunnels, offset a distance greater than the prop offset at prop depth.
- An 8" sphere displaces about the same as a gallon container.
- A 10" sphere displaces about 2 gallons or about 16 lbs. of water.
- High contrast 9" yellow Buoys are visible to the normal naked eye at about half a mile, and with binoculars well beyond a mile.