





FLOATING SIGNALS USED BY U. S. COAST & GEODETIC SURVEY

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Geodetic Survey, Special Publication N° 143 - 1928

Along some sections of the coast it is desirable to carry accurately controlled hydrography beyond the limits of visibility of shore signals or to develop banks out of sight of land. For these purposes various types of floating signals are anchored at suitable offshore points and located with reference to the shore objects. Several types of floating signals are described in Special Publication N° 93, and various other designs have been used by different hydrographers. Their essential features are a centre pole or light structure supported near the middle by one or more barrels or a pontoon raft; crossed targets at the upper end to increase their visibility; a counterweight at the bottom to hold them upright; and suitable anchoring gear. For cheapness and convenience in handling and stowing the one-barrel signal illustrated in fig. is usually preferred. This signal is similar to the one described on pages 74 and 75 of the above publication, with a few modifications now considered desirable.

Black-iron screening or canvas strips painted black, attached to 1 by 2 inch crosspieces, are used for targets, and a flag may be added if desired. Each signal is provided with a distinguishing mark, such as crosspieces at various angles or variation in the color of the flag, so that, when a number of signals are used, each may be identified under all conditions.

A heavy wooden oil barrel or galvanized-iron gasolin drum may be used. The latter will usually give the best results and should be well painted with red lead. The framework is clamped against the barrel with two bolts and the 1 by 4 inch crosspieces on both sides of the framework above and below the barrel are notched to fit over the chimes of the barrel.

Some hydrographers paint the entire signal with black asphaltum, while others prefer white paint for the framework above the barrel and antifouling paint below.

Old railroad-car couplers, purchased as scrap iron, have been used with considerable success for anchors and counterweights. They are considered superior to concrete blocks, as they hold better and are easier to handle. One coupler is sufficient for a counterweight, while three, linked together with an iron bar, are required for an anchor.

In order to shorten the swinging radius of these signals and to prevent fouling of anchors, two anchors and a bridle of three-eighths or one-half inch wire rope may be used for anchoring, as indicated in fig. The horizontal part of the bridle should be about three times the depth of water and the upright part about equal to the depth. If a single anchor line is used, its length should be about two and one-half times the depth, with its upper part of wire rope about equal in length to the depth of water, and the remainder of $\frac{5}{16}$ inch boat chain.

Floating signals are planted and taken up by the survey ship. When anchoring with a bridle an effort should be made to lay out the anchors in the direction of the prevailing wind, or current if the latter is strong. Signals may be planted in fairly rough weather, but comparatively smooth weather is required for picking them up. The latter operation will be facilitated by attaching a length of mine-thread rope to the anchor ringbolt of the signal. A large eyesplice in the free end of this line is hung over a screw hook near the top of the signal. The line should have plenty of slack, so that it can be lifted off the hook and brought aboard by means of a long boat hook.

When not in use these signals may be stowed in a small space by removing the targets, cross braces, barrel, and counterweight. Their location and use are described in chapter 5.

MATERIALS FOR ONE-BARREL SIGNAL.

Barrel, 55-gallon, wood or galvanized iron.....	1
Bolts, $\frac{1}{2}$ by 7 inches.....	2
Bolts, $\frac{5}{8}$ by 32 inches.....	2
Car coupler (scrap iron) (1).....	1
Cloth.....	yard 1
Lumber, 2 by 4 inches by 16 feet	pieces 5
Lumber, 1 by 4 inches.....	linear feet 28
Lumber, 1 by 2 inches.....	" 42
Nails, eightpenny	pound 1
Paint.....	gallon $\frac{1}{2}$
Plate, iron, $\frac{1}{2}$ by 2 by 6 inches	1
Plates, iron, $\frac{1}{2}$ by 2 by 4 inches.....	2
Ringbolt, $\frac{5}{8}$ by 5 inches	1
Screen, wire, black (2)	square feet 32
Tacks, 6-ounce	package 1

Anchoring with one anchor.

Cable, wire, $\frac{3}{8}$ or $\frac{1}{2}$ inch.....	feet 60
Car couplers (scrap iron) (3)	3
Chain, boat, $\frac{5}{16}$ inch.....	feet 90
Bar, iron, $\frac{1}{2}$ by 1 inch (3)	" 5
Shackle, screw anchor, $\frac{3}{8}$ inch	1
Thimbles, wire rope	2

Anchoring with two anchors and bridle.

Cable, wire, $\frac{3}{8}$ or $\frac{1}{2}$ inch.....	feet 240
Car couplers, (scrap iron) (3)	6
Bar, iron, $\frac{1}{2}$ by 1 inch (3)	feet 10
Shackles, screw anchor, $\frac{3}{8}$ inch.....	4
Thimbles, wire rope	6

WATER SIGNALS

It is sometimes desirable to erect signals in shallow water some distance from land. A tripod made of lengths of iron pipe, wired together through crosses at the top, makes a simple signal that will stand in a moderate depth of water and, if wrapped with cloth and with flags set in top, may be seen at a long distance. In exposed situations in the water such signals may be made more secure by pumping the legs into the bottom by means of a water jet; long poles and saplings have also in this manner been pumped in on ocean bars and have withstood storms.

A type of water signal that is constructed on land and then towed out and sunk in position is described in Special Publication No 93.

Signals of this nature should be located preferably by triangulation or, if this is impracticable, by sextant fixes or cuts.

1) For concrete counterweight, substitute 1 $\frac{1}{2}$ bags Portland cement and equal amount of sand and broken stone.

2) For canvas targets, substitute 20 square feet of canvas.

3) For concrete anchor, substitute about 200 pounds of Portland cement and 300 pounds of sand and broken stone for each anchor block.