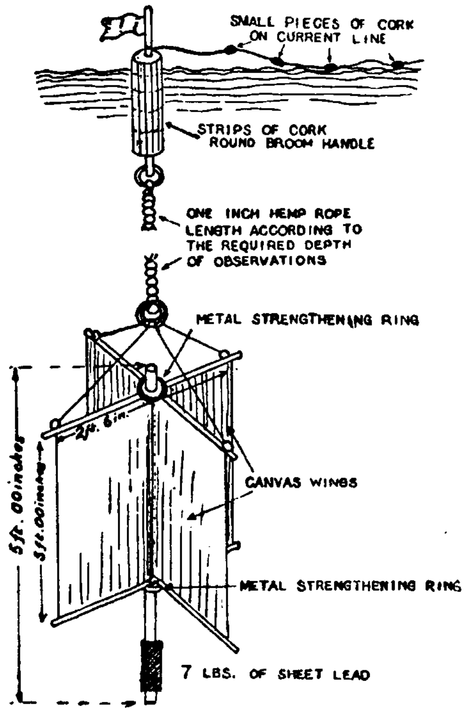


The "Current Line" can be constructed of any light rope, but a plaited line similar to that used for Patent Log lines but of smaller diameter has been found to be most suitable as it is strong and does not tend to shrink or kink. Small pieces of cork should be secured to the Current Line at short intervals to keep it on the surface of the water. The first 100 feet or so of current line should be kept blank as a "stray line" to allow the drag to float well clear of the eddies astern of the ship or boat before the observations are commenced, and a white bunting mark then inserted. At distances of one hundred, two hundred, three hundred, etc. feet from the white bunting are inserted marks consisting of one, two, three, etc. knots; at each intervening 50 feet yellow bunting, and at every 25 and 75 feet blue bunting marks.

The drag having been lowered into the water and allowed to float clear of the ship or boat, the exact time is taken when the white mark on the current line goes out, the drag is then allowed to float with the current for one, two or three minutes according to its strength; at the end of which time the exact amount of line run out can be measured by means of the knots and coloured marks, the rate in knots of the current being thus determined.

Thus if 258 feet of line runs out in one minute the strength of the current is 2.58 knots, or if 420 feet runs out in two minutes the strength is $\frac{420}{200} = 2.10$ kts, etc.

The current line must be paid out at just sufficient speed to keep it straight along the surface of the water but without checking the speed at which the drag is drifting.

The direction in which the current is setting is determined by taking a compass bearing of the white flag on top of the Float.

It is advisable to have a small line fastened to the weight at the bottom of the Drag and stopped to the top to assist in lifting it inboard and to prevent an undue strain coming on the centre stave.

HYDROGRAPHIC SIGNAL WITH TRIANGULAR CROSS-SECTION

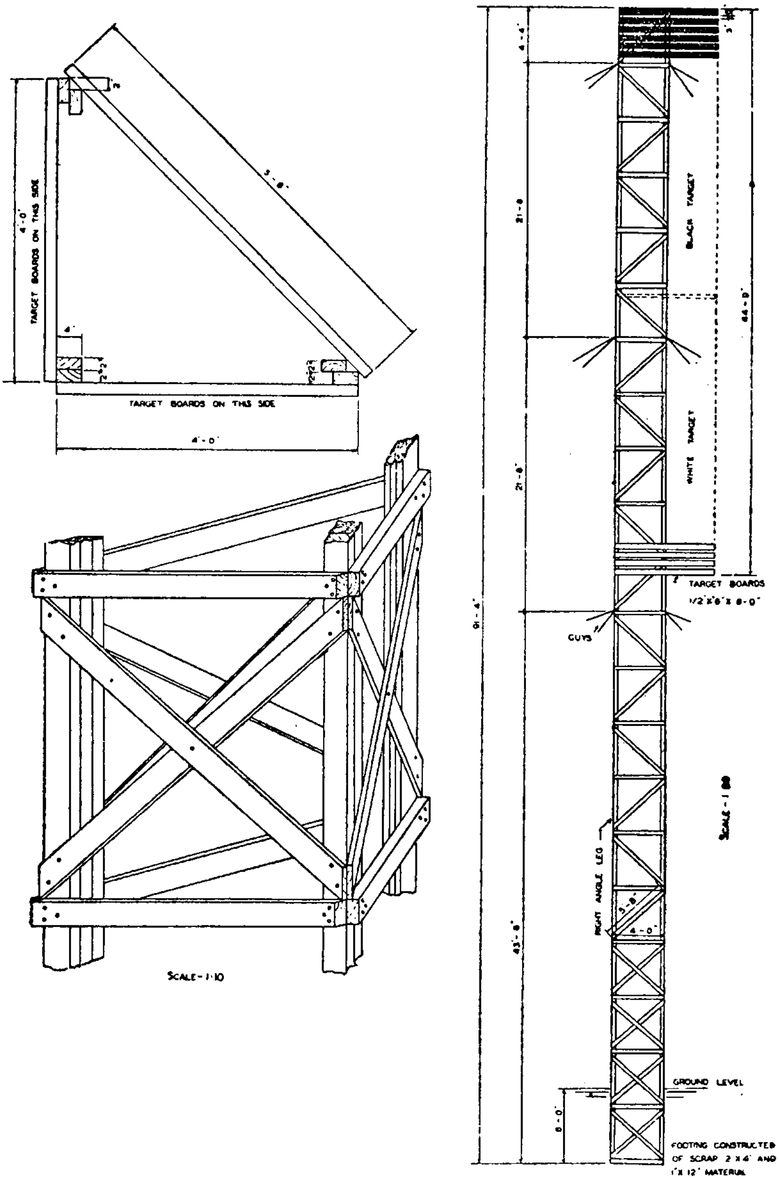
by

H. A. PATON & W. F. DEANE, U. S. Coast and Geodetic Survey.

(Extract from the *Bulletin of the Association of Field Engineers*, U. S. Coast and Geodetic Survey, Washington, June, 1931, p. 91).

While considering the type of hydrographic signal to be constructed for the survey of the entrance to Port Royal Sound, S. C., by the party on the *Natoma*, C. A. Egner commanding, it was found that a tower with a triangular cross-section could be built with a great economy of labour, material and time, and, at the same time, add appreciably to the visibility.

By using a right triangle cross-section and orienting it so that the bisectrix of the right angle pointed through the center of the working grounds, the visibility was greatly aided. With targets on the equal sides of the triangle, the tower had more value as a left hand or right hand object for sextant fixes without appreciably reducing the size of the target visible for a center object. The width of the target when used as left hand or right hand object was eight feet or more, and when used as a center object, eight feet to eleven feet three inches.



As shown by the accompanying drawing, the cross-section is a right triangle with sides 4, 4, and 5.66 feet. Here the utmost economy is realised for the usual stock lengths of material are easily divisible without waste. For example: 4 4-foot girders, or 2 5.66-foot girders and 1 4-foot girder could be cut from a 16-foot 2" × 4" board; 3 5.66-foot girders from an 18-foot 2" × 4", and 1 5.66-foot and 2 4-foot girders from a 14-foot length.

The length between girders, top to bottom, is 4 feet. Thus the diagonals can also be cut economically from stock lengths of 1" × 4" lumber. For example: 3 5.66-foot diagonals could be cut from an 18-foot 1" × 4" piece, 2 6.95-foot diagonals from a 14-foot length, and 1 6.95-foot and 2 5.66-foot diagonals from an 18-foot length.

The legs or uprights are framed to accommodate the nailing on of girders and diagonals with the maximum strength possible. One leg, at the right angle, is made in the usual manner by nailing 2 2" × 4" pieces together to make a 4" × 4" section. The other two legs are built up by nailing 2 2" × 4" boards together in such manner as to have a 2" overlap. This overlap gives an even surface to nail to and if nails be driven into both pieces, the connection will be strong. All legs are framed with a 2 - 2" × 4" section with an initial 8-foot piece of material to allow for a sufficient overlap. The length of the splices used was 3 feet, or, in cases where odd lengths of 2" × 4" boards were used, the splices were smaller. 1" × 4" boards are recommended for splices in all cases as the joints are then sound enough.

Double diagonals were used for each bent for 4 bents, then single diagonals were used.

By reference to the drawing, it will be noted that the lower 6 feet of the signal were buried in the ground with the footing used as shown. This footing of 1" × 12" boards on 2" × 4" boards is recommended, as no danger is introduced because of lack of perpendicularity.

Twenty 8-gauge guy wires were used and found satisfactory. Some issue might be taken to the large number of guys, but from the experience derived from the building of this signal, the additional amount of wire insures a 45° angle or greater between the ground and the guy, the resultant force caused by wind putting tension on the guy was more successfully coped with. Four guys were used at the juncture of the tenth and eleventh bents, 8 at the fifteenth and sixteenth, and 8 at the twentieth and twenty-first. It is desirable that the guys be made fast to the tower and led out in such fashion as to be perpendicular to a side of the cross-section. The customary "deadmen" were used for anchor where trees were not available.

In usual practice, the target boards, 60 - ½" × 6" × 16', would be nailed to the long side or hypotenuse of the triangle. However in this case, to insure the visibility heretofore discussed, the targets were cut into two pieces of 8 feet and nailed on the 4-foot sides of the tower. This also eliminates the use of wings as braces.

The simplicity of the design lends itself to adaptation to signals of any height up to a maximum of about 100 feet. An additional advantage is realised in using the triangular cross-section in preference to the rectangular, because of the smaller amount of twist in the former.

THE "BANNER" METHOD OF ATTACHING A FLAG TO A BEACON

by Rear Admiral J. D. NARES.

All surveyors must have expended much weary time and eye strain trying to obtain angles to distant beacons on days with no wind, when the flags marking them were hanging "up and down the mast".

It was in 1920 while carrying out a survey off the coast of Sierra Leone, W. C. Africa, where day after day there was little or no wind, that the following method of attaching flags to the floating beacons in order to make them more visible was used and found to be most successful.

The flag was suspended in the form of a "Banner" from the head of the beacon spar, as shown in Fig. 1, a light bamboo being used as a spreader, suspended at its centre by a 2 ½ foot length of 1 ½" rope attached to head of spar.