

DIRECTIONS FOR CREATING **TRADITIONAL LEAD LINES AND SOUNDING POLES**

(excerpted from the *NOAA Hydrographic Manual*, July 1976, with modifications)

Traditional Lead Line Construction

I. Material

Standard lead line material is mahogany-colored tiller rope with a phosphor-bronze wire center. The center consists of six strands of seven 33-B (S-gage) wires each. The wire core is flexible and should not break after continual use and coiling. The rope is size 8 (about 0.24 in. in diameter), and is made of waterproofed, solid braided, long-staple cotton. The braid should be tight enough so that broken wire strands will not protrude through the covering and injure a leadsman's hands. Material for lead lines may either be requisitioned from the Marine Centers or be purchased from a well-equipped marine supply dealer.

II. Fabrication and Marking

Depending on the depths in which they will be used and on the size of the vessel, lead lines should be 30 to 60 meters long. Each lead line is identified by a consecutive number stamped on a metal disk attached at the inboard end of the line. Identification is made when a line is initially graduated. This number is to be retained throughout the life of the lead line or until re-marking is necessary. The braided covering of an unseasoned lead line tends to shrink when wet causing the wire core to buckle and the strands to break. Broken strands are likely to protrude through the covering and cause hand injuries. To prevent rupturing the core with repeated use, pre-season each lead line as follows:

1. Prepare the lead line by soaking it in salt water for 24 hours. Then, while the line is still wet, work the cotton covering along the wire by hand until the wire protrudes from the covering. The wire should protrude about 1/3 meter for each 20 meters of line. This is a tedious procedure requiring the cooperative efforts of several people. The covering can be pushed back and slackened only a few inches at a time; this length of slack must be pushed nearly the full length of the line before the next small section can be started. The excess protruding wire is cut off. The covering must not be worked back too far, or it will form bulges along the wire. Lead lines so prepared will maintain an almost constant length for future use.

2. Next, the line is dried under tension (about 50 lb) and then soaked again for 24 hr. Never boil a lead line as this destroys the waterproofing of the cover.

3. After attaching a lead to the line, the line should be wetted down again and placed under a tension equal to the weight of the lead; this tension is maintained while the line is being graduated. Temporary marks made at this time can be used for later permanent marking. Graduation marks on a new lead line may be laid off with a steel tape. The best method, however, is to mark the distances permanently on a suitable surface such as on the deck of a ship or on a wharf if the survey party is shore based. Permanent markings are convenient when verifying the graduations in the future. Lead lines for NOAA hydrographic surveys should be graduated in meters, with intermediate marks to permit readings to the nearest decimeter. Each meter should be marked by a seizing of black thread, with a leather strip clearly indicating the numerical value for even meter intervals. Each even decimeter (0.2,

0.4, 0.6, and 0.8) is marked by a seizing of white thread. Odd tenth readings are estimated. Waxed linen thread should be used to secure marks to the lead line in such a manner that there can be no possibility of slippage. Do not insert the thread through the braided covering of the line.

III. Verification

When checks of traditional lead lines are made, the lead lines must be wet and under a tension equal to the weight of the attached lead in water. The testing standard should be a good recently calibrated steel tape or pre-measured graduation marks on deck or ashore. Replace or re-mark lead lines if the errors exceed 0.1 meter.

IV. Sounding Leads

Each survey unit should have one or more leads. Leads come in standard weights of 5, 7, 9, 14, and 25 lb are requisitioned from the Marine Centers. Various methods may be used to attach the lead to the lead line. The preferred method is to have a galvanized thimble at the lower end of the lead line to which the lead can be attached by a shackle.

Traditional Sounding Pole Construction

I. Material

A sounding pole is made from a 5 meter length of 1.5 inch (3.81 cm) round lumber capped with a weighted metal shoe at each end to hasten sinking. Shorter poles may be used depending on the depth conditions.

II. Fabrication and Marking

Any convenient system of marking that is symmetrical toward both ends and will minimize reading errors may be used. The following marking system is recommended:

Mark each meter and even decimeter graduation (0.2, 0.4, 0.6, and 0.8) permanently by cutting a small notch in the pole. Paint the entire pole white; then paint odd decimeter graduation marks black.

III. Verification

Sounding poles must be verified against a known standard, such as a survey quality metal tape, to ensure that depth markings are unambiguous and accurate.