

HINTS TO HYDROGRAPHIC SURVEYORS

CONSTRUCTION OF MARINE TOWERS

(Extract from an article entitled "*The Survey of the Gulf of Paria*" by the HYDROGRAPHIC ENGINEER B.J. ANDERSON, published in *The Military Engineer* Vol. XXIX, N° 163, Washington, January-February, 1937, pp. 56-58).

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During the progress of the survey of the Gulf of Paria *, five marine towers were erected and placed in position from the ship. The following method of construction, with trained personnel, has been found to give excellent results.

Upon anchoring the ship at a point selected for a station, careful soundings were taken to determine the character and regularity of bottom. If not already in progress, erection of the tower was begun on the skid beams over the forward well deck by bolting foot plates to plank mattresses about 4 feet square, after which the corner posts were attached and each loaded with 300 pounds of railroad iron secured to the corner post just above the mattress.

The first section of tower was then completed and securely lashed to the skid beams as a precautionary measure. Two additional sections (each 13 1/2 feet high) were erected, forming a structure about 40 feet in height. A sling of 5-inch manila, with four legs, was secured to the tower, each leg of the sling being attached about 7 feet from the top. The uncompleted tower was then unlashd and lifted with a single 6-inch manila whip from the end of the long boat boom, swung over the ship's side and lowered until the base of the tower was just clear of the bottom. While the structure was still suspended from the boom, the upper sections were added, with the exception of the observing platform. The ship's anchor was then hove to short stay, the tower lowered to the bottom, and the ship quickly backed without picking up the anchor. The whip was let go on deck and allowed to unreeve through the block at the end of the boom. With the ship well clear, a construction party was sent out to install the observing platform, add decorations and recover the whip, the sling being left attached to the tower to facilitate its recovery. The time consumed in the erection of an 80-foot tower was about 2 1/2 hours with trained personnel.

Marine towers 60, 80, and 100 feet in height have been erected in the manner described and placed in from 30 to 60 feet of water. In one instance, it was found necessary to secure the tower in place with four anchors after it had moved 300 yards without losing its verticality. It was probably placed on a bed of asphaltum lightly covered with mud offering slight resistance to sliding in the strong currents.

On a former project, towers were constructed in a horizontal position, lifted with two boat booms and lowered vertically. This method adds considerably to the safety of the construction party. The corner posts, however, should be reinforced with 2-inch iron pipe to prevent buckling while lifting.

* Carried out by the U.S.S. *Hannibal* in 1931-33.