

LOCATING OF WRECKS.

From Hydrographic Department *Professional Paper* No. 2 - British Admiralty, 1947 -
Locating and Investigating and Sweeping over Shoals.

One of the most important activities of every Navy at the end of the last war was the searching for and fixing of the numerous wrecks of World Wars I and II, which might constitute a danger to navigation.

Undertaken just after mine - sweeping, this work is yet being performed. It may be of interest to point out the processes most generally used and the results which may be obtained from them.

The Hydrographic Department of the British Admiralty in *Professional Paper* No 2 of 1947 (Locating and Investigating and Sweeping over Shoals), passes in review some of the methods used by the British Navy as well as a few of the results obtained. Some extracts appear below.

In general, it may be said that most of the innovations stemming from the war concerning means of detection and systems of navigation are used together in this particular operation. The former method of drift-sweeping — whatever the kind of drag used — which was till now the only means of searching for wrecks, although sometimes resorted to during the last part of the work, is replaced during an important part of searching operations by a new process of detection, consisting of Asdic equipment.

Asdic Instrument. Sonar, whose principle is the same, is used in the U. S. A.

The principle of operation is similar to that of U. S. sounding gear, but instead of the impulses being transmitted vertically downwards, they have the form of a horizontal beam of 5° divergence.

Transmission of the impulse may be effected by a hand-operated key or may be automatically made at regular intervals varying from 1 to about 3.5 seconds. The horizontal movement of the beam is controlled by hand-training in conjunction with a gyro-repeater of the ship.

The echo may either be heard in a pair of ear-phones, or recorded in a similar manner to soundings. When an echo is obtained the azimuth is read on the gyro-repeater and the distance from the object is obtained by measuring the interval between transmission and reception, either directly or from the scale fitted on the recorder.

The divergence of the Asdic beam being 5° , a sector may be swept by successive transmissions in 5° steps. Provided the speed of the ship is slow, the area from the beam to right ahead on each side can be thoroughly examined.

When desirable a more rigorous examination can be made by using 3° steps of bearing. In this case some reduction in the ship's speed would be necessary to ensure that no gap was left between any consecutive sweeps on the same side.

Given the speed and course of the ship, the time taken by a sweeping of 90° , and the range adopted, a diagram may easily be plotted showing the overlap of swept sectors, and thus the area thoroughly examined on either side of the course.

Procedure in Searching.

When the area to be investigated is determined, a net of lines to be run by the searching ship and on which she will be able to get accurate fixes is drawn on the work-sheet. The procedure used in obtaining fixes will be dealt with later. The distance between lines depends on the range and the speed.

Range depends on good Asdic transmission conditions through sea-water and a large target lying at a wide inclination. Contacts have sometimes been obtained at distances of 4500 to 5000 yards. Generally the maximum range adopted is 1200 yards which allows an area 1000 yards wide on either side of the ship to be considered as reliably examined. The minimum range at which a contact should be established is about 300-

400 yards. Once contact has been made, it is considered possible to be maintained down to a range of 100-150 yards.

Optimum ship's speed is about 5 knots.

With automatic transmission at 3.5 second intervals and sweeping by steps of 5°, an arc of 90° can be swept in just over a minute. In practice, however, it is advisable to allow 5 minutes for examining both 90° sectors from beam to ahead.

Locating of wrecks and determining of least depths.

Information on approximate position of known wrecks, their tonnage and date of sinking are mentioned on the sheet.

A preliminary investigation of the area is generally undertaken, during which any contact is plotted in bearing and range with respect to the ship's position. The notations of contacts are classified as : Very good or strong ; good ; fair ; poor.

Experience of the operators is most important during this stage. It is sometimes difficult to distinguish between contacts from wrecks or obstructions and those obtained from rocks, shoals and fish. However, a wreck will generally give two or several bearings and ranges from different places and should thus be located on the sheet within 100-200 yards. Configuration of the seabed, particularly in the vicinity of the wreck, and changes in density of sea-water, tidal streams, are factors affecting the efficiency and accuracy of searching.

When the preliminary investigation is over, and every contact plotted, fixing and location of the wreck and measurement of least depth are undertaken.

Various processes are available and used successively till a positive result is obtained.

The first is similar to the one normally used in searching for rocks. It consists in running sounding tracks with a sounding recorder, cross-lines being centered on the approximate position of the wreck which can be marked by a dan.

Asdic is used during this period to run the ship more accurately towards the contact. It may occur that the shorter cross-section of least soundings be found and thus the bearing of the cross-beam of the wreck determined. The bearing of the wreck is deduced and the finding of the least depth becomes easier.

But more widespread is use of the wire-drag throughout the area assumed to contain the wreck.

The procedure used by *H.M.S. Seagull* in 1946 is as follows : The wreck is approached downstream, with the aid of the Asdic to pass directly over it. Then a first dan is laid downstream at a certain distance from the wreck ; two other dans are laid on each side perpendicularly to the direction of the stream. Relative fixes of dans are rapidly obtained by normal means and plotted on a large scale. Drift sweeping is then undertaken following alignments through dans and a conspicuous object ashore, should it be available, or following courses on dans. During this the sounding recorder is used. The location of the wreck can be obtained by this means, together with its minimum depth.

The various procedures of drag sweeping will not be described here. Use of Short Stay Oropesa, with one wire of 150 fathoms length, will however be mentioned. This procedure gives a spread of 100 yards to the area swept.

Fixing.

With respect to methods used for fixing ships and wrecks, as well as courses of the searching ship, some new navigational aids or systems can be, and in fact have been, employed. Such is the Decca Navigator on the East Coast of England, in the South and North Falls areas. Any radio aid affording an accuracy similar to normal hydrographic procedure (sextant angles between objects whose position is known) may be used. Consequently the tendency will probably be use of Radar, Decca, Shoran, Lorac, Raydist, etc. in fixing P. A., P. D., and E. D., in conjunction with the application of Asdic and the U. S. A. Echo-Sounder.

The following information is given as a result of wreck-searching operations with Asdic, effected by *H.M.S. Franklin* in 1946, in the area between South and North Falls.

The area to be examined was about 100 square nautical miles. It contained 13 assumed positions of wrecks whose dates of sinking were known except 2, and all but 5 of the tonnages were known.

Searching permitted 35 echoes to be plotted, thus classified :

15 Fair.
9 Good.
8 Poor.

3 of the wrecks mentioned were located and immediately swept ; their least depths were shown.

3 other wrecks may have corresponded to echoes obtained, though results could not be guaranteed by this first Asdic investigation. They require further investigation.

6 of the wrecks may be considered as non-existent.

1 reported wreck was found to be a small bank.

Among the 35 echoes or groups of echoes, 12 were considered to be fish echoes, eddies or bank echoes, were not found again, and will not require further investigation.

23 echoes will require further investigation.

At that point of the survey, the officer in charge estimated that the work to be done to ensure 100 % sweeping of the area would take two months.

From previous experience in which a small wreck was missed in the preliminary A/S search, he thought that only Oropesa Sweeping might ensure safe water.

However, all areas requiring investigation do not offer such great echo density. and it may be generally admitted that the time saved by using Asdic is considerable, reducing by 4 or 5 times the duration of search by wire-drag alone.

