



# COAST GUARD



## *PROCEEDINGS* OF THE MERCHANT MARINE COUNCIL

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# PROCEEDINGS

OF THE  
MERCHANT MARINE COUNCIL

IN THIS ISSUE . . .

## Rapid Radar Plotting . . .

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### COVERS

FRONT COVER: The *Texaco Rhode Island*, operated by States Tankers, Inc. The 577' tanker was built in 1964 at Sparrows Point, Md. Courtesy *Texaco Inc.*

BACK COVER: "Steer Clear of Trouble—Take the Safe Side." Courtesy *Imperial Oil Fleet News.*

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# RAPID RADAR PLOTTING

Commander Edward F. Oliver, USCG

Assistant Chief, Merchant Vessel Personnel Division, Headquarters

THE YEAR 1969 may be a landmark year in the maritime world—the year that deck officers stow away maneuvering board and plotting sheet pads and commence practical plotting directly on the radarscope or reflection plotter.

Just as the time sight method to find longitude gave way to H.O. 214, it appears that the conventional naval combat information center (CIC) *speed-triangle* method<sup>1</sup> of plotting, where radar furnished information is transferred to a maneuvering board for solution, will give way to the *distance-triangle* method.<sup>2</sup> The latter method will be designated for the purposes of this article as the *rapid radar plotting* method where the plot is made directly on the radarscope.

In the conventional CIC *speed-triangle* method the magnitudes of the vectors represent the speed in knots to a scale convenient to the navigator, whereas in the *rapid radar plotting* method the relative plot and vector diagram are combined and the magnitudes represent the actual distance traveled during the plotting interval.

*The author's article on "Rapid Radar Plotting" represents the author's personal opinions only and does not necessarily represent the official views of the U.S. Coast Guard—Editor.*

## MAJOR DIFFERENCES

The major difference between the two methods is that in the *rapid radar plotting* method the vector diagram may be plotted at the location of the target echo on the radarscope (or on a plotting sheet if desired). In effect this method lends itself to solution directly on the scope because there is no clutter of solution lines overlapping at the center of the scope. Most importantly several targets can be plotted at the same time and evaluated together in aspect. Although the vector diagrams are smaller than the CIC *speed-triangle* method, and some accuracy is sacrificed, the rapidity of solution and the fact that several targets can be plotted at the same time more than compensates for the accuracy sacrificed.

The conventional CIC-manuevering board method was fine for the naval officer with a gang of white hats in the CIC shack, but for the harried merchant marine deck officer navigating with limited visibility in traffic the value is questionable. The CIC method was designed for U.S. naval vessel station keeping and to plan tactical maneuvers for some future time,

not to determine the CPA, true course and true speed of a meeting vessel.

Unfortunately, for too long, the shipping industry, with a few exceptions, ignored the inadequacy of the conventional CIC method. The fact that the navigating personnel on watch on a merchant ship number one or two as opposed to the four, five, or six on watch on a naval vessel was ignored. It was assumed that somehow the mate would be able to take radar ranges and bearings of various targets, transfer the information to a maneuvering board, make the proper mental calculations in applying different distance and speed scales, keep a visual watch, answer the telephone, make log and bell book entries, etc. The fact is that while the merchant marine deck officer is a capable man, he is still only human and has certain limitations.

## MULTIPLE TARGET INADEQUACY

The time has come when the merchant marine deck officer, and all those interested in his performance—be they steamship owners or admiralty attorneys—are realizing that the CIC method of plotting may not be serving him properly and may in fact poorly serve him. The questionable adequacy of the CIC method is no better illustrated than in the multiple target situation. It is necessary to use a separate plotting sheet for each target or different colored pencils which is subject to error at night because otherwise the vector

<sup>1</sup> Referred to as the *speed-triangle* method because the lengths of three sides of the vector diagram are scaled in speed units, that is in knots.

<sup>2</sup> Referred to as the *distance-triangle* method because the lengths of three sides of the vector diagram are scaled in distance units (miles). These lengths are also proportional to the distance traveled during the minutes of the plotting interval; thus they are proportional to rate of movement. Since speed in knots is also rate of movement, the sides of both the *speed triangle* and the *distance triangle* represent the same entity, only they are in different units.

diagrams plotted at the center of the plot would overlap and the clutter of lines would be confusing. With each target plotted on a separate sheet, it is difficult to base an evaluation of the effect of own ship's change of course on several targets and have an appreciation of the aspect of the overall problem.

Example 22 in H.O. 217, *Maneuvering Board Manual*, 1963 edition, is an excellent example of the excessive amount of work and time required in the solution of a multiple radar target situation through the use of separate relative plots and speed triangles. Eventually the time will come when radar sets will be equipped with computers which will automatically read out multiple targets' true courses and speeds, CPAs, and a recommended change in own ship's course and/or speed. However, in the interim, until vessels are equipped with such computers, it is the deck officers' responsibility to determine the required information in the minimum of time. A simpler and more rapid method than the CIC method is mandatory, and the *rapid radar plotting* method may be the interim solution until the marine computer era arrives.

The *rapid radar plotting* method is most effective if made directly on the radarscope or reflection plotter. However, if the radar is not equipped with a reflection plotter, and the diameter of the scope is too small to allow for plotting, the method can still be used to better advantage on a maneuvering board than the *speed-triangle* method. Although the disadvantages associated with the transference of data and the changing of distance scales are still present, multiple targets can be plotted on the same plotting sheet and an evaluation made of a contemplated course change with an aspect of other targets available. This is not feasible using the CIC method, where plotting multiple targets introduces confusion and errors.

The main limitation to efficient use of the *rapid radar plotting* meth-

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od is the diameter of the radarscope. Ten inches appears to be the practical lower limit for use of the method, and with a 10-inch scope the range must be relatively low, approximately 8 miles. If plotting is done at a greater range, the vector diagram will be too small for an acceptable tolerance in the estimate of course and speed.

The use of the *rapid radar plotting* method has been advanced occasionally in the past few years by a few discerning navigators<sup>2</sup> but only recently has its true worth over the CIC method been fully appreciated. The method has been called by various names such as the *distance-triangle* technique, the *Keystone* method, the *Slack* method, the *Newmar* method, and the *British* method. It is understood that this method is now widely used in the British merchant service.

#### MAIN ADVANTAGES

The following is a recapitulation of the advantages of the *rapid radar plotting* method:

<sup>2</sup> Captain Robert M. Slack, "The Keystone System of Anti-collision Radar Navigation," *Navigation: Journal of the Institute of Navigation*, vol. 14, No. 2, summer 1967.

Ernest B. Brown, U.S. Naval Oceanographic Office, "Simplified Radar Plotting" paper presented to the National Marine Navigation Meeting of the Institute of Navigation, November 1968.

Captain Christian Hengst, "Anti-Collision Radar Navigation," published by Codan Marine, Inc., 1964.

(1) Construction of the vector diagram at the respective target echo provides a better presentation of target aspect.

(2) There is less overlapping of vector diagrams and thus less confusing clutter.

(3) Essentially only one scale is necessary for the target solutions, i.e., the distance scale of the radar range setting.

(4) There is no need to calculate the relative speed; a reasonably accurate estimate of the relative speed may be made by comparison of the length of the relative vector with the length of own ship's true vector which is directly proportional to own ship's speed in knots.

(5) The method is the basis of a very rapid means of analyzing the effects upon the relative movements of several radar targets which would result from an intended course of action by own ship.

#### TYPICAL PROBLEM

A typical navigational problem with three targets on the radarscope is solved as follows:

OWN SHIP COURSE 000°T, SPEED 20 KNOTS	
TIME	TARGET NO. 1
1000.....	050°T at 9 miles
1006.....	050°T at 7.5 miles
	TARGET NO. 2
1000.....	320°T at 8 miles
1006.....	333°T at 6 miles
	TARGET NO. 3
1000.....	235°T at 8 miles
1006.....	225°T at 6 miles

The problem is to analyze the targets' respective relative-movement lines, determine the CPAs, recognize which target, if any, presents a potential danger, and ascertain what course change and/or speed change should be made to clear the closest point of approach by 2 miles.

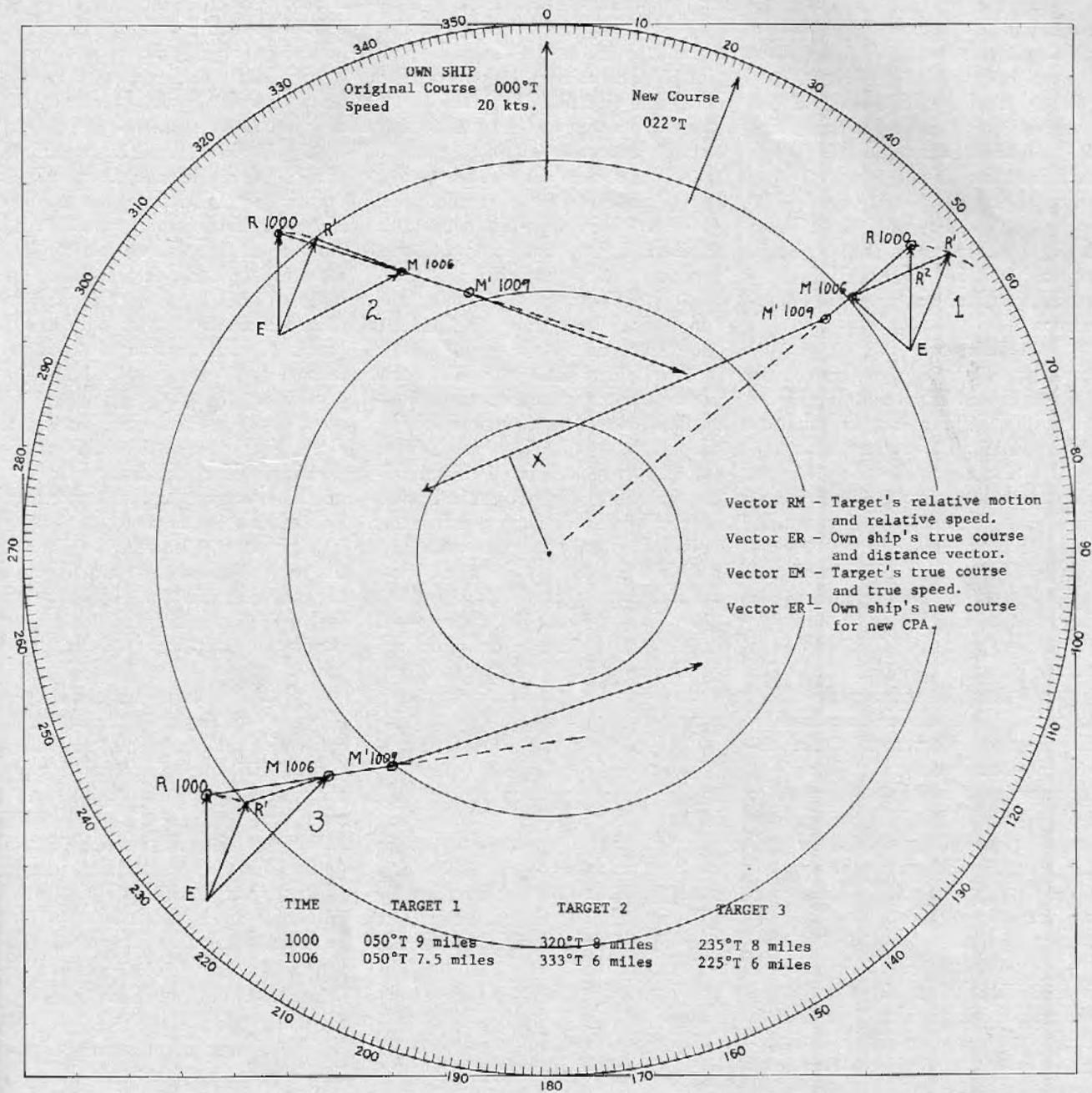


FIGURE 1.—Plot of three targets showing result when own ship's course is changed.

The solution would be as follows:

(a) Plot the echo of each target when it appears, circle it and label the point R. (See figure 1.) After three echoes of each target have been plotted, label the third echo M and construct the relative-movement line RM. The RM line gives the length and direction of the relative movement during the plotting interval (6 minutes). To determine the CPA if both target and own ship maintain course and speed, the RM line is extended past the center of the radar-scope.

(b) It is apparent after plotting the three relative-movement lines (extended RM lines) that the CPA of target No. 1 indicates a potential collision situation. It appears that target No. 2 will pass ahead sufficiently clear; however, since it is forward of the beam, it should be kept under evaluation in the event it should change course. Target No. 3 will pass well clear astern and normally would be scrubbed and ignored; however, for the purposes of this solution, the vector diagram will be solved. The approximate time of arrival of the targets at CPA can be determined by stepping off increments of the observed relative-movement line along its extension. In the case of target No. 1 the 6-minute RM line segment can be stepped off approximately  $4\frac{1}{2}$  times or 27 minutes so the time of CPA (in this case collision since on a collision course) if course or speed is not changed would be 1033.

(c) With respect to target No. 1, it is obvious that either a course change, or speed change, or both, is necessary to avoid collision. It is decided that it would be preferable to leave target No. 1 two miles to port; accordingly, a desired relative-movement line is constructed from an assumed point  $M^1$  tangent to the 2-mile circle at point X. (The bearing of point X establishes the bearing of the desired 2-mile CPA.)

Note that the new relative-movement line  $M^1X$  must be constructed from an assumed point  $M^1$  at which

it is anticipated own ship's course and/or speed will be altered.

(d) Now draw from R a line parallel to and in the opposite direction as the heading flasher (or in a reciprocal direction of own ship's true course if plotting on the maneuvering board), and make its length equal to the distance own ship travels during the 6 minutes of target echo plot (1000 to 1006). The distance will be 2 miles (6 minutes at 20 knots). Label this (own ship) vector ER; if a parallel line cursor is installed on the radarscope, the cursor will facilitate the construction.

(e) Draw in vector EM. The vector EM gives the distance and direction traveled by the target during the time interval of the plotting. True target speed may be obtained approximately by comparing the lengths of EM with own ship speed vector ER. By inspection it appears that target No. 1 has a true speed of 15 knots on a true course of approximately  $310^\circ$ . Target No. 2 has a true speed of 24 knots on a true course of approximately  $060^\circ$  T. Target No. 3 has a true speed of 28 knots on a true course of approximately  $044^\circ$  T.

(f) Draw a line through M parallel to and in the opposite direction as the new relative-movement line  $M^1X$ .

(g) If own speed is to remain constant, rotate the vector ER around point E. Where the arc inscribed by ER intersects the extended line through M it establishes point  $R^1$ . The vector  $ER^1$  represents the new true course  $022^\circ$  for own ship to steer to pass the target at the desired 2-mile CPA. Note that this course change must be made at point  $M^1$  (time 1009).

(h) The intersection of ER and  $R^1M$  is designated  $R^2$ . If it is desired to maintain course and reduce speed,  $ER^2$  establishes what the new speed should be. The new speed is determined by noting the ratio of  $ER^2$  to ER. Since  $ER^2$  appears to be three-fourths the length of ER, speed must be reduced by one-fourth, or 5 knots.

Either the course change of  $22^\circ$  to starboard or a reduction in speed of 5 knots will allow target No. 1 to pass to port by 2 miles.

(i) Assuming a change in course or speed is effected at point  $M^1$ , the new relative-movement line generated will then be  $M^1X$ . Assuming that the course is changed to  $022^\circ$  T, vector  $ER^1$ , then the new relative-movement lines for targets No. 2 and No. 3 must be resolved to determine the effect on those targets. First, the vectors (EM) for each of the targets must be constructed as with target No. 1. Then ER is rotated around E to own ship's new course.  $R^1M$  then establishes the new relative-movement direction for targets No. 2 and No. 3. Since point  $M^1$  establishes the position of the course change, the new relative-movement lines are generated by constructing a line parallel to  $R^1M$  through point  $M^1$ . A glance at the new relative-movement lines for targets No. 2 and No. 3 indicate that they will pass well clear if a course change to  $022^\circ$  T is made at point  $M^1$ .

(j) Assuming a change in speed is made (see figure 2) to effect the same relative movement of target No. 1, i.e.,  $M^1X$ , then the required speed change (reduction) is determined by visual estimation of the vector  $ER^2$ . As indicated in paragraph (h), it was determined that a speed of 15 knots (5 knot reduction) would result in a CPA of 2 miles (target No. 1). The resultant relative-movement lines for targets No. 2 and No. 3 would then be resolved as described in the following paragraph.

(k) Using original course vector ER, a speed reduction to 15 knots would be represented by the vector  $ER^2$ . The length of this vector is transferred to targets No. 2 and No. 3 by marking off this length measured from point E, which establishes point  $R^2$ . The new relative-movement direction then becomes  $R^2M$ . A line constructed parallel to  $R^2M$  from point  $M^1$  then establishes the new

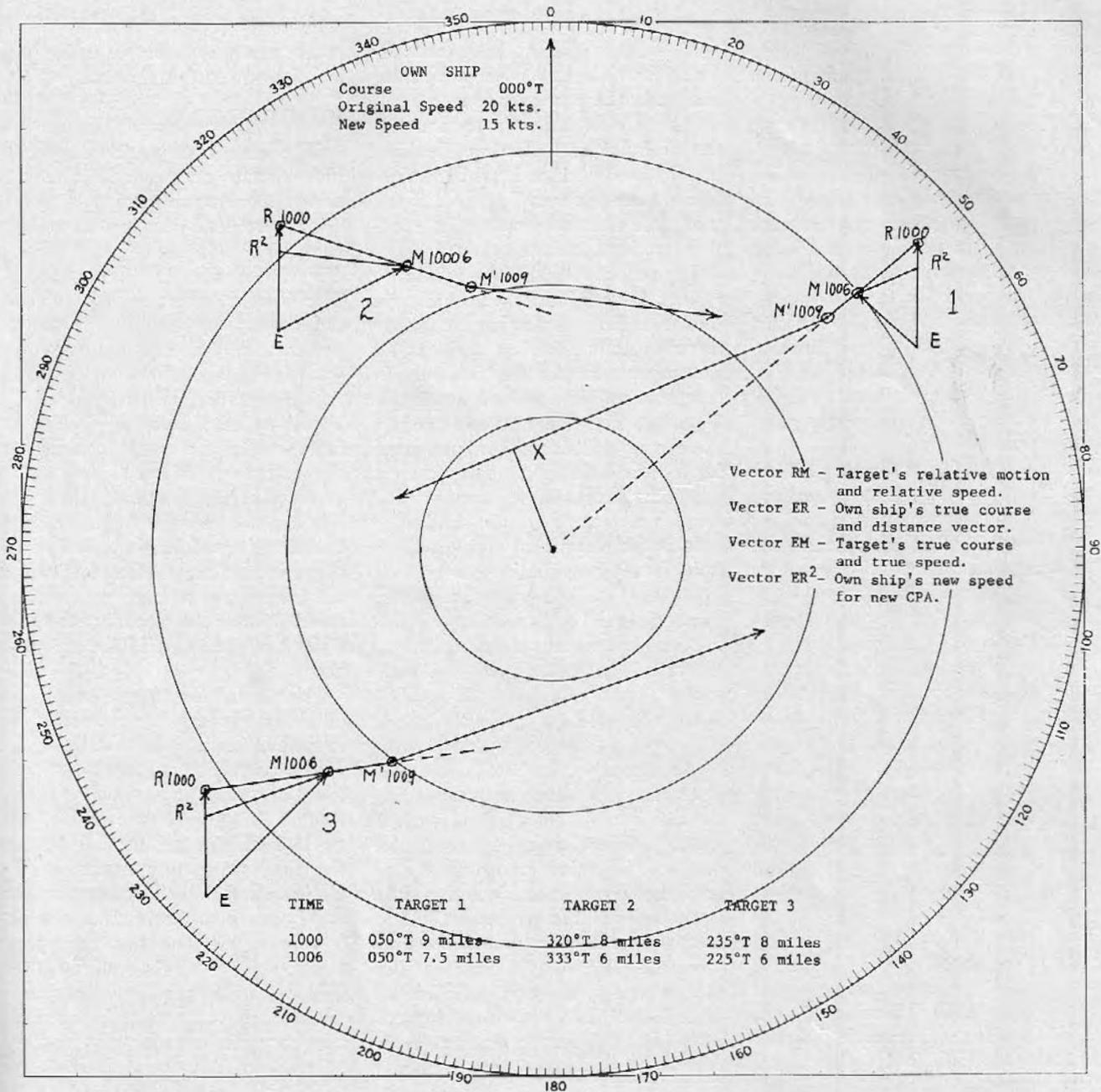


FIGURE 2.—Plot of three targets showing result when own ship's speed is changed.

relative-movement line for targets No. 2 and No. 3 as a result of the speed reduction.

### CHANGES TO PUBLICATIONS

Since the rapid *radar plotting* method is similar to the conventional CIC method in that a vector diagram is used, it is not anticipated that deck officers will experience any difficulty in the transition. To facilitate in the transition however, the U.S. Coast Guard, U.S. Maritime Administration, and U.S. Oceanographic Office are making the following pertinent changes in programs and publications:

(a) The Coast Guard will accept the *rapid radar plotting* method in solving radar plotting problems given in the radar observer and deck license examinations. Other methods of plotting still will be acceptable, as long as the candidate demonstrates an understanding of relative motion.

(b) The Maritime Administration radar schools, which heretofore concentrated their instruction on the old CIC method—although the new method was mentioned—will now emphasize the new method.

(c) The U.S. Oceanographic Office has plans to add an addendum to H.O. 257, the *Radar Plotting Manual*, which will include instructions on the new plotting method. This little-publicized manual was originally designed for the use of merchant marine officers and was first published in 1960. The next editions of H.O. 217, *Maneuvering Board Manual*, and H.O. 9, *American Practical Navigator (Bowditch)*, will devote a section to the "off the center of the scope" method of plotting.

Collisions have not decreased since the advent of radar; if anything, they have increased. Perhaps the utilization of this new method of plotting—which permits plotting on the radar-scope—may result in a decrease in the number of collisions.

Although collisions have not decreased, there has been a definite change in the past decade in the admiralty courts' attitude toward the use of radar and plotting. Decision has followed decision in which judges have found the vessel at fault if the navigator did not plot the information obtained from the radar.<sup>4</sup>

In connection with these admiralty rulings, one objection, voiced already to the method of plotting on the reflection plotter, is that there is no plotting record for use in court in case of a collision. Although this is a legalistic, negative criticism, and if there is no collision there is no need for a record, in light of the interest admiralty judges have shown in plotting it may have a certain validity.

It would seem that Yankee ingenuity would provide the answer. It is understood that inexpensive plastic sheets designed to fit the scope or reflection plotter are in the design stage. If these were noted with the time and date and retained until the end of the voyage, they would serve as a record admissible in any court proceedings.

Another possible answer which should satisfy the admiralty court would be a radar log similar to the deck log. The time and data of targets' bearings, ranges, and CPAs could be logged. In those cases, where from the relative movement line and projected CPA it appeared that the true course and speed should be plotted these items could be logged. This information, together with

course and speed changes in the deck log, should satisfy the court.

### ADMIRALTY TREND

The extent to which admiralty judges have gone recently in considering the use or misuse of radar in collision is evident in a recent collision case, *Kearsarge-Oriana*, 231 F Supp 469, 1964 AMC 2163 (SD Cal 1964). The *Oriana* was equipped with two radar sets, one with a true motion presentation (the true motion radar was not in use) and one giving a relative presentation. District Judge John F. Kilkenny found the *Oriana* at fault for "failure to use the true motion radar and failure to keep a plot of the *Kearsarge's* course and speed. She had no marks for the *Kearsarge's* positions at various times, no vector diagrams and no relative plots to give the *Kearsarge's* true course and speed. Under the circumstances, the *Oriana* might as well have no radar aboard."

Prior to the *Kearsarge-Oriana* case admiralty judges have referred to radar plotting in general terms. If the *Kearsarge* dictum portends any trend, the time may not be too far off when a judge will take note of the method of plotting used. Knowing the time consuming nature of the CIC method and the inherent possibility of error where there is a transference of data to a maneuvering board, a judge might well find that, "The use of the speed vector triangle method raises a presumption as to the adequacy of the radar plotting."

It behooves the prudent navigator to use the plotting method which gives him the necessary information to determine what, if any, avoiding action is necessary in the minimum of time. If you can do that by using a maneuvering board and the speed vector triangle, more power to you. Otherwise you may do well to start using the *rapid radar plotting* method. †

<sup>4</sup> The *Gannet* (1967) 1 Lloyd's List LR 97, the *Sanderford*, 236 F.2d 270, 271 (2d Cir. 1956); *Kearsarge-Oriana*, supra; *Francisville-Mathew Luckenbach*, 215 F. Supp 667 (SD NY, 1963), aff'd 324 F.2d 503 (2d Cir. 1963); the *Southport* (1949) 2 Lloyd's List LR 862; *Australia Star-Hindoo*, 172 F.2d 472 (2d Cir. 1949), cert den 338 US 823 (1949); the *Robert L. Holt* (1956) 2 Lloyd's List LR 337; the *Chusan* (1955) 2 Lloyd's List LR 685; *Chinook-Dagmar Salem* (1951) 4 Dom LR 1, 1951 AMC 1253 (Can S Ct); the *Gulford* (1956) 2 Lloyd's List LR 74; the *Prins Alexander* (1955) 2 Lloyd's List LR 1; the *Anna Salem* (1954) 1 Lloyd's List LR 475, 488.

Q. What precautions should be observed when operating a radar set with a high degree of sea return suppression?

A. When radar is operated with a high degree of sea return suppression, it is operating at reduced sensitivity and will miss small targets which may be a source of danger to the ship. Under such conditions a vigilant visual lookout continues to be the most reliable method of discovering potential danger.

Q. A Performer or Echo Box is used to:

- (a) Reduce sea return
- (b) Check and tune the set
- (c) Assure true directional stability
- (d) Scan sectors
- (e) Indicate heading

A. (b) Check and tune the set.

Q. (a) What does a sudden increase or decrease of the signal strength of another vessel's pip on the PPI scope usually denote when the vessel observed on the PPI scope is close to your vessel?

(b) What parts of the ship's structure could cause blind sectors or shadows on the PPI scope display?

A. (a) A sudden increase or decrease of the signal strength of a vessel's pip on the PPI scope when that vessel is close to your vessel indicates a change of heading that increases or decreases the projected area of the vessel reflecting the radar beam of energy.

(b) The mast and cross-trees, funnel, and possibly other parts of the ship's structure could cause blind spots or shadows in the PPI scope display.

Q. Parallel-lined overlays on a PPI scope may be used to determine:

- (a) Closest point of approach
- (b) Distance off abeam
- (c) Bearing
- (d) Range
- (e) (a) and (b)

A. (e) (a) and (b) above.

Q. A point of land lies between a vessel fitted with radar and a small boat. The boat may not be seen on the vessel's radar scope because of:

- (a) Sea clutter
- (b) Snow
- (c) Shadow effect
- (d) Ghost echoes
- (e) Interference

A. (c) Shadow effect.

Q. A wave guide is:

- (a) A vacuum tube
- (b) A range scale
- (c) A hollow pipe, usually of rectangular or round cross section used to transmit radio frequency energy
- (d) An antenna

(e) An oscilloscope on which recurrent pulses or wave forms may be observed

A. (c) A hollow pipe, usually of rectangular or round cross section used to transmit radio frequency energy.

Q. The ability of a radar to show objects observed close together on the same bearing as separate pips depends on:

- (a) Rotation rate of the antenna
- (b) Size of antenna reflector
- (c) Pulse length
- (d) Width of the beam
- (e) Automatic gain control

A. (c) Pulse length.

## Radar Training

Recently a group from Chevron Shipping inspected a new and radically different radar training center at Fort Mason, San Francisco, operated by MARAD.

This is a radar simulator. Here, a computer puts radar problems into four scopes. Each scope is arranged to facilitate the plotting of problems. One scope has devices to control own course and speed.

The thing that you can do with a simulator that you would not do in practice is to create dangerous situations. The navigator at the master scope must evaluate the situation, then maneuver his ship to get out of trouble. He is working against time as he would be on a ship that is underway. This is totally different than solving problems at leisure during a written test.

This training center must be seen to be believed. The illusion that you are on the bridge of a ship in fog underway meeting traffic is perfect. Here is the Golden Gate, the San Francisco lightship, Buoys 1 and 2 and two other vessels both on collision courses with you. This training could be invaluable.

There are three simulator schools in the United States run by MARAD: One at San Francisco, one at New York, and one at New Orleans. Attendance is limited to U.S. citizens. It is expected that individuals will attend simulator schools on their own time in the interest of their professional advancement.

There are a number of simulator schools abroad and many of the Masters and Deck Officers of the Foreign Flag fleet have already had this training.

Chevron Shipping realizes the need for training and retraining in the use of radar. For this reason we presently have Captain R. Slack riding the U.S. Flag fleet giving instruction in the use of radar and radar plotting.

*Safety Bulletin  
Chevron Shipping Co.*

Editor's Note—The Coast Guard is contemplating rules concerning simulator training, as well as rules requiring a deck officer to pass a radar plotting examination when renewing his license. However, the latter rules would permit the deck officer to substitute simulator training for the plotting examination. †

## Kings Point Observes 25th

September 30 marked the 25th anniversary of the U.S. Merchant Marine Academy at Kings Point, N.Y. On that date in 1943 the academy was dedicated, and its doors were opened to the young men who were to become the first of some 13,087 officers since graduated from the institution.

The academy traces its origin back to 1931, when a survey made by the National Conference on the Merchant Marine indicated wide support for a Federal institution to train merchant marine officers. On March 15, 1938, the Government established the U.S. Merchant Marine Cadet Corps. Cadets were trained at sea until temporary shore facilities were set up, and as World War II approached, the need for a Federal academy increased.

The Government acquired the Walter P. Chrysler Estate and neighboring properties totaling 68 acres shortly after the United States entered the war. Construction was begun on this site in 1942, and the academy was completed the following year. Only one new building has been added since that time: The Merchant Marine Memorial Chapel, which is a memorial to 6,709 merchant mariners who died in World Wars I and II. World War II claimed 210 Kings Point graduates.

Kings Point is open to unmarried young men between the ages of 17 and 22 who have a high school education or its equivalent. Appointment to the academy requires the recommendation of a senator or representative. Each senator and representative may recommend 10 candidates

for acceptance. The candidates must then pass physical and scholastic tests before admission. At the present time, entering cadets pledge to serve 3 years in the Merchant Marine upon graduation. Beginning with the class entering during 1969, this pledge will be extended to 5 years.

Midshipmen choose between an engineering or deck officer course upon entering the academy, although the top 10 percent may take a combined deck-engineering course. All midshipmen take the naval science course for 4 years. Kings Point graduates receive bachelor of science degrees. One of the prerequisites for graduation is successful completion of a Coast Guard examination for a license as third mate or third assistant engineer. Successful candidates from the combined deck-engineering course receive both licenses. All graduates receive commissions as ensigns in the U.S. Naval Reserve. †

## New Book on Merchant Marine

A new book of interest to the prospective career merchant mariner has appeared:

A DEFINITIVE STUDY OF YOUR FUTURE IN THE MERCHANT MARINE, by Rear Adm. Gordon McLintock, USMS. Published by Richards Rosen Press, 29 East 21st Street, New York, N.Y. 10010, 1968. Price: \$4.

The volume is filled with pictures, facts, poems, and specifics—all intended to inform and encourage the merchant seaman in his career. A

brief history of the merchant marine is included, followed by a section on ship organization and descriptions of how ships function in peace and in war. Other sections of the book are devoted to the entrance requirements at Kings Point and the various State maritime academies. An appendix lists the principal American maritime unions and the leading steamship lines. †

## New Edition, Chart No. 1

A new edition, the first in 5 years, of a booklet containing symbols and abbreviations used on all nautical charts issued by the U.S. Government is now available.

The booklet was prepared jointly by the Coast and Geodetic Survey, the Naval Oceanographic Office, the Coast Guard, and U.S. Lake Survey. It is designated as chart No. 1.

Approximately 20 percent of the contents of the new edition shows changes occurring since the publication was last printed in 1963. New chart symbols of primary importance which have been included are those designated marine limit areas, such as Shipping Safety Fairways in the Gulf of Mexico and Directed Traffic Lanes for the approaches to Atlantic and Pacific ports. Also, illustrations depicting aids to navigation have been revised to reflect new technological advances in the construction of these features. Illustrative pages for "Aids to Navigation on Western Rivers" and the "Uniform State Wa-

terway Marking System" have been included for the first time.

Chart No. 1 is published by the Coast and Geodetic Survey, an agency of the Environmental Science Services Administration in the U.S. Department of Commerce. Copies can be purchased for 50 cents from the Coast and Geodetic Survey (C44), Rockville, Md. 20852, from other Government chart distribution offices, and from authorized nautical chart agents. †

## New Edition U.S. Coast Pilot 7 for Pacific Coast

A new edition of U.S. Coast Pilot 7, the "mariner's bible" for the Pacific Coast and the first to be issued in 5 years, was published last November by the Coast and Geodetic Survey.

The 380-page volume contains the latest information on the coast and harbors of California, Oregon, Washington, and Hawaii, based on a year's on-the-spot inspection by the agency's personnel.

The 10th edition of this well-known book, which has served mariners for more than a century, includes greatly expanded information on port facilities at some of the Nation's most important harbors on the Pacific, including San Diego, Los Angeles, Long Beach, San Francisco, Portland, Seattle, Tacoma, and Honolulu.

Detailed information is provided on wharves, cargo-handling equipment, depths alongside wharves, available storage area, and other data of interest to mariners. Small craft information has been increased, with emphasis on the transient boatman away from his usual cruising area. Some new information on electronic navigation has been added.

In addition to the numerous bays, harbors, and rivers along the coasts of California, Oregon, and Washington, Coast Pilot 7 describes the offshore Channel Islands of southern California, the Sacramento and San Joaquin Rivers and their delta region, the Columbia River and the large "inland sea" comprised of the Straits of Juan de Fuca and Georgia, and Puget Sound. A chapter on Hawaii describes the eight larger islands and many of the small outer islands of the Hawaiian Archipelago.

Copies of the new edition are available for \$2.50 from the Coast and Geodetic Survey (C44), Rockville, Md. 20852, or from Coast and Geodetic Survey sales agents. Annual supplements are distributed free. †

## Public Library of the High Seas

Seagoing libraries have been a familiar sight to the crews of American-flag ships since the inception of the American Merchant Marine Library Association (AMMLA) in 1921. The "Public Library of the High Seas"—the Association's more familiar title—provides seamen with a library service comparable to that of many community libraries.

In 1967 the Association delivered 5,856 library units to hundreds of ships, including 46 Coast Guard and other Government vessels. Throughout its 46-year history, the Association has distributed 261,018 library units containing 15,708,972 books from its domestic port offices in the United States.

Beginning with four port offices in 1921, the Association has since doubled that number and now offers its services through the following major ports: Boston, New York, Norfolk, New Orleans, San Pedro, San Fran-

cisco, Seattle, and Sault Ste. Marie. The latter port serves the Great Lakes fleet.

Each of the AMMLA port offices maintains shore library facilities, where seamen may borrow standard library books as well as technical material used to assist those studying for license preparation and advancement in grades. The shore libraries allow liberal borrowing periods to conform with the length of sea voyages.

For the borrower's convenience, books checked out from a port office may be returned at any of the other AMMLA port offices.

Of particular interest is the collection of nautical material which has been accumulated since 1948 in a special section at AMMLA Headquarters. The collection contains over 22,000 catalogued titles and is available to all those interested in nautical research and reference.

The AMMLA standard seagoing library unit contains 40 bound books, of which 26 are fiction and 14 non-fiction in a variety of classifications. In addition, between 20 and 30 pocket books and 100 magazines are included. Books in seagoing units receive considerable wear, and weather conditions at sea shorten the lifespan of such volumes. Where land public library books survive approximately 40 circulations, seagoing library books rarely are presentable for inclusion in a library unit more than four times.

To replace materials as they deteriorate, the AMMLA relies on contributions. Last year 5,603 individuals and organizations donated 227,948 books, 82,794 pocket books, and 516-960 magazines to the Association. Since the AMMLA is a nonprofit organization such support is essential.

Anyone having donations of books should send them to the nearest port office of the Association. Those interested in further supporting the program of the "Public Library of the High Seas" should contact the Association's Headquarters, 45 Broadway, New York, N.Y. 10006. †

# The Plot to End Collisions

YOU'RE STANDING WATCH on the bridge of your vessel, cutting through thick fog at 16 knots. You spot a large target on the radar about 8 miles away, dead ahead, and closing fast. You alter course to the right, but the target continues to close rapidly. Moments later the lights of a large vessel break through the fog on your port bow. You order hard right rudder and sound the general alarm as the bow of the other vessel grinds into your port side. . . .

The next thing you know, there's a full-scale investigation, proceedings are instituted against your license, and your ship is in drydock undergoing \$700,000 of repairs.

Impossible? Not by a long shot. Collisions at sea are all too common, almost as common as the errors in judgment that cause them. A mate actually found himself in the situation described above, and if you find yourself making some of the mistakes that contributed to the following casualties, you may well see your watch come to an equally disastrous conclusion.

To repeat the causes of many collisions is to dwell on a recurring theme: restricted visibility, excessive speed, and misinterpretation of radar information. Time and again these conditions culminate in major casualties.

## **The Cost of Speed**

In a typical case, a freighter was outbound from a Pacific port with a pilot at the helm. Her speed was 13.5 knots despite poor visibility of one-half mile or less. The lookout sighted lights on the starboard bow; a vessel was crossing from starboard to port about one-half mile away. Although the radar was functioning properly,

the vessel hadn't been detected on the screen. The pilot ordered hard right rudder, stop engines, and full astern, but it was too late. His bow struck the port side of the crossing vessel.

The other ship also had a pilot in charge. She was traveling at 16 knots, and her radar was used to plot fixes on radar ranges. No plot was made of targets. The pilot first spotted the outbound vessel as a pip on his radar screen at about 6 miles on his starboard bow. Planning a port-to-port passage, the pilot altered course 25 degrees to starboard. The target continued to close. The pilot ordered further changes of 10 degrees and 15 degrees to starboard, but he soon sighted the masthead, range, and green sidelights of the outgoing vessel.

Ironically enough, the collision might have been avoided if the inbound vessel had maintained her original course, passing starboard to starboard at one-half mile. The pilot of that vessel apparently decided on a port-to-port passage on the basis of only a quick scrutiny of his radar. Had he plotted the threatening target, he could have determined its course, speed, and CPA and made a more reasonable judgment.

The excessive speed of both vessels resulted in a whopping \$2.5 million repair bill for just one of them. Charges were preferred against both pilots.

## **For Want of a Plot**

The failure to clearly interpret radar information often increases the dangers in a complex traffic situation. Such was the case in an incident involving two vessels off the Japanese coast. Dense fog limited visibility to 200-300 yards, and traffic was heavy.

An inbound freighter was proceeding at 7 knots, heading into a narrow channel. Many vessels were passing close at hand, but no radar plot was maintained. The master noted a target on the 6-mile scale, indicating a starboard-to-starboard passage. But as the minutes passed the target began to close. When the range was about 1 mile the master ordered a 5-degree course change to port. Then the engines were stopped when a fog signal was heard forward of the beam on the starboard bow. Prior to impact right full rudder and full astern emergency were ordered.

Aboard the outbound vessel the situation was similar. A port target was spotted on the radar, but it seemed to be opening. It then began to close, and the master ordered full astern and hard right rudder upon hearing three blasts off his port bow. The outbound vessel's speed was 3 knots at time of impact.

The outbound vessel had apparently failed to keep a course to starboard in the narrow channel, as is required by rule 25(a) of the International Rules of the Road. Both masters were relying on the guidance of radar in the thick weather, but their failure to plot made it impossible to discern each other's intentions. Thus the misuse of radar made a bad situation worse: heavy traffic, a vessel on the wrong side of a channel, and confusion all contributed to the crash. Fortunately both masters took quick action when collision was imminent, and damage was not extensive.

## **Radar Inoperative**

Most seagoing vessels are equipped with radar, and it's usually functioning properly. But occasionally a ves-

sel must navigate blindly through areas of poor visibility when the radar is on the blink. Such a vessel may find itself in a position as hazardous as that which is likely to befall the vessel that relies on unplotted radar information. The vessels involved in the following case met under those unpleasant circumstances.

A freighter encountered heavy fog at a time when its radar was inoperative and was forced to navigate by visual bearings. Speed was reduced as visibility decreased. A lighted buoy was sighted dead ahead at one-quarter to one-half mile, and the master ordered hard right rudder. After that the vessel proceeded at a cautious 4 knots. Then the lights of another vessel appeared off the port bow at a distance of one-quarter mile, on an apparent collision course. The master took immediate evasive action, but his vessel was struck on the port quarter.

The other vessel had sighted lights off her starboard bow before a squall limited visibility. Minutes later a radar target was observed, about 3 miles out on the starboard bow. No evasive action was ordered, no whistle signals were ordered, and a speed of 15 knots was maintained. Presently a red light was spotted on the starboard bow at a distance of one-half mile. Efforts to avoid the crash were too late.

The "blind" vessel was in a hopeless situation, having no way of detecting the other vessel until she loomed from the fog at close quarters. The other vessel, with radar functioning, detected the presence of another ship in plenty of time to take evasive action, yet did nothing. The result was a total repair bill of over \$500,000 for the two vessels.

### The Safe Course

Like most casualties, collisions don't "just happen." They are *caused*, usually by a combination of circumstances: bad weather, heavy traffic, poor judgment, and often a lack of common sense. Judgment and common sense are the two factors that can be readily controlled. Judgment is a matter of determining the proper



**CRUNCH!**—There is no more convincing argument for the plotting of radar targets than the consequences of not doing so. Neither this vessel nor the one she collided with was plotting targets before the crash. Yet both vessels "saw" each other on their radar screens! The damage being surveyed here amounted to more than \$500,000.

speed and course for the weather and traffic conditions at hand; prudence and experience are the companions of sound judgment. Common sense is a matter of taking advantage of anything that will decrease the chances of an accident. This means such things as plotting radar targets, sounding fog signals in thick weather, and properly posting lookouts.

All of the collisions discussed above could have been avoided, probably by merely plotting radar information and taking appropriate action based

on the results. In all of the cases, damage would have been decreased if speed had been decreased. Had the Annex to the Rules and rule 16 of the International Rules of the Road been followed closely, the ships involved would probably have enjoyed uneventful voyages.

The next time you take your watch, remember these casualties. And if the fog starts to close in, don't forget that the fate of your shipmates, your ship, and your career will be riding on your judgment and common sense. †

## Some observations of the U.S.P. & I. Agency of the Marine Office of America

### ACCIDENT FREE VOYAGE?

"Well, no accidents this trip," was the way the Skipper greeted the Port Captain with a big smile on his face.

"But we sure had a near one. The gang were topping the jumbo and the sailor on one of the guys did not slack off. Well you know the power of those jumbos? It ripped that old lashing pad the guy was secured to right out of the deck and it went flying across the hatch, just missed the Bosun and wrapped itself around the other guy; then with the swell running the jumbo began to swing and we had a hard job finally getting it secured!"

This is not an unusual comment to hear and it does show how safety engineers in general have failed to put across one of the fundamentals of safety. The fact that an injury did not occur was just plain luck, nothing more or less. An accident did occur and it was a serious one. If steps are not taken to correct the conditions that led to this mishap, it is inevitable that the same behavioral pattern will set the stage for another accident which may result in serious injury.

Dr. William Tarrants of the Department of Transportation defines an accident as, "An unplanned, not necessarily injurious or damaging event, which interrupts the completion of an activity, and is invariably preceded by an unsafe act and/or unsafe condition or some combination of unsafe acts and/or unsafe conditions."



Injuries speak for themselves and men who have been injured learn from their experience the hard way. It would be far better in our safety meetings to discuss the near misses where through luck, chance, or fortune no one has been injured yet from which valuable lessons can be learned and action taken to eliminate accident causes. In fact there are so many more "near miss" accidents than "injury causing" accidents that we are able to learn with a great deal more accuracy from a study of these, than if only "injury-causing" accidents are considered.

In analyzing an accident, it is not enough to conclude that someone was careless or was not paying attention to his job. Nor are we trying to fix blame on some individual. The most

important thing to keep in mind is how do we prevent a repetition. In the case mentioned was there someone whose only job was supervision? If so, was he doing this job in the proper way and under the proper conditions? Had each man received the proper instructions and known just what to do? Are men encouraged to ask questions if they do not completely understand their function? Was anyone hard of hearing or nearsighted or perhaps not feeling up to snuff when this occurred?

Only by prompt and thorough investigation of all accidents, is it possible to get the real answers upon which corrective measures can be based. †

DON'T MISS THE "NEAR MISSES"!

### DAT YOU, FRENCHIE, ROUND DE BEND?

We never read the above in the Pilot Rules as proper procedure when approaching a bend, yet it came in over the R/T of a tow we were riding. As far as we know, no whistle signals were ever exchanged. Apparently Frenchie was around some other bend because it was the last we heard from that particular tow.

In another case, the outcome was not so fortunate. An 800-foot tow was heading East in the inter-coastal canal and was near a cut

where they had previously heard over R/T that a 4-knot current was setting.

Approaching the cut, the Captain called over the radio inquiring if the cut was clear. Receiving no reply, he hooked up his tow full speed to keep control and was swinging into the cut when the bow of another tow heading west came into sight. He then blew warning signals and went full astern! Just prior to the collision, the other Captain got on his phone and apologized for having his receiver volume turned down low!

In another case, two tows were approaching a bend in Bayou Boeuff and neither sounded the "Bend Blast" prescribed by Rule 80.5 of the Pilot Rules for Inland Waters. At time of sighting both tows blew three blasts and backed but too late to avert a collision.

A Coast Guard Hearing resulted in a license suspension for one Captain because of his failure to blow the prescribed bend signal and it quoted the classic PENNSYLVANIA Case 86 U.S. 125, 136 (1873).

"But when, as in this case, a ship at the time of collision, is in actual violation of a statutory rule intended to prevent collisions, it is no more than a reasonable presumption that the fault, if not the sole cause, was at least a contributory cause of the disaster. In such a case the burden rests upon the ship of showing not merely that her fault might not have been one of the causes, or that it probably was not, but that it could not have been. Such a rule is necessary to enforce obedience to the statute."

Now the R/T is a valuable aid to navigation and its intelligent use in conjunction with the prescribed Pilot Rules is of extreme value in avoidance of collisions but it can not and must not be substituted for the whistle.

There are good reasons for the prescribed whistle signals. Someone's phone may not be turned on or re-

ceiving clearly. The whistle will alert and clear up verbal misunderstandings. If you don't blow, you are breaking the law. ‡

SO BLOW, MAN BLOW!

## AND EVERY FINGER A MARLINSPIKE

Lumberitis was an occupational disease of old steam schooner hands. The visible symptoms were that they had to pick up and feel every piece of lumber they saw.

This "pick up and feel" is an inherent characteristic of seamen. A piece of manila line is inspected almost as much by feel as by sight. The hand on the steering wheel feels just right amount of pressure; taking up the bolts when replacing the head on a pump, the feel of the wrench tells when the bolt is properly tight.

What we are getting at is that whether you call it, lumberitis or something else, a sailor's hands are pretty important to him and ought to be treated with the greatest degree of care.

Tools can be replaced easily, but artificial fingers or hands never work with the same efficiency. Sometimes the "whole" seaman has to be replaced and the unfortunate individual who lost his fingers or hand is forced into some other occupation, less rewarding and certainly much less interesting than going to sea.

Because so many shipboard tasks require the use of fingers in close proximity to heavy weights, lines under tension, and moving machinery, seamen must constantly be on the alert to keep their hands and fingers out of dangerous positions.

We recall a very able bosun who was a talented guitar player as well. The deck gang were overhauling gear. A boom gooseneck had been lifted and greased and was being reset in the swivel. It hung up halfway in for

some reason. The bosun thrust his hand into the bottom recess to see what was causing it to hang up; apparently he released the gooseneck and it dropped into place, shearing off three fingers of his right hand. From that time on not only was the man totally incapacitated as a seaman (you try splicing a line with only your left hand) but could no longer play his guitar. Of the two, he was more bitter about the latter.

Recently we reviewed another case which left a man crippled for life. An A.B., who had a reputation aboard for being a conscientious and capable worker, was pouring lubricating compound on the lifeboat fall as it was being spooled on the drum. He was standing on a side plate of the winch casing about two feet off the deck and leaning over to see what he was doing. Somehow his feet slipped and his hand became caught in the moving winch bull gear which chewed off three fingers and half the palm of his hand.

Engineers have more than their share of bad finger injuries, usually from improper use of hand tools. However, driving pulleys on automatic starting equipment still seem to be claiming fingers.

Not so long ago an engineer had to replace the belts on an electrically driven compressor. He shut the power off at the switchboard and locked the circuit. He then removed the guard and replaced the belts. Wishing to check before replacing the guard, he went over to the switchboard and energized the circuit. The compressor did not turn over so he grasped the belts and pulled. At that moment it started and he lost four fingers when the belt went over the drive pulley.

As galleys become more automated, to the frequent injuries from improperly handled knives and cleavers are added the hazards of power meat saws, garbage disposals, meat grinders, and potato peelers. ‡

Robert H. Smith, U.S. P. & I. Agency

## Deck Obstructions and the Human Eye

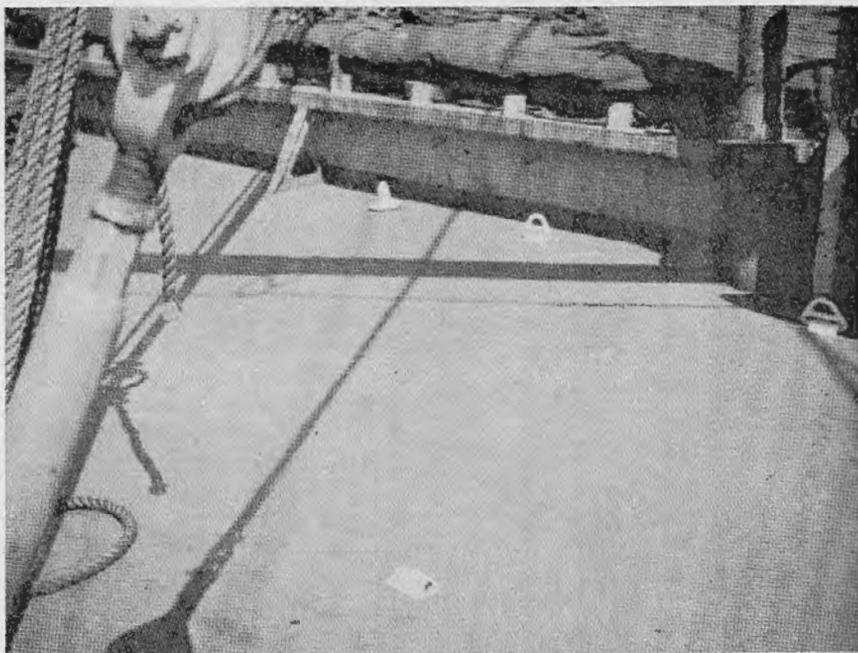
It is a physical impossibility for a man to look in all directions at the same time. Even though most men have a certain amount of peripheral vision which allows them to detect fringe side areas while looking straight ahead, they are not able to focus their vision on these side areas clearly enough to avoid certain hazards.

Consider however, the advantages of a visual system which would allow a man walking the deck of a ship to see in all directions simultaneously. This man would be able to see potential hazards above, such as moving loads and men rigging gear. He would also be well aware of the numerous obstructions underfoot, such as pad eyes, cleats, and other deck fastenings. The net result would be an outstanding ability to move about various sections of the ship with a high degree of safety.

Unfortunately, men with normal vision are only able to focus in a given direction, while their peripheral vision enables them to sense, rather than see, obstructions in a fringe area—thereby allowing them to trip over deck obstructions if they happen to be walking along the deck, watching a moving load above.

One of the ways to “lick the problem” lies in outlining the objects underfoot in such a manner that the peripheral “warning radar” picks them up instantly and enables the man to guide himself past the obstructions without harm while he keeps other hazards in focus.

It has been recommended to PMA member companies that all deck fittings be painted a contrasting color so that they can be easily seen—and



thereby avoided as tripping hazards. This recommendation has also gone to agents of foreign line vessels so that they, too, can reduce tripping accidents aboard their ships through this means.

Statistical experience indicates that many slips, trips and falls aboard ship were caused by protruding objects, such as pad eyes, cleats or lashing chains.

A certain sense of security can be felt while walking the deck of a ship whose deck obstructions have been painted in bright, contrasting colors. One is able to keep the eyes where they belong while moving about the deck safely. Wide acceptance of the recommendation that deck fittings be painted a high visibility color will cer-

tainly reduce the number of accidents directly attributable to the “slips, trips and falls” category. ‡

*Courtesy The Channel, Pacific Maritime Association.*

## Pump Failure Causes Woe

Some years ago a tanker was discharging a cargo of gasoline. She had steam turbine pumps. The mate on watch was not watching his tanks, and one of the pumps lost suction. It pumped on an empty tank and heated up. Someone saw that the pump was hot and reported it to the mate

who opened up a full tank. The gasoline ran to the hot pump. There was an explosion followed by a fire.

This month a Chevron transport vessel had a pump failure which had as its probable cause the running dry of the pump.

Here are the details. The vessel was at a European port and was preparing to discharge cargo. The starboard cargo pump was lined up to discharge cargo. The pump was a steam turbine centrifugal pump. The engineer put steam on the pump. It turned a few revolutions and seized. This resulted in ship delay and expensive repairs.

From conversation with the senior officers, it was learned that the pump had been run dry upon the completion of ballast operation in the Persian Gulf, either because the engineers had failed to secure the pump immediately after being notified or by not being notified soon enough. Further, at the time of starting the pump at European port, the system had been lined up with the exception of the opening of the tank suction valve. The watch officer was waiting for the pump r.p.m. to show on the control panel tachometer prior to opening this valve. He never opened the valve as evidenced by the lack of liquid in the pump when opened. It is possible that had the pump been completely submerged in liquid, it might have continued to run, even though some shaft seizure had occurred previously; but, this is only conjecture.

The ship stated that they started the pump with the tank suction valve closed for two reasons:

1. Because of their practice of leaving the sea suction closed in a harbor when starting to pump ballast into the ship until the pump was running.

2. Because leaving the tank valve closed would prevent petroleum from the shore tank running back into the ship's tank and causing a spill.

Neither of these reasons appears to be valid in this case.



All centrifugal pumps should be started under full submergence, and the discharge valve on the pump kept closed until pressure is up on the pump. The only exception is when ballasting in a harbor; then the starting of the pump and the opening of the sea valve should be simultaneous.

When starting a pump to discharge ashore, the bypass on the pump should be closed. This will prevent petroleum from ashore filling the ship's tank and causing a spill. ⚓

*Safety Bulletin  
Chevron Shipping Company*

## Note Blind Arcs

The majority of radar scanners are sited aboard ship so that blind arcs, if any, are located on the port bow and quarter so that there are no blind areas dead ahead, dead astern, or on the starboard quarter.

These blind arcs have shadow sectors on either side, which reduces responses from targets in variant degrees.

In addition, false echoes picked up by reflections from large surfaces usually occur in a blind arc at the correct range but on a false bearing.

This, of course, is common knowledge to radar users, but, nevertheless, exact locations of blind arcs are only acquired after frequent P.P.I. observations as they vary from ship to ship.

Blind arcs should be carefully noted and posted near the radar dis-

play so that all navigators, including pilots, are aware of this hazard. ⚓

## A KNOWN HAZARD CAN BE GUARDED AGAINST

*Safety Letter  
Marine Transport Lines, Inc.*

### Approved Equipment

#### Commandant Issues Equipment Approvals

By Commandant Action of December 6 and 13, 1968, Coast Guard approval was granted to certain items of lifesaving, and other miscellaneous equipment and materials.

Those interested in these approvals should consult the Federal Registers of December 11 and 18, 1968, for detailed itemization and identification.

### STORES AND SUPPLIES

Articles of ships' stores and supplies certificated from January 1 to January 31, 1969, inclusive, for use on board vessels in accordance with the provisions of part 147 of the regulations governing "Explosives or Other Dangerous Articles on Board Vessels" are as follows:

#### CERTIFIED

*Haviland Products Co.*, 421 Ann St., N.W., Grand Rapids, Mich. 49502: Certificate 842, dated January 2, 1969, "SWISH"; Certificate 843, dated January 17, 1969, F.O.R. No. 6; Certificate 844, dated January 17, 1969, Hav Elec T-9; Certificate 845, dated January 17, 1969, Haviland PS No. 3; Certificate 846, dated January 17, 1969, Temcol OD.

*Apollo Chemical Corp.*, 250 Delaware Ave., Clifton, N.J. 07014: Certificate 847, dated January 23, 1969, Pentron EMC-33.

# NAVIGATION AND VESSEL INSPECTION CIRCULAR NO. 8-68

15 NOVEMBER 1968

## Subject: Classification of Vessels as Self-Propelled

### PURPOSE

The purpose of this circular is to establish uniform guidelines concerning classification of certain vessels as self-propelled.

### BACKGROUND

(a) There is an increasing number of non-self-propelled vessels being equipped with positioning machinery, steering aids, and propulsion assist units. Heretofore, each vessel was individually evaluated with a determination being made as to whether the installed machinery was in fact propulsion machinery, and secondly, if the propulsion obtained therefrom was substantial to the extent that the vessel was required to be re-classified as self-propelled. Propulsion is one of the determining factors in the application of the various vessel inspection laws as well as certain international agreements. Propulsion also relates to the particulars of the minimum required vessel manning scales.

(b) These installations and their use can be segregated into four general categories which are:

(1) Fixed unidirectional tunnel type "thrusters" used solely as a docking aid or steering aid in restricted waters.

(2) "Kickers" used solely for the purpose of transiting locks and/or canals in which there is not room for assisting tugs.

(3) Propulsion assist machinery incorporating directional capabilities which enable the equipment to provide steering assist as well as propulsion assist.

(4) Unidirectional propulsion assist machinery providing only fore and aft propulsion capability.

### DISCUSSION

(a) Any vessel equipped with mechanical means which gives it the capability of propelling itself could be arbitrarily classified as self-propelled. However, within the basic intent of the vessel inspection laws, which advocate a certain level of maritime safety, categorical classification of the described innovations as "mechanical propulsion," in some cases, would serve no useful purpose. Such classification would be appropriate only to prevent a compromise of overall safety of the vessel operation. One of the requisite characteristics of a self-propelled vessel is on board operational control and the effects of placing part or all of such control, in the form of propulsion or steering, on the towed vessel must be considered.

(b) Normally, a non-self-propelled vessel is a vessel without sufficient means for self-propulsion and is, there-

fore, required to be towed. Such vessels are supposedly moved by properly manned and equipped tug boats. Installation of "mechanical aids" on the towed vessel as a substitute for a tug or for a reduction of the normally required towing services, essentially places the responsibility for the safe navigation of the vessel on the proper operation of the propulsion assist equipment. Accordingly, these vessels must be adequately manned and equipped for their proper operation.

(c) Unidirectional propulsion assist equipment normally makes a substantial contribution to the forward speed of a vessel. Therefore, applying the philosophy outlined in subparagraphs (a) and (b), it is apparent that vessels equipped with propulsion assist machinery should be classified as self-propelled.

(d) The Coast Guard readily recognizes that vessels concurrently propelled by tugs and installed propulsion assist equipment are unique and do not logically lend themselves to a rigid application of the equipage/manning standards applicable to the conventionally powered inspected vessel. Accordingly, where feasible, such standards will necessarily require modification to accommodate a reasonable application to the various designs of this type.

### ACTION

(a) The following are guidelines which apply to those towed vessels equipped with varying types of mechanical maneuvering aids:

(1) The Coast Guard's policy in regard to unidirectional tunnel type "thrusters" is reaffirmed. Such installations will not be considered a basis for classifying a vessel as self-propelled.

(2) The Coast Guard's policy in regard to "kickers" used solely for transiting locks and/or canals is reaffirmed. Such installations will not be considered a basis for classifying a vessel as self-propelled.

(3) Vessels equipped with directional maneuvering equipment and/or substantial propulsion assist units will normally be considered as self-propelled vessels; notwithstanding the fact that a towing vessel may be employed in the operation.

(b) Proposals which, by reason of mode of operation or equipage, do not readily fall within the foregoing criteria shall be forwarded with complete details to the Commandant (MVI) for evaluation.

(c) For those self-propelled vessels described in subparagraph (a) (3), requiring inspecting, complete particulars of the vessel, mode of operation and the recommendations of the OCMI shall be forwarded to the Commandant (MVI) in order that a reasonable application of appropriate inspection, equipage and manning standards may be evaluated. †

## MERCHANT MARINE SAFETY PUBLICATIONS

The following publications of marine safety rules and regulations may be obtained from the nearest marine inspection office of the U.S. Coast Guard. Because changes to the rules and regulations are made from time to time, these publications, between revisions, must be kept current by the individual consulting the latest applicable Federal Register. (Official changes to all Federal rules and regulations are published in the Federal Register, printed daily except Sunday, Monday, and days following holidays.) The date of each Coast Guard publication in the table below is indicated in parentheses following its title. The dates of the Federal Registers affecting each publication are noted after the date of each edition.

The Federal Register may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20402. Subscription rate is \$1.50 per month or \$15 per year, payable in advance. Individual copies may be purchased so long as they are available. The charge for individual copies of the Federal Register varies in proportion to the size of the issue but will be 15 cents unless otherwise noted in the table of changes below. Regulations for Dangerous Cargoes, 46 CFR 146 and 147 (Subchapter N), dated January 1, 1969 are now available from the Superintendent of Documents, price: \$3.75.

CG No.	TITLE OF PUBLICATION
101	Specimen Examination for Merchant Marine Deck Officers (7-1-63).
108	Rules and Regulations for Military Explosives and Hazardous Munitions (5-1-68).
115	Marine Engineering Regulations and Material Specifications (3-1-66). F.R. 12-6-66, 12-20-67, 6-1-68, 12-18-68.
123	Rules and Regulations for Tank Vessels (5-2-66). F.R. 12-6-66, 12-9-67, 12-27-67, 1-26-68; 1-27-68, 2-10-68, 4-12-68, 6-1-68, 10-2-68, 12-18-68, 12-28-68.
129	Proceedings of the Merchant Marine Council (Monthly).
169	Rules of the Road—International—Inland (9-1-65). F.R. 12-8-65, 12-22-65, 2-5-66, 3-15-66, 7-30-66, 8-2-66, 9-7-66, 10-22-66, 12-23-67, 6-4-68.
172	Rules of the Road—Great Lakes (9-1-66).
174	A Manual for the Safe Handling of Inflammable and Combustible Liquids (3-2-64).
175	Manual for Lifeboatmen, Able Seamen, and Qualified Members of Engine Department (3-1-65).
176	Load Line Regulations (1-3-66). F.R. 12-6-66, 1-6-67, 9-27-67, 7-12-68.
182	Specimen Examinations for Merchant Marine Engineer Licenses (7-1-63).
184	Rules of the Road—Western Rivers (9-1-66). F.R. 9-7-66, 12-23-67.
190	Equipment Lists (8-1-68). F.R. 11-7-68, 11-8-68, 11-16-68, 11-19-68, 11-20-68, 12-11-68, 12-18-68.
191	Rules and Regulations for Licensing and Certifying of Merchant Marine Personnel (5-1-68). F.R. 11-28-68.
200	Marine Investigation Regulations and Suspension and Revocation Proceedings (5-1-67). F.R. 3-30-68.
220	Specimen Examination Questions for Licenses as Master, Mate, and Pilot of Central Western Rivers Vessels (4-1-57).
227	Laws Governing Marine Inspection (3-1-65).
239	Security of Vessels and Waterfront Facilities (5-1-68).
249	Merchant Marine Council Public Hearing Agenda (Annually).
256	Rules and Regulations for Passenger Vessels (5-2-66). F.R. 12-6-66, 1-13-67, 4-25-67, 8-29-67, 12-20-67, 1-27-68, 4-12-68, 10-2-68, 12-18-68, 12-28-68.
257	Rules and Regulations for Cargo and Miscellaneous Vessels (1-3-66). F.R. 4-16-66, 12-6-66, 1-13-67, 12-9-67, 1-26-68, 1-27-68, 2-10-68, 4-12-68, 6-1-68, 10-2-68, 12-18-68, 12-28-68.
258	Rules and Regulations for Uninspected Vessels (3-1-67). F.R. 12-27-67, 1-27-68, 4-12-68, 12-28-68.
259	Electrical Engineering Regulations (3-1-67). F.R. 12-20-67, 12-27-67, 1-27-68, 4-12-68, 12-18-68, 12-28-68.
266	Rules and Regulations for Bulk Grain Cargoes (5-1-68).
268	Rules and Regulations for Manning of Vessels (5-1-67). F.R. 4-12-68.
293	Miscellaneous Electrical Equipment List (9-3-68).
320	Rules and Regulations for Artificial Islands and Fixed Structures on the Outer Continental Shelf (11-1-68). F.R. 12-17-68.
323	Rules and Regulations for Small Passenger Vessels (Under 100 Gross Tons) (1-3-66). F.R. 12-6-66, 1-13-67, 12-27-67, 1-27-68, 4-12-68, 11-28-68, 12-18-68, 12-28-68.
329	Fire Fighting Manual for Tank Vessels (7-1-68).

### CHANGES PUBLISHED DURING JANUARY 1969

The following have been modified by Federal Registers:

(No Change)

# LIFELINES

STEER CLEAR OF TROUBLE – TAKE THE SAFE SIDE



E.N.

# BE CAREFUL!