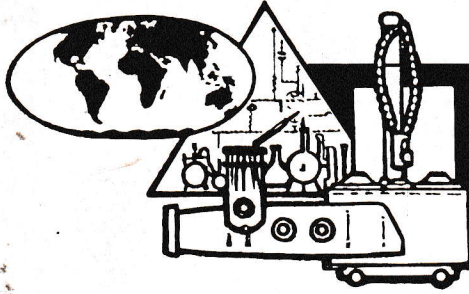


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THE MINE AND DEPTH CHARGE TROUBLESHOOTER

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CONFERENCE**
PAGE 3

▶ **INDEX 1969**
PAGE 11

▶ **ELEMENT CODES
HELP KEEP SCORE**
PAGE 8



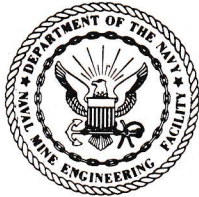
AN OFFICIAL NAVORD PUBLICATION

AN OFFICIAL NAVORD PUBLICATION

RADM MARK H. WOODS, USN
Commander, Naval Ordnance Systems Command

The Troubleshooter is an official NAV-ORD publication which disseminates informative articles pertaining to assembly, testing, safety, configuration, maintenance, and delivery of U. S. Naval mines and depth charges. When the word DIRECTIVE appears as a part of the mine heading of the article, the content that follows contains information requiring action that is mandatory and shall be acted upon promptly. The Troubleshooter issue is your authority for subh action.

Troubleshooter is also the journal for the Rudminde Program, a world-wide defect-reporting system, which promotes a high level of readiness in U.S. Naval mines and depth charges. Problems with these weapons are to be reported via NAVORD Form 8500/1 (2-68) to the Naval Mine Engineering Facility as directed by NAVORDINST 8500.3.



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THE MINE AND DEPTH CHARGE

TROUBLESHOOTER

ISSUE 1-70

1 APRIL 1970

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COVER

Admiral Thomas H. Moorer, Chairman, Joint Chief of Staff, and Captain Don F. Hihn, Commanding Officer, NWS Charleston, South Carolina, pause for a handshake at the dinner session of the 13th Minefield Conference. Captain Hihn was Mine Warfare Director, Underwater Division, NAVORD-SYSCOM until relieved by Captain James E. Myrick. F.C. Townley contractor's representative, stands in the background. More on the conference in story and pictures on page 3.

Photo by John Arena, courtesy NOL publication, The Oak Leaf

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FL SHOPTALK

NMEF FLEET LIAISON DESK • 703/887-2411 • AUTOVON 723-1900 • EXTENSIONS 492 & 695

FL Shoptalk is a column of observations general and specific, prepared by members of NAVMINENGRFAC's Fleet Liaison (FL) Department. Head of the department is LT Paul W. Hanks. Other members include LT M. D. Horn, Jr., CWO B. E. Wharton and CWO P. E. Dechene.

CHECK THE RECORD

By now you are all in receipt of some of the new standardized Assembly Check-off Sheets. As they come off the press, you'll be receiving more on other Mk's/Mods of mines. Many of you are perhaps wondering why the lack of serial-number identification on some of the job steps calling for installation of the various components, and it is to that end that we are addressing this item.

Before the last annual mine conference, all the fleet reps were gathered together to discuss the requirements, considerations and format for a standard type of assembly check-off sheet. Keep in mind now, that what we are speaking of is an assembly check-off sheet, not an assembly record sheet. It was recognized that each represented separate items used in mine shops to enhance mine assembly operations.

The assembly record sheet, which lists component identification data, offers no particular problem. The format might change slightly from shop to shop--one shop might want the information on a 5" x 7" card--others preferred it on 8-1/2" by 11" paper for inclusion in a mine history folder. But basically, the information required is the same. It was recognized, however, that the requirement to record serial number and lot number and NORD number was redundant and unnecessary. Components which have serial numbers need not be identified also by lot and NORD number. Recording of serial numbers, where serial number identification is provided, remains sufficient for all local purposes, relative to keeping tabs on what is where.

Some components do not have serial numbers, though, and those which don't are, almost without exception, those which never see a complete functional test. In these cases NORD identification is the only identification data available and it represents a population identity that is necessary to the "surveillance" modus operandi. These you will find identified on the assembly check-off sheet. Likewise, the few components which require serial number identification (since they have serial numbers) are identified for the same purpose as NORDS, and must be recorded.

To wrap it all up, we must identify those components which exist within the surveillance program. The other components are "proven good by reason of passing a functional class "B" test". Once passed, this acts as a certification that they will be serviceable and capable of performing their required function, within reliability constraints, until the next biennial maintenance cycle. Any corrective replacement requirement that NAVMINENGRFAC generates will be consistent with your next maintenance

schedule, thus negating the requirement for opening up all your mines to pull a component that is suspect.

In this regards, though, it is a good idea and good management to have a handle on just what you do have assembled in your mines.

We can foresee the situation where NAVMINENGRFAC might identify a certain serial range of components which might cause some trouble. By message, T-Shooter Bulletin, or some other media they let you know about it--stating that these should be set aside and replaced with spares from your shelf during the next maintenance cycle. In this case it is almost a must that you have some idea as to how many you will be required to replace so you can determine if you have enough spares on your shelf to cover the replacement--plus expected reject rate--before you enter into your next cycle. This is where your "assembly record" sheet pays off, and we strongly recommend such a system to provide you that final interface with your inventory of on-hand material. It's the last segment of a closed loop of information to keep you, the professional, on top of things.

FIRE EXTINGUISHER TAGS

It seems that there has never been an inspection conducted where someone didn't report missing inspection tags from fire extinguishers, especially

when the extinguisher is mounted outside exposed to the elements, such as alongside a paint locker or on a vehicle. The paper tags just don't stand up; they get wet and deteriorate, blow away, etc. NAVMAG GUAM had this problem, but they discovered an aluminum tag that is virtually indestructible and when wired onto an extinguisher will not tear or blow off. Another nice

FIRE EXTINGUISHER INSPECTION RECORD					
EXTINGUISHER NO.					
	'68	'69	'70	'71	'72
JAN					
FEB					
MAR					
APR					
MAY					
JUN					
JUL					
AUG					
SEP					
OCT					
NOV					
DEC					

THE ANSUL COMPANY, MARINETTE, WISC

feature is that it is good for five years, plus the fact you only need to punch the applicable month with a hand clipper/punch and there is no running or fading of a handwritten entry such as on the paper tags.

Continued on page 2

BULLETIN POLICY WILL CHANGE

Some of our more alert readers recently asked what to do about five Troubleshooter Bulletins which, according to the self cancelling statement on their masthead, had expired, but according to OP 3504 VOL 7 REV 2 were still current. This raised the question whether such listings in OP 3504 VOL 7 are intended to nullify the self-cancelling feature of the bulletins. The answer is that they are.

The contradiction should not, of course, have occurred. The reason it did stems from NAVMINENGRFAC difficulties in acquiring computer services from outside activities for the production of past revisions of OP 3504 VOL 7, with the result that the cutoff date for changes to Revision 2 was considerably in advance of the date it was actually ready for release to print. As a result the bulletins cited were current on the cutoff date for Revision 2, hence were listed, but had expired by the time distribution of Revision 2 by NAVPUBFORMCEN, in Philadelphia was accomplished.

Improvement in the computer problem is evidenced by the fact that a new edition of OP 3504, Revision 3, had a data cutoff date of 15 June 1970 and was delivered to the printer on 26 June. This was three months following release of Revision 2, indicating that the planned quarterly revision schedule for this volume has now been achieved.

Although Revision 3 lists no bulletins which will self-cancel within three months of the planned expiration of Revision 3, the situation calls for an action which will take place as soon as proper functioning of the Volume-7 computer system is firmly demonstrated: namely, the masthead information on the bulletins will be changed to delete the self-cancellation statement.

Thus the governing document for currency of bulletins will become OP 3504. This will not affect the standing policy of cancelling bulletins as soon after their release as Practicable.

FL SHOPTALK

Continued from page 1

The tag is made by the Ansul Company, 101 Stanton St. Marinette, Wisconsin, 54143 and sells for fifteen cents each, which equates to three cents a year. The tag appears as shown here but before you rush out and buy them you had better clear it with your local base fire department.

PRIDE IN WORKMANSHIP

I am sure we all have the same basic objective in mine assembly and that is to put out a good product. The illustrations of page 7 of Troubleshooter 3-69 are examples of how not to do it. Recently during an FSMT of some Mk 57 Mines we discovered that three of the propellants in the mud agitator failed to operate/burn. The problem was traced to the guide block on the Anchor and was caused by failure of the tongue of the slide to uncover the stop release which allows the explosive piston to line up with



Recently Distributed

- OP 3504: Authorized Configuration Data for Underwater Mines
- VOL 7 REV 2: Deployment References

Released to Print

- OP 1892 REV 3: Mine Mk 36-2, Assembly
- OP 3504: Authorized Configuration Data for Underwater Mines
 - VOL 1 REV 3: Cross References
 - VOL 2 REV 3: Material Application
 - VOL 3 REV 2: Piece Parts
 - VOL 4 REV 3: Bills of Material
 - VOL 5 REV 2: Test Equipment, Support Equipment and Tools
 - VOL 6 REV 0: Illustrated Parts Breakdowns
 - VOL 7 REV 3: Deployment References
- OP 3388: Mine and Depth-Charge Test Sets, Qualification, Troubleshooting and Repair
 - VOL 1 REV 1: Test Sets Mk 1 thru 126
 - VOL 2 REV 0: Test Sets Mk 127 thru 264
 - VOL 3 REV 0: Test Sets Mk 265 above

In Final Preparation

- OP 1765 REV 4: Mine Mk 25-2, Assembly
- OP 1797 REV 4: Mine Mk 25-1, Assembly
- OP 1452 VOL 2 REV 4 CH 1: Mine Components and Accessories, Hydrostatic Devices (This change adds completely new pressure and electrical tests for Depth Compensator Mk 3 and Sensitivity Switch Mk 3, using the Test Set Mk 250 and Accessory Sets.)

In the Works (in approximate order of intended release)

- OP 2572 VOLS 1 & 2 REV 3: Mine Mk 56, Assembly
- OP 3232 REV 0: Air-Laid Mines, Preparation
- OP 2718 VOLS 1 & 2 REV 3: Mine Mk 57, Assembly
- OP 956 REV 5: Mine Mk 25-0, Assembly
- OP 3379 VOL 1 REV 1: Maintenance Guide, All Mines

* This report is designed to keep readers abreast of what is going on behind the scenes concerning technical manual projects. It is not designed to compete with OP 3504 VOL 7, which is the only list of technical manuals, revisions, and changes authorized for fleet use.

the explosive fitting. Take a look at page 12 of Troubleshooter 2-66 for the straight dope. This check is being incorporated into the next revision of OP 2718. While we are talking about the Mk 57, don't forget to check the torque on the socket head screws which hold the mooring arm bracket on the mechanism compartment. During the same FSMT several mooring arms were loose enough to be moved by hand and one mounting screw was only finger tight. The procedure to follow is covered in OP 2718 VOL 1 PART 2 REV 1 Step 27, Instruction Sheet SM-1a and figure 9 on the facing page.

13th MINEFIELD CONFERENCE

COASTAL shelves was the theme of the 13th Annual Technical Conference on The Navy Minefield held at White Oak, Maryland, this year. The Naval Ordnance Laboratory played host to some 400 members of the mine community who attended the sessions. The Naval Mine Engineering Facility, Yorktown, Virginia was represented by W. F. Skinner, with H. A. Ross Clunis, of the Development Department, and Trist B. McConnell of the Weapons Engineering Support systems Department.

Those who attended the minefield conference represented the more than a thousand senior military and civilian representatives of the many governmental, industrial and academic activities that contribute to naval minefield technology. Eight sessions of several hours each were held in the two days of the conference, January 26 and 27.

Dr. Gregory K. Hartmann, the NOL Technical Director, was chairman of the opening session which was devoted to reports of various survey studies that relate to the uses of mines. Following an address of welcome by Captain George G. Ball, USN, the NOL Commander, Dr. Hartmann delivered the first of the Conference's 32 technical papers. Included was a paper by NAVMINENGRFAC's Ross-Clunis on "New Mine Power Sources." To supplement the information in his paper Mr. Ross-Clunis also supplied an exhibit of mine batteries now being used and those proposed. (See Troubleshooter 3-68 for more on New Power Sources for Mines.)

The fifth session was a dinner meeting at the Officer's Club of Fort McNair. The speakers included the Honorable Russell E. Train, the Under Secretary of the Interior, who spoke of The Value of Rights to Coastal Shelves; and Admiral Thomas H. Moorer,

Continued on page 8



Admiral Thomas H. Moorer, Chairman, Joint Chiefs of Staff, then the Chief of Naval Operations, speaks at the conference dinner session. Seated, left to right, are: Dr. Albert B. Focke, session Chairman; the Honorable Russell E. Train, Under Secretary of the Interior; Captain George G. Ball, NOL Commander; and Dr. James S. Coles, Chairman of the Mine Advisory Committee (partially hidden).

Photo by John Arena



A number of exhibits were open to conferees between sessions including one on mine power sources, current and experimental, assembled by H. A. Ross-Clunis, Component Redesign Division, Development Department, NAVMINENGRFAC, Yorktown, Virginia.

Photo by Roy Simpson

What is a Minefield?

This summation of what it takes to make a minefield, as it appeared in NOL's program booklet for the 13th Minefield Conference, is worth reading by all minemen.

The minefield has too long been thought of as simply a distribution of mines in a sea environment.

It consists of mines, countermeasures, and targets, to be sure. But it also involves ships, airplanes, submarines, helicopters, and the newer types of platforms like hydrofoils and ground-effect machines.

The minefield is a collateral, auxiliary, or support system for naval operations—not a competitive system that will reduce carrier and submarine force levels. It has the unique ability to extend the threat of denial and destruction for a long period of time after its introduction.

And it can be used solely for surveillance, particularly in reasonably restricted and narrow waters.

But the minefield is yet much more.

It is people who plan, prepare, test, repair, manufacture, distribute, store, recover, dispose of, and neutralize mines.

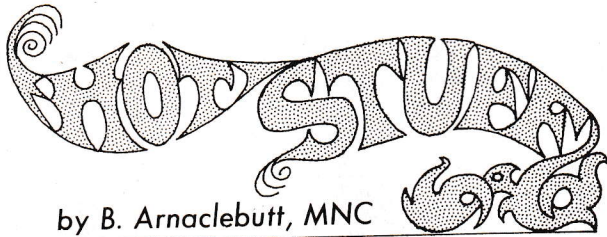
It is a technology and a science of exploration and application. It involves problems in understanding human and national behavior, mathematics and ecology.

But the minefield is still more.

It is a way of thinking. This, as much as all the rest, separates and identifies the minefield as a system apart.

It is this humanistic trait that gives rise to the application of descriptive terms such as cunning, bold, patient, and devastating to the minefield.

But, most of all, it is a philosophy. It results in a situation whereby a relatively small outlay of national resources in mine material requires an inordinately larger expenditure by the enemy to combat it or to reduce its effect.



by B. Arnaclebutt, MNC

New FSN for adapter connector

MINES MK 25-1/36-2/49-1:

Dear Barney:

Can't get the male connector to make the adapter cable for the detonator-energy tests of Firing Mechanism A-5 Mod 3 with Test Set Mk 61 as instructed in OP 2567, Part 1, Volume 1, Chapter 2, Appendix A. Using the FSN 5935-636-5975 given in the instructions, requisitions come back with a "not available" notation. Help please.

MN1 ACT

Dear ACT:

The trouble is that the FSN for that connector has been changed to 9N 5935-643-5385. This gets you the male connector, MS-3101A20-29P, that you need. Assume you have had no difficulty in getting the rest of the parts needed to make the adapter cable; Cable CA 519 from a discarded Battery BA-241/U, the 3 ohm, 1/2 watt resistor, etc. Check the cables in your Mk 61 Test Set before starting to make this adapter cable. Somebody else may have made one and stowed it in the set.

B. Arnaclebutt

Wind the CDs —not the leads

MINES MK 6-14, 15/25/27/36/39/49:

DIRECTIVE

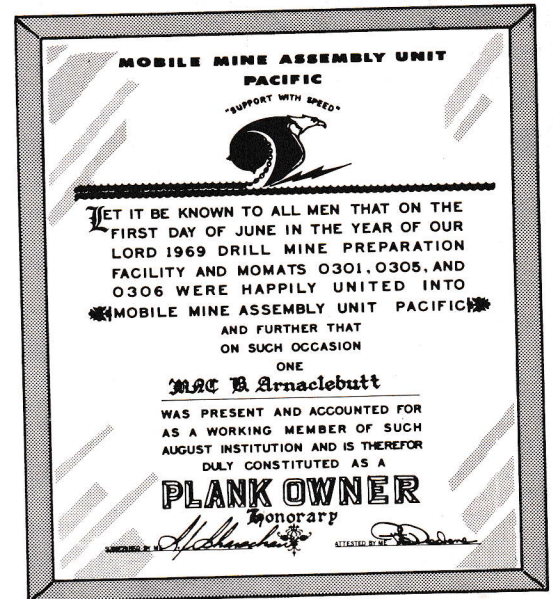
Dear Barney:

The internal insulation on our handwound clock-delay leads have been suffering a high mortality rate. The leads nearest the winding post show evidence of being pinched, the insulation being split and chafed, so that bare wire is exposed. In one lot of CD 10s, 20 percent were so damaged without evidence of what caused it.

CLD

Dear CLD:

The most plausible explanation of the cause of this damage is advanced, via Rudminde, by Mr. F. A. Smith, NAD Hawthorne. He blames the use of winding keys or cranks that are drilled and tapped too deep which allows the cable leads to be pinched between key and upper plate of the clock delay. The first time the cable is pulled to any extent, says Mr. Smith, the short lead will be pulled over to the



GRATEFULLY RECEIVED

Gee fellows you shouldn't have! Or are you trying to soften up the old Chief by making him an Honorary Plank Owner upon the occasion of the establishment of Mobile Mine Assembly Unit Pacific? Take it any way you want the fact is that the colorful Plank Owners certificate is framed and has a place of honor on the Troubleshooter's wall.

Not only are we proud of the certificate but also the exalted company we are in. It is not often we get to share honors with an admiral for, as CWO Dechene writes, it "is one of two honorary plank owners certificates that are being issued by MOMAUPAC, one to Chief B. Arnaclebutt and the other to RADM H. V. Bird, Commander in Chief of Mine Forces Pacific."

Good luck and all the best to the newly established MOMAUPAC about which more, with pictures, appears on page 6 following Hot Stuff.

winding post causing it to be pinched if an unauthorized winding tool is used.

So why use an authorized tool? It is true that the requirement for packaging a winding key with each hand-wound clock was deleted in 1963 because mine activities were acquiring an over abundance of them but, if over the years all these keys have disappeared, the correct key 7K00501 can be requisitioned. The use of no other key is authorized.

B. Arnaclebutt

No effect on calibration

ALL MINES:

DIRECTIVE

Dear Chief Butt:

What effect does battery replacement have on the calibration of a multimeter, such as the AN/PSM and Simpson 260, if any? The question comes up because calibration

stickers sometimes are placed so that the battery cover cannot be removed without breaking it. Also the sticker may prevent operating the mechanical zero adjustment screw for the same reason. This implies that the calibration sticker also serves as a seal.

MN2 CWR

Dear CWR:

The placement of a calibration sticker over adjustment screw or battery compartment cover is an accident of location and not intended as a prohibition against turning adjustment screw or replacing a battery. Before using you are required to adjust a meter to zero if necessary. Also if you can't adjust to zero you are required to replace a battery of proper voltage to be able to do so. Replacement does not void calibration.

To avoid confusing a sticker with a seal calibration laboratories have been instructed to affix calibration stickers so they will not have to be removed or broken to mechanically zero the meters or to replace batteries.

B. Amalebutt

Easing M-9 installation

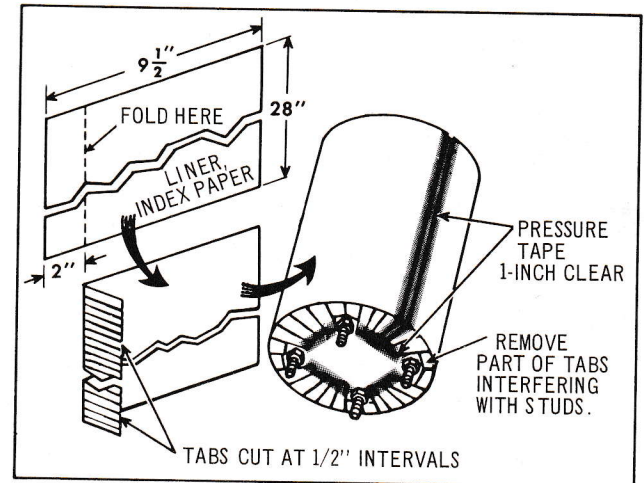
MINES MK 36-1:

Dear B:

During the performance of maintenance on the Mine Mk 36 Mod 1 difficulty was encountered in removing and installing the M-9 Mod 1 Firing Mechanism in spite of the fix in Troubleshooter 3-68. We blame added thickness of the new Mk 18 cushion set and variations in mechanism compartment diameter. If the end of the cushion is trim-

med the smaller-diameter compartment would be no problem. How about the rest of the problem.

CPS-NM2



Dear CPS:

Trim the cushion by all means if it doesn't fit in the compartment without overlapping. To solve the problem of the thicker cushion substitute index paper, 5P00504, 9Q9310-160-7841 for the newsboard. It is thinner and slicker, and should let the M-9 go in and come out without using undue force. Being thinner the index paper will take special treatment to avoid crumpling, a procedure similar to that used in installing fish paper on boosters. This method will be described in the upcoming Rev 5 to OP 1684. Preparation of the liner is shown here. The tape that holds it all together is 7T00086, 9Q8135-663-3732.

B. Amalebutt



SAVES \$49,000 REWARDED

Chief Warrant Officer Edward R. Jones, USN (right) receives a check from Captain O. D. MacMillan as payment for a beneficial suggestion. Mr. Jones, who is Mines Preparation Officer at Key West Test and Evaluation Detachment, designed and built a mine instrumentation unit that saved the government money to the tune of \$49,000.00 for which he was awarded \$880.00. Mr. Jones' idea also saved a delay of six months that would have had serious consequences for the project.

TROUBLESHOOTER 1-70

FAREWELL TO MOMATS

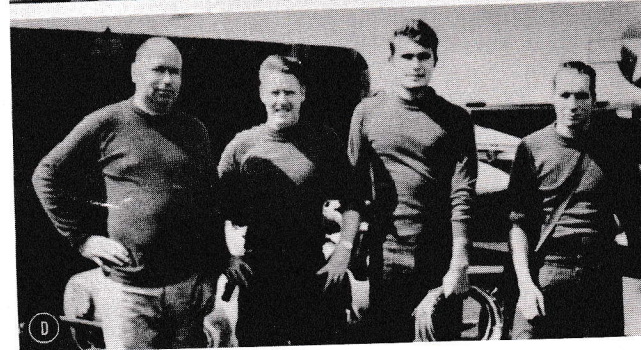
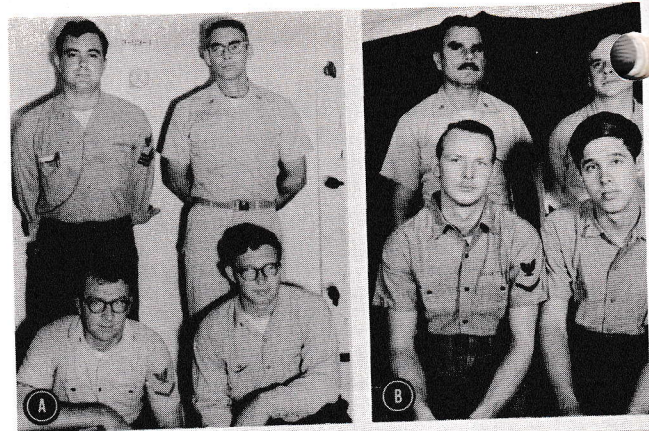
WELCOME MOMAUPAC

The last of the MOMATS, officially Mobile Mine Assembly Teams, disappeared with the formation of Mobile Mine Assembly Unit Pacific on 1 June 1969. At the direction of the Chief of Naval Operations, the Drill Mine Preparation Facility and Inshore Undersea Warfare Group One, as well as MOMATS 0302, 0303, 0304, and 0305, were disestablished. The manpower was used to establish MOMAUPAC with CWO 4 S. J. Scharschan commanding and based at U. S. Naval Station, Long Beach, California. MOMATS 0301 and 0306 were also disestablished.

The west coast action followed the pattern of the organization of Mobile Mine Assembly Unit Atlantic, which became MOMAULANT 1 July 1968. This command based at U. S. Naval Station, Charleston, South Carolina absorbed the east coast MOMATS 0321, 0322, and 0327. Detachments from the parent MOMAULANT accomplish the mission formerly required of the MOMATS.

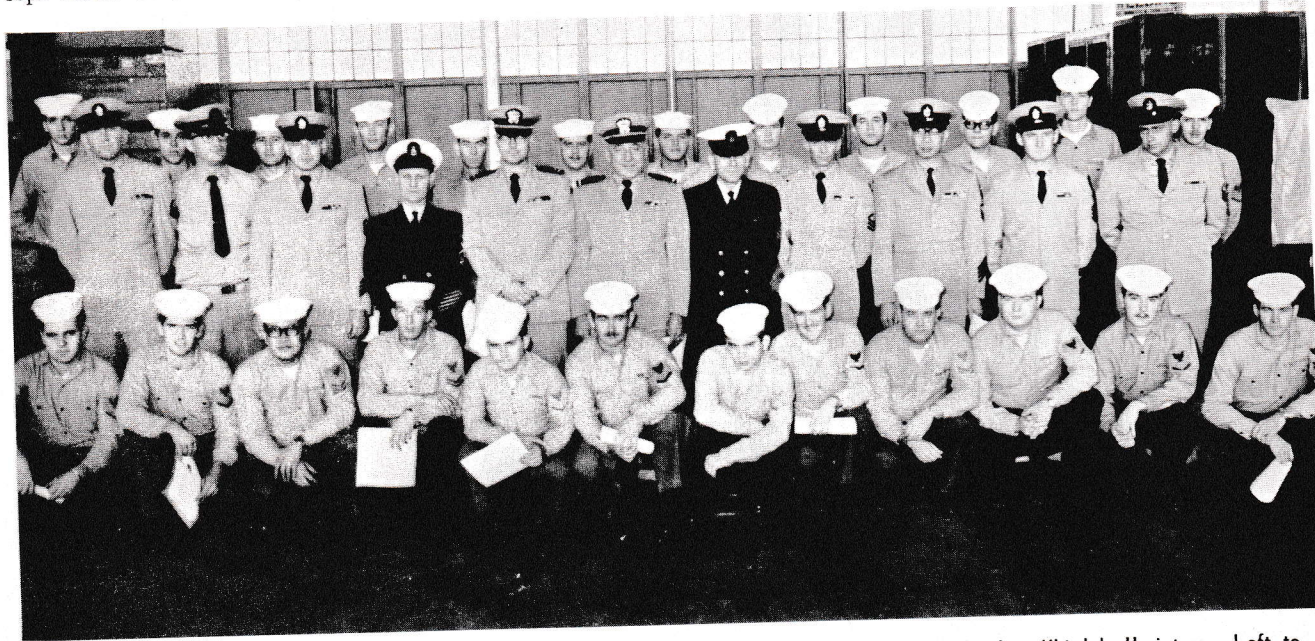
MOMAUPAC's mission includes support of COMINEPAC's drill mine program and support of West Pac operations. In supporting COMINEPAC, MOMAUPAC will be called upon to prepare and overhaul approximately 350 air-laid, 120 surface-laid and 93 submarine-laid drill mines yearly. The West Pac support at this time consists of three detachments deployed from four to six months.

This marks the end of MOMATS which started their careers as MDAUs, MINE Detail Augmenting Units, except MOMAT 0327 which began as Mine Project 4.



Members of the three detachments now deployed by MOMAUPAC pictured above, identified left to right:

Detachment A. Front row: MN3 J.W.Hudson and MNSN T.A. Lawson; Second row: MN1 J.W.Amburgy and MNCS J.D.Stokes. Detachment B. Front row: MN3 C.F.Argetsinger and MNSN D.J.Abbott; Second row: MNC W.G. Phillippi and MN2 D.D.Smith. Detachment D. MNC F. Cline, MN2 J. (NMN) Stevens, MN3 J.D.Snead and MN2 R.P.Kidd.



The crew of Mobile Mine Assembly Unit Pacific at the Naval Station, Long Beach, California pose for their "birthday" picture. Left to right they are:

First row: MN3 M.J. Bayer, MN3 W.E. Hunter, SK1 M.A. Mantanona, MN2 R.R. Davis, MN3 J.J. Jakubisin, MN3 T.L. Bell, MN3 T.T. Sage, MN3 W.M. Small, MN2 R.C. Knight, MN3 K.M. Banks, MN3 S.M. Moore, MN2 S.R. Stephens. Second row: MNCS R.W. Fowler, MNC B.N. Johnson, MNC W.R. Segesser, MNCM J.(N) Glowa, CWO2 P.E. Dechene, CWO4 S.J. Scharschan, MNC F.D. West, MNC D.T. Frank, MNC C. Sing, Jr., MNC D.R. Jones, MNC R.L. Johnson. Third row: MN2 M.H. Fritzhall, NMSN D.T. Abbott, MN2 J.G. Blyth, MN1 R.E. Dwengerk, MN1 C.W. Briggs, Jr., MN3 G.A. Hess, MN2 G.E. Robertson, MN3 J.C. Good, SK2 F.J. Kerekes, MN3 F.M. Crowell, MN3 J.A. Hoffmeister, MN3 D.J. Steinhoefel. Not present for photo were MN1 S.L. Guy and MNSN S.A. Bruno.

AN INTRODUCTION TO A MUCH-REVISED OP 3504



REVISIONS to all volumes of OP 3504, Authorized Configuration Data for Underwater Mines, which were in the printing and distribution mill at the time of this writing, are more than just an updating of information. The volumes incorporate changes and additions that require a new look at the introductory matter to all volumes, especially Volume 1, and to Volume 6, which has been released in its first edition (revision zero) and contains the first illustrated parts breakdown (IPB) ever published for a U S Navy mine! By putting emphasis on these two volumes it is not meant to infer that minemen should neglect making themselves familiar with the contents of the other volumes. They will find the time so spent will pay off in time saved when they have to refer to OP 3504 for specific information.

The changes that have greatest significance to the user are in the area of support equipment. Earlier editions carried all types of mine support material under Material Classification Index 7, (first digit of the MMC), everything from apron to wrench. Now, however, the 7 index has been limited to tools, generally hand tools, and to test instrumentation devices and jigs. Shop equipment, including material handling and safety equipment, has been identified by Material Classification Index 1, and bulk material, tape, paint, adhesive, etc., by 5. Test equipment continues to be identified by index 4 as it has always been, while a new one--Index 3 for crates, containers, packaging material, and the like--makes its first appearance in the new editions.

This One Could Hurt

If you've read this far you may be grinding your teeth, wondering what will happen with all the MMCs--those ubiquitous Mine Material Management Codes--that have been so widely used for parts identification in other publications. Who's going to get them all changed to agree with these changes in OP 3504 and how does the "gentle reader" resolve the ten thousand points of confusion that are bound to occur in the meantime?

In response to such well-founded concerns, users of earlier editions of OP 3504 will be pleased to find a new section in the new Volume 1. It identifies all MMCs which, for reasons of growth or refinement of the data system, have had to be cancelled, superseded, or corrected. The section provides a two-way listing: the first in "cancelled" MMC sequence, giving replacement (current) MMCs for "old" ones wherever appropriate. The second listing identifies current MMCs to earlier ones which they have cancelled. Users of OP 3504 will find these lists helpful when tracking down any MMC that appears to have dropped out of the system, and it will resolve with dispatch cases such as we have just described, where it has been necessary to change a previously-assigned MMC. Fortunately, re-assignments have been--and will always be--few and far between.

Symbols, Abbreviations, and Codes

Of necessity, Volumes 1 through 7 of OP 3504 abound with symbols, abbreviations, and codes.

Some are standard and in wide use throughout the Navy or DOD, others have been developed especially for mines.

Until now, only Volume 7 has contained explanations of the symbols etc. used in it, and it will continue to do so. But now the symbols, abbreviations, and codes used in Volumes 1 through 5 are made equally easy to interpret in that their many meanings are explained in three tables in the introduction to the new Volume 1.

Volume 6 Explains Itself

Seemingly that leaves the new Volume 6 high and dry but actually it does not--as you will see when you read it--since it contains its own explanations, peculiar to use of the complete IPBs it will contain. The one in the first release covers only Mine Mark 56 Mod 0. To the extent that dollar allocations allow, other mines will be similarly covered in future editions.

Don't Stop Here

These, then, are some of the new things you will find in the new 3504, but not all. As we suggested at the outset, it behooves every user of the all-encompassing mine configuration bible which is OP 3504 to read the introductory matter in each volume carefully, several times. Only in this way will you become aware of the many changes and improvements which it is not practicable to explain here, and thus acquire the ability to solve hundreds of day-to-day mine-shop problems with the proficiency which these computer-produced marvels make possible.

MINE MATERIAL CLASSIFICATION

Some new categories appear as Mine Material Classification Indexes in the revised OP 3504. The new line-up of indexes and the categories of material is given here. Group 6 appears only in Volume 7, Deployment References.

- 0-assembly-level item for service mine or service and drill.
- 1-shop equipment including handling and safety equipment.
- 2-reserved.
- 3-crates, containers, packaging material, etc.
- 4-test equipment.
- 5-bulk material.
- 6-reference data (DWG, LD, OP, OD, Ordalt, OSR, etc.)
- 7-tools including FSMT instrumentation material.
- 8-reserved.
- 9-assembly-level item for drill mines only.

ELEMENT CODES HELP KEEP SCORE

ALL MINES:

DIRECTIVE

All mine shops are now in receipt of their initial supply of Report of Class "B" Test and Class "C" Test forms. On both, there is a column identified as "Element Code" which, according to the instructions on the reverse of the forms, is for NAVMINENGRFAC use only. There are now elements of information that will be identified in the Element Code column on both Class-B and Class-C test-report forms--that of any adjustment or replacement which must be done to bring a component to Class-B limits, on the Class-B form--and that of identifying when you experience a Class-C test failure on the Class-C forms. This information will be included by the use of simple codes, in the Element Code column.

6. SECURITY CLASSIFICATION	
J/S NO.	
14. ELEMENT CODE	
A-R107	

SECURITY CLASSIFICATION	
J/S NO.	
14. ELEMENT CODE	
R-0C00171	

On the Class B forms all you have to do is indicate which control(s) you had to adjust, or what items you had to replace to bring the component within acceptable test limits. But this should NOT include items which you, the tester, adjusted or replaced as a matter of refinement, to bring a mechanism to the middle of a prescribed range. Thus adjustment of the kind that should be reported would be a M-11 firing mechanism on which it was necessary to adjust Potentio-

meter R107 to bring the mechanism within Class-B test limits. In this case you would simply indicate A-R107 in the Element-Code column on the same line as the serial number of the mechanism which required the adjustment. An example of a replacement would be that of the 300-mfd capacitor in an A-6 firing mechanism in order for it to pass the Class-B test. In this case you would indicate R-0C00171 (MMC code of the capacitor) in the Element-Code column.

On the Class C forms two types of information will be supplied in the Element-Code column by the codes BD or BU. These indicate that mine failure occurred during the Class C test performed prior to break-down (BD) or after biennial maintenance (after Class B testing of components) when the Class C test is performed in

CONFIDENTIAL (WHEN FILLED IN)	
AN DATA	
RATE	RATE
RATE	RATE
RATE	RATE
12. QUANTITY	
PASSED	FAILED
18. ELEMENT CODE	
BU (or BD)	

the course of build-up (BU). The Code BU would also apply in the course of building a new weapon to D configuration or higher.

This explanation takes care of Element-Code column entries on the test forms while the rest of the instructions on the reverse of the forms apply. Troubleshooter Bulletin No. 208 explains the use. When gathered this information will be of great value in keeping track of component stability and deterioration trends.

PREFORMED PACKING FOR ACCESSORY SETS

Need replacement O-rings for your Accessory Set? Having trouble identifying them?

Here is a tabulation that amplifies and corrects the Hot Stuff item "FSNs for replacement packing" in Troubleshooter 4-69, and answers both questions:

TEST SET	ACCESSORY SET	MS 29513-	FSN 5330-
Mk 250	Mk 6, 7, 8, 12, 13 20, 24, 25	-260	-252-6041
Mk 250	Mk 6, 7, 8, 12, 13	-251	-599-3071
Mk 250	Mk 6, 7, 8, 12, 13	-250	-291-3085
Mk 266	Mk 10	-239	-291-3076
Mk 250	Mk 13	-228	-291-7337
Mk 250	Mk 13	-010	-248-3835
Mk 263	Mk 17	-239	-291-3076
Mk 250	Mk 20	-346	-251-9378

CONFERENCE

Continued from page 3

USN, as the Chief of Naval Operations, who discussed Continental Shelves and Navy Responsibilities.

Other sessions dealt with the characteristics and exploration of coastal shelves, minefield effectiveness, advances in mine and countermeasure hardware, and advances in minefield technology.

The Naval Ordnance Laboratory which organized the first conference in 1958 with the continuing support of the Naval Ordnance Systems Command, the Chief of Naval Material, the Chief of Naval Operations, and many others responsive to the needs of mine warfare now proposes that next January's conference have for its subject The Minefield with Ice Cover. Nol's Underwater Evaluation Department, which develops conference sessions, believes recent trends point to a need for emphasis on such use of mines. These trends include increased surface and submarine traffic, the development of oil fields near Alaskan coastal shelves, the discovery of deep subsurface channels and the use of northern waters for industry, minerals, and foods.

Do You do this Job Right?

SD-4 CABLE RETAINER

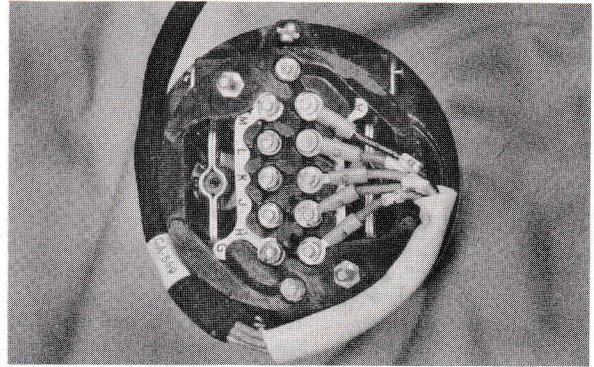
MINES MK 18/25/27/36/49:

If you are having trouble keeping cable leads in place when installing the SD-4 Mod 1 in a mine's clock well here is a way to make the job easier. Thanks to MN 3 Arthur F. Ross, NAVMAG Guam for the idea.

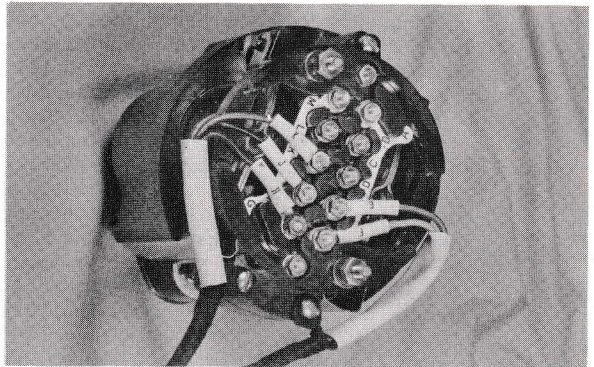
The problem is that a sterilizer cable assembly contains anywhere from three to six leads which tend to fan out, where they connect to the sterilizer, so that one or more can be in danger of being pinched between the SD-4 body and the clock well wall. Keeping these leads free of a bind can be difficult since the sterilizer has to be lowered to the bottom of a well that allows little clearance for a lead gone astray.

Mine assembly instructions take care of keeping the cable and its branches out of the way but the danger lies in the length of cable leads between strain loop and where the leads, now unrestrained by the cable covering, enter the SD-4 Case. To correct slip a piece of insulating sleeving over the loose leads, as illustrated here, to keep them from fanning out. What you need is a length of thin-walled plastic sleeving with a 3/8-inch inside diameter, approximately 3 inches long. It can be obtained by FSN 5970-617-5798, at a cost of 2 cents a foot.

The short time spent in installing this cable retainer at a cost of 1/2 cent a unit will save time in the long run when you are installing the SD-4--to say nothing of the danger of rupturing insulation on a lead wire or severing it.



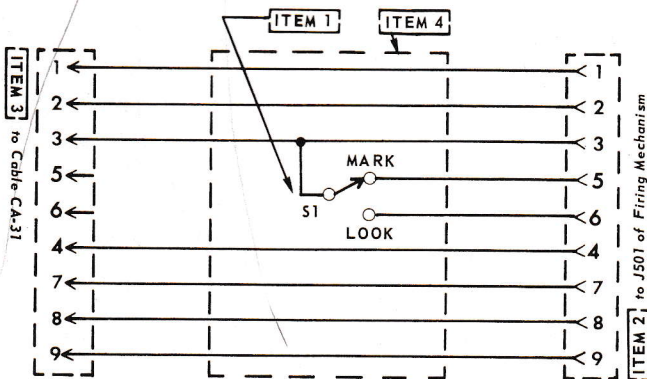
An example of insulating sleeving on Cables CA-350, CA-524, CA-530, and CA-559.



Two lengths of same sleeving used to protect leads of Cable CA-300.

TEST SET MK 265 ADAPTER SCHEMATIC CORRECTED

MINES MK 52/55-3, 4, 6:



Corrected Schematic

The schematic for the adapter in the Troubleshooter issue 1-69 shows the numbering for the amphenol connectors in the wrong sequence. This is the adapter that makes it possible to discover a miswired Firing Mechanism Mk 22 Mod 1 with Test Set Mk 265.

In both Item 3 and Item 4 the numbers should read 1, 2, 3, 5, 6, 4, 7, 8, and 9. This makes 5 and 6 the cable connections interrupted by switch S1 instead of 4 and 5. Substitute the corrected schematic here for that on page 9 of the 1-69 issue and everything will be OK.

The Editor

ABOUT THIS INDEX

This is the first appearance of an annual index for The Troubleshooter. It is designed to lead information-seekers to articles of all categories including group and other photos. Most technical information will be cross referenced. For example, an adapter cable for a test set will appear under the TEST SET heading as well as under CABLE. Non-technical articles of personal or general interest are also referenced in this index. In page-number references C1 indicates a front cover and C4 a back cover.

It is probable that such yearly indexes will henceforth appear in the first issue for the year following the year of the index. Thus as this Troubleshooter 1-70 carries the index for 1969, so the Issue 1-71 will carry an index for the year 1970. Several considerations led to this departure from the 5-year index.

A magazine such as The Troubleshooter deals with problems of the moment, with solutions which are subject to refinement before being permanently incorporated into other publications. As a result an index that references a 5-year-old Troubleshooter could be misleading. The Troubleshooter is transient, not intended to be "the law" forever, yet minemen have been known to refer to Troubleshooter 1-65 for painting and color coding when years after newer and more complete information on that subject was published in OP 1452 Volume 3. Also OP 1452 can be updated by official changes and revisions. Troubleshooter 1-65 cannot!

For these and other valid reasons (problems of stocking, wear and tear, etc.) mine activities will only be required to keep as active references those Troubleshooters covered by the annual index plus those for the current year. In the present case this means the four 1969 issues and those that will be issued for 1970. And when 1-71 comes out with its index for 1970, minemen will not be held accountable for information in the 1969 issues, with information in the cancelled issues incorporated in OPs or corrected by Ordalt or OSR, as required.

This does not mean that those who cherish some gems of "nice to do if you can use it" information need to throw past or future labor-saving ideas out the window. We know, for example, that items like MN1 Neiderbaumer's Test Pots in Troubleshooter 3-67 and such educational pieces as Voltmeter Loading Effects back in 2-64 will continue to be saved by some readers for a long time to come.

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MINES, MINEMEN & MEMORABILIA

HISTORICAL SERIES No. 3

MINES AGAINST THE U-BOAT

PART I: 'The Yankee Squadron' is Born

The United States' lethargic approach to mine warfare ended with the advent of World War I. The British had learned early the value of the minefield as a weapon against the U-boat. Although they had practically no stocks of mines before 1914 they stepped up underwater mine production rapidly. They laid minefields to protect harbors and ship channels with results that were on the whole satisfactory although the mines were not the sophisticated underwater weapons that were to follow them.

Shipping was Britain's lifeline and the submarine was threatening it. Armed merchantmen merely called for German countermeasures that led to unrestricted undersea attack on neutral and combatant alike without warning. Another course of action considered by the English was to deny the sub ready access to the Atlantic. To this end a mine barrage in the North Sea was proposed but tabled by the admiralty largely because of the enormity of the task. Then the United States entered in war, largely because of U-boat sinkings.

The U. S. Navy revived the mine barrage scheme and focused its energies on the problem. Navy planners and American inventors were hard at work to come up with a mine that would be effective against the submarine while keeping the mined area safe for surface vessels, a requirement the British insisted upon. The admiralty wanted nothing that would restrict the movement of the Grand Fleet and feared mines that planted shallow, a fault that was not uncommon in the past performance of mines. American inventors came up with a moored mine with an antenna which would increase coverage in depth by use of a copper wire attached to a float above the mine. The Bureau of Ordnance authorized the inventor to proceed with this idea and so launched the production of the Mk 6 mine.

An Allied Naval Conference in London September 4 and 5, 1917 was favorable to the U. S. undertaking although the early attitude of the British Admiralty was not at all encouraging. The English did not believe that the United States could come up with a satisfactory new mine, on a crash basis.

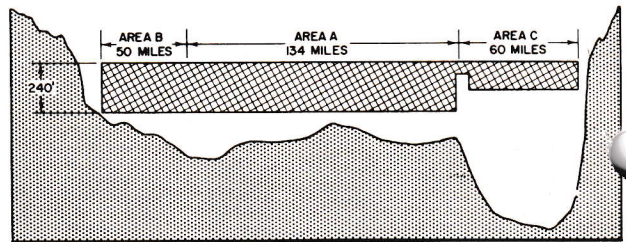
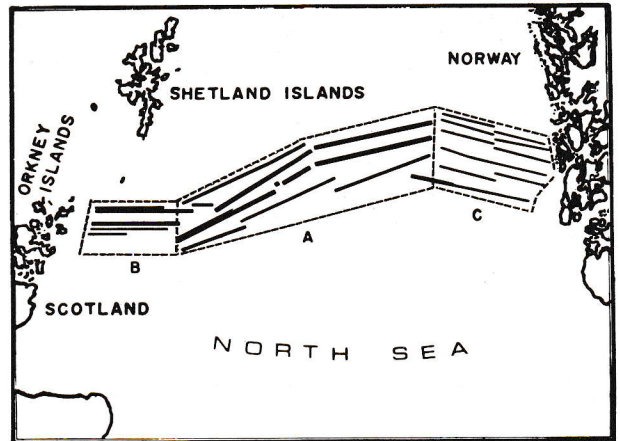
The plan was stupendous for those early days of underwater mining. The Northern Barrage was to stretch 250 miles across the North Sea from Aberdeen to the Norwegian Coast. Under the plan the U. S. was to provide 55,000 mines. The field's effect was

to be in depth, leaving to patrol boats the denial of passage of submarines on the surface.

To direct the operation the Mine Force, Atlantic Fleet was established by General Order 218 Of 5 June 1916 and commanded by Rear Admiral Reginald R. Belknap, then with the rank of captain. The task force was organized as Mine Squadron One on April 10,

1918, at Hampton Roads, Virginia where Captain Belknap relieved Captain H. V. Butler. The Mine Force command was taken by Admiral Joseph Strauss. Captain Butler became squadron chief of staff and skipper of the flagship San Francisco. Mine

Squadron ONE was familiarly known as the Yankee Squadron,* the title of Captain Belknap's book on its history, published in 1920 by the U. S. Navy



NORTH SEA MINE BARRAGE

According to plan, areas B and C were to be the responsibility of the British although the U. S. helped out with 15,000 mines. Area A was America's responsibility and required 36,300 mines. Norway laid mines along its shores but not until the last months of the war.

Institute, a book to which this writer is indebted for much of his information.

At the beginning the "Mine Force" consisted principally of the old cruisers San Francisco and Baltimore converted to mine ships in 1911 and 1915 respectively. By 1918, when Mine Squadron ONE was organized, the force had been augmented by eight converted merchantmen which were commissioned and joined in December 1917 and in the early months of 1918.

It was this squadron of ten ships the youngest of which was launched in 1911 and the oldest in 1888, that laid 56,571 mines in the North Sea Mine Barrage. The squadron made thirteen excursions in cooperation with the British and in one laid 5520 mines in 3 hours and 50 minutes. Operations in laying the mines, which comprised more than four fifths of those laid in that famous barrage operation, began 7 June 1908 and ended 26 October 1918, little less than five months.

* The mine-laying operation was a combined effort with British and American squadrons working together. To the British the Mine Squadron ONE, U. S. Atlantic Fleet was Second Mine-laying Squadron. This dual identification led to the popular and unofficial use of "The Yankee Squadron" to clearly differentiate between British and American units.

