

*mine and depth-charge*

# THE TROUBLESHOOTER

- ▶ Testing MK 23 containers
- ▶ A mine's obituary
- ▶ Fitting MK 12 lugs



**AN OFFICIAL NAVORD PUBLICATION**



*in this issue . . .*

*mine and depth - charge*

# THE TROUBLESHOOTER

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**COVER PHOTO:** Most air-laid mines are either hung on this A-1 airplane, or is awaiting its turn. This picture was taken during a series of fit tests conducted by NATC and NMEF at NAS, Norfolk. In the foreground are various pieces of loading equipment ranging from the USAF MJ-1 power loader to the familiar standby, the Aero 14C bomb hoist with the Aero 61A hoisting sling. Can you identify all the items shown?

1 APRIL 1967

The Troubleshooter, an official NAVORD publication, contains technical information pertinent to the assembly, testing, and delivery of US naval depth charges and mines. It is both authoritative and directive in nature, and reference may be made to a particular issue as the authority for adoption of ideas promulgated therein.

Troubleshooter is also the official journal of the Rudminde Program a world-wide defect-reporting campaign designed to promote a high level of undersea warfare readiness in US naval depth charges and mines. The Program's basic instrument is NAVORD Form 8500/5 (I-63). Everyone who encounters problems with these weapons should report them via this form direct to the Naval Mine Engineering Facility as prescribed by NAVORDINST 8500.8.

**ARTHUR R. GRALLA**  
Rear Admiral U.S. Navy  
Commander, Ordnance Systems Command

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**THE OFFICIAL JOURNAL OF THE RUDMINDE PROGRAM**



# RUDMINDE REPORT TO THE FLEET

## Black box is not dead

The shouting over a black box to test mine test sets dates back so far that many of the strongest voices have departed the ranks of our T-Shooter readership. But not all. Hardly a week goes by without our receiving an inquiry from somewhere asking, in effect, "Wot hoppen?"

The answer, as some readers are very much aware, is: Plenty, and most of it bad. More than once we have thought the program was on the verge of "go", then just as many times we gave it up for gone.

But gone it is not, witnessed by the fact that the first fifteen units have now been issued to mine-assembly activities, with more scheduled for release later this year. Now grown into three units as explained in Volume 1 of OP 3379, the black box has been officially designated Test Set Checkout Group Mark 1 Mod 0, and consists of a Test Set Mark 456 Mod 0, a Power Supply Mark 136 Mod 0, and an Accessory Set Mark 66 Mod 0.

## OP 3388 released too

Instructions for using the group to check out Class B and C test sets are contained in OP 3388, of which copies of Revision 0 have been released to those who have already received the checkout group. This zero revision has purposely not been placed in Cog-I stock, though, so do not order it. The reason is that a more complete Revision 1 will be distributed and in stock in only a few weeks, while Rev 0 is merely a stop-gap produced in a very limited number to provide some info to recipients of the first available checkout groups.

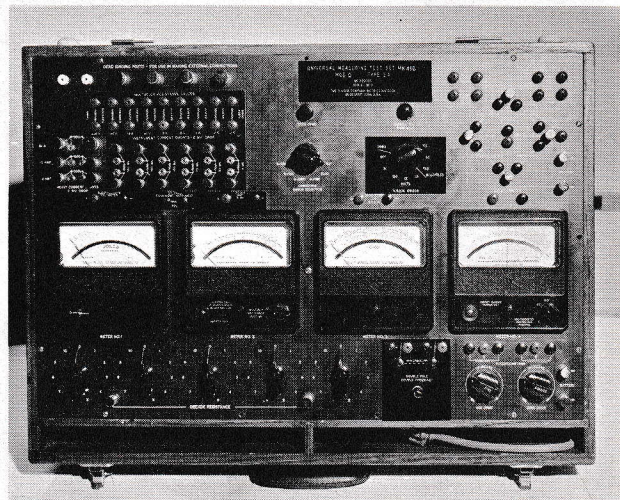
## Next: Test-set MRCs

Revision 1 to OP 3388 will not, however, be the end. While Rev 1 will contain some general maintenance data, it will be a far cry from the latest policy adopted for test sets, which will be presented later in Rev 2 to OP 3388, Volume 5 of OP 3504, and test-set MRCs, all three of which are in preparation now at NMEF. Rev 2 to OP 3388 will contain not only test-set checkout procedures, but also troubleshooting and repair instructions for each set. Volume 5 of OP 3504 will ultimately establish and identify the many test-set repair parts that are being made available at the organizational maintenance level. Test Set MRCs will specify regular test-set maintenance, including required intervals for checkouts, and will liberalize requirements for laboratory calibration cycles when maintenance and checkouts are so performed.

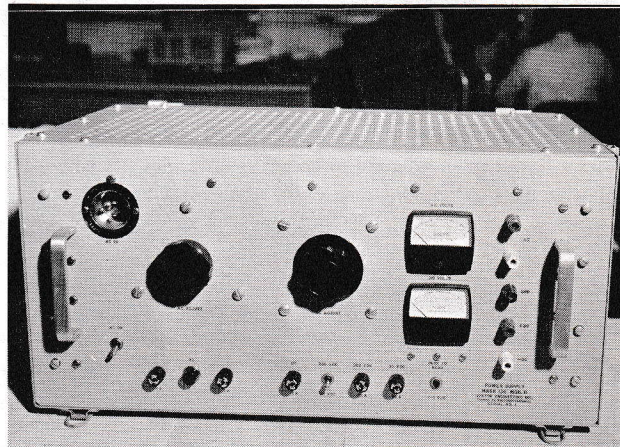
Any such system is bound to contain bugs that will have to be worked out but we feel confident that this can be done. The main thing, we think, is that it has finally become feasible to give you in the mine shops almost exactly the kind of test-set maintenance system you have asked for for so long.

Release of the first checkout groups and a limited-scope OP 3388 may only be a first step as you see it, but we're sure you'll admit that it's a very important first step indeed.

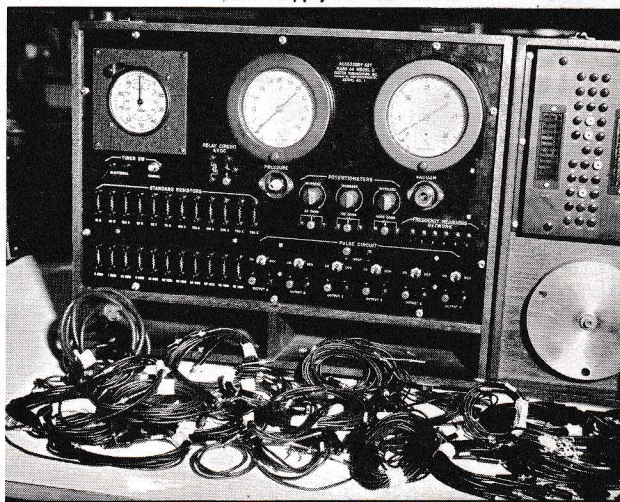
## TEST SET CHECK-OUT GROUP MK 1 MOD 0



Test Set Mk 456 Mod 0

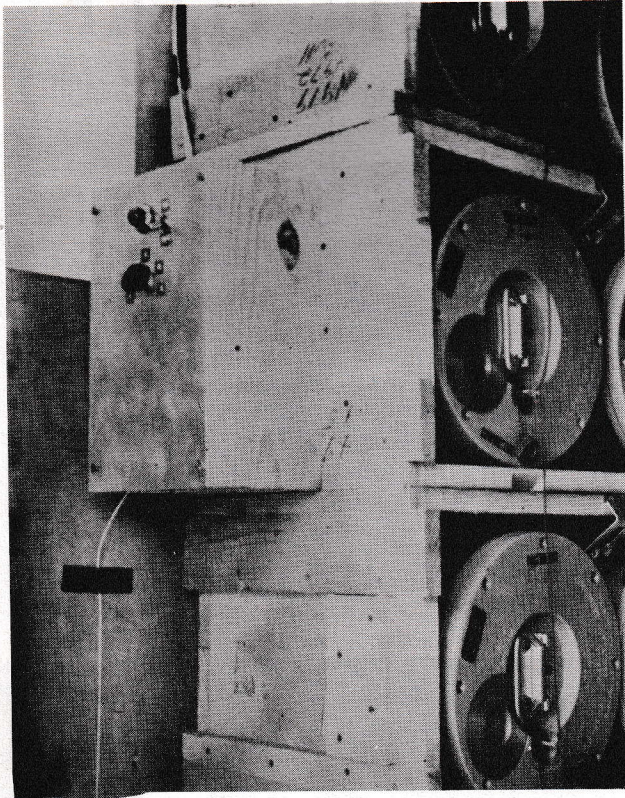


Power Supply Mk 136 Mod 0

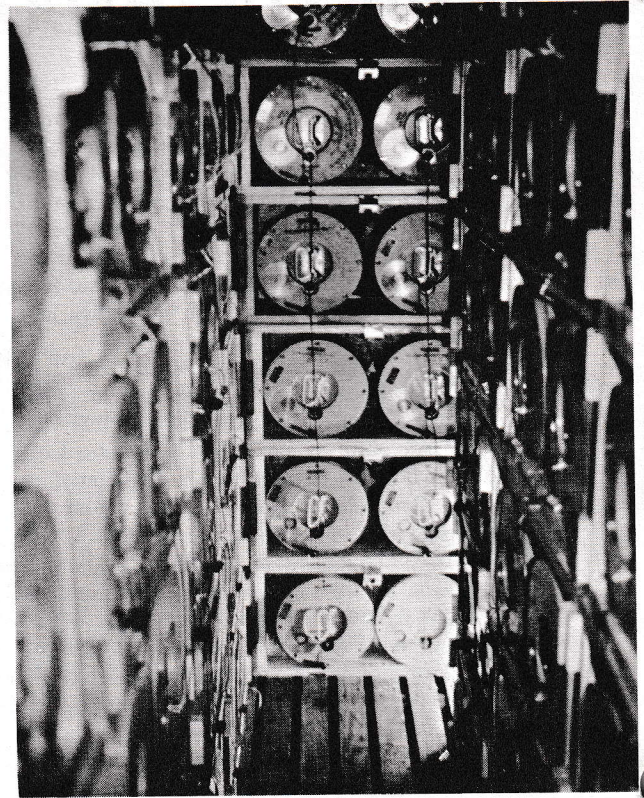


Accessory Set Mk 66 Mod 0

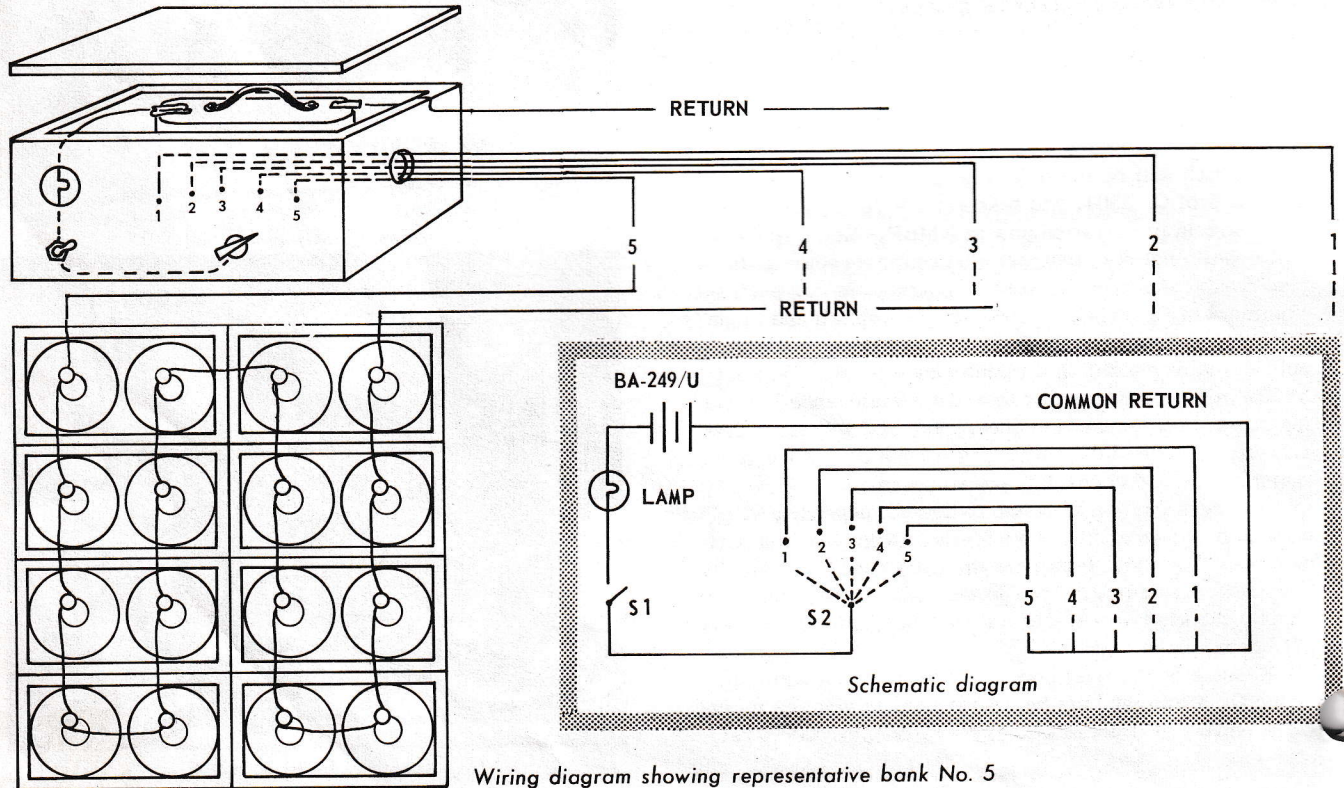




The switch box is mounted in an accessible location where the glow of the light can be seen while troubleshooting.



A view of the stacks in a typical storage arrangement with connecting wires in place.



Wiring diagram showing representative bank No. 5



# TEST RIG FOR MK 23 CONTAINERS

ACTIVITIES REQUIRED TO STORE considerable numbers of Pressure Detectors Mk 1 Mod 0 in Containers Mk 23 Mod 0 invariably find it tedious and time-consuming to test each unit individually for loss of pressure as required by OP 2567 (e.g., within one week of receipt and every three months thereafter). The fact that the detectors (containers) are generally stacked in reefers with little access space doesn't help.

Members of MOMAT 0322 first worked out a scheme to cope with these problems, which they passed along to MOMAT 0321, who evolved the set-up we show here. The circuit is made of parts that are easy to come by, and amounts to nothing more than connecting a number of the containers' pressure switches in series with a selector switch, indicator lamp, and six-volt battery. Almost any number of containers can be monitored by being divided into convenient stacks, with a selector switch with positions wired to match the number of stacks.

Lt Lyal Stryker, O-in-C of MOMAT 0321, states that the time to make and rig such circuits has more than paid off in time saved in making tests . . . to wit: it takes one only a minute or so to check all containers on site, and two minutes to locate one that has lost pressure.

Sound good? Here are the materials needed to construct the circuit shown here. Stryker's group used salvage as their main source of materials, but here are some stock numbers for those who may not be that lucky:

- ▶ SPST toggle switch, S1, 5930-683-1628
- ▶ Five-position rotary switch, S2, 5930-248-5489
- ▶ Lamp socket, miniature bayonet, 6210-295-2599
- ▶ Lamp, No. 47, 6240-155-7808
- ▶ Battery BA-249/U (6 volts)
- ▶ Male pins from discarded amphenol. (The CD-14 amphenol plug has pins the right size.)
- ▶ Hook-up wire as required
- ▶ Plywood, 1/4-inch, sufficient to make box to hold battery and serve as a mount for light socket and switches.

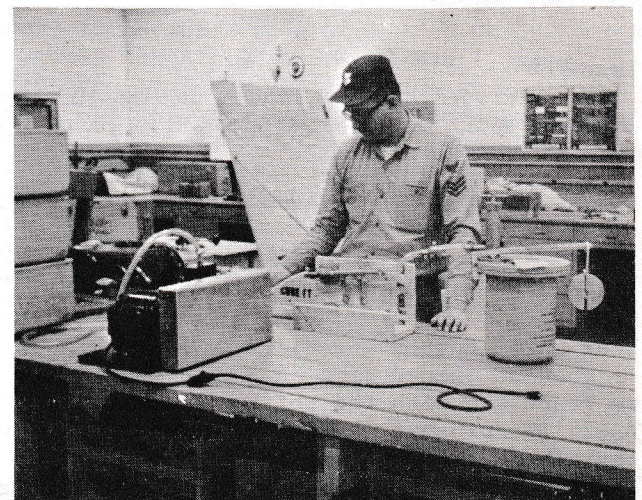
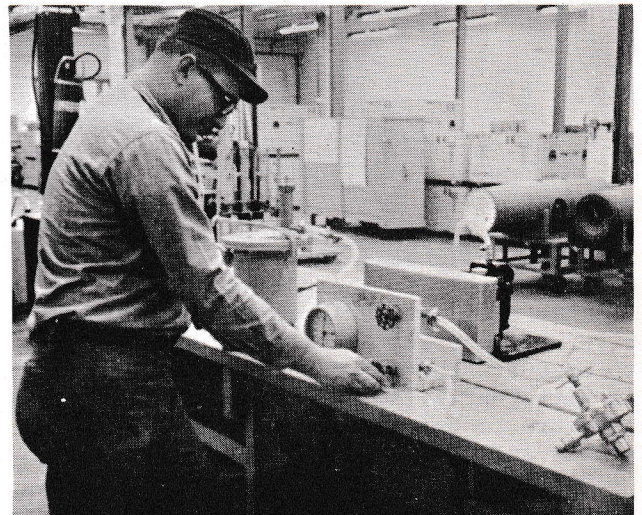
Battery, light, and switches are wired according to the wiring diagram. The leads from the selector switch are identified with the stacks to which they connect. Jumper wires between containers are made from pieces of hook-up wire about 15 inches long with an amphenol pin soldered on each end. A troubleshooting jumper wire, length equal to the height and breadth of the stacks, is made in the same way.

To use, turn the SPST switch to ON and rotate the selector switch through its five positions observing that the bulb lights at each position. When the bulb does not light at one of the positions it indicates a container with an open pressure switch in the stack being tested . . . to identify which, leave the selector on the "no-light" position and jumper rows of containers in the stack, one at a time. When the indicator lamp then lights the low pressure container will be in the jumpered row . . . simply jumper the containers in that row one at a time to reveal the bad container.

In treating leaky containers MOMAT people have discovered that the sealant we recommended for strengthening Junction Box Mk 35 connectors (Troubleshooter 4-63, P2) is also ideal for curing leaks around the test plugs in the Mk 23 containers. The sealant is applied around the base of the fitting and into the spaghetti insulation on each wire leading into the fitting. In case your Issue 4-63 isn't handy, this sealant consists of a two-part kit of potting compound and catalyst in a 2-1/2 ounce cartridge via 8030-881-2618, or in gallon jars via 8030-823-7953. One cartridge should do the job on five or six leaking plugs.

Filling of the Mk 23 Containers is another process which MOMAT 0321 has improved. "The hosecock clamps

(continued on page 8)

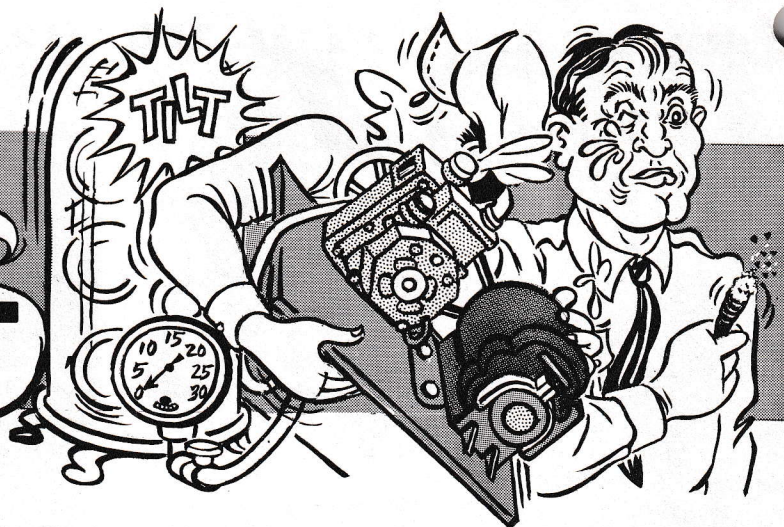


MN1 R. F. Stancik checks a MOMAT 0321 panel arrangement of the pressure-vacuum gage and valves for control of steps in the filling procedure for the Mk 23 container. The mounting provides convenient control center and a firm platform for operation of the gate valves.



# HOT STUFF

by B. Arnaclebutt, MNC



## Tilt!

Dear B.B.

Like a lot of other things, that vacuum pump used with Test Set Mk 157 Mod 0 doesn't operate properly if it isn't properly filled with a special oil just like T-Shooter said on page 7 of Issue 2-66. Also that oil spills awfully easy if the pump is tilted, and absolutely if the pump is shipped filled.

This pump gets a lot of use, not only with the test set but also as the pump used to evacuate the Mark 23 container before it is nitrogen filled. This means oil refills are sure to be needed. What is the stock number and what quantity do you get?

OTW, MNC

Dear OTW

The oil for your purpose is Vacuum Pump Oil, HYVAC Cenco No. 93050. FSN 9150-273-8663 will get you one quart.

*B. Arnaclebutt*

## What's happening here?

Dear Chief Butt

When we opened some 36-2 mines recently we found two with the bottoms of their BA-241/Us crushed, and the bulkheads between charge and battery compartments bulged so much it was impossible to reinstall A-5 cover plates over new batteries. No other components appeared damaged but of course we rejected the cases.

Both cases had been loaded with HBX-1 in 1953, and held at our advance depot since 1956, but we are certain the expansion

occurred within a 30-day period during which we experienced occasional 90° temperatures . . . somewhat usual for our location. Any second guesses?

GDW MN2

Dear GDW

Yours is but the second such report we have received in these many years of chasing Rudmindes. So the answer for now is NO . . . no second guesses . . . but instead a request that anyone anywhere encountering similar phenomena report promptly via Rudminde, of course, with description of storage conditions and load, serial number of case, and any other data that might help our crystal-ballers.

*B. Arnaclebutt*

## Missing insulation

Dear Chief

We have received some Code A CD-12 clock delays without insulation in the fuse holders. Before, the insulation has always been supplied with the clocks. So, is the requirement for the insulation still mandatory, and if so, how do we get it?

CDT MN1

Dear CDT

That insulation is mandatory, and you should improvise if it's not there. A piece of insulating sleeving (spaghetti) whose inside diameter will accept either slug or fuse (about 1/4-inch diameter) will serve your purpose when cut in 1-1/4-inch lengths. If you must you can order it at a cent per foot via 5970-644-2639.

*B. Arnaclebutt*



## Saving hubbel connectors

Dear B.B.

Hate to bring up those Hubbel connectors again but now we've found that they can be damaged by misorientation of the terminal blocks on the Hydrophone Mark 6 Mod 1. The holes in the blocks are off center and if, by accident of angle, they are too close together the 800/1800 series instrument cable has to bend back on itself. This distortion makes it necessary to force the connector in at an angle with resulting damage. Even if the damage doesn't occur going in, it sure will when coming out.

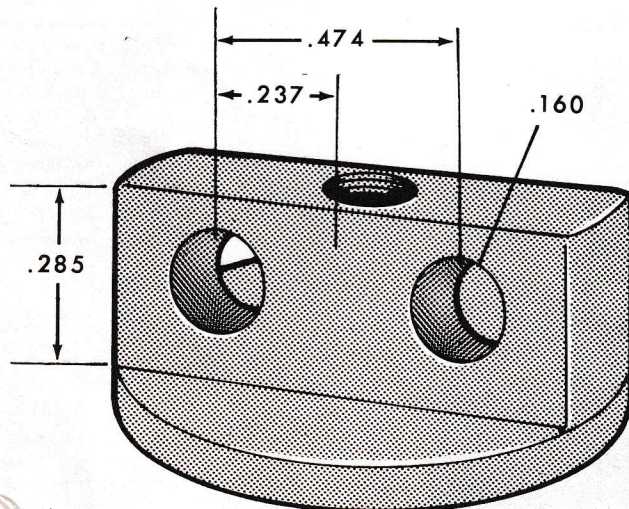
Our solution would be to drill a duplicate hole at the opposite edge of each block to give a choice of "Hubbel holes" to accommodate the cable in Mk 52/55 mines that use the hydrophone. It works for MOMAT 0321.

RFR, MN1

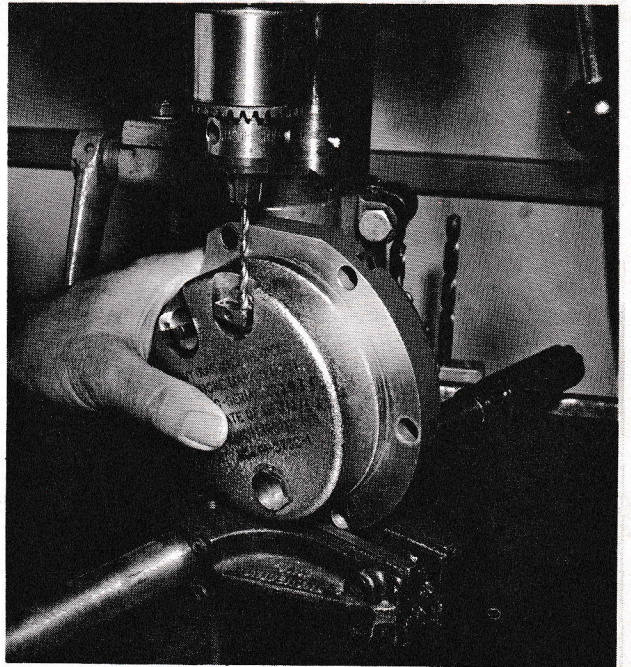
Dear Bob

At the risk of having our name changed to The Hubbel-shooter I'm printing your suggestion and saying you can consider your fix official. Drawings have been revised so that in future procurements there will be two terminal holes on all of these gadgets. Others who are faced with the one-hole problem may do likewise per the illustrations here.

*B. Amable*



Terminal Block Hydrophone Mk 6 Mod 1



Best means of getting a clean, straight hole is to use a machinist's clamp on the flange to hold the hydrophone upright on a drill press table. A No. 20 drill is just right. Use the stop on the drill press to avoid damage to the hydrophone case. After drilling wipe the hydrophone clean of all metal dust and chips.

## New air dryers good as old

Dear Barnacles:

This new Air Dryer Mk 10 Mod 1, manufactured by Eagle Chemical Company is too well stuffed with silica gel and too long (8 x 3-5/8 inches vs 7-1/2 x 4 inches) to fit in the air-dryer retainers in Mk 25 mines. So far we've been saving the old bags for the 25s and reserving the new ones for our Mk 52 mines. This works fine, but what happens when we run out of the older-type air dryers?

ADF, MN3

Dear ADF:

Fear Not. Simply pinch the bag with your fingers midway along its length and shake so the gel collects at the ends, leaving a void across the center of the bag that makes it easy to fold double and fit into the retainer just like it shows in your OPs. A strip of masking tape will hold all in place while you install the retainer.

*B. Amable*



## Cables CA-997 vs CA-22

Dear B.B.

Have in stock a number of Clock Delays CD-14 Mod 4 with cable assembly identified as CA-22 instead of CA-997. Although clocks were received as Code A and passed tests on the 75-2 test set, we have placed them in Code J. Contracts are NOW-61-1041F and NOW-62-1059F.

R L J MN1

Dear R L J

This is one of those things. The contracts you cite were originally for CD-14 Mod 3s, then changed to provide Mod 4s, but the manufacturer did not change the cables' sleeves to indicate change to CA-997. Electrically Cables CA-22 and CA-997 are identical. The physical difference is at the lead end, inside the case of the clock, where the white lead which connected to the motor-wind switch is in a different position. If your clocks check out on the 75-2 test set, then, they are serviceable. Use them.

*B. Arncliffe*

## Fitting crimped lugs

Dear Barney

For Mine Mk 10 assembly we received twenty Cables CA-649 four of which had crimped instead of soldered lugs. These cables connect to AR-1 switches with terminal nuts 5/16-inch across flats, which will not run down flat for tight connections. Were we right in rejecting the CA-649s?

HLT MN1

Dear HLT

This is an oddball situation that may crop up in activities with Mine Mk 10 responsibilities. The solution is to replace those 5/16-inch (across flats) terminal nuts with nut, plain, hexagon, brass, nickle-plated, 6-32 NC-2B, 5310-952-1427, which will clear those CA-649 lugs making the cables serviceable.

Mk 10 activities might as well requisition extras as spares while they're at it. We don't consider crimped lugs to be reliable for mine cables used in mine assemblies, so have ruled them out in new procurements. Eventually, then, problems involving them will disappear, but it will be a long time happening for CA-649, if ever.

*B. Arncliffe*

## Oops!

Dear Barnacles

Information stenciled on the Component Container Mk 23 Mod 0 states "for resealing see filling procedures BUWEPS DWG 1442531 and NAVWEPS OP 2567, Vol 1, Chapter 10." Wrong? The only info that applies is in Chapter 11.

WWP MN2

Dear WWP

Somebody slipped on that one. The reference should be OP 2567, Part 1, Vol 2, Rev 2, Chapter 11 for the new procedure. The manufacturer followed the wording of a note on DWG 1442531 which was also in error. Corrections are being made but to bring existing containers into line correct that stencil to read Vol 2 Chapter 11. Chapter 11 should be in your hands as Change 1 by the time you read this.

*B. Arncliffe*



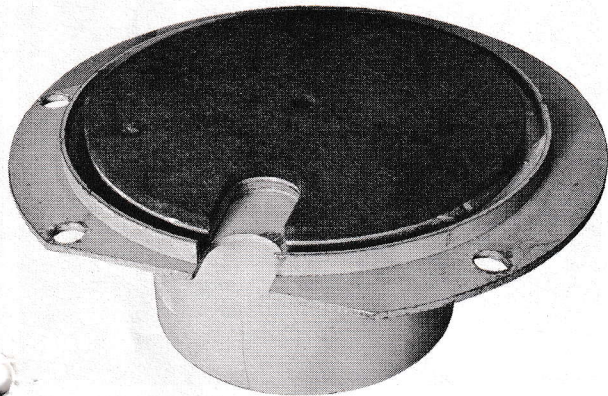
The Mine Shop crew at NAD, Earle poses for a picture in blues at Colts Neck, N.J. Left to right, kneeling, are MN2 H. P. Hart, MNSN C. Bowling, MN1 R.W. Wilson; standing, MNC J. Dwyer, MN2 A. P. Kirkwood, MN3 B. Stoner, MN3 R. A. Ferguson, MN3 S. R. Helms, TMCS W. Brooks. Since this photo was taken Chief Dwyer has transferred to NAVMAG Subic.



## CASE OF THE MISSING SPACER-DISC

Some retainers DWG 451863 for Firing Mechanism A-5 Mod 3 in Mine Mk 25 Mod 1 have found their way into depot stocks minus a spacer-disc, as evidenced by a Rudminde from NAVMAG Subic reporting their entire stock of retainers in this condition. These retainers should not be used without the discs because the retainer also serves as a cover for the battery compartment (BA-241/U) and it is the function of the spacer-disc, a circle of plywood with a felt pad cemented to it, to protect the top of the battery and hold it solidly.

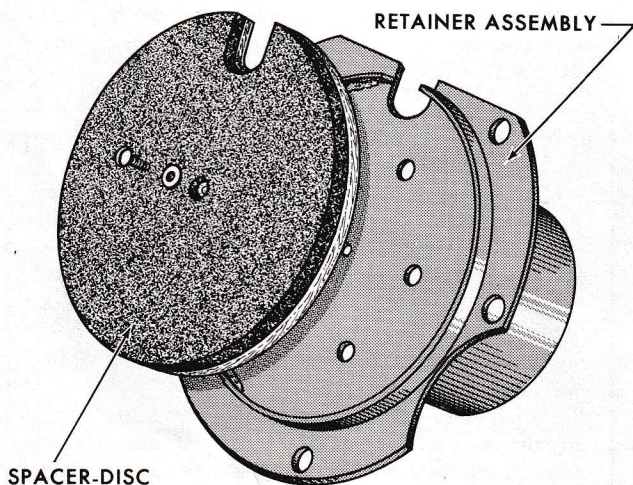
All of these retainers should look like the one we show here, with the spacer disc as part of the assembly.



RETAINER ASSEMBLY COMPLETE WITH SPACER-DISC

Any which do not should be placed in Code G and repair parts ordered with which to make them complete:

- ▶ Spacer-disc assembly (DWG 443660) 1350-038-5878
- ▶ Screw, round-head, 1/4-20 x 1/2, MS-35206-279, 5305-988-1723(1)
- ▶ Washer, flat, steel, 1/4-inch, MS-27183-10, 5310-809-4058(1)



Assemble as we show, plywood against steel plate, cushion-side out, oriented so cutout in retainer and disc coincide. It is through this opening that the Battery Cable CA-519 is led when the A-5 firing mechanism is installed.

TROUBLESHOOTER 1-67

## MATING MK 12 LUGS TO MK 8 BOMB SHACKLES

Difficulties have been experienced in mating Mk 12 suspension lugs mounted on Mk 25 mines with Mk 8 bomb shackles on SP-2H aircraft. The problem lies in lug cross bars being more than .490-inch thick, fore and aft.

Specifications for the Mk 12 lug have been changed from  $.485 \pm .015$  inch to  $.490 \pm .020$  inch. This should correct the misfit for new Mk 12 lugs. Meanwhile lugs now in stock should be trial-fit like this:

- ▶ Rotate one or both Mk 12 lugs to get a true alignment of 180 degrees using a Mk 8 bomb shackle that has a  $.500 \pm .010$  inch lug slot as an alignment device.
- ▶ Position lugs in the Mk 8 shackle over mounting screw holes in the mine and torque screws to  $50 \pm 5$  lb.ft. as required.

If this cannot be done discard the lugs and try another set. If you run out of Mk 12 lugs that fit, World War II lugs (DWG 495955) may be used but only on mines to be loaded on P-2 aircraft.

## SCREWS MISSING FROM MK 57 DRILL SECTION

When you come to that part of Instruction Sheet SD(D)-1a of OP 2718 Volume 2 Part 2 that tells you to install two half-inch brass socket-head screws and two 1/2-inch lock washers in the test-plug studs in the arming device well of the drill section of Mine Mk 57 Mod 0, you will discover they were not supplied. The reason is that they were overlooked in the drawings.

Correction of the oversight has been made—on paper. Meanwhile, to be able to install the CA-72 test plug in the well, you should requisition 2 each:

- ▶ Screw, socket-head, 5/16-18 x 1/2, 5303-877-7140
- ▶ Washer, lock, 5/16-inch, 5310-080-7331

## THE NUMBERS GAME

The FED STD 595 color number for Gray (Blue) in the box under "Paints To Hide By", Troubleshooter 3-66 P3, should be 36231.

The stock number for the "Ordnance tape" described under the photos in Troubleshooter 4-66 P3 has been changed to 8135-914-1614.

## CREDIT WHERE CREDIT IS DUE

The whole business about fitting oversized BA 251/Us into Circuit Breaks Mks 1 and 2, reported in Troubleshooter 3-66, represented the work of MN3 H. B. Steen of Momat 0321. So our belated thanks, Brother Steen, and our readers' thanks too, for your detailed Rudminde and pix. Sorry we did not know the source at the time we went to press.

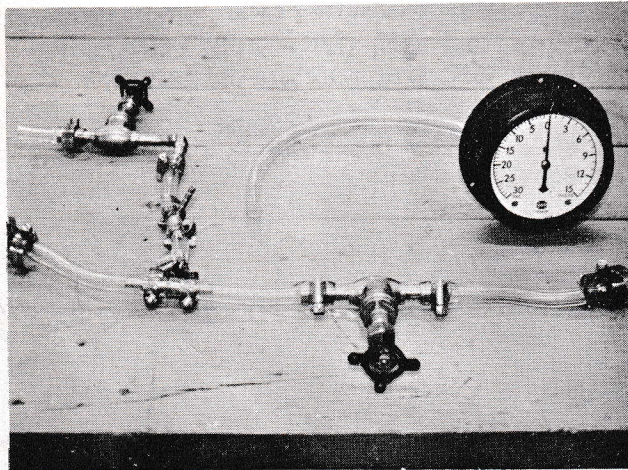
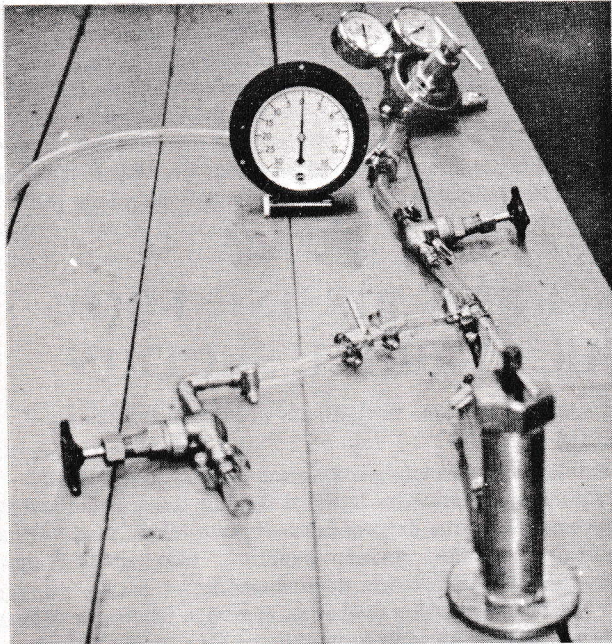


# TEST RIG

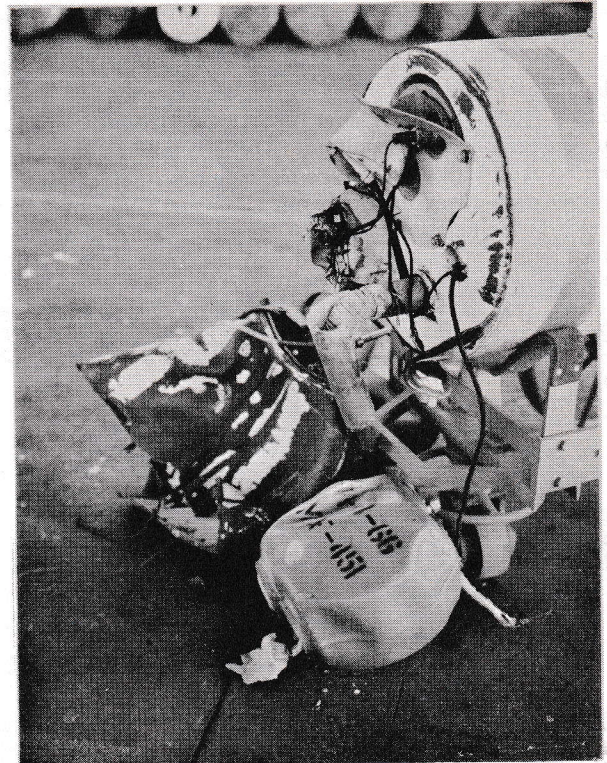
(continued from page 3)

supplied with the filling kit," says Lt. Toby Horne, are so small that adequate closure cannot be obtained unless pliers are used, or cross pieces are brazed onto the clamps' screws." So 0321 has substituted 1/4-inch gate valves for these clamps (200 psi capacity, 4820-554-8711), each requiring two 1/4-inch nipples.

Although we have not checked this out at NMEF, and have received no other complaints on the hosecock clamps, 0321's lashup looks good and is shown here for the benefit of any who may wish to follow suit.



A close look at how the gate valves with nipples, two to each valve, are connected to the Tygon plastic tubing and made secure by hose clamps. The gage and nitrogen gas cylinder have not been connected. The evacuation and filling fixture assembly is shown in the top picture.



## OBITUARY FOR A MINE

Would you believe what could happen to a mine that dropped without a parachute? They fall hard, as this photo by MN1 Jim McDonough from DRILLMINPREPFAC, Long Beach, shows. The mine, in case you can't recognize the remains, is (was) a Drill Mk 25.

Jim writes: "It appears as if the mine tumbled, and between the velocity and angle of impact the tail was completely sheared off, not to mention what damage was done to the components. Some mess!"

### REFER NEEDS FOR NON-FSN ITEMS DIRECT TO NMEF

When you need depth-charge or mine material for which there is no assigned Federal Stock Number, do not requisition from the Ships Parts Control Center at Mechanicsburg, Pa. (SPCC). Send a letter direct to the Naval Mine Engineering Facility (ES), Yorktown, Va. 23491, with information describing the circumstances responsible for the requirement.

With detailed information concerning the need for the material or equipment, NMEF can determine if the item should be established in the stock system or whether alternative action should be taken. Any other course leads to unnecessary paper work between SPCC and NMEF with resultant delays.



# Do You do this Job Right?

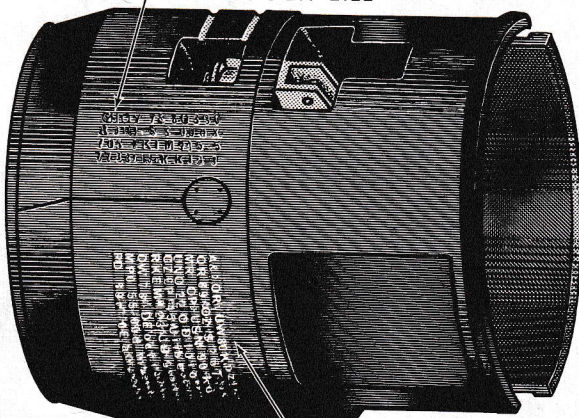
## IDENTIFYING MK 57 ANCHORS

**A**CTIVITIES ASSEMBLING Mark 57 mines have had difficulty with the serial identification of the Mk 57-0 anchors. Rudmines on the subject fall into three categories: 1) serial number, manufacturer etc. stenciled on the anchor but not die-stamped; 2) serial etc. die-stamped but not stenciled; 3) two numbers die-stamped on the anchor without indication as to which is the serial number.

What leads to the confusion is that Drawing 1438502 requires die-stamping the outside of the anchor in 1/4-inch characters, information including serial number and manufacturer, and calls for this info to be repeated in stenciling. Then the drawing for the housing, 1467530 requires die-stamping in 3/8-inch characters, of the foundry heat number. This explains the two numbers and the confusion. The key is the fact that the numbers die-stamped in the mooring-arm-hinge cut-outs in the anchors (see illustration) is the foundry heat number. The number on the outside of the anchor is the serial number.

### AREA OF DIE STAMPING

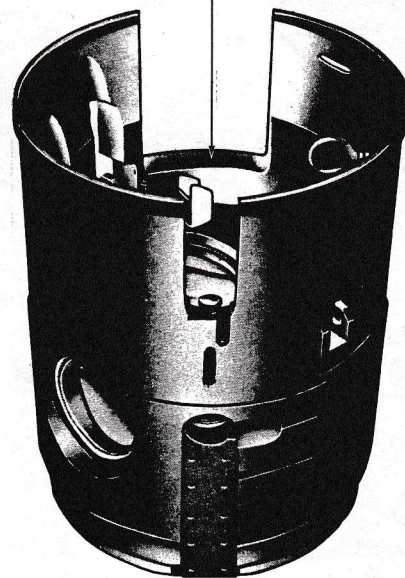
After stamping repair damaged areas with paint TT-E-516, black 8010-297-2122



### AREA FOR STENCIL

Use white TT-P-98, Type I 8010-285-493

### ANCHOR HOUSING DRAWING NUMBER AND FOUNDRY HEAT NUMBER



Activities discovering incomplete identification should die-stamp the following information on the sides of the anchors where shown in the illustrations.

MK 57 MOD 0 SERIAL MFR  
CONTR.NO. LD 295964

Stenciled nomenclature, in white half-inch letters, must include the following information, placed as shown; all in conformance with the article on color coding and stenciling in Troubleshooter 1-65:

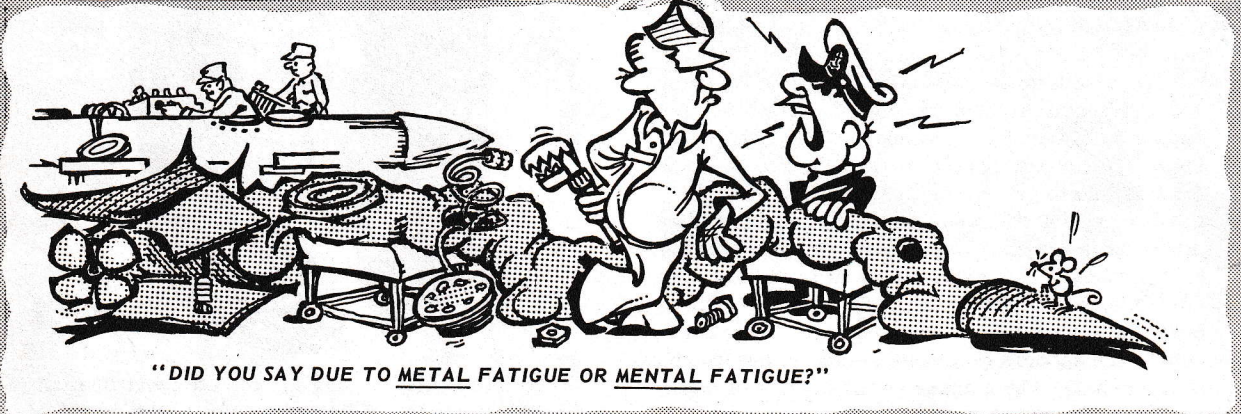
US NAVY NAVORD  
ANCHOR: UNDERWATER-MINE  
MARK 57 MOD 0  
10001-LD 295964  
MFR (Name or symbol)  
CONTRACT NO. 000000  
SERIAL NO. 0000  
FSN-1350-730-7938  
GROSS WT. 000 LBS

*The Editor*





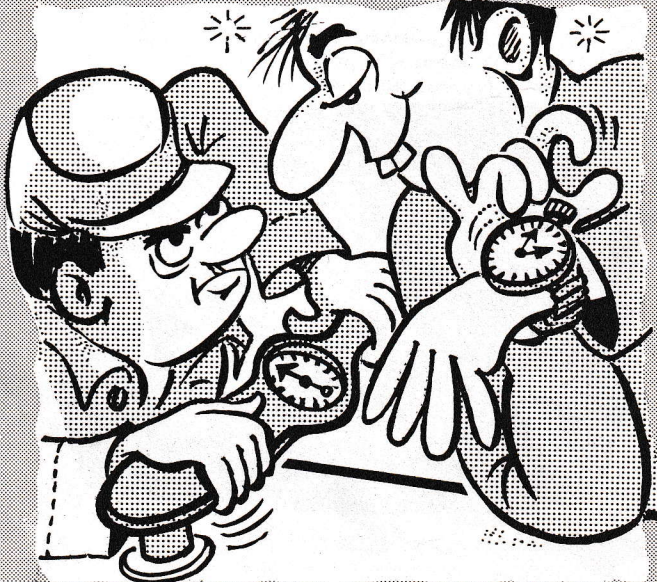
"I THINK WE ARE APPROACHING YORKTOWN NAVAL WEAPONS STATION NOW, SIR."



"DID YOU SAY DUE TO METAL FATIGUE OR MENTAL FATIGUE?"



"THIS IS OUR MARK V, MOD 2 MODEL."



use **RUDMINDE!** BUT REAL PROBLEMS ARE NOT A JOKING MATTER...