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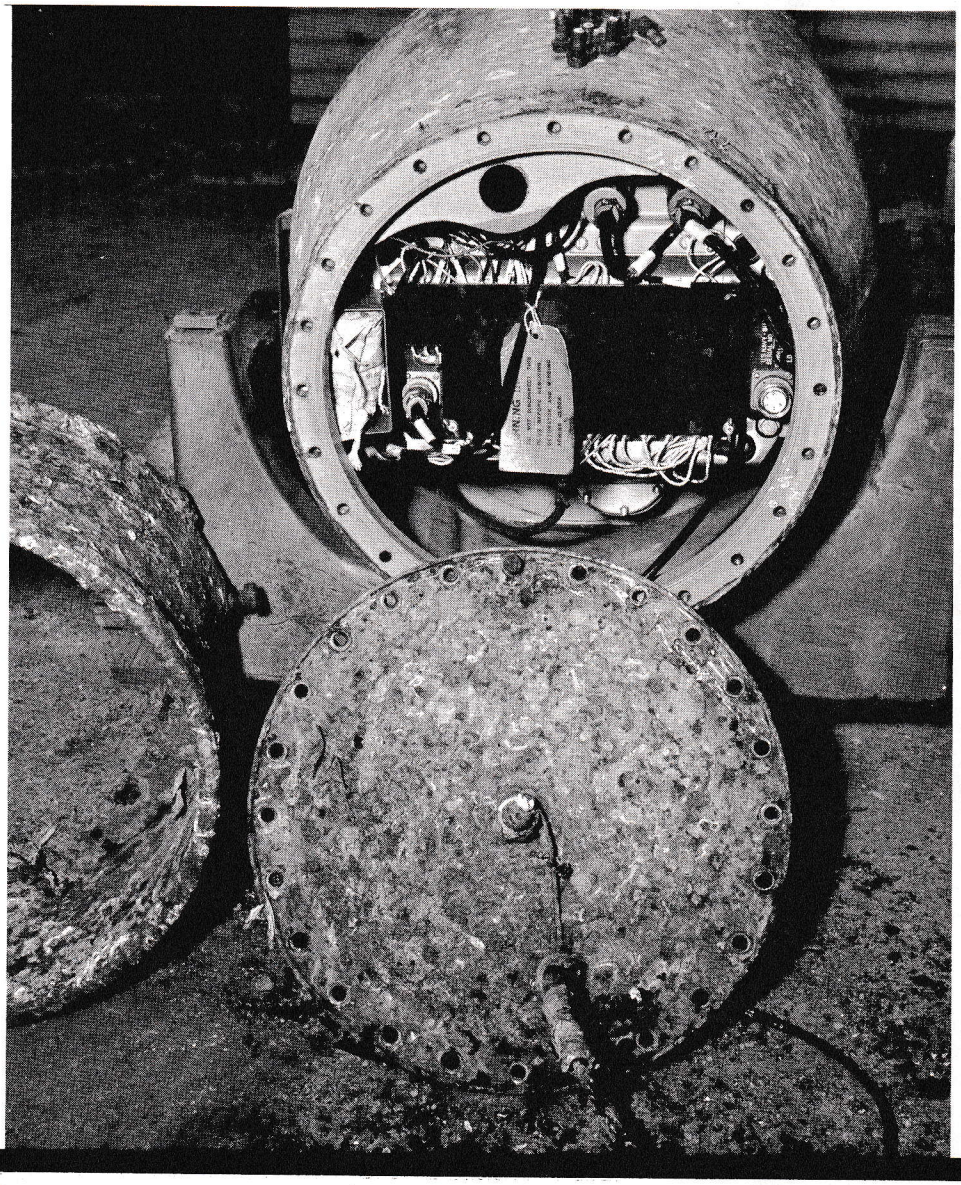
No. 3-68

mine and depth-charge

THE TROUBLESHOOTER

- POWER SOURCES
- SIX YEARS DOWN BUT NOT OUT
- PROPELLANT PROBLEMS



AN OFFICIAL *NAVORD* PUBLICATION

in this issue . . .

THE TROUBLESHOOTER

mine and depth-charge

Published by the Naval Mine Engineering Facility, Yorktown, Virginia 23491

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REGULAR FEATURES

ARTICLES

COVER PHOTO: Here is evidence of what a first-class mine assembly team can do . . . a Mk 25 Mod 0 Mine still good after six years at the bottom of ye Mediterranean. For more see story and pictures on page 3.

1 OCTOBER 1968

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 8500/1 (2-68) Everyone who encounters problems with these weapons should report them via this form direct to the Naval Mine Engineering Facility as prescribed by NAVORDINST 8500.3.

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

NEW FEATURE COMING

Most T-Shooter readers know that one part of the NMEF organization is the Fleet Liaison Department for which the organizational code is FL. Head of FL at the moment is LCDR Lyal M. Stryker. Other members include LT M. D. Horn, LT R.L. Anderson LTJG D. C. Tuttle, and ENS J. C. Owens, Jr.

Recently Lyal has suggested that FL should be given their own soap box in The Troubleshooter. The result: starting in the next issue, if all goes according to plan, there will begin a new regular feature authored by members of the FL Department, possibly titled FL Forum. We hope that it will provide a new avenue of communication between NMEF and the mine force. Meantime here is a write-up by LT Toby Horn to give you the picture as he sees it:

Introduction to FL

The present organization of the FL Department offers much versatility. Our experience combines test and evaluation (OPEVAL), experimentation (Naval Ordnance Unit), deployment, logistics, and facilities planning (MOMAT), aircraft loading (Aviation Ordnance), and administrative reports, techniques and planning, etc. (mine staff). In short, some one of us in FL has some experience in just about any of the projects, jobs, or operational tasks in which Troubleshooter readers are involved. That can go a long way toward providing you, the Fleet, with some answers you need. If it doesn't, we want to know about it.

Naturally, though, we cannot speak for the entire mine force. That's why we keep the AUTOVON lines hot, and many of you know that we do. We've also received a lot of calls and personal letters from you and have in most cases been able to provide resolutions or guidelines for your problems. Our invitation to direct contact stands, whether by phone or personal letter, just so we don't circumvent official channels on official matters.

Helpful hints

Our travel bags are always packed, one marked NORTH and one SOUTH. "Here today, GUAM tomorrow," as the saying goes, and it seems to be holding true. This only adds to our versatility, because we are able to keep up-to-date on mine matters in all parts of the world: FSMTs, MINEX's, logistics planning, systems analysis, facilities, field testing, and the scope goes on and on. During these trips we are going to write down helpful hints that we can pass along to those of you who think you might be able to use them. There are some ideas, projects, and methods used by some of you in the Fleet that border on sheer genius, and we want others to know about them. The wealth of knowledge is limitless.

Things past, present, and future

Mine Conference #24 and FSMT Conference #6 are now past history. There were a lot of good agenda items presented, expounded, and resolved. The shortage of travel funds this fiscal year affected attendance as far as the "user-types" were concerned but we hope next year this will be somewhat resolved. Meanwhile NMEF will be taking a new look at several things including extending the life of gaskets in DELTA configured mines, which could represent substantial savings in both capital and manpower, and extending the quarterly tests of A, B, and C configured mines to six-month intervals, or when battery histories dictate.

Looking into the future

In addition we are into a long-range program concerning power sources. So far the philosophy and feasibility study look good, but we have a long way to go in the hardware department before we can put a "factuality" stamp on it. You'll find more on this in an article elsewhere in this issue.

The prime contract buy of Mine Mk 56, from Aerojet, is shaping up well and it may set a precedent for future mine procurements. In essence, NAVORD contracted with Aerojet-General Corp. for the complete DELTA configured weapon. Aerojet then sub-contracted to their subsidiary companies and small business for the individual components which come into Aerojet, are inspected, and then assembled to DELTA. NAVORD then receives the whole "end round" as a complete procurement item. This does not reduce the role of NMEF, which still maintains the standards and specs and issues waivers and makes acceptance and periodic tests. In fact a new Field Evaluation Division was necessary to cope with the environmental, and fit and function tests necessary prior to final acceptance. It is a whole new area that holds much promise toward you in the Fleet getting A-1 hardware to do your A-1 job.

Packaging is important too

Also worth mention are continuing reports concerning packaging discrepancies for the shipment of test equipment. We cannot overstress the importance of you minemen in supply-function billets using every angle you know to assure that test equipment gets packaged properly for shipment. We realize most shops have their units packaged by the local supply department, so that the responsibility seems to rest in other hands. But your responsibility has got to go further than just turning it over to the shipping and receiving point. Tag your sets, mark the shipment request forms, and assure placement of the FRAGILE stencils or tags. One suggestion was to stencil each test set "If you can read this I am not packaged properly for shipment." In any case, there is always that 10%!

When you receive equipment that is not packaged properly don't forget to initiate a DD Form 6, "Report of Shipment Discrepancy." The cost of test equipment precludes cranking in a J-Factor for breakage when it comes to procurement, and we all know how long it takes to get a test set into the repair and calibration mill, and back again in good order.

What ever happened to Charley?

Here is an unofficial list of mine-type Limited Duty Officers, divided into year-groups, and giving duty stations and estimated rotation dates. If your name should be here but is not please accept our apologies. It was not our intent to omit anyone, so if we're incorrect or your name is omitted drop us a note with the correct information.

If Warrants will drop us a note we will compile and publish a list like this one for them. If you know where any of your contemporaries are please let us know this too . . . because of the varied assignments of WOs a complete list was not available at press time.

NAME	LOCATION	ESTIMATED ROTATION
YG-57		
LCDR JOHN O'BRIEN	NAS Whidbey Island	Nov 1970
LCDR E.L.ROBERTS	NAVORDSYSCOM Staff	Sep 1969
LCDR B.W.RANDLE	NAVMINENGRFAC	Apr 1970
YG-58		
LCDR J.W.KOERBER	NWS Yorktown	Dec 1969
LCDR R.J.TRASK	NWS Yorktown	Aug 1970
YG-59		
LCDR H.E.SPRECHER	MINELANT Staff	Sep 1970
LCDR W.W.POOLE	VIETNAM (IVWG)	Oct 1969
LT E.J.MILANOWSKI	NAD Oahu	May 1970
YG-60		
LT W.G.CHERRY	NAD Hawthorne	Aug 1969
LCDR L.M.STRYKER	NAVMINENGRFAC	Feb 1970
LCDR R.A.JANKE	CO MOMAULANT	Aug 1969
LT R.McGAW	NOF YOKO	
LT T.K.WILEY	NAD Oahu	Dec 1969
YG-61		
LT A.R.BOREEN	Turkey (MAG Staff)	Aug 1969/70
YG-62		
LT B.A.KREUSCH	EOD	
LT D.A.DeCRONA	NOF YOKO	Jun 1969
LT H.W.ELSTON	MINEPAC Staff	Mar 1969
LT J.J.IRELAND	NAD Oahu	May 1969
LT F.A.DRAPER	NWS Yorktown	Aug 1969
LT R.A.BILLINGS	MOMAU	Nov 1969
LT B.BENINTENDE	NWS Yorktown	Jan 1969
LT L.E.RONAN		
YG-63		
LT R.F.GREENE	NMAF Misawa	Apr 1970
LT K.R.PETERSON	NSMW	Aug 1970
LT W.J.MEHARD	AD-26 (SHENANDOAH)	Dec 1969
LT H.M.CAMPBELL	NWS Yorktown	
LT H.L.KOCHER	NAF Naha	
LT R.W.RINES	GUAM	
LT G.E.MEADOWS	MOMAU	Aug 1969
LT C.J.WRIGHT	SERVPAC Staff	Jan 1970
LT B.P.HERNANDEZ	NAVMAG Subic Bay	Aug 1970
YG-64		
LT P.W.HANKS	POMFLANT	Aug 1968
LT E.C.OYER	NAVMAG Guam	Sep 1969
LT M.D.HORN	NAVMINENGRFAC	Jul 1970
LT R.L.ANDERSON	NAVMINENGRFAC	Mar 1970
LTJG T.A.MUDD	Hospital, Portsmouth	
YG-65		
LT W.A.ROBERTS	MINEPAC Staff	Jan 1971
LT J.R.BRUCE	NAVMAG Guam	Oct 1968/Jun 70
LT R.F.RUHLAND	MOMAU	Jul 1970

SAFETY RULES ARE MADE TO LIVE BY

It can happen! Recently headlines in newspapers over the nation screamed "Munition Blasts Kill 2, Injure 13." The sites of the explosions were at Crane Naval Ammunition Depot and an Army ordnance plant in Louisiana.

While these were loading facilities for bombs at the Army plant and flares at Crane, it could happen in a mine shop on a smaller scale. Who is to say which is more of a tragedy . . . giving point to the 1-68 Troubleshooter article "Playing Safe with Detonators." Handling explosives, like arithmetic, leaves no room for little mistakes. It must be faultless. 2 + 2 = 4 and it is no smaller error to say 2 + 2 = 3 than it is to say 2 + 2 = 8.

At Crane the cause of the explosion was a parachute flare ignited by a spark. The fire spread to other flares and the workers in the vicinity were seriously burned. Burns can be as painful as wounds – and as fatal – and the result as cataclysmic . . . giving point to the article on mine signals, very much akin to flares, which appeared in Troubleshooter 4-67. Emphasis was placed on flame which burns with intense heat. But there is danger from toxic gases which can be lethal in confined spaces, and should not be overlooked. At the end of the article references were given for study in handling signals safely. Heed them.

Acts of God such as lightning are insured against by grounding systems where explosive-loaded weapons are stored. Nothing much can be done about lightning but to defend against it. It is the acts of man that safety people strive to control and with those munition blasts still fresh in the minds of those of us who are daily surrounded by explosives this list of some of the do's and dont's that must be observed to live with them may take on new meaning.

▶Do not carry flame producing devices into restricted explosive areas.
▶Smoke only in authorized places.
▶Handle all explosives with due care and consideration.
▶Follow all safety rules and regulations.
▶Secure all explosive loads so that material cannot tumble or fall.
▶Make certain required static grounding is always used.
▶Never short cut or change an operating procedure.
▶Whenever there is doubt concerning an operation, don't proceed until you get adequate information.
▶Report all suspect situations immediately, so corrections can be made immediately if necessary.

SIX YEARS LATER.... GOOD MINE STILL GOOD!

BY TMCS J. H. KEEN, JR.

EDITOR'S NOTE: The following is a report, essentially unchanged, sent to NMEF by Chief Keen as an enclosure to a Rudminde. The check list he refers to shows that the mine was tested by now MMC Don Chmura, Mobile Mine Assembly Unit Atlantic, after assembly by MN3 Jon Paul Hildreth, now in the Inactive Reserve.

Here is a Drill Mine Mk 25 Mod 0 that has rested on the bottom of the sea for more than six years before its recovery 5 March 1968. It was one of twenty mines assembled by NAF Sigonella for MEDLANDEX 1-62. The mine check sheet found in the mine gives assembly and testing dates. The mine was loaded aboard a VP44 P-2 aircraft and planted 1 February 1962.

The mine was discovered when caught in an Italian fisherman's nets. Italian authorities were notified, and recovered the mine with assistance of the NAF Sigonella EOD team. The mine was then returned to NAF Sigonella, where it had been assembled six years earlier.

Preliminary inspection revealed the case to be in remarkable shape. The bottom must have been smooth and sandy as the exterior of the case was not fouled with sea growth. All abraded sections of the exterior were smooth and shiny with little evidence of rust. Electrolytic action between the mine case and the clock starters had eroded the clock starters. The clock starter for the recovery clock was the more advanced in deterioration, with approximately one to two months left before final failure by flooding of the case would have occurred.

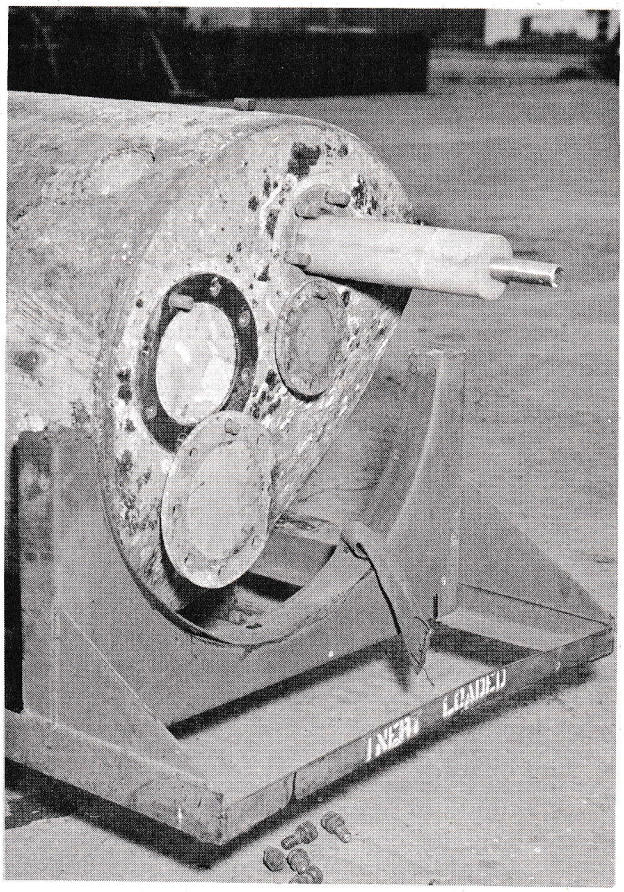
All cap screws, nuts, and shield bolts had had a coating of anti-seize compound FSN 8030-526-2522 applied during assembly. This corrosion-resistant compound was instrumental in our relatively easy disassembly task. The case interior was dry except for battery fluid leakage. All gasket surfaces were clean and dry.

Somewhere along the recovery route someone tried to pull the search coil out through the nose plate. They failed, but managed to break a search-coil lead. But then a repair job on the search-coil lead, a clean-up of the battery fluid leakage, a battery change, and an OP test was performed as if the mine was ready for planting. And the mine fired!

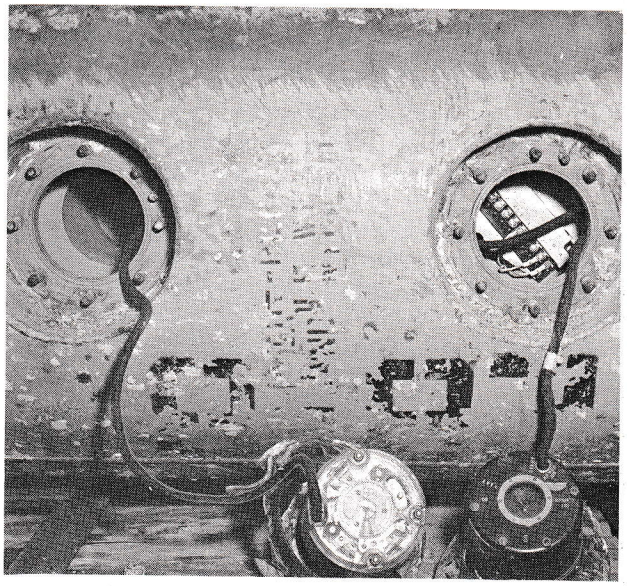
It seems an old practice has saved DOD a piece of change. The mine case, shield, and all components were saved because of the anti-seize compound. The relatively easy case disassembly would have been most difficult otherwise, and in all probability would have ended with all reject material because of frozen or wrung-off nuts, bolts, etc.

In any event this is a unique circumstance and we can see first-hand the value of good minemen's labor. After all, we got back a serviceable drill mine after six plus years underwater!

Anti-seize compound was discontinued because, under final torque, screws had a tendency to back off when subjected to prolonged vibration, due to the very properties that make the material "anti-seize" – EDITOR.



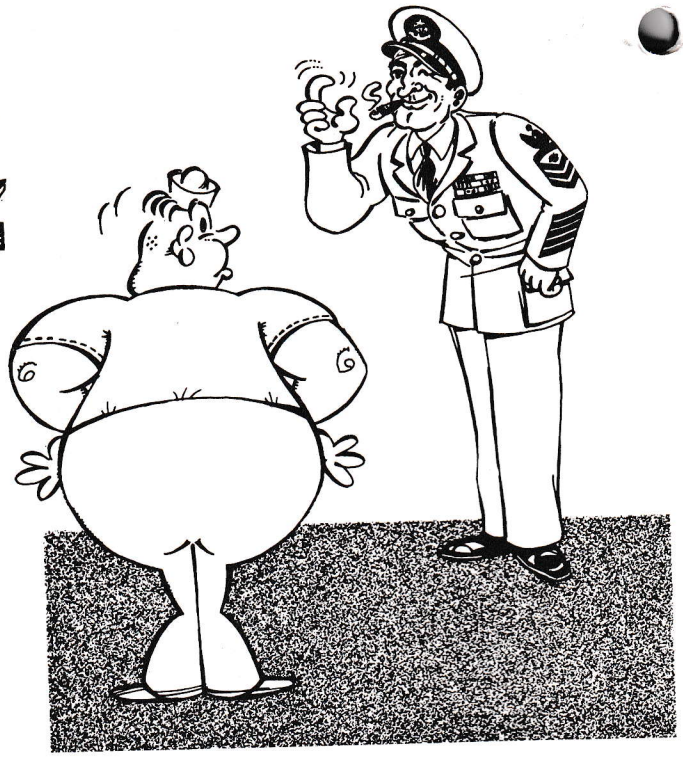
Search coil slides easily in tube.



Clocks still operable but near the end of the line because of electrolysis.

by B. Arnaclebutt, MNC

HOT STUFF



MINE MK 57-0:
Balancing vs ballasting

Dear Barney:

What is the dope on those lead weights that balance Mine Mk 57 Mod 0. They attach to the fin of explosive section Mk 2 but OP 2718 says nothing about location or order of attachment, while for Mines Mk 27 ballasting is a big thing.

LWP MN2

Dear LWP:

The words tell the story: for the 27 they are called ballasting weights, for the 57 they're balancing weights, concerned only with horizontal balance, not pull-around, a problem peculiar to self-propelled weapons such as the Mk 27.

For the Mk 57, then, the only requirement beyond case horizontal attitude at mooring depth is a vertical attitude in which the mooring arm will point down. For this the stabilizing forces built into the 57 Mine are so great that they overcome any pull-around force those balancing weights could exert. To mention two:

▶ The pull of the mooring cable, held by the anchor, opposing the positive buoyancy of the mine.
▶ The 200-pound weight of the instrument rack lying horizontally in the lower half of the mechanism compartment.

With all that going there's not much to worry about. Forty pounds (or less) of balancing weights are attached to the fin at 1, 5, 7, and 11 o'clock. Of these, only 20 pounds can be attached to stations that would exert an undesired pull-around effect, which – at most – would exert about 5.5 lb-ft torque. Versus the factors cited above, this force is negligible.

So you still want a way to do it by the numbers? Even though it's not necessary, here's how:

▶ First, distribute required weights as equally as possible on the two lower stations (180 degrees out from the arming-device well).
▶ Next, distribute any required additional weighting, in excess of 20 pounds, as equally as possible on the two upper stations.

B. Arnaclebutt

DRILL MINE MK 25/36/52/55:
Putting on the squeeze

Dear Hot Stuff:

Installing Parapak Mk 20 Mod 0 on the shield for the Float Mk 17 in new OAs of Drill Mines Mk 25, 36, 52, and 55 can be a problem. The trouble lies in installing Parachute Release Mk 20 against the pressure of the cushion between the float and the parapak. It ain't easy.

MN2 EAW

Dear EAW:

Obviously you haven't been clued on the buddy system. Here's how she works:

First you get your Mk 17 float installed in the shield, and the cushion in place, and your shield resting cushion-side-up squarely on the deck. Okay?

Next the parachute release: marry three of its quarter bands and secure with clevis pins, place the parapak and align it as instructed in the assembly manual for the mine with which you are concerned, then seat the partially assembled release correctly, as close to its final position as you can get it.

Now pick your buddy. A fellow MN down on his physical fitness and up on his girth is the man you need – one who weighs about 170 lbs, although as little as 150 will often do. Navigate him to an erect standing position smack in the center of ye parapak and you're in busi... The release will seat correctly with only a little manipu...

lation, and the free end of the fourth quarter band can be secured, whereupon "buddy" can take a well-earned rest while you get the next shield ready.

— How about that?

B. Armaclebutt

ALL MINES:

To test or not to test

Dear B. Butt,

Whenever breaking seals on watertight openings in mine cases we're supposed to replace packings or gaskets. This means we break electrical connections. So are we then supposed to perform a mine operational test? Some say yes, some say no. What do you say?

THM MN2

Dear THM:

As I see it, it would be a remote circumstance that would call for opening up a mine for reasons other than those which require the operational test whether connections are broken or not. But let's assume it can happen to anyone sooner or later, anyhow.

When it does, whether you should test depends on what type of connection is involved. If it is a quick-disconnect, polarity-oriented (keyed) plug such as an amphenol or cannon, no test is required. If connections of individual leads have to be made though, such as on a terminal board, a test is definitely necessary to verify the correctness of connections.

Let me also mention that packings (O-rings) and gaskets can be stretched a bit without harm, so you can usually install them from front to rear (pass over a flange) without breaking any connections at all. By taking advantage of the increased length of the long axis when the gasket is made elliptical, stretching does not have to be too severe, and any O-ring or gasket that can't be stretched a little is probably in too bad condition to be used anyhow and should be discarded.

B. Armaclebutt

MINE MK 25-2/27-3,5/36-3/49-2:

Lights out

Dear B Butt:

Something should be done about those indicator lamps DS-1 and DS-2 in Test Set Mk 65. They burn out in no time. Besides the trouble of continually replacing them, half the time you don't know if you're reading a bad test or a bad bulb.

HOPEFUL

Dear Hopeful:

The trouble is simple: you have six-volt pilot lights fired by a 12-volt battery . . . you and a lot of others with Mk 65 sets. The solution is also simple: you put in 14-volt bulbs the next time you replace one. That's the nearest value to 12 volts available in this commercial-type bulb. The glow will thereafter be weaker but hopefully longer: a thousand hours in most cases.

Stock number for the 14-volter is 6240-792-4196; just right for the miniature bayonet bases in the 65 set. New sets will come equipped with this bulb.

B. Armaclebutt

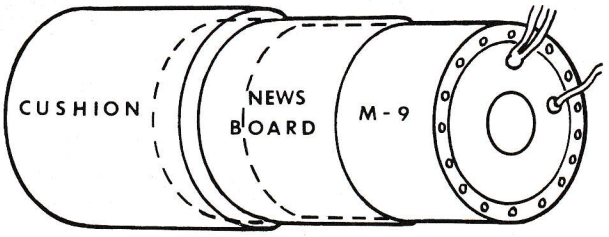
MINE MK 36-1

Getting the M-9 unstuck

Dear Barnacles:

Getting the Firing Mechanism M-9 in or out of the Mine Mk 36-1 compartment is a struggle when the newsboard spacer is installed between compartment wall and the Mk 18 cushion like it says in the assembly manual. It would be easier on both men and mechanism if the spacer were placed between the M-9 and the cushion.

JA & WOD



Dear JA & WOD:

Yours is a slick way of handling a sticky job and we go along with the spacer switch from outside to inside the cushion. That is, between the cushion and the mechanism. This doesn't mean you should start tearing down your Mines Mk 36 Mod 1 in Configurations A, B, C, or D just to make the spacer change. Time enough to do it when the next maintenance cycle comes around.

The new order for installing cushion and spacer in relation to the M-9 firing mech, as shown in the sketch here, will be incorporated in the next revision of OP 1684.

B. Armaclebutt

MINE MK 18-0/36-1,3/25-2 /27-2,3,4,5/49-2:

SR shorting clips

Dear Barnacles:

Always we have had to keep shorting devices on sensitive relays in storage. Now we install the relays in Configuration D mines without them, for two years or more. Is this legal?

NM1 SDW

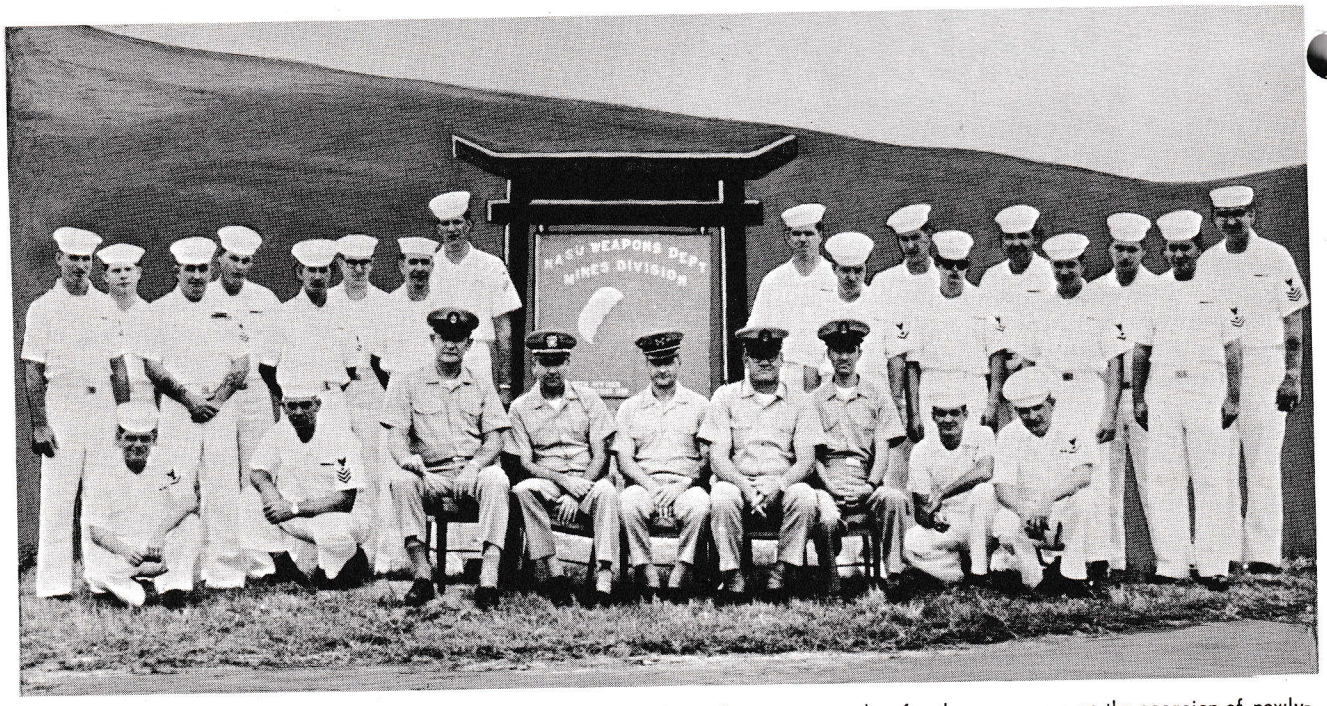
Dear SDW:

Shorting devices on Sensitive Relays SR-6, SR-7, and Mk 25, once thought to be an absolute requirement, are no longer a must. It follows that the lack of them on a relay is no longer the basis for rejection of relays as long as they pass Class B tests.

Several circumstances brought about the dropping of this requirement. The shorting devices were designed to shunt the relay's moving coils with a resistance of low value, to provide mechanical damping and insure against damage by shock. The requirement for them was in effect through the many years when the bulk of relay stocks were in shelf storage. Now with a large portion of them installed in assembled weapons the shorting clips are removed, only because their value is outweighed by the readiness philosophy of the ABCD configurations. In any case the relays' movements are rugged enough that they're not likely to suffer from any "normal" shocks. You'd have to abuse 'em pretty bad to damage them.

This does not mean, however, that the shorting devices should be stripped from relays on which they are already attached, or that they should not be used for packaged storage when they are readily available. It doesn't hurt to have additional insurance against unusual hazards such as may be encountered, not only in storage but also during shipment.

B. Barnacle Butt



Personnel of the Mine Division, Navy Air Support Unit, Iwakuni, Japan, get together for the cameraman on the occasion of newly-appointed WO-1 Ed Jones' departure for his new assignment to OPTEVDET, Key West, Florida. Another slated to leave the group when this was taken is Lt. Ken Ahlstrom, for staff duty, Attack Carrier Air Wing–Nine, NAS Lemoore, California. Those in the photograph, left to right, are:

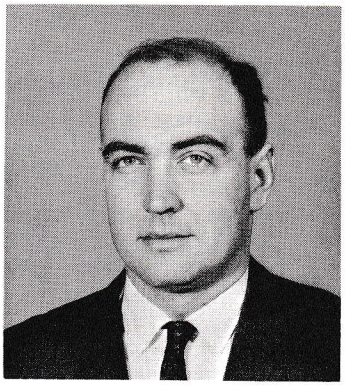
First row: MN3 W. R. McMillion, MN1 J. J. Sbei, MNC L. M. Siluk, Department Head and Mines Division Officer Lt. K. T. Ahlstrom, Assistant Mines Division Officer WO-1 E. R. Jones, MNC B. L. Bishop, MNC L. E. Lee, MN3 G. L. Gray, and MN3 P. D. Weaver.

Second row: MN3 J. L. Meeks, MN2 A. P. Kirkwood, MN3 C. S. Ewer, MN1 J. R. Cottrell, MN3 J. M. Willis, MN3 B. E. Swenson, MN3 G. R. Donaldson, and MN2 S. J. Kelly.

Third row: MNSN E. L. Kinder, MN2 B. W. Luker, MN2 R. H. Tyrrell, MNSN R. E. Hirst, MH2 N. S. Canfield, SN D. W. Gmeiner, MN2 J. Sapien, MN2 A. A. Bauer, and MN1 D. P. Allgor. MNC Z. O. Chuhay was absent when the picture was taken.

NEW POWER SOURCES FOR MINES

By H. A. Ross-Clunis
Chief, Component Redesign Division
Development Department,
Naval Mine Engineering Facility.



There is a major development underway to improve the present mine battery situation. It began a couple of years ago, when a letter came out of the office of The Chief of Naval Operations stating the desirability of a family of batteries for mines which would allow mine storage with batteries installed for five years or more, and still be capable of supplying power for an armed life equal to maximum sterilization settings for the mines.

Before the program could get going a complete study of the current situation vs the goals was initiated, including efforts to find a battery power supply that could reduce the need for some thirty different battery types now required to power our various mines. To this end a special committee, representing the best battery brains in the country, was convened by the National Academy of Science at the request of the CNO.

The first determination is that, in the foreseeable future, CNO's requirements simply cannot be met completely. Batteries of high enough energy to give old vacuum tube mines a truly long armed life, and still give a "liveable" shelf life, cannot now be obtained. Neither can batteries be obtained which will survive five years of truly uncontrolled (say 120° F) storage. There are batteries on the horizon which will do these things but that horizon is too far off for current purposes. Make temperatures no higher than 70° and the horizon is closer.

The bulk of mine batteries now in use are a type called Le Clanche, after the man who developed them nearly a century ago. In design they are the same as batteries sold for use in flashlights, etc. They are cheap, rugged, and reasonably dependable. In fact, for mine purposes, their only really bad characteristic is their perishability, which creates a constant resupply problem and limits the amount of time in which mines may be kept fully assembled and still expected to work. Then there is the fact, already mentioned, that mines, and their batteries, have developed gradually over the years with the result that we now have a great number of different battery types to keep in stock, to power our mines. So much for where we are.

As for where we're going, a task team representing the Naval Ordnance System Command, Naval Research Laboratory, Naval Ordnance Laboratory White Oak, and Naval Mine Engineering Facility has been formed to work from there. Their approach:

▶ Select a battery chemistry system which will give us the shelf life we want and still give sufficient energy density.

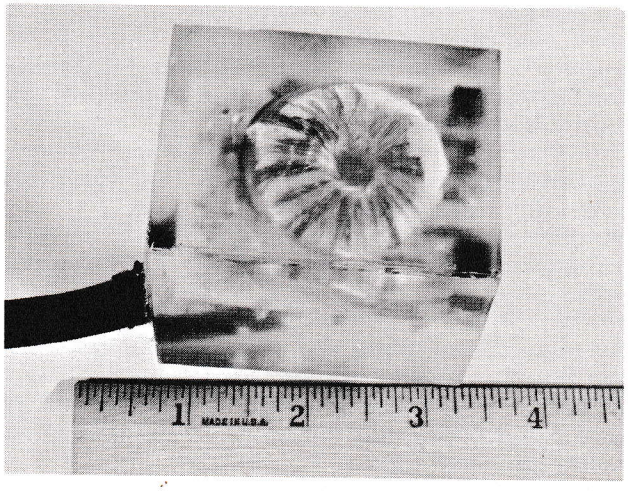
▶ Design a family of DC-DC converters which can take relatively low battery output voltage and convert it to the high voltages required by certain mechanisms.

▶ Develop a minimum number of battery types utilizing the selected chemistry which, along with the converter, can meet all known mine voltage requirements.

The battery chemistry has been selected: Cadmium-Mercuric Oxide. These batteries will be chemically identical to the mercury cells now used in the BA-1322 and BA-1359 except the zinc cathode is replaced by cadmium. Cell voltage is 0.9V as compared to 1.35V for zinc-mercury cells and 1.5 for Le Clanche cells.

Specifications have also been prepared for five DC-DC converters for use with vacuum-tube mechanisms. Basically these converters consist of an oscillator to convert DC to AC, a transformer to raise the voltage, and a rectifier to convert back to DC. The use of these converters will eliminate all needs for high-voltage batteries. A review of all mines reveals that a family of four such batteries can supply all required voltages . . . a considerable simplification compared to the current situation.

The next step is to get prototype models of the converters for evaluation, and to get a battery manufacturer at work developing the four battery types. These things take time so don't look for immediate results. When they come, though, you will see a considerable change in the mine power-source situation.



Experimental DC-DC Converter

DISCREPANCIES – THEIR CAUSE AND EFFECT

FLEET SERVICE-MINE TEST PROGRAM

All "programs" have troubles and the Fleet Service-Mine Test Program is no exception. So we've listed some of them here for the edification of all concerned. If you find that a bad choice of words remember — before you start a Discrepancy March on Yorktown — that our purpose in printing such lists periodically is to help, not to censure. It's smart to learn by experience. It's smarter still to learn from the mistakes of others rather than from your own.

One occurrence has been nominated as discrepancy of the year for FY '67. It happened when an attempt was made to adjust cables through a hand-hole in the afterbody of a Mk 27 mine. The fire that resulted when a switch was inadvertently tripped during the fumbling injured two men. We hope it won't happen again.

In most cases problems were attributable to failure to follow instructions that were printed but not read. In at least one case, though, there was a disagreement in published instructions. Troubleshooter 2-64 said no spacing required in stowage of sensitive relays while OP 1452 Vol 5 specified at least 1-3/4 inches. Troubleshooter was right but the matter was overlooked in Revision 4 to the OP. It has since been fixed by Change 14.

Also, out-of-date guide-lines for FSMT procedures caused some confusion during post-recovery operations. The new FSMT Guide (see box) should take care of that.

Anyhow, that's how we see things at our end. How do you see 'em at yours?

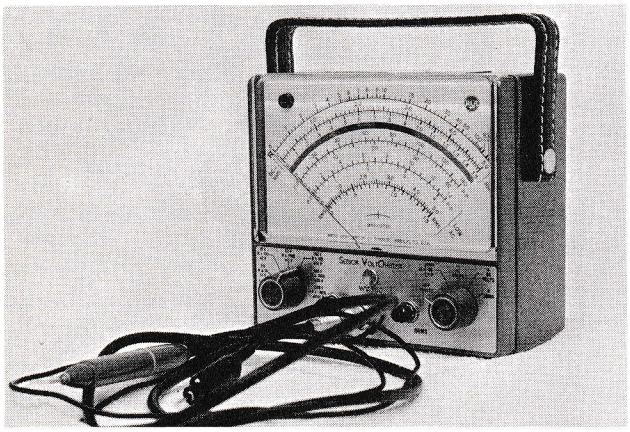
FLEET SERVICE-MINE TEST GUIDE REVISED

A second revision of the FSMT GUIDE dated 15 September 1968 has been published. The need for this revision has been apparent since mines for FSMTs have been prepositioned in ABCD configurations, creating voids in FSMT logistics procedures and necessitating changes in FSMT administration and force relationships. The most significant changes are to the chapters on planning and logistics, and reports and forms. They will aid those involved in FSMTs by clarifying data collection, thereby increasing the validity of test data. If you missed receiving your new Guide or need extra copies, request from NMEF.

DISCREPANCY	CAUSE	RESULT
CD 14-6 improperly installed in a Mine 36-2.	Personnel error.	Clock delay damaged.
Case 36-2 improperly inert-loaded.	Undetermined. Void in load suspected.	Case crushed in rear suspension lug area at water impact.
The yellow color-coding dots not removed from the mine cases and extenders after mine rendered safe by EOD.	FSMT Guide out-of-date.	Uncertainty whether mines rendered safe.
Spacer B not installed between BA-236/Us, Mine 52-2.	Personnel error.	Possibility of broken connections or damaged batteries at water impact.
Fire-recorder readout tag not properly filled in.	Inadequate training, supervision.	Actuation data lost.
Incorrect settings on Clocks Mk-22 and Circuit Breaker Mk 1 Mod 0.	Personnel error.	Mine-field design effort wasted.
Mine handling gear not safety tested.	Personnel error.	Safety hazard.
Used boxes and packaging accumulated in mine assembly building.	Inadequate supervision.	Fire hazard.
Mines not properly connected to building grounding system.	Inadequate supervision.	Safety hazard.

DISCREPANCY	CAUSE	RESULT
Check-off sheets for Mine 27 impeller tests completed before testing.	Personnel error — inadequate supervision.	Faulty impellers easily overlooked.
CA-527 incorrectly connected to BA-249/U.	Personnel error.	No voltage at bleeder end of CA-93; sterilization aborted.
Clock-starter/clock-delay marriage not protected by tape.	Troubleshooter 3-66 ignored.	Damaged clock cable.
Wooden spacer improperly placed on a Clock Mk 22.	Personnel error.	Clock cable crushed.
Solder connection broken on CA-535 terminal card.	Undetermined.	Open circuit to the Clock Mk 22; mine could not arm.
While marrying Mine Mk 27 afterbody to war-battery section, attempt made to adjust cables in afterbody through hand hole.	Inadequate design, instructions, and supervision.	Propulsion motor start switch accidently closed. Result: fire, damage to afterbody, two men injured.
Transmitters Mk 62 failed to operate in Mines Mk 27.	Unknown. Incorrect testing, installation possible.	None of four mines located for recovery.
Microphone connector broken; not reported.	Unknown.	Assembly of mine delayed until another microphone obtained, matched with firing mech, installed.
Operating instructions for test sets not removed from set.	Lack of proper supervision.	Possibility of incorrect instructions being used.
Temperature and humidity control not maintained while testing sensitive relays.	Misinterpretation of Troubleshooter Bulletins 39 and 79.	Exposure to harmful environment.
Instructions not clear on separation of sensitive relays in storage.	See introduction, this article.	Confusion.
Pinger mounts welded in mine cases incorrectly.	Personnel error.	Possibility of poor acoustic coupling or weld carrying away on water entry.
Lead loose on battery terminal.	Personnel error.	Possible mine failure.
Mounting bracket for BA-205/U loose; two batteries crushed.	Personnel error.	Could have caused mine or sterilization failure.
Explosive fittings not included in mine shipment for final prep.	Personnel error.	Lost time
CA-80 pinched between instrument rack and bulkhead.	Personnel error.	Required new cable.
Propellant for mud agitator would not fit cavity in end plate.	Manufacturing defect.	Propellant unuseable.

DISCREPANCY	CAUSE	RESULT
Planners, assembly, and user personnel unfamiliar with the Mk 27 mobile mine system; manuals lack launch depths and pressures.	Insufficient training and exercising of weapons.	Mines broached, ran erratically.
War-battery section, Mine Mk 27, too badly dented to join afterbody.	Careless handling at the issuing activity.	Repairs before case could be used.
Plastic cover of the Arming Device Mk 5 pinched the P-3 leg of CA-833; broke when torque applied to securing screws.	Failure to follow OP 2608.	Arming device and cable rejected.



The Volt-ohmyst RCA, CRV-WV 98c, 4V0006, is a compact VTVM instrument for measuring ac and dc voltage and resistance. It includes an improved circuit providing ±3% accuracy full scale on both ac and dc measurements with less than 1% tracking error. It has a high input resistance, electronic protection against burnout, rugged 200 microamp meter, and precision multiplier resistors.

ALL MINES:

AN/USM-34 SHOCK HAZARD

Users of Multimeter AN/USM-34 and -34A have a potential shocker on their hands and should request disposition from NMEF. The meter to requisition in place of the 34 is Voltohmyst, RCA, WV-98C, 4V00006.

Early models of meter AN/USM-34 (serial numbers 2232 and lower) connect one side of the potential being tested to the case, without benefit of a ground. Serials 2233 and higher have a three-prong plug that may or may not ground the case depending on whether or not the plug is properly used. The AN/USM-34A has a plastic case which nullifies this shock hazard. But regardless of these circumstances, neither of these meters is any longer authorized for mine activities.

For many years we have cautioned readers to always use an external ground connection on AC-operated test equipment to insure against electrical shock. Now most of the newer AC-operated mine test sets have three-prong plugs which automatically ground the equipment when plugged into a properly grounded AC receptacle, particularly sets associated with Mines Mk 52, 55, 56, and 57. With these sets no external ground connections are required.

All mine shops are required to have grounded AC systems: either a ground incorporated into the wiring system, identified by three-prong polarized receptacles, or – in older systems – a series of grounded buss bars.

ALL MINES:

TORQUE TALK

Should torque tolerances in mine publications be specified in plus-or-minus terms? Should you make allowances when there is some grease on the threads? Starting in 1969, most torques will be specified in single values, such as 18 lb-ft or 12 lb-in.

Tolerances for torques so specified shall be as follows: From 2 to 10, tolerance is plus or minus 1; from 11 to 30, tolerance is plus or minus 2; above 30, tolerance is plus or minus 5. This means that for a specified torque of 12 lb-in any applied torque between 10 and 14 lb-in is authorized. For a specified torque of 18 lb-ft any applied torque between 16 and 20 lb-ft is authorized. Where deviations from these standards are required, tolerances will be specifically stated in the instructions.

Torques specified in mine publications are to be applied as given, since all such values will have been correlated for direct reading on the specified wrench, including instances where crowfoot wrenches are specified, and where some grease will be present.

Where mine publications state to tighten securely or to secure (rather than specifying a torque) fastenings are to be tightened with the appropriate tool without use of excessive pressure or "cheaters." Components specified to be secured hand or finger-tight should never have tool pressure applied.

This represents a standardization which has been jointly adopted by NMEF and NOL. Statements similar to the above will be appearing in the "General Shop Practices" chapters of all new mine manuals. Meantime all hands are hereby advised that this is the policy when questions of torque and tolerance arise.

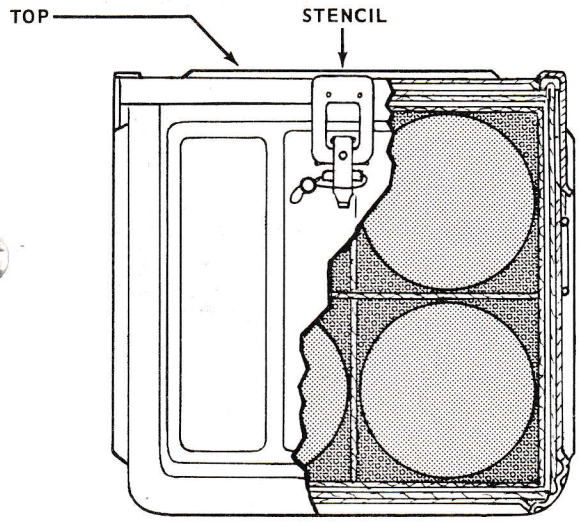
MINE MK 57:

PROPELLANT PROBLEMS

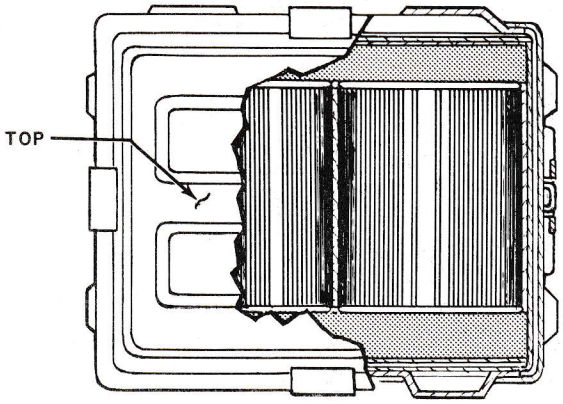
During a recent fleet exercise it was discovered that some propellants for Mud Agitator Mk 1 were so out of shape they wouldn't fit in their cavities. The reason: the explosive material they contain is plastic enough to flow when the propellants are stowed horizontally for some time.

Unfortunately the way the charges are packaged makes horizontal the normal attitude (see cutaway top-up view). An immediate solution, then, is to turn all such containers on their sides. This will make the propellants vertical and arrest the tendency of the explosive to "slump." You should even go a step further. To keep some well-meaning soul from turning them back again stencil on the lid of the outer container, in black, the legend: STORE CONTAINER ON SIDE.

Propellant charges in depot stocks are being screened for distortion and a new container to insure vertical stowage has been designed. Together, these measures should take care of the problem. In cases where they do not—where you find propellants which have "slumped"—place them in Code H and request disposition. Do not try to reshape or force-fit them



CONTAINER TOP-SIDE-UP: PROPELLANTS ON SIDES



CONTAINER ON ITS SIDE: PROPELLANTS UPRIGHT

Another problem that you may encounter is an orifice plate which has come unstuck from the propellant, in which case you will not be able to handle it with T-wrenches as shown in OP 2718.

The cause of this problem is migration of the solvent in the propellant. The mixture of nitroglycerine and stabilizer exudes as an oily-appearing liquid that destroys the adhesive that bonds plate to propellant. This oily exudate may also appear as a liquid film on the outside of the propellant mass.

In such cases loose orifice plates are not a cause for rejection. To use the propellant, wipe the liquid off the outside with rags, being sure to wear rubber gloves. Next, drop the propellant into its cavity without benefit of the T wrenches. You will then be able to use the T-wrenches to lower the orifice plate onto the propellant so the plate's hole clears the igniter, and the snap ring will then hold all in place.

If you should have to remove the propellant to add more spacers, per OP 2718, first lift out the orifice plate with the T-wrenches. Then, with a helper, you can turn the end plate over until the propellant slides out of the cavity and into your gloved hand. Don't let it drop.

By all means avoid skin contact with the exudate; such contact can cause really severe headaches. If you should get it on you wash with soap and water as soon as you can. Dispose of contaminated rags and gloves in accordance with OP 5.

MOMAT 0305 SHARES AWARD

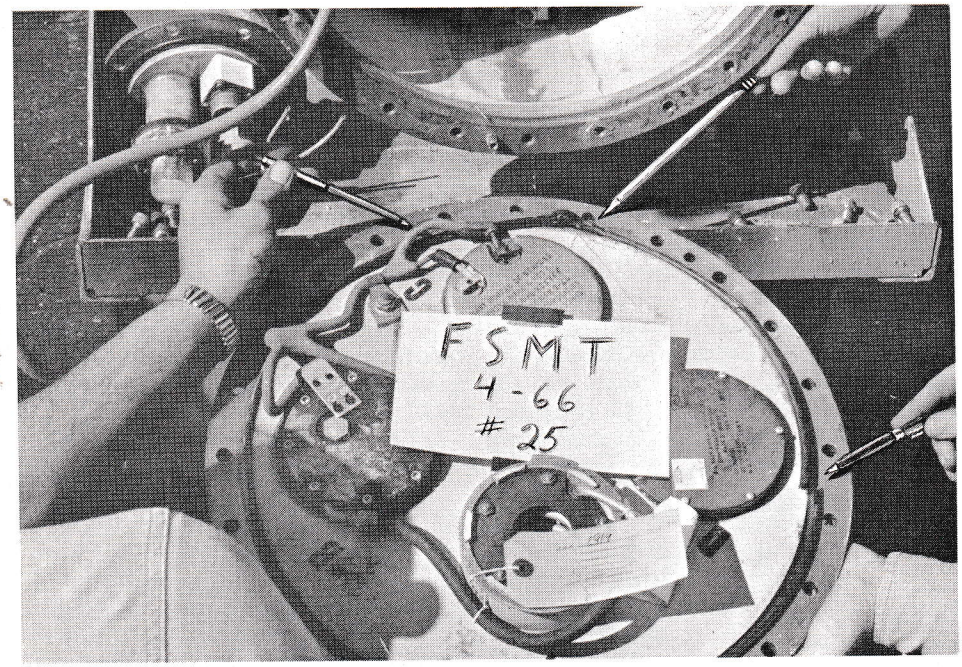
A letter from WO P. E. Dechene, NAS Whidbey Island, advised us that members of MOMAT 0305, omitted from the photograph of the Mine and Torpedo Division NAVMAG Subic in Troubleshooter 2-68, should have been included among those sharing the Meritorious Unit Commendation awarded the Subic group. At the time of deployment in 1967, in addition to Warrant Officer Dechene, members of MOMAT 0305 were MNC F. A. Eck, MN1 C. M. Johnson, MN2 C. A. Parker, MNSN R. L. Blakeslee, MNSA J. J. Jakubisin and MNSA M. S. Flynn. Chief Eck and MN1 Johnson shipped over while deployed on Yankee Station.

Those were rough days. WO Dechene states that MNSN Blakeslee, while TAD to the USS Kitty Hawk, was in an aircraft crash with other ordnance personnel that took three lives. Blakeslee nearly lost his life inside the pitch-dark sinking airplane too, then at the last frantic moment found the escape hatch and fought his way to the surface, inhaling a quantity of sea water on the way.

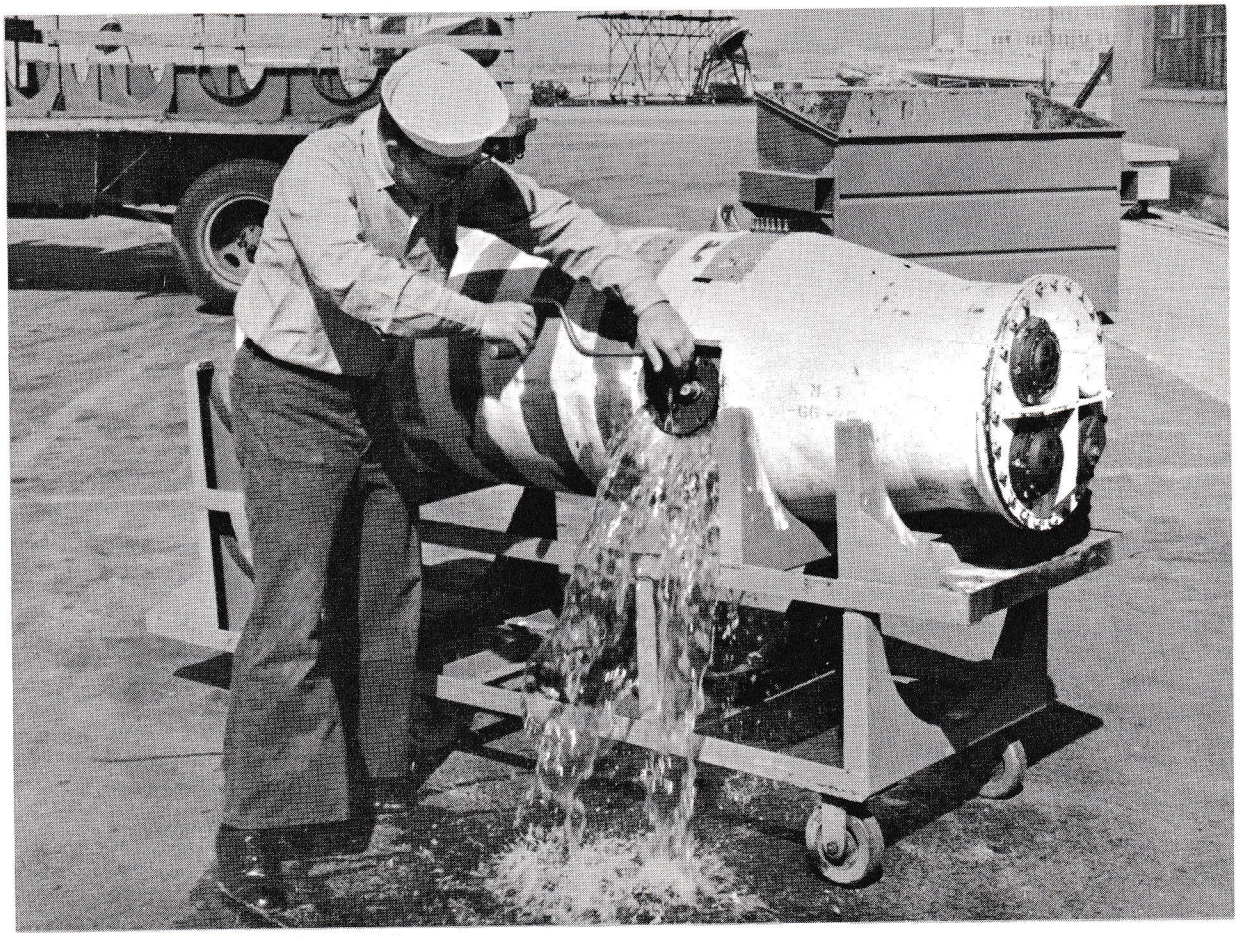
A member of the crew of the rescue helicopter jumped into the water and rescued him. After two days in sick bay Blakeslee was back on duty.

A MINOR POINT?

It's more than minor when the point is installation of the wrong-size packing (O-ring) on a mine-case watertight opening. Here three hands point out the breaks it produced.



The result should be predictable to all hands: an FSMT Mk 55 flooder. This shouldn't even happen to a Mark 6!



Do You do this Job Right?

MINE MK 57-0:

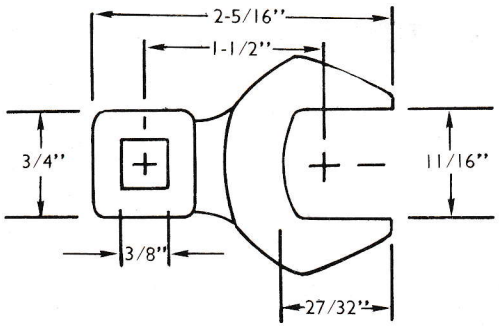
NEW PROBLEM: NEW TOOL

Try marrying the Mechanism Section Mk 2 to Explosive Section Mk 2 or Drill Section Mk 2 in assembling a Mk 57-0 mine using crowfoot attachment 7A00078, and you will find it just doesn't reach far enough into the half-moon slots to do the job satisfactorily. The trouble is that the torque wrench rides the outside diameter of the mechanism section and prevents the crowfoot from seating on the nut properly. The result is a poor grip, a chewed nut, and a false torque reading.

The answer is crowfoot attachment 7A00512, which extends the reach by 1-1/2 inches. This new tool is being put into the supply system and will be available sometime in 1969. If you can't wait, an open purchase of P. A. Sturtevant Company's Model TC 22, adapter, open end, 11/16 opening, 3/8-inch drive, will do the job for $3.17.

Or you can cut off an open-end 11/16-inch wrench and weld on a 3/8-inch drive as the assembly crew at Charleston did.

No problem with torque values. The added length of the new adapter is not enough to result in a significant change. Keep to the under side of the tolerance if you want to be particular.



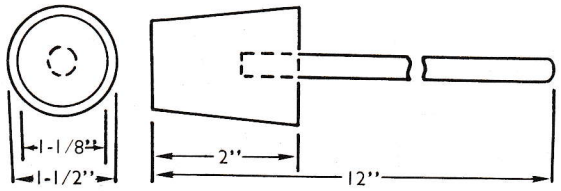
MINE MK 56-0:

BUSHING-SLEEVE EXTRACTOR

Sooner or later you'll be converting a Mk 56 "D" mine to a higher assembly configuration. When you do, you'll have a problem with a bushing sleeve in the release-pin well. You just can't get it out of the well any easy way.

This sleeve isn't fastened to anything until the explosive driver is installed (see Job Right-T-Shooter 2-68) so it just sits at the bottom of the well all by itself. But you'd need some eight-inch fingers to pull it out, or superhuman muscle to shake it out, because with the anchor married to the mechanism section of the mine and the release pin firmly locked in place, you sure can't push it out!

The answer is to turn out a plug of soft wood on a lathe, or whittle it out, roughly to the dimensions in the sketch. Actually the dimensions are not critical. You need only make sure the small end is smaller than the ID of the sleeve and the larger exceeds it. Drill a hole and glue or otherwise fasten a 10-1/2-inch dowel for a handle, and you have it made; a bushing-sleeve extractor that works without work just about every time.



To use, push the plug into the bushing sleeve and withdraw. The soft wood will engage the threads firmly enough to draw out the sleeve without damaging them.

You can get the same result with a cushion-grip screwdriver if you have one with the right size handle and a shank at least 8 inches long.

the Editor


"OH, I'D SAY THERE'S A LITTLE SPARK IN THE OLD CHIEF, YET, SIR!"
"DOESN'T YOUR HUSBAND HAVE A HOBBY?"
LOST & FOUND
"CAN YOU DESCRIBE IT?"
MINE
"SAVE THAT RECIPE, I HAVE TO PATCH A CRACK IN ONE OF OUR MISSILES!"
BUT Real PROBLEMS ARE NO JOKING MATTER....
USE RUDMINDE!