

*mine and depth-charge*

# THE TROUBLESHOOTER

▶ HYDROBALLISTICS  
LAB DEDICATED

▶ DRILL-MINE SIGNALS

◀ POWER LOADING  
FOR MK 27s



**AN OFFICIAL NAVORD PUBLICATION**



*in this issue . . .*

*mine and depth charge*

# THE TROUBLESHOOTER

Published by the Naval Mine Engineering Facility, Yorktown, Virginia

Roland H. A. Immonde, CDR, USN ..... Officer-in-Charge  
Haines A. Miller ..... Technical Director  
Thomas R. Nevitt ..... Editor  
D. Jack LaBar ..... Art Director

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**COVER PHOTO:** The "other side" uses mines too. Navy Petty Officer Joel Johnson, left, and Ensign Gary Barton wash off an enemy command-detonate mine just taken from the Long Tau River, the first step toward disarming it. The mine was cut loose from its moorings by a Navy minesweeper operating in the Vietnam river.

1 JANUARY 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 8500/5 (1-63). 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

## SPRECHER SPEAKS... AGAIN!

*In Troubleshooter 2-67 we printed a rundown on the Mine Warfare School at Charleston in the form of an open letter to MN rates everywhere, from Ed Sprecher. It answered a lot of questions, but it also raised more than a few, and for that reason we are printing some answers — in the form of another letter from Ed — here.*

**I**N TROUBLESHOOTER 2-67 I spoke of several avenues of education available to all minemen, including a revised and slightly lengthened "B" course. Here's what it consists of.

When entering school, students commence 5½ weeks of B-Prep which encompasses basic electricity to electronics. No electrician dope, but a new course with all new equipment. Following prep comes 7 days of test-set repair with thorough practical application of the Test-Set Checkout Group Mk 1 Mod 1. After that, three days are spent on administration and logistics, in which are explained today's procedures for establishing shop allowances, files, battery histories, etc. from a logistic standpoint. Non-Modular Accessories follows for 9 days. This course includes a complete rundown on each component including repair procedures for repairable items. Battery histories are once again touched on in Non-Modular, but from a weapon-assembly standpoint this time.

Moored mines are the first weapons presented. We give 4 days on the Mk 6, 10, and 53, including complete assembly (marrying and balancing the Mk 10, etc.). Five days are then spent on the Mk 25-0, 39, and 49-0.

This is the initial encounter, since prep, with gas tubes, etc. Complete system analyses are conducted, including the Drill 49 which is a one-of-a-kind beast. The old standbys M9-1 and M9-2 with related mines are taken to task for 3 days, followed by 3 days of combination mines involving the A6 and A8. Then, for 6 days, come the first vacuum-tube firing mechanisms, the A5 in the Mk 25-1, 36-2, and 49-1, and the Mk 19 in the Mk 50 mine. In each of these classes complete system analyses and troubleshooting is included.

Next come 13 jam-packed days on our only mobile weapon, the 27, including complete overhaul of the afterbody, changing watertight seals, authorized gyro testing, ballasting, deck runs, battery charging, and exercise weapon assembly and recorder readout analysis.

With that done, you shift to the new school building for 5 days of Modular Accessories. Once again battery histories are figured for mines containing batteries with many different age groups and then, after a thorough understanding of Modular Accessories, 9 days are allocated to the 52/55 Mods 1 thru 6. We have some new study card sets for circuit and system analysis that graduating B students say are great!

From here we dive into logic and Boolean algebra with both feet. Computer action is explained utilizing a Bi-Trans Six computer for practical experience, and this provides exactly the prep you need for the 6 days that follow, on the Mods 7 and up. The Mk 56/57s follow with 14 days allotted. Study card sets are again utilized and

there is practical experience in balancing, leak-testing, and marriage of all sections into complete weapons. The next 3 days are spent on special-purpose weapons. Here assembly, testing, and disassembly problems are presented and discussed. Last but not least is a day on mine-field planning.

In all, then, between 50 and 60 percent of the time is spent in lab or practical application in which the major time allocation falls on the new mines and associated components. Increased emphasis is placed on troubleshooting and post-recovery analysis of all weapon systems in order to better prepare personnel for billets of greater responsibility. As I indicated in Troubleshooter 2-67, emphasis on the older designs has been minimized. The course is good, and the increasing number of requests for B school is encouraging. Some students are even returning for a second time having initially attended subsequent to that magic 1959 date I mentioned in 2-67, proving again that even BUPERS is bending over backwards to help us.

L.T. H. E. SPRECHER Jr.  
U. S. Naval Schools, Mine Warfare  
U. S. Naval Station  
Charleston, South Carolina 29408

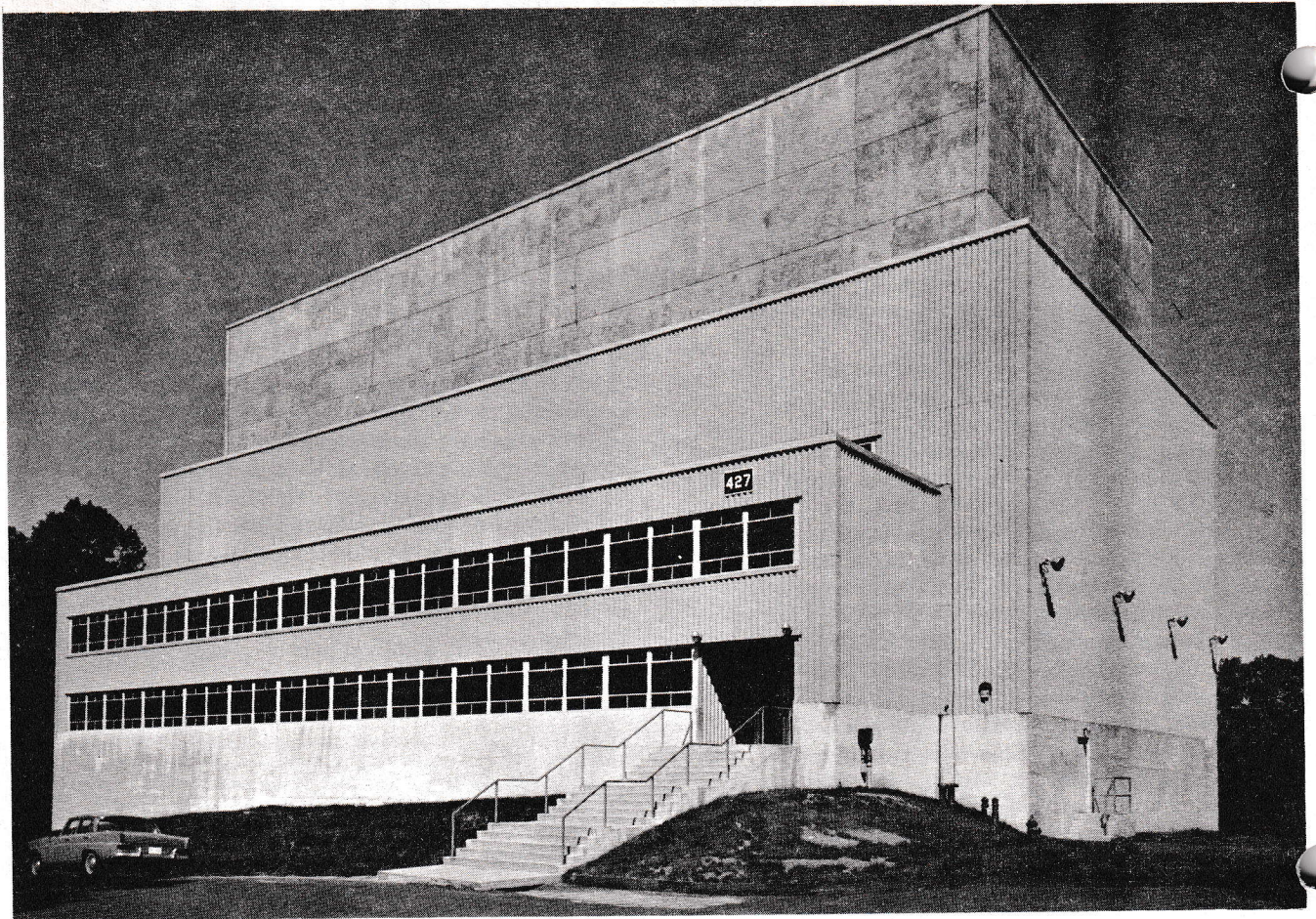
*NOTE: By the time you read this Ed will have attended the final design conference for a new mine school building, and he says there are some hopes for construction beginning in the fall. He has promised to keep us posted, and also to come through with a description of the new 'A' curriculum. He says he's still wide open for any gripes you want to send his way by mail!*

## NAVORDINST 8500.3 COMING

Somewhere near the time you read this you'll be receiving the new Instruction on the use of Rudminde — 8500.3, and in it you will find some changes. Here are a few to watch for:

- ▶ It will specify NAVORD Form 8500/1 as the new Rudminde Form (i.e., defect report form for mine and depth-charge material).
- ▶ It provides for submission of Rudminde in message form, when warranted.
- ▶ It specifies that Rudminde should not be submitted on drill gear which becomes defective after repeated use... only that which is peculiar to drill (vs service) mines and fails for reasons which appear to stem from causes other than re-use.
- ▶ It provides for special identification of Rudminde submitted against defects encountered in the application of planned maintenance.
- ▶ It clarifies use of Rudminde in conjunction with Fleet Service-Mine Tests and the World-Wide Surveillance Program.
- ▶ It makes mandatory the use of Rudminde by all Naval missions concerned with inspection, maintenance, storage, test, assembly, final prep, planting, and recovery of depth charges and mines.





## HYDROBALLISTICS FACILITY DEDICATED

**T**HE World's leading hydroballistics research facility, the Naval Ordnance Laboratory Hydroballistics Facility, was dedicated on 31 October 1967 at Silver Spring, Maryland by Rear Admiral Arthur R. Gralla, Commander, Naval Ordnance Systems Command. Among its many functions, NOL is the design agency for all US Navy underwater mines.

The new facility provides an environment for simulating the performance of missiles that enter, travel through, or leave the water at high speeds. In the words of Admiral Gralla: "We anticipate that this Facility will pay for itself many times during development of future underwater weapons."

William L. Borrows of England's Admiralty Research Laboratory joined Admiral Gralla in a traditional ceremony, that of mixing a sample of water from the Admiralty Laboratory's hydroballistics tank with the water of the new NOL tank. This perpetuated a continuous mixing of waters that began when William Fronde, a pioneering naval architect, designed the first modern research tank in England during the mid-1800's.

Witnessing the ceremonies were 40 guests representing a number of US research activities, the several Naval Systems Commands, and the British Admiralty.

Guest speakers at a Technical Symposium on hydrodynamics research held in conjunction with the dedication, were Mr. Borrows, Professor J.F. Kennedy of the University of Iowa, and Dr. J.W. Hoyt of the Naval Underseas Warfare Center.

The symbolic key to the Facility was received by Captain E.F. Schreiter, Commander of NOL, from the Officer-in-Charge of Construction, Chesapeake Division, Naval Facilities Engineering Command, Captain H. F. Curren. Dr. G.K. Hartmann, NOL Technical Director, gave a history of hydroballistics research at NOL, and Dr. A.E. Seigel, Chief of NOL's Ballistics Department, described the new facility before visitors toured the structure and witnessed the firing of a scale model of an experimental missile under the direction of Dr. V.C. Dawson, Chief of the laboratory's Hydroballistics and Mechanics Division.

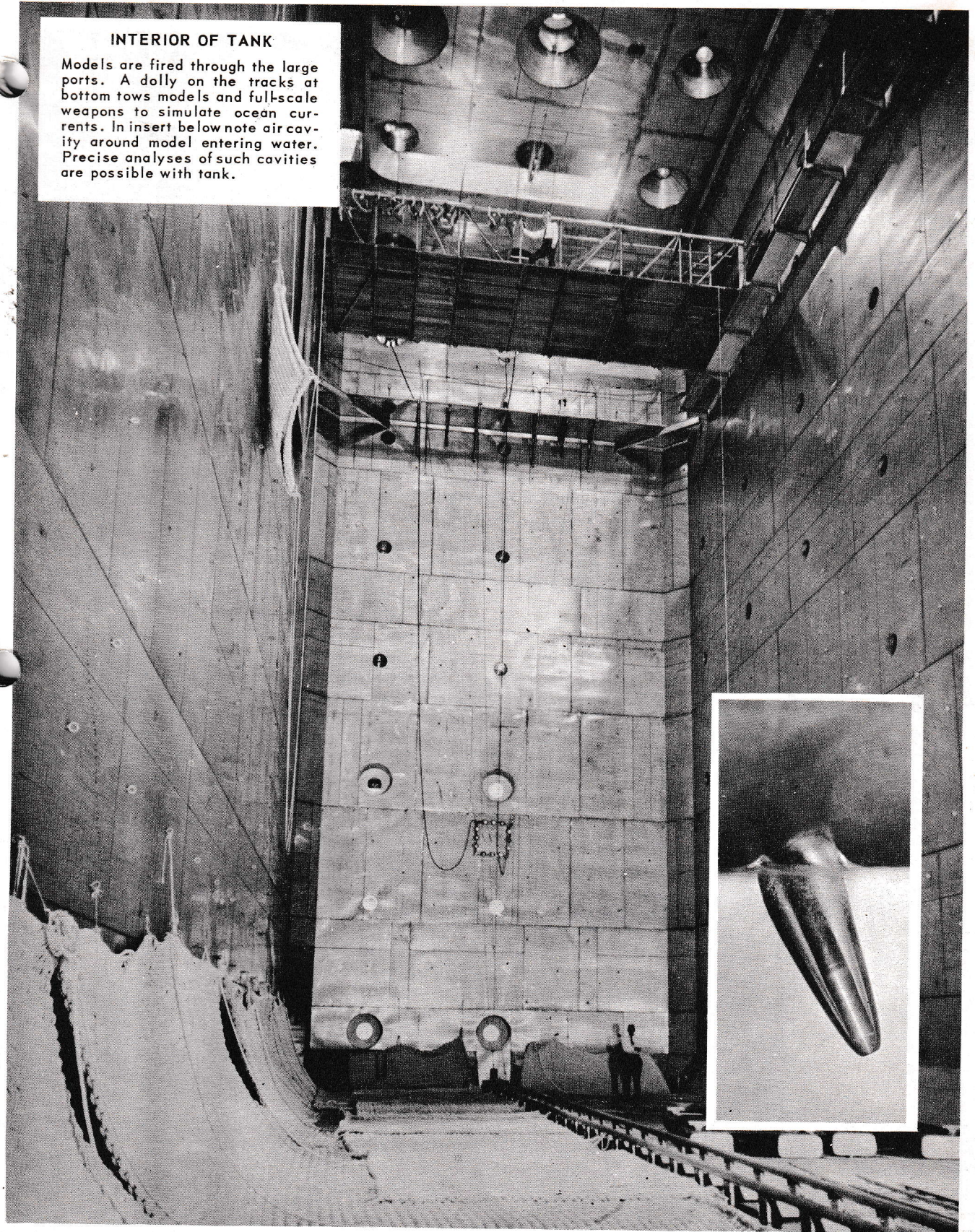
The design of the Facility is ingenious indeed. The interior of the main building has nine levels, four of which are below ground. The central portion is constructed of massive reinforced concrete honeycomb that forms a rectangular tank 100 feet long, 35 feet wide, and 75 feet high. The walls, lined with 1/8-inch stainless steel

*(Continued on Page 8)*



### INTERIOR OF TANK

Models are fired through the large ports. A dolly on the tracks at bottom tows models and full-scale weapons to simulate ocean currents. In insert below note air cavity around model entering water. Precise analyses of such cavities are possible with tank.



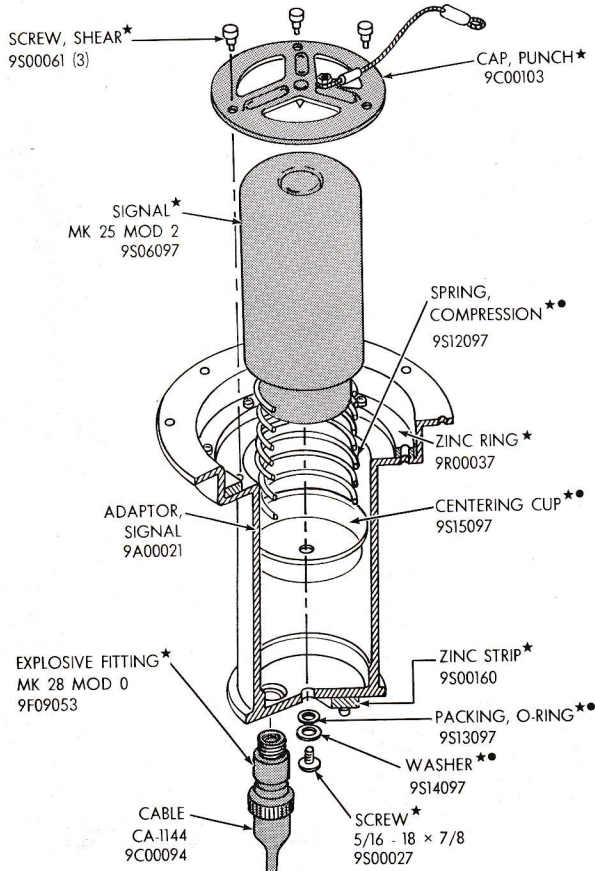


# SIGNAL MK 25 IN NEW SURROUNDINGS

WITH THE ADVENT of the Drill Mines Mk 56 and 57, mine assemblers will meet the old familiar Mk 25-2 signal in a new configuration, and a new Mk 55-0 signal that is a component part of the Float Mk 16.

In the Drill 56 the Mk 25 signal does not install in a float, but instead in a signal adapter which is installed in the signal well of the mine's drill section. This adapter acts as a signal ejector when the drill mine actuates.

When the signal is ejected it strikes a punch cap much the same as the punch cap used with the Floats Mk 15 and 17. This new cap is spoked, and it is held in place by three plastic shear screws instead of rivets. Explosive Fitting Mk 28 Mod 0/9F09053 expels the signal. It has more bang than the explosive fittings in the Mk 15 and 17 floats because the strength of the shear screws require it. In fact, even the Explosive Fitting 7-1 originally specified was too weak. Drill 56-0 use of the Mk 25 signal also calls for a non-magnetic screw 9S00027. Those that come with the signal must be discarded in favor of the non-magnetic jobs.



- ★ Expendable each plant.
- Supplied with signal.

Signal Mk 25 Mod 2 in Drill Mine Mk 56 Mod 0

The new punch cap is a zero level assembly item, which means you order it as a separate line item, whereas the other punch caps are supplied as parts of the Mk 15 and 17 floats. Shear screws, zinc ring, zinc strip, Explosive Fitting 28-0, Cable CA-1144, and the non-magnetic screws are also zero-level items. No provision is made to use colored signals (Mk 39 or Mk 44) in the Drill 56.

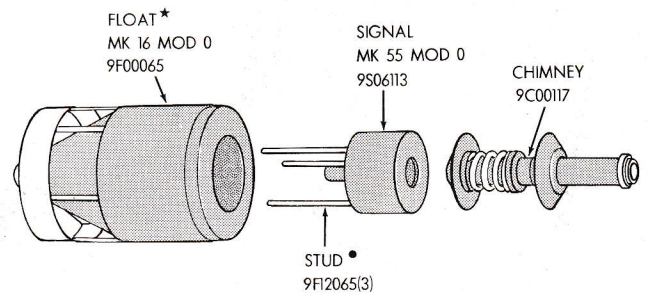
The Mk 55 signal for the Drill Mine Mk 57 installs in the Float Mk 16, which does not eject it but carries it to the water surface where a percussion-type primer starts a firecracker fuse that ignites the signal's pyrotechnic mixture. The resultant emission is gray smoke and flame; duration is about two minutes, after which the float scuttles taking the signal with it.

The Mark 55 signal can be ignited by a sharp blow on its percussion-primer end, so requires careful handling. In fact, it is best not to remove any pyrotechnic signal from its packaging until it is to be installed in its float thereby minimizing the chance of damage or spurious ignition.

Although all pyrotechnics used as underwater mine signals are designed and tested for safety under normal conditions they are also subject to accidental ignition when exposed to high humidity, moisture, and temperatures (above 100° F). In short, it's always well to remember that pyrotechnics contain chemicals intended to burn with intense heat. Also remember that it's dangerous to breath fumes from a burning signal or any chemical dust that leaks from a damaged one.

In fighting fire involving signals, foamate, carbon dioxide, and carbon tetrachloride extinguishers and fog nozzles are ineffective because the pyrotechnics' combustion is self supporting. Furthermore, chemical-type extinguishers can generate poisonous gases. Therefore the best fire-fighting agent is water in flooding quantities and at low pressure, and the primary fire-fighting effort should be to prevent spread of fire to surrounding combustibles.

For additional information on handling, transportation, and storage of pyrotechnics see OP 4 - Ammunition Afloat; CG 108 - Coast Guard Rules and Regulations; OP 5 Vol 1 - Ammunition Ashore; and Federal Regulations 49 CFR 71-78.

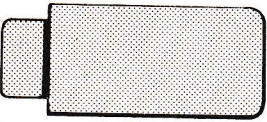




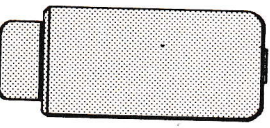
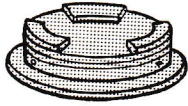
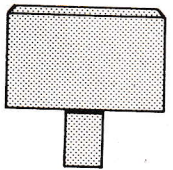


- ★ Cover, salt-chamber components not shown.
- Supplied with float.

Signal Mk 55 Mod 0 in Drill Mine Mk 57 Mod 0



# DRILL-MINE SIGNALS AND HOW THEY ARE USED

SIGNALS*	CAPS	USED WITH	SIGNAL DESCRIPTION
 <p>SIGNAL, SMOKE AND ILLUMINATION, MARINE MK 25 MOD 2 - 9S06097</p>	 <p>CAP, PUNCH TYPE 9F26061 or 9F14069</p>	<p>FLOATS MK 15 MOD 1 - 9F00061 MK 17 MOD 0 - 9F00069</p> <p>ON DRILL MINES MK 18 MOD 0 MK 25 MODS 0, 1, 2 MK 36 MODS 1, 2, 3 MKS 52/55 ALL MODS</p>	<p>SMOKE COLOR: Gray</p> <p>BURNING TIME: Three to five minutes</p> <p>SIZE: 9 inches long by 4 inches diameter</p> <p>OPERATION: An aluminum cylinder launched by explosive fitting. Pyrotechnic material reacts with water to produce smoke and flame.</p>
 <p>SIGNAL, SMOKE AND ILLUMINATION, MARINE MK 26 MOD 0 - 9S06101</p>	 <p>CAP, PUNCH TYPE 9C00103</p>	<p>SIGNAL ADAPTER 9A00021</p> <p>ON DRILL MINE MK 56 MOD 0</p>	
 <p>SIGNAL, SMOKE AND ILLUMINATION, MARINE MK 26 MOD 0 - 9S06101</p>	NONE	<p>PROJECTOR MK 18 MOD 0 - 9P00213</p> <p>ON DRILL MINES MK 6 MOD 2 MK 10 MOD 3 MK 49 MODS 0, 1, 2</p>	<p>SMOKE COLOR: Gray</p> <p>BURNING TIME: Two to six minutes</p> <p>SIZE: 10½ inches long by 2½ inches diameter</p> <p>OPERATION: Fiberglass cylinder launched by percussion-type primer and black powder charge. Pyrotechnic material ignited by safety fuse and quick match.</p>
 <p>SIGNALS, SMOKE AND ILLUMINATION, MARINE MK 39 MOD 0 - 9S06105 (GREEN) MK 44 MOD 0 - 9S06109 (RED)</p>	 <p>CAP, PLAIN TYPE 9S11105 or 9S11109</p>	<p>FLOATS MK 15 MOD 1 - 9F00061 MK 17 MOD 0 - 9F00069</p> <p>ON DRILL MINES MK 18 MOD 0 MK 25 MODS 0, 1, 2 MK 36 MODS 1, 2, 3 MKS 52/55 ALL MODS</p>	<p>SMOKE COLOR: Green (Mk 39) and Red (Mk 44)</p> <p>BURNING TIME: Three minutes</p> <p>SIZE: 9½ inches long by 4 inches diameter</p> <p>OPERATION: An aluminum cylinder launched by explosive fitting. Pyrotechnic material ignited by percussion primer and safety fuse.</p>
 <p>SIGNAL, SMOKE AND ILLUMINATION, MARINE MK 55 MOD 0 - 9S06113</p>	NONE	<p>FLOAT MK 16 MOD 0 - 9F00065</p> <p>ON DRILL MINE MK 57 MOD 0</p>	<p>SMOKE COLOR: Gray</p> <p>BURNING TIME: Two minutes</p> <p>SIZE: 4 by 4 inches</p> <p>OPERATION: Cylindrically-shaped aluminum body carried to surface by float. Pyrotechnic material ignited by percussion type primer and fire-cracker fuse.</p>

\*Signal Mk 4 Mods 3 and 4, a 7/8-inch aluminum cylinder 5 inches long, used with the Mk 41 practice mine is not shown. Actuated by a firing pin it emits a flash and puff of smoke as a visual impact indication.



by B. Arnaclebutt, MNC

# HOT STUFF

## Case of the missing studs

Dear B

Can Clock Delays CDs 8, 10, 12 and 17 that have passed B tests but have one or two broken studs be used for drill mines? If so what authority? The clocks were received as Code A and the stud defect was not noted until after testing.

BCS

Dear BCS

. . . and away we go! First, on the premise that what's good enough for service use is ok for drill, we'd have to conclude clocks with one missing stud are ok for drill since service-mine MRCs allow them. Now with two studs missing the stew gets a bit thinner, but I'm going to say okay anyhow . . . but with two reservations:

- ▶ The missing studs must not be adjacent. That is, there's got to be one good stud in between.
- ▶ This applies to drill use only. It has no effect on the doctrine in current MRCs for service mines.

You can quote me on that. In other words, this article is your authority.

*B. Arnaclebutt*

## Diaphragm replacement

Dear B Butts,

When stationed in Yokosuka 4 years ago it was SOP to change all extender and clock-starter diaphragms before planting service or drill mines. Now, in accordance with MRCs, the extenders and clock starters should be B tested, but only if leaks develop should their diaphragms be replaced. Now my present command has 100% diaphragm spares stocked, plus an additional 10%, which appears as if this diaphragm is still expected to be replaced.

So what say you? I say that if diaphragms are to be replaced before planting there's no reason for the test performed on clock starter or extender as stated in MRCs. Of course this may have been only a



WESTPAC policy because I can't find a thing on it in writing. Can you?

CH, MNC

Dear Charlie:

Shady or otherwise, let's forget the past. Today it is not required that you replace these diaphragms unless your B tests indicate such replacement is necessary.

As for whether and when your B tests are to be performed, your MRCs and OPs are sufficiently explicit on this, taking into account the assembly conditions of your mines, your maintenance cycles, etc. which I won't try to wring out here.

Okay?

*B. Arnaclebutt*

## Correcting a misfit

Dear B

Now we're receiving attenuator plugs for the Firing Mechanism Mk 20 that won't mate with the firing mechanism receptacle. What gives?

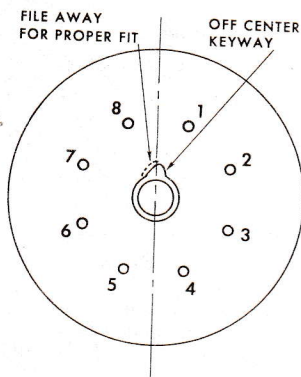
MAP MN2

Dear MAP

Most plugs are okay but not all. Some, probably like yours, have offset keyways, easily recognized by an ex-



amination of its relation to connector 1 and 8. The keyway should be dead center between them. If you get some that are not, file away the edge that interferes until it clears the center post key on the firing mechanism. The resultant enlarged keyway is no problem.



Misfits also may be due to deformed contacts in the plug. This can be corrected by a pointed probe such as a finishing nail or a piece of stiff wire. Spread the inserts with this tool until the attenuator plug can be fitted over the prongs on the firing mechanism, so the plug seats firmly but without too much effort.

We've also seen plugs with potting compound in the center hole. This you can pick out with a pen knife. Newer plugs, we hope, will be free of such imperfections.

*B. Armaclebutt*

## Tolerant tolerance

Dear B-Butt:

What is the correct tolerance for the 5600-ohm resistor used in the Bleeder Assembly DWG 1620873? For the Mine Mk 25 Mod 2 the resistor called out is 5600-ohm 1/2 watt plus or minus 5 percent. OP 1452 Vol

1 Rev 4 calls out a 5600-ohm resistor with a 20 percent tolerance. The resistor itself has a silver band on it which means to me that its tolerance is 10 percent. How do you explain this wide swing in tolerance?

P. A. T.

Dear Pat:

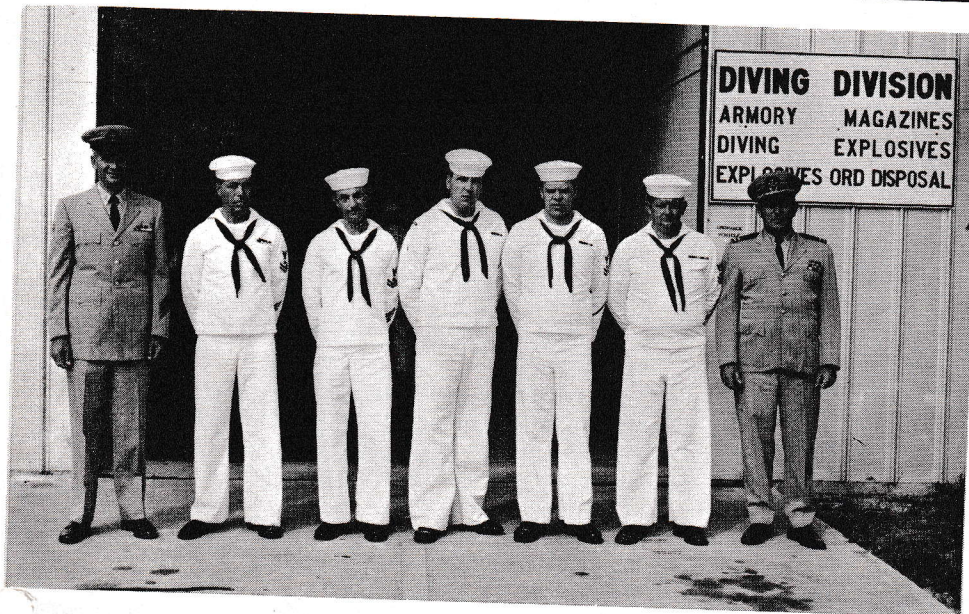
Your authority for how to assemble your mines is your assembly OP, but not for what goes into them. For this OD 3504 is your final authority. What 3504 specifies in this case is Bleeder Assembly OB00050. That, not the resistor, is the assembly-level item to be concerned with.

Formerly this bleeder assembly, identified in OP 1452 Vol 1, as DWG 1620873, included a 5600-ohm 1/2 watt resistor plus or minus 5 percent. The resistor currently specified is a 5600-ohm 1/2 watt plus or minus 10 percent.

Furthermore the 10 percent tolerance is for the resistor all by itself. When the bleeder assembly is manufactured this value is going to be affected in production so the tolerance increases to plus or minus 15 percent.

Finally, at the time of assembly into the mine, age and conditions of storage (heat, humidity, etc.) will have to be allowed for. To do so the tolerance increases to plus 50 percent or minus 20 percent. Plus 50 minus 20 is perfectly valid for the bleeder assembly in its end use, and these are the tolerances that will soon show up in your OPs.

*B. Armaclebutt*



Just in case their fellow minemen have forgotten where they are, Mineman Parks sends ye editor a photo of the crew at the U. S. Navy Mine Defense Laboratory, Panama City, Florida 32401. They are, left to right: GMGCS S. S. Smith, MN2 J. F. Harrison, MN2 A. H. Stoudt, MN2 J. Sapien, MN2 C. E. Combs, MN2 D. R. Parks, and LT. J. C. Bladh, O-in-C. Mineman Second when this photo was taken, Stoudt is now Mineman First.



# MK 27 MINES TO GET POWER LOADING BUTTON

THE FIRST FOUR Mk 27 mines to be power-loaded (rather than mule-hauled) into the tubes of a submarine were equipped with a new propeller nut that was being evaluated in conjunction with Fleet Test FSMT CSP-1-67. The nut accepts a "button" whose configuration mates with the standardized power loading apparatus found in the torpedo rooms of all modern submarines. The prototypes performed without hitch. Result: by the end of calendar year 1968 the hardware will be available and it will have become SOP for mine assembly shops to install it on the tails of all mods of the 27 mine, in the course of preparation for delivery to submarines.

The power loading button is in fact the same one (OB00116) now used on Mines Mk 10 Mod 3, Mk 49 Mods 0, 1, 2, and Mk 57 Mod 0. The new propeller nut, ON00034, is identical to the older nut except that the hex opening for a wrench which secures it on the propeller shaft is threaded, to accept the button. Flats on the sides of the new nut provide a grip for a 2-1/4-inch open end wrench which will take the place of the internal socket wrench currently listed among the tools for Mine Mk 27.

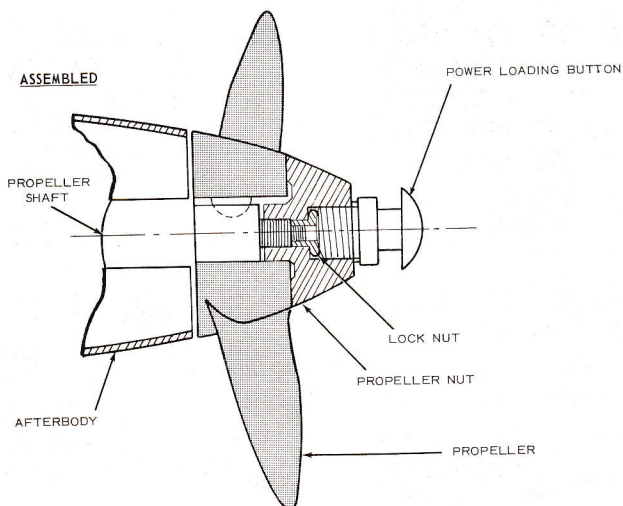
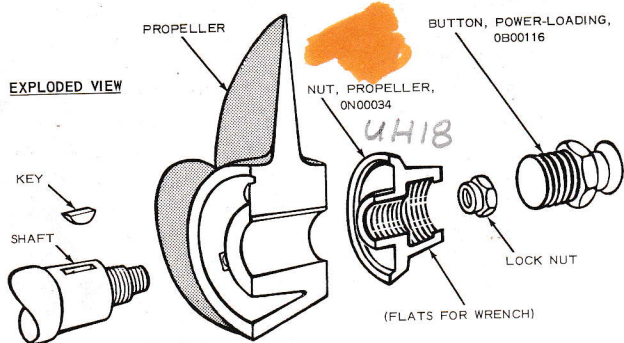
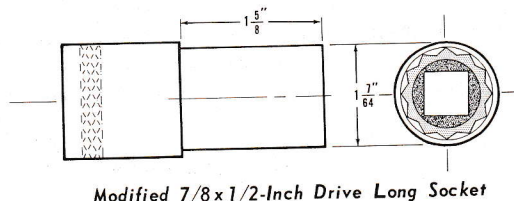
In preparing mines for FSMT CSP-1-67, mine production personnel at NAD Oahu made the change from

old to new propeller nut without any difficulty in four steps.

- ▶ Remove propeller locking nut (right-hand thread) with 7/8-inch socket.
- ▶ Remove old propeller nut (left-hand thread) with special internal socket wrench.
- ▶ Screw new propeller nut (left-hand thread) on propeller shaft and secure with 2-1/4-inch open end wrench 7W00595.
- ▶ Install propeller locking nut, (right-hand thread) and secure with modified 7/8-inch socket wrench 7W00594.

At this point the mine is ready to accept the power loading button. Until the propeller lock is removed in preparation for tube loading, however, the button should simply be wired to the propeller lock. It can easily be detached and screwed in place when the lock is removed.

Mk 27 mine assembly missions will receive wrenches automatically when they become available. Replacements will be supplied upon request to NMEF, Yorktown, Virginia 23491.



Installation of New Propeller Nut with Power Loading Button

## FACILITY DEDICATED (Continued from Page 2)

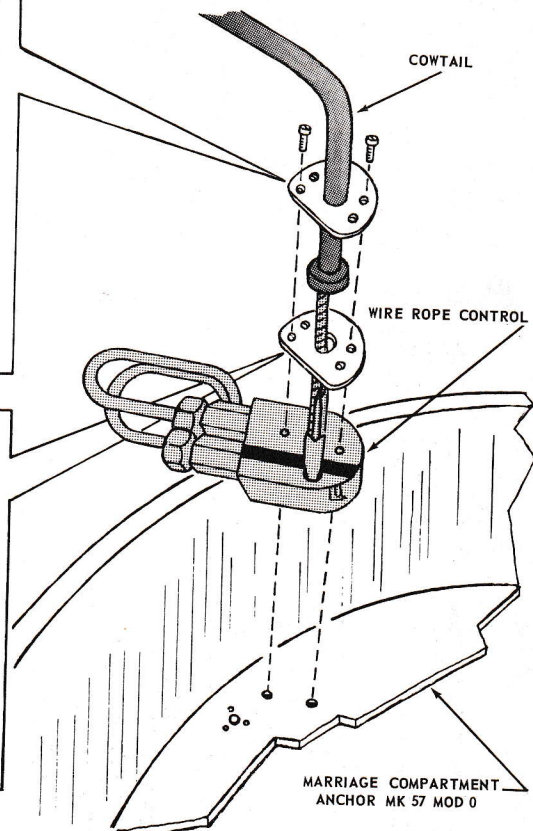
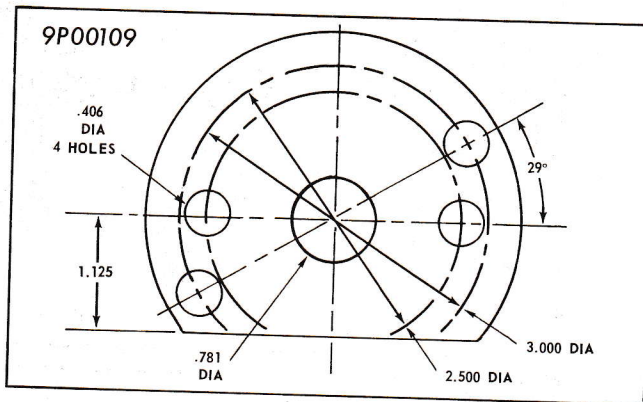
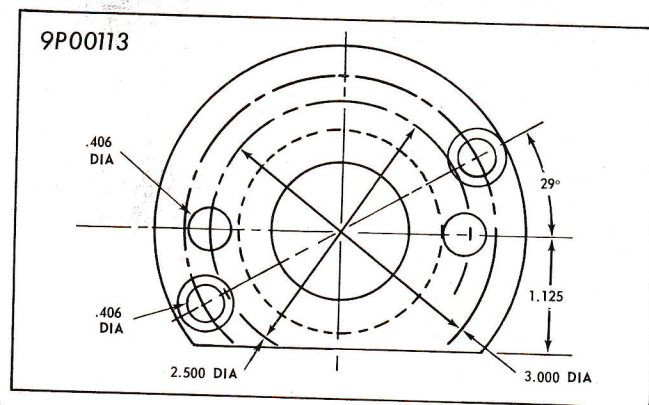
to preserve water clarity, have 142 armored-glass ports for visual and photographic observations, and 15 larger gun ports through which models can be launched by specially-designed powder and air guns. The tank can hold 1,750,000 gallons of water, at which capacity nominal water depth is 65 feet. This is sufficient to contain whole trajectories. The design permits reduction of air pressure above the water so that the water pressure can be scaled to the models. A three-inch diameter model can be launched at 3000 feet-per-second — other size models at appropriately higher or lower speeds.

The tank is monitored by a control board that records water and air pressure, and temperature. A fire-control system synchronizes launcher-camera operation permitting special high-speed 16mm and 35mm cameras to capture entire model trajectories. An optical whip recorder measures angular motion of water entry, and a multichannel tape recorder monitors telemetry signals. Water level in the tank can be precisely varied, and the tank can be completely drained into a storage tank adjacent to the building in less than 25 minutes.

Weapons that enter or re-enter the water at great speeds have spawned numerous vexing hydrodynamic problems which, if they are to be resolved in the design parameters of the weapons, requires precise knowledge of the forces experienced at water entry and the shape of the weapon's water-entry cavity. This new NOL facility is uniquely equipped to permit the acquisition of such knowledge.



# Do You do this Job Right?



## CURE FOR BOTTOMING SCREWS

**Y**OU CAN'T MOUNT the Wire Rope Control Mk 12 Mod 0 on the drill version of Anchor Mk 57 Mod 0 with the 3/8-16 x 3-3/4 inch socket-head screws supplied with the anchor. They are too long. The difference lies in the plates used to hold the cowtail to the wire-rope control: In the service anchor these holes are not counterbored while in the drill anchor they're counterbored a full quarter inch. Result: to get a firm mounting you must shorten the screws a quarter inch or they'll bottom before the plate is snug. Here is the story.

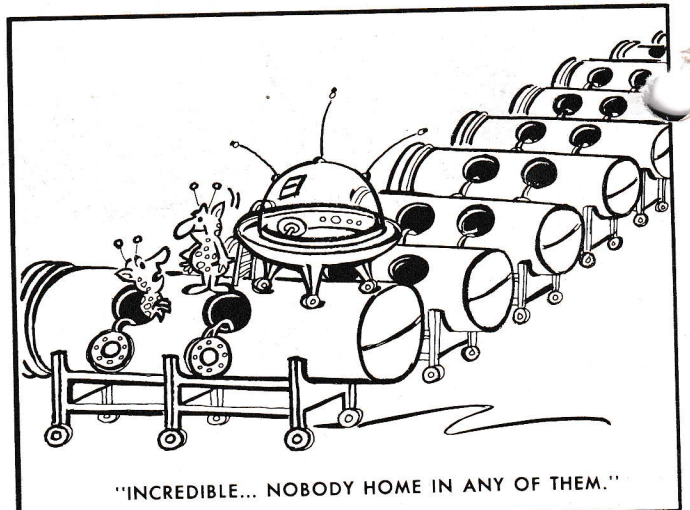
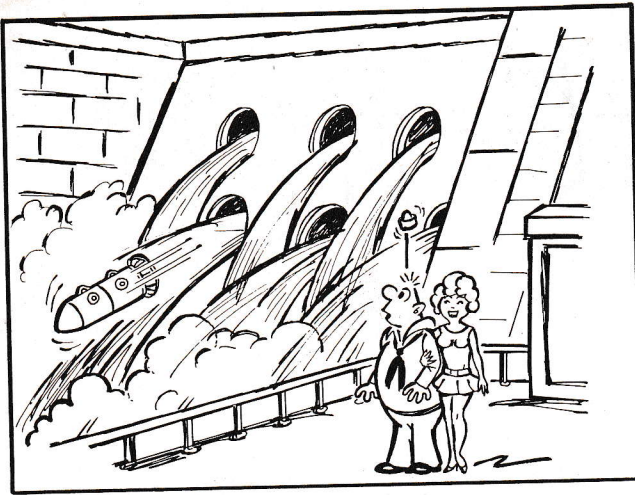
The screws come with the service anchor as part of the cable gripper, which they secure to the bulkhead of the anchor's marriage compartment. They are just right for this job. In converting the service anchor to a drill anchor, though, you're told to install a wire-rope-control in place of the

service anchor's cable gripper. Both the control and gripper are about the same overall height, but the plates used for the cable gripper won't work with the wire-rope control. The plates that will work: Plate 9P00113 with those counterbored holes and Plate 9P00109 which backs it up, have to be used in their place.

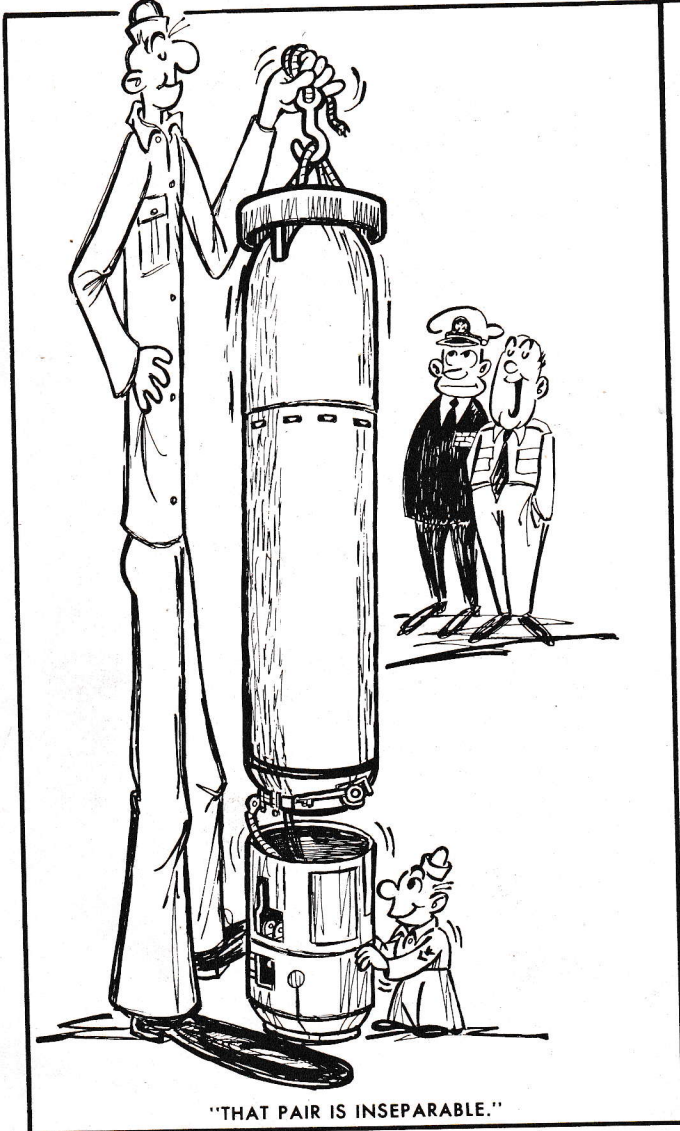
Forget the screw holes in plate 9P00113 that are not counterbored; they don't match the holes in the wire-rope control. Also forget any ideas of improvising a spacer to compensate for that extra screw length. Those counterbores are needed to provide clearance which any spacers are almost sure to insure a lack of when it's needed later on.

*The Editor*

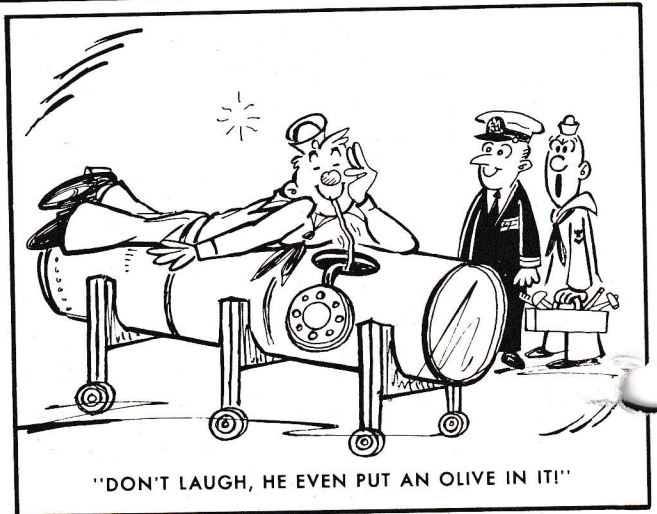




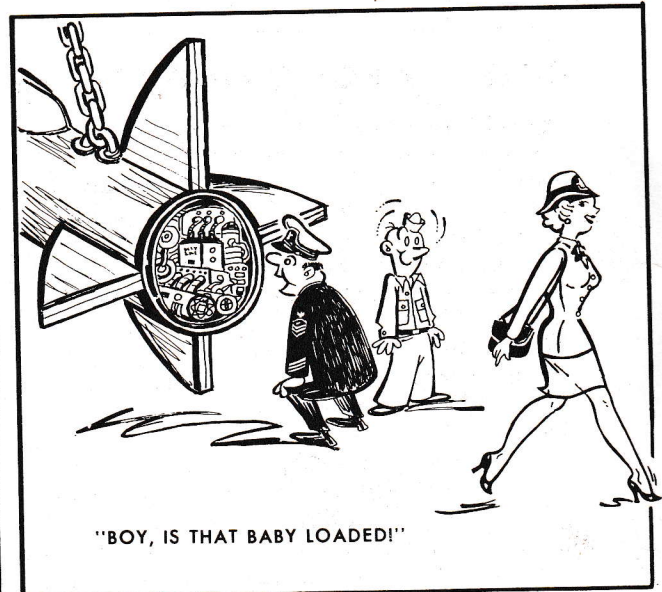
"INCREDIBLE... NOBODY HOME IN ANY OF THEM."



"THAT PAIR IS INSEPARABLE."



"DON'T LAUGH, HE EVEN PUT AN OLIVE IN IT!"



"BOY, IS THAT BABY LOADED!"

BUT *Real* PROBLEMS ARE NO JOKING MATTER ...  
**USE RUDMINDE!**