

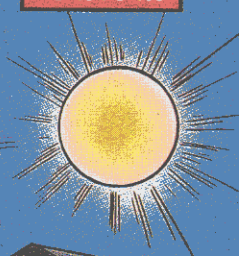
Issue 468

PS

November  
1991

# THE PREVENTIVE MAINTENANCE MONTHLY

TB 43-PS-468



CONNIE'S DRIVING  
TIPS WERE GREAT,  
BUT WE WON'T NEED  
THEM ON SUCH A  
SUNNY DAY!

BUT IDEAL  
CONDITIONS  
CAN CHANGE  
QUICKLY!

IF THEY  
FOLLOW MY  
PM TIPS, THEY  
WILL BE ABLE TO  
ADJUST THEIR  
DRIVING TO  
CHANGING  
CONDITIONS.

Approved For Public Release;  
Distribution is Unlimited

All Skidding Aside ...  
See Page 27

# The STORMS of WINTER

**N**obody ever said Army life was a beach. Quite the contrary! We're often tossed from one extreme to the other.

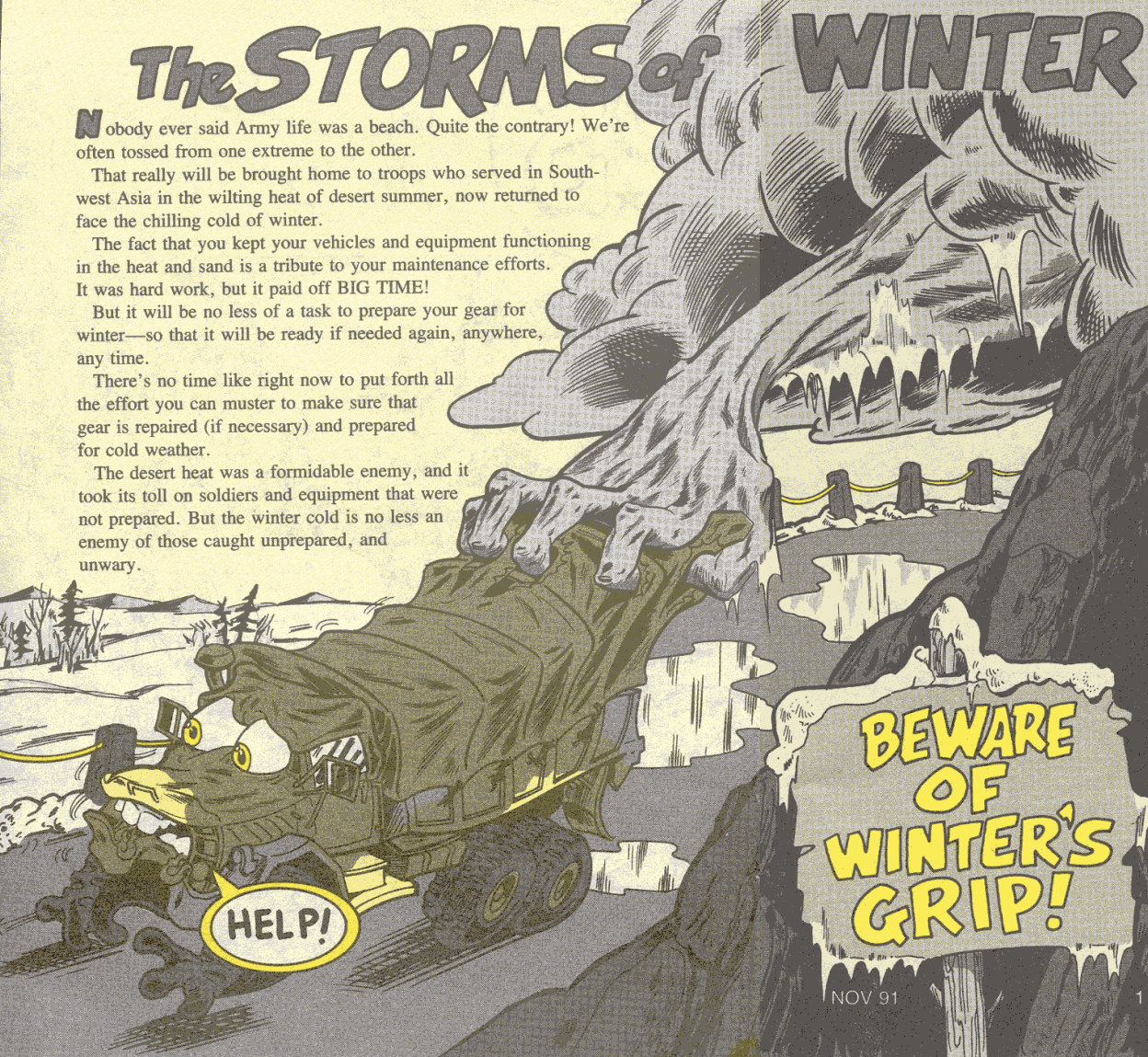
That really will be brought home to troops who served in Southwest Asia in the wilting heat of desert summer, now returned to face the chilling cold of winter.

The fact that you kept your vehicles and equipment functioning in the heat and sand is a tribute to your maintenance efforts. It was hard work, but it paid off **BIG TIME!**

But it will be no less of a task to prepare your gear for winter—so that it will be ready if needed again, anywhere, any time.

There's no time like right now to put forth all the effort you can muster to make sure that gear is repaired (if necessary) and prepared for cold weather.

The desert heat was a formidable enemy, and it took its toll on soldiers and equipment that were not prepared. But the winter cold is no less an enemy of those caught unprepared, and unwary.



PS

THE  
PREVENTIVE  
MAINTENANCE  
MONTHLY

TB 43-PS-468, The Preventive Maintenance Monthly, is an official publication of the Department of the Army, providing information for all soldiers assigned to combat and combat support units and all soldiers with unit maintenance and supply duties. All information published has been reviewed and approved by the agency responsible for the equipment, publication or policy discussed. Application of the information is optional with the user.

ISSUE 468 DECEMBER 1991

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You are invited to send PS your ideas for improving maintenance procedures, questions on maintenance and supply problems, questions or comments on material published in PS. Just write to:

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By Order of the Secretary of the Army:

**GORDON R. SULLIVAN**  
General, United States Army Chief of Staff

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*Milton H. Hamilton*  
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Administrative Assistant to the Secretary of the Army

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**BEWARE  
OF  
WINTER'S  
GRIP!**

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# Fighting the Cold War

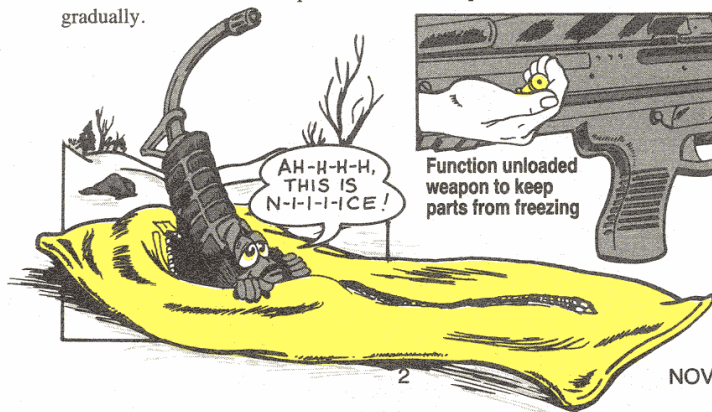
**C**old weather will stop your rifle or machine gun cold if you don't play it cool with PM. Use these PM weapons to fight the cold war:

✓ Use Rifle Bore Cleaner, NSN 6850-00-224-6663, to remove carbon and LAW, NSN 9150-00-292-9689, to lube your weapons when temperatures drop below 10°F. LAW does a much better job of withstanding extreme cold than CLP or LSA.

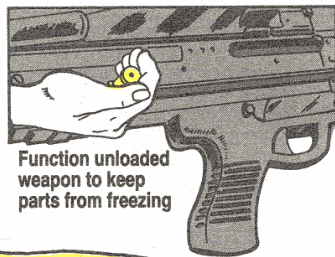


LAW's the thing for cold weather lubing

✓ Prevent condensation from forming inside weapons by keeping them covered when you move from cold to warmth. That lets the weapon warm gradually.

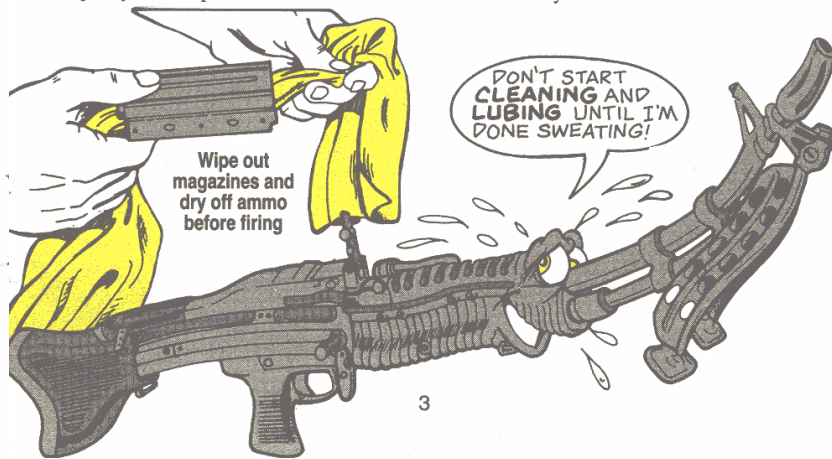


✓ Hand function the weapon every 30 minutes to keep parts from freezing solid. If parts do freeze, move them slowly and easily until they move smoothly again. That way you won't break parts.



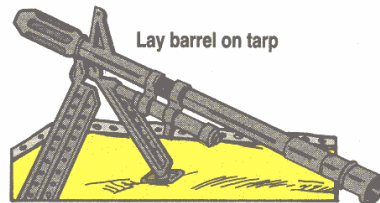
Function unloaded weapon to keep parts from freezing

✓ Keep ammo dry. If necessary, wipe ammo and the insides of magazines dry before firing. That wipes out moisture that will freeze and jam your weapon.



Wipe out magazines and dry off ammo before firing

✓ Never lay a hot weapon or barrel on the snow. Use a tarp or poncho to set it on.



Lay barrel on tarp

✓ Store weapons in a covered, wind-protected area when you're not using them. If that's not possible, cover them with a blanket or poncho. That at least keeps ice and snow away from the barrel, sights and working parts.

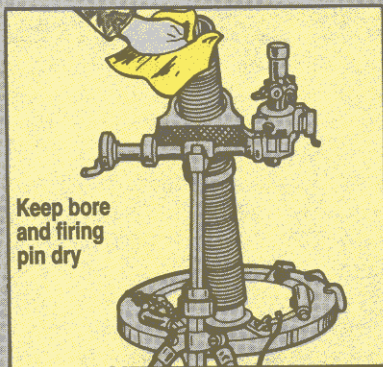
✓ Wait until a weapon warms to room temperature before cleaning it. The weapon will sweat with condensation. If you clean and lube the weapon before it quits sweating, the sweat freezes when you take it back outside.

# Solutions to Cold Problems

Your mortar needs some special attention in cold weather.

Lube with LAW instead of GPL, NSN 9150-00-231-2361 when the temperature drops below 10°F. LAW does not get as stiff as GPL in cold weather.

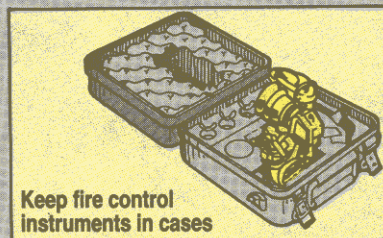
Wipe the inside of the bore dry before you go into the cold.



Keep bore and firing pin dry

Cover cartridges until they're ready to be fired. That stops ice from coating them.

Keep fire control instruments in their cases. The cases cushion the instruments' delicate optics against the shock of the cold.



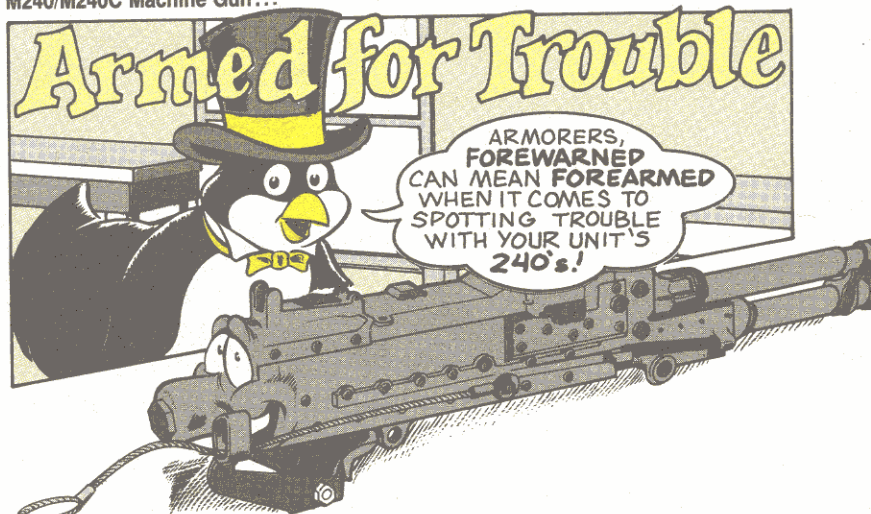
Keep fire control instruments in cases



Never bring fire control instruments directly from the cold into a warm place. That cracks optics and lets condensation form inside the instruments. Leave the instruments someplace sheltered but unheated where they can gradually warm before you bring them inside.

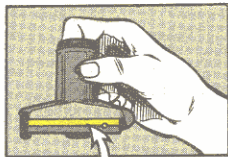
When you bring your mortar inside from the cold, wait at least an hour before cleaning and lubing it. By then the mortar will have stopped sweating from condensation and you can get rid of all moisture.

# Armed for Trouble



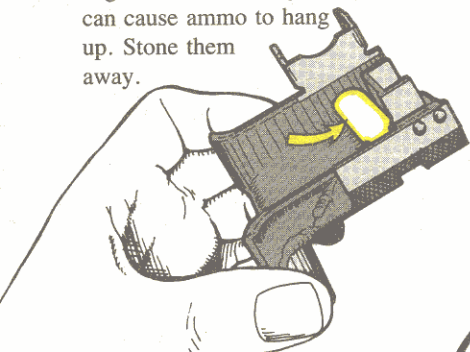
**H**ere are some common problems and their solutions:

**Back plate won't slide into receiver.** Eyeball the tracks of the plate and receiver for burrs. Stone burrs away. If

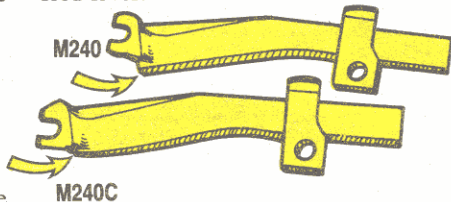


the back plate still won't slide in, turn in the M240 to your support.

**Feeds poorly.** Look for burrs on the edges of the feed tray. They can cause ammo to hang up. Stone them away.



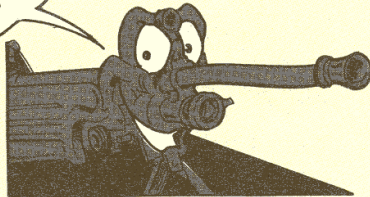
**Won't cock.** Check the feed lever. The M240 and the M240C use different levers, but they look almost identical. The wrong lever prevents cocking. The M240C's is broader and more squared off at the notched end. Get the correct feed lever.



**Feed cover won't close easily.** Eyeball the cover pin. If it's bent, the cover will be out of alignment and the feed lever and the bolt will be damaged when the M240's fired. Replace the cover pin.

# It's the Little Things

SOMETIMES LITTLE THINGS MAKE THE DIFFERENCE BETWEEN AN M249 THAT DOES THE JOB AND ONE THAT GOES ON SICK CALL.



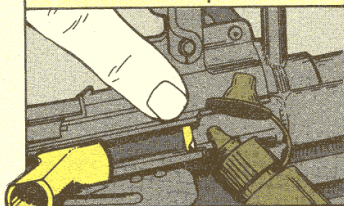
**D**epot folks who repair M249s say the biggest reason they have to junk 'em is because gunners forget to push the cocking lever forward after they lock back the bolt. If the lever's not pushed forward until it locks, it's left flapping.

During firing, the lever bangs against the locking pin. Over time, that enlarges the pin hole. The pin falls out and the cocking lever flies off. The lever banging back and forth also wears out the receiver rails. Enlarged pin holes and worn-out rails can't be fixed.

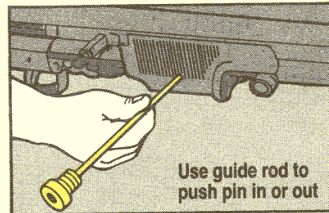
Just remember to push the cocking lever forward until it clicks after you cock your M249. And do it every time.

Keep the cocking lever from hanging up on the lock pin by putting a few drops of CLP on the pin during cleaning.

Push cocking lever forward until it locks on pin



A few drops of CLP on pin helps cocking handle move



Use guide rod to push pin in or out

or out. If the pin won't go in, make sure the holes are lined up. Cleaning and lubing the pin helps it slide better.

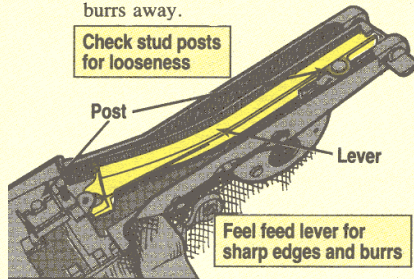
## PMCS

Feel the stud posts inside the cover for looseness. If a post comes loose, the feed pawls mash together and your M249 jams. Report loose posts.

Test tension in the barrel release latch during PMCS. If it moves easily, the spring's weak and needs to be replaced. Otherwise, the barrel can fall off if the latch is even bumped slightly.

Feel the feed levers for sharp edges and burrs that can gash your hands. Your armorer can stone edges dull and burrs away.

Check stud posts for looseness



Post

Lever

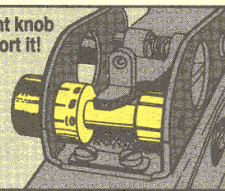
Feel feed lever for sharp edges and burrs

Eyeball the front sight post. The post often works loose and you can't zero the sight. No more than two threads on the post should show. If it's too high, your armorer can screw the post back in the front sight bracket.

No more than two threads should show on front sight post

Test the rear sight knobs for binding. If either knob binds, it will cause problems when you sight. Tell your armorer.

If rear sight knob binds, report it!



Feel the safety for tightness. Safety springs break often and the safety can fall out. If the safety's loose, report it.

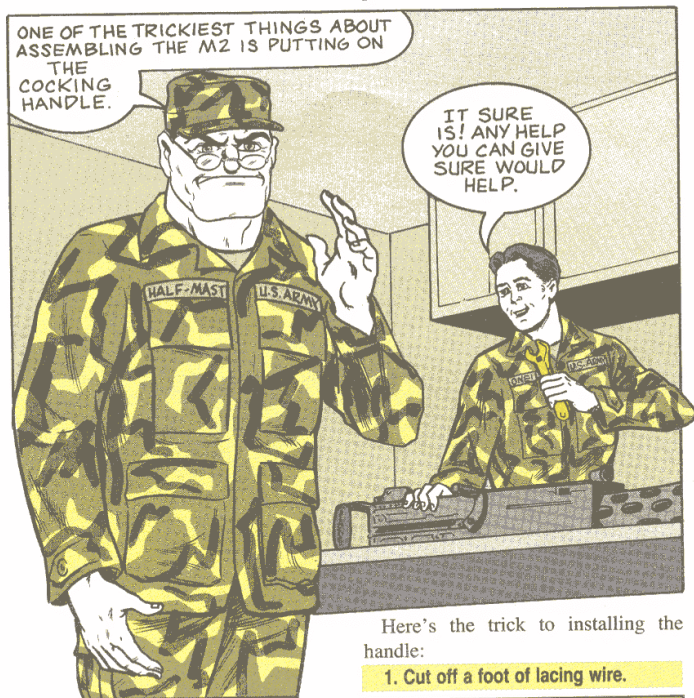
Safety loose? Report it!



A LITTLE THING HERE AND A LITTLE THING THERE AND SOON YOU'VE GOT BIG PROBLEMS.



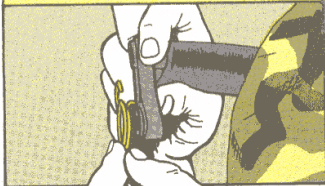
# Give Hook to Spring Problem



Here's the trick to installing the handle:

1. Cut off a foot of lacing wire.

2. Insert the spring tang into the hole on the back of the lever.



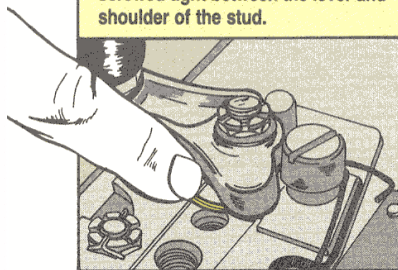
8

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If you armorers don't keep the handle spring out from between the handle lever and shouldered stud, the spring will break or wear out fast. Then the cocking handle flaps around during firing and can hurt you when you pull on the handle. Plus you have to worry about keeping the spring over the headless stud hole while screwing in the stud.

3. Put the slide lever on the shouldered stud.

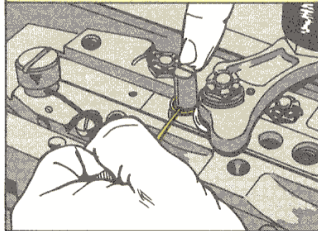
4. Install the washer and screw the nut on hand-tight. Make sure you don't get the loops of the spring screwed tight between the lever and shoulder of the stud.



5. Pivot the charging handle back until the lever clears the stud hole.

6. Double the lacing wire and hook it around the loop in the spring.

7. Pull the wire until the loop is centered over the hole.



8. Screw in the headless stud.

9. Tighten the lever nut just enough to give the handle free play.

10. Insert the cotter pin and loop the pin's ends around the lever nut.

TACFIRE...

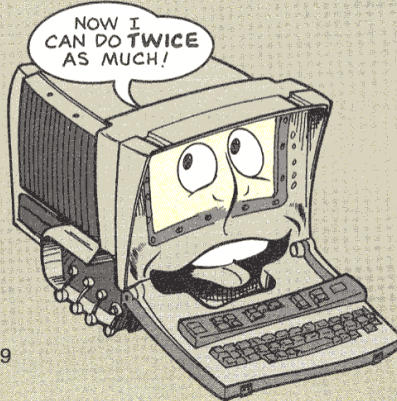
## Two Cables Double Capabilities

The Battery Computer System (BCS) with your TACFIRE came with only one W7/W10 communications cable.

But that was OK. Since you could communicate to only one secure device, you only needed one cable.

Now that you have Version 9 software for the TACFIRE, you can communicate to two different secure devices—the KG-31 or the KY-57. But the only way to do this is to use a second cable. Order one with NSN 5995-01-119-9277.

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9



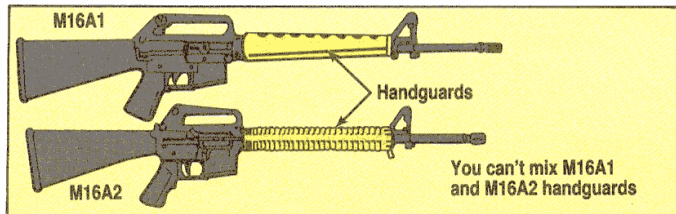
In most ways you armorers can treat your new M16A2s just like your old M16A1s. But there are some differences—and points—you need to remember:

**Parts.** Many M16A1 parts are no longer available. When you order them, you'll receive M16A2 parts instead.

The M16A2 parts are a bit different. The new pistol grip is slightly longer and has a bump on the front. The new sliping is tapered, not straight. The new front sight is square instead of round. But they'll work fine on M16A1s.

Two M16A2 parts that won't fit the same are the buttstock and the handguards.

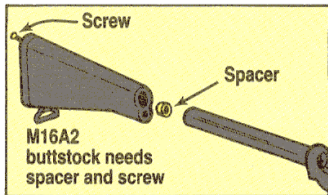
The M16A2 buttstock is  $\frac{5}{8}$  inch longer than the M16A1's. To make it fit on an M16A1, you'll need a spacer,



HEY, YOU!

# Remember the Differences

NSN 5365-01-267-2169, and screw, NSN 5305-01-147-8585.



But make sure you never use an M16A2 buttstock screw on an M16A1 buttstock. The M16A2 screw is almost twice as long as the M16A1's and will damage the buttstock. You can tell at a glance which screw you've got.



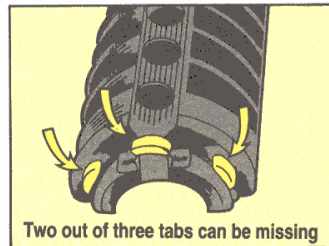
There are no more M16A1 left-hand handguards. If you need a new left-hand handguard, you must order two new M16A2 handguards, NSN 1005-01-134-3629, because M16A1 and M16A2 handguards can't be used together.

**New Parts.** A side sling adapter is available that fits both the M16A1 and M16A2 rifles with the M203 grenade launcher mounted on them. The adapter is more durable and doesn't rub the finish off the M16's front sight. Your support will need to install locking swivel bars, NSN 5340-01-264-6530, and swivel mounts, NSN 1010-01-264-6517, for the adapters.

The M16A2 requires a different front sight post removal tool. Instructions for fabricating the tool are on Page E-2 in TM 9-1005-319-23&P.

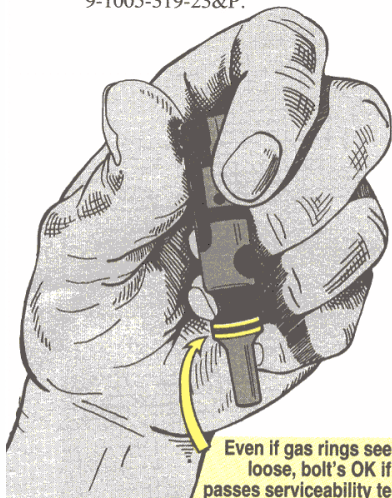
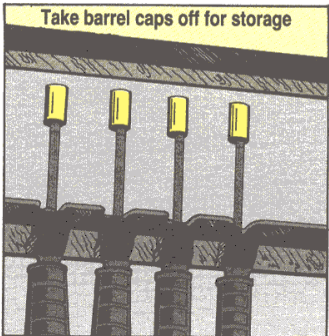
**PMCS.** Some M16A2 bolts may seem to have loose gas rings. But the bolt's OK as long as it passes the serviceability test on Page 2-36 in TM 9-1005-319-23&P.

The M16A2 is mission capable even if two of the three front retaining tabs on either handguard are missing.



**Storage.** The old M11 rack won't work with the M16A2s unless you get them modified by support. Order new M12 racks with NSN 1095-00-407-0674.

New M16A2s come with caps on their barrels, but that doesn't mean the caps should stay on in the arms room. Caps trap moisture, which causes corrosion. Caps are only for field use to keep dirt from plugging the barrel.



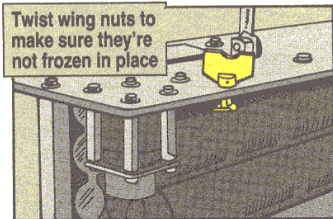


# Hot Tips for

# Cold Weather

**Y**our TOW's going to need a little extra help in cold weather.

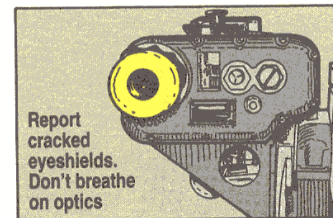
The wing nuts on the battery of the missile guidance set (MGS) freeze in place and then pop off when the battery's loaded. If there're fewer than four wing nuts, your MGS is NMC. Prevent seized nuts by twisting each one before you load the battery.



Twist wing nuts to make sure they're not frozen in place

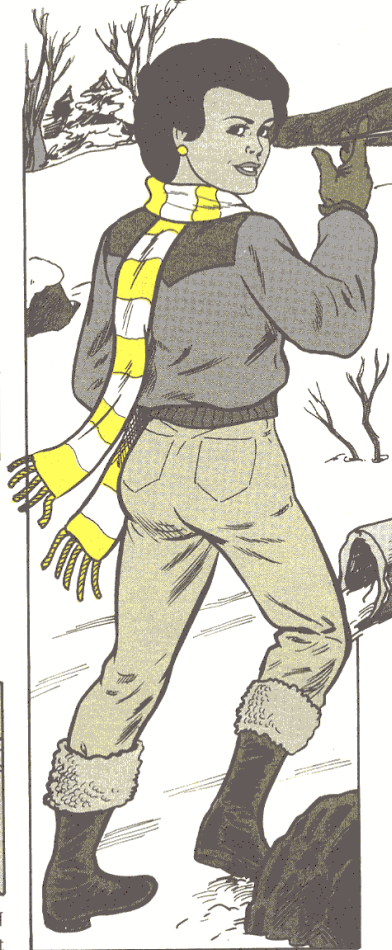
Your repairman should also order extra wing nuts, NSN 5325-01-148-8601, and retainer rings, NSN 5365-00-298-6564.

Rubber eyeshields on the optical and night sights freeze, collect ice and eventually crack. That leaves the delicate optics vulnerable to ice and snow.



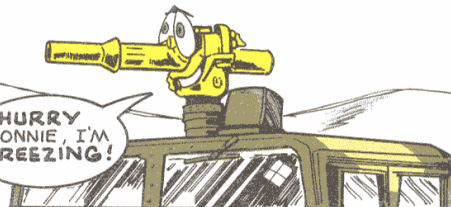
Report cracked eyeshields. Don't breathe on optics

Tell your repairman if eyeshields, NSN 5855-01-070-4072, are cracked. Don't

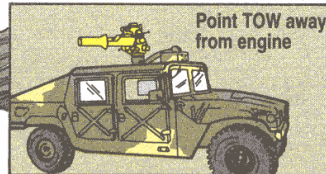


COME WITH ME FOR SOME PM TO WARM UP YOUR TOW!

HURRY BONNIE, I'M FREEZING!

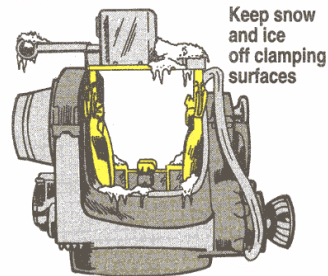


breathe on optics in cold weather, either. That will fog and ice them. Extreme cold causes distortion for the AN/TAS-4A night sight when cold hits the heat rising from the vehicle engine on mounted TOW's. Beat distortion by positioning your vehicle so you're aiming away from the engine.



Point TOW away from engine

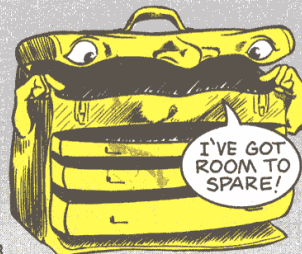
Keep clamping surfaces on the traversing unit, sights, and missile clear of snow and ice. They can prevent a good electrical connection.



Keep snow and ice off clamping surfaces

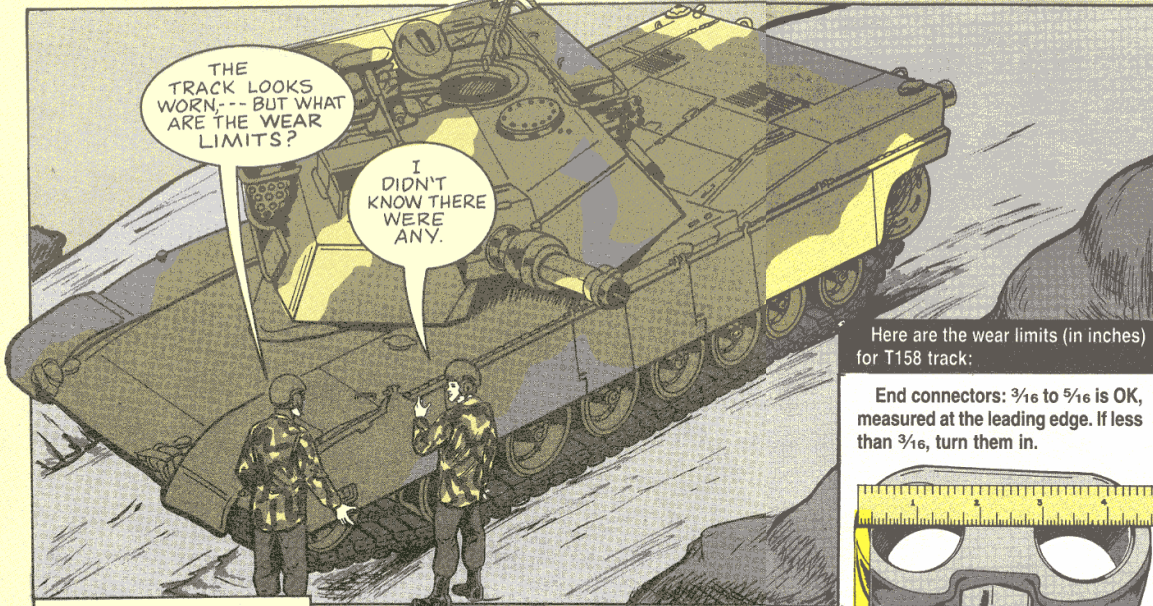
## Toolbox for Armorsers

If the little plastic parts box that comes with the small arms tool kit isn't big enough to hold all your spare parts, order toolbox, NSN 5140-00-494-2015. It's a metal box with much more space to keep repair parts separate and it's good for taking to the field. The toolbox costs \$65. Use Appendix A of CTA 50-970 as your ordering authority.



I'VE GOT ROOM TO SPARE!

# T158 Track Wear Limits, Differences



THE TRACK LOOKS WORN,--- BUT WHAT ARE THE WEAR LIMITS?

I DIDN'T KNOW THERE WERE ANY.

YOU M1-SERIES TANK CREWS AND MECHANICS NEED TO KNOW A THING OR TWO ABOUT THE NEW T158 TRACK SINCE IT'LL BE REPLACING T156 TRACK!



**F**irst off, T158 has replaceable pads. Pads are good until the grousers start marking a hard surface. Then you just replace them.

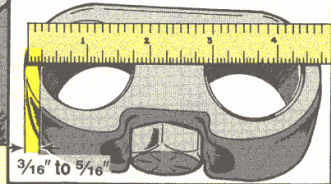
T158 has a solid center guide with two bolts to hold it. The center guide is installed before the end connectors on this track, which is opposite from the way things work with T156.

You cannot mix T158 shoes with T156 shoes on the same track. Neither can you run one track of T158 and one track of T156 on the same tank.

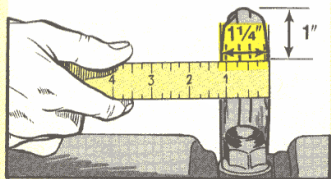
Follow all other information in the -10, -20 and -24P-1 TMs as it applies to T158.

Here are the wear limits (in inches) for T158 track:

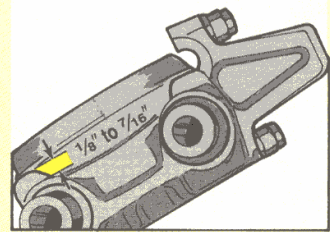
**End connectors:**  $\frac{3}{16}$  to  $\frac{5}{16}$  is OK, measured at the leading edge. If less than  $\frac{3}{16}$ , turn them in.



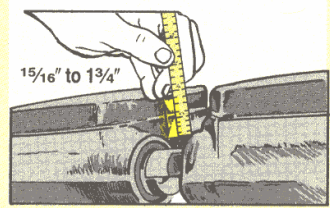
**Center guides:**  $\frac{1}{2}$  to  $1\frac{1}{4}$  thick measured at a point one inch down from the tip is OK. If less than  $\frac{1}{2}$ , turn them in.



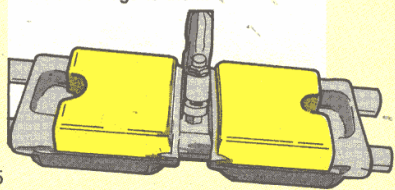
**Grouser:**  $\frac{1}{8}$  to  $\frac{7}{16}$  above the binocular radius is OK. If less than  $\frac{1}{8}$ , or if any metal is exposed on the shoe body, turn in the shoe.



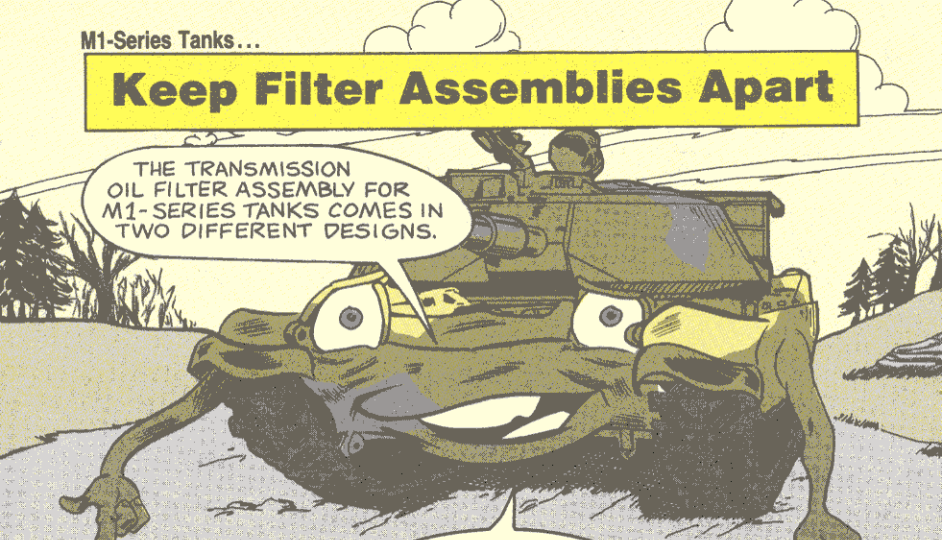
**Replace pad:**  $1\frac{5}{16}$  to  $1\frac{3}{4}$  is OK, as long as the shoe doesn't mark a hard surface. If less than  $1\frac{5}{16}$ , replace the pad.



**Roadwheel path rubber:** Replace any shoe that has exposed metal in the insert area. Exposed binocular tubes are OK as long as there is no metal damage to them.

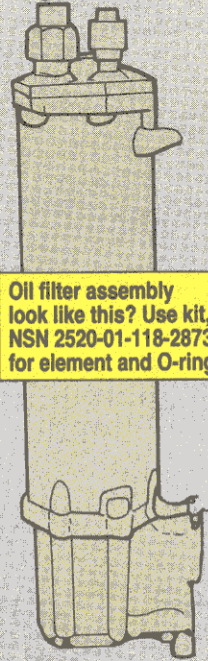


# Keep Filter Assemblies Apart

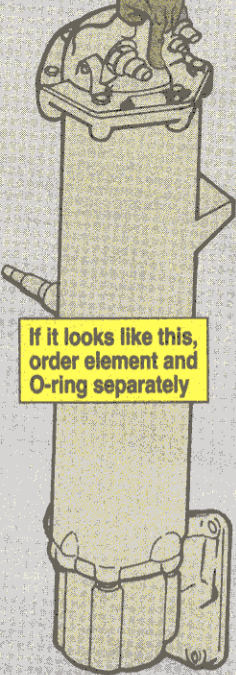


THE TRANSMISSION OIL FILTER ASSEMBLY FOR M1-SERIES TANKS COMES IN TWO DIFFERENT DESIGNS.

ONE IS USED ONLY ON M1/IPM1 TANKS; THE OTHER IS USED ON ALL M1s.



Oil filter assembly look like this? Use kit, NSN 2520-01-118-2873, for element and O-ring



If it looks like this, order element and O-ring separately

The design shown in Fig 210 of TM 9-2350-255-24P-1 is the one for M1/IPM1 tanks. The design in Fig 211 is the one that can be used on all M1 tanks.

Depending on which design your tank has, order repair parts from the correct figure only. Never be tempted to order parts kit, NSN 2520-01-118-2873, for example, from Fig 210 just to get the preformed packing you need for the design shown in Fig 211.

The packing, NSN 5330-00-165-1966, Item 23 in Fig 211, costs less than \$1.25. The parts kit costs about \$170.

Avoid any problems with these filter assemblies by sticking with the right TM figures.

Tanks, Howitzers...

# Cannon Cleaning and Preserving

HERE'S EVERYTHING YOU NEED TO KNOW TO GET THE ADVANTAGE OF CLP IN KITS TO CLEAN AND PRESERVE YOUR TANK OR HOWITZER CANNONS.

- FOR 105MM AND 120MM TANK CANNONS, USE NSN 1015-01-196-2173. THE KIT HAS 30 PRE-MEASURED CONTAINERS OF CLP, A LITER OF CLP IN A TRIGGER SPRAY BOTTLE, 30 BORE CLEANING SLEEVES AND A BORE EVACUATOR BRUSH.
- FOR 105MM, 155MM AND 203MM (8-IN) ARTILLERY CANNONS, USE NSN 1025-01-196-2172. THIS KIT HAS ALL OF THE ITEMS IN THE TANK KIT, PLUS A PRIMER VENT BRUSH.
- TO GET A BOX OF 800 CLEANING SLEEVES FOR THE TANK KIT, USE NSN 1025-01-316-9250. TO GET A BOX OF 30 SLEEVES FOR THE HOWITZER KIT, USE NSN 1025-01-311-3770.
- TO GET THE NYLON BRISTLE BORE BRUSH AND BAG ASSEMBLY FOR A 105MM HOWITZER CANNON, USE NSN 1025-01-196-2175; FOR A 155MM HOWITZER CANNON, USE NSN 1025-01-196-2176; AND FOR A 203MM HOWITZER CANNON, USE NSN 1030-01-196-2177.
- FOR A REPLACEMENT BRUSH FOR A 105MM TANK CANNON, USE NSN 1015-00-615-7208. THIS IS A WIRE BRISTLE BRUSH. NO BAG IS AVAILABLE. THE 120MM TANK CANNON BRUSH, NSN 1015-01-209-3483, ALSO IS WIRE.
- DO NOT USE WITH RIFLE BORE CLEANER (RBC) FOR TANKS AND HOWITZERS.



# Put a Halt to Fuel Freeze-Up

When temperatures drop, water freezes in the bottom of the fuel tank and the lowest parts of the fuel line. Then your engine won't start.

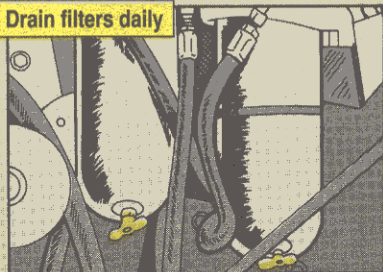
Here are some tips to keep the fuel system from br-r-r-r-r... freezing:

- 1 Refuel with care to keep water or snow out of the tank.
- 2 Keep the fuel tank filled up to the FULL mark to stop condensation.

EUREKA!



## Drain filters daily



- 3 Add icing inhibitors to the fuel. There are two kinds for diesel and jet fuel and one for gasoline.

### Diesel

(Ethylene Glycol Monomethyl Ether)

5-gal can NSN 6850-00-753-5061

55-gal drum NSN 6850-00-060-5312

(Diethylene Glycol Monomethyl Ether)

55-gal drum NSN 6850-01-089-5514

### Gasoline

(Methanol)

1-gal can NSN 6810-00-597-3608

5-gal can NSN 6810-00-275-6010

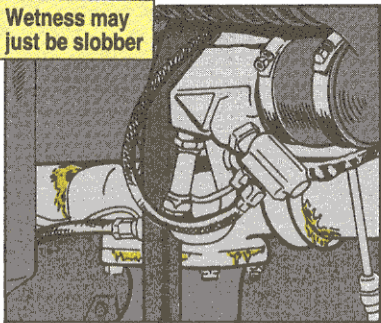
Mix one pint of additive with 40 gallons of fuel. Pour it in before refueling. Also, read 'n heed: You'll damage the engine if you add more than two pints of additive to 40 gallons of fuel. Engine performance also suffers when too much additive is used. If you use JP-8 jet fuel, you don't add icing inhibitor—it's already in there! Jet A-1 does *not* have the inhibitor, so treat it just like diesel fuel.

# Clobber Slobber



If you find wetness that looks like fuel or oil around the exhaust manifold or muffler on your diesel-powered truck, don't panic. Could be your engine is suffering from "diesel slobber". It's messy, but not fatal.

Wetness may just be slobber



The slobber is unburned fuel and condensation. It's common under certain conditions—high humidity and low temperatures, and long idling without reaching operating temperature.

Before you call for help, give your truck a good run. Then check it to see if the wetness is gone. If you still find leaks, get your mechanic to check it.

You can reduce or prevent slobber by idling your truck no more than 10 minutes. If you're going to be waiting longer than that, shut down the engine.

Sometimes you can't prevent slobber—like when you have to make short trips on a cool, humid day.

No problem. Just drive your truck a few minutes, or let it run at fast idle for five minutes or so.

MOST LIKELY YOU'LL DRY UP THE MESS. IF NOT, REPORT IT!

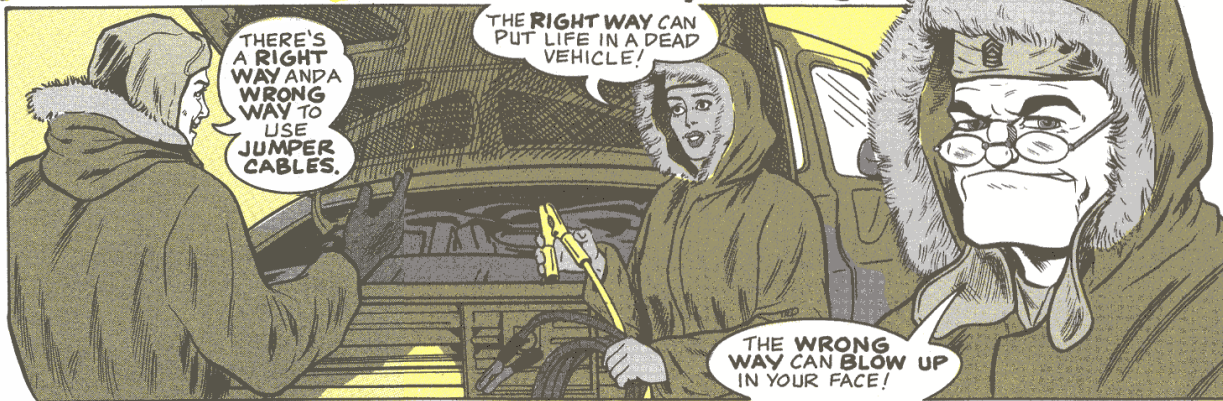


# Jump Starting the Easy Way

**A** wrong hookup can cause the battery to blow up and shower you with acid and bits of battery. That's an obvious sign you did something wrong. But other things can happen that aren't so noisy—like a burned-up alternator or blown fuses in the electrical system.

If your truck doesn't have a slave receptacle—like some older trucks—jumper cables are the only way to start a vehicle with weak or dead batteries.

Hooking up jumper cables is as easy as 1-2-3-4. And keep in mind that the red cable hooks up to the positive (+) posts and black goes to the negative (-) ones.

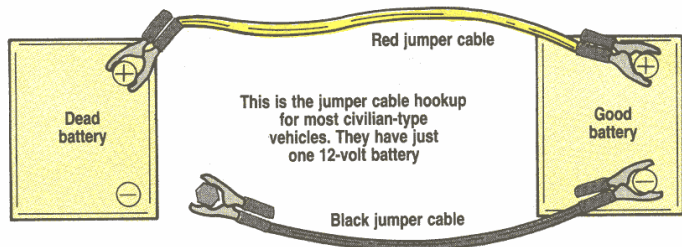


## Single 12-volt System

+ Hook one end of the red cable to the positive (+) post of the dead battery and the other end to the positive post of the live battery.

+ Hook up one end of the black cable to the negative (-) post of the live battery, but do not connect the other end to the dead battery. Instead, fasten the clamp to any bare metal on the dead vehicle that's at least a foot away from the dead battery. That way any spark from the hookup won't explode the gases that build up around the battery. Also, don't smoke while working around the batteries.

Unhook the cables in reverse order, 4, 3, 2, 1, after the engine starts. Be sure to unhook both ends of the black cable before you touch the red cable.

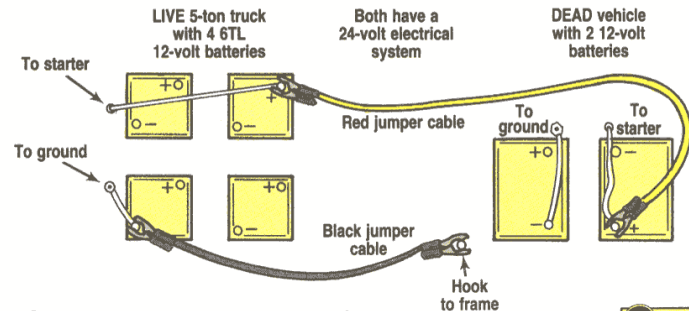


## 24-volt Systems

Most military-design trucks have two or four batteries. Each battery puts out 12 volts, but they're set up so that the vehicle has a 24-volt system. Each battery has a positive (+) and a negative (-) post. That makes hooking up jumper cables a little tricky.

Begin by finding the positive post on both vehicles that has the cable leading to the starter. Hook the red cable to those posts as shown below.

Next, find the negative post that has the cable to ground on the live vehicle. Hook the black jumper cable to that post. Hook the other end to a solid, paint-free metal contact on the dead vehicle that's at least a foot away from the batteries.

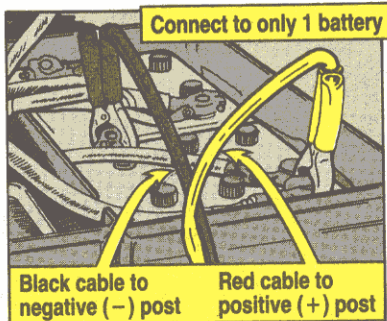


## 24-volt to 12-volt

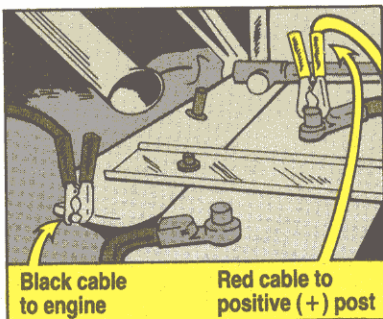
You can jump-start a vehicle with a 12-volt system—like the old M880-series—from a vehicle with a 24-volt system. But don't try it the other way around. The 12-volt one doesn't have the volts needed.

When you jump from a 24- to 12-volt system, use only one of the batteries. That gives you all the power you need to start the 12-volt vehicle without burning up the electrical system. Do it like this:

LIVE 5-ton truck



DEAD M880-Series 1¼-ton truck



## Picture Perfect Jump Starting

Avoid confusion when jump starting with a 4½-in by 5½-in red and white stick-on label. To get it, call the Army Safety Center at DSN 558-3014 or -2062, or write to:

US Army Safety Center  
ATTN: CSSC-M  
Ft Rucker, AL 36362-5363

Put the decal near the battery so it's easy to see.





# Tester Check

The readings you get with the antifreeze and battery tester, NSN 6630-00-105-1418, are only as accurate as your tester.

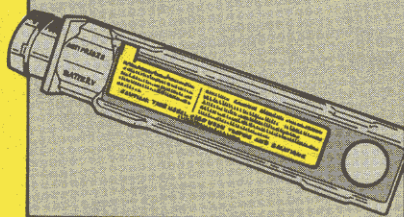
Take a reading using distilled water, NSN 6810-00-682-6867. If the reading is more than 34°F or less than 30°F, your tester needs adjusting. Take three or four readings to be sure.

If the reading is off, remove the instruction plate on the bottom by working a knife under the edge. Carefully dig out the sealer over the screws closest to each end.



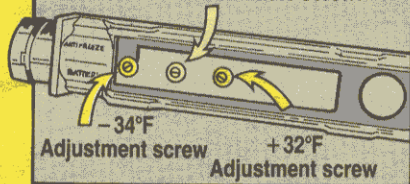
counterclockwise reduces it. Make sure the final adjustment to 32°F is clockwise.

Remove metal cover on bottom



(Never touch the middle screw! It holds the lens in place.)

Don't touch the middle screw!



Final adjustments must be clockwise



Mix up a solution of exactly one part distilled water and one part antifreeze, NSN 6850-00-181-7929. Stir it well.

Take several readings with the antifreeze solution. If the reading is more than -32°F or less than -36°F, adjust to -34°F using the screw closest to the eyepiece. Again, make sure the last adjustment to -34°F is clockwise.

Rinse the tester and recheck with distilled water. Repeat the adjustment for 32°F if needed. Then recheck using the antifreeze solution.

Repeat the tests until both readings check out.

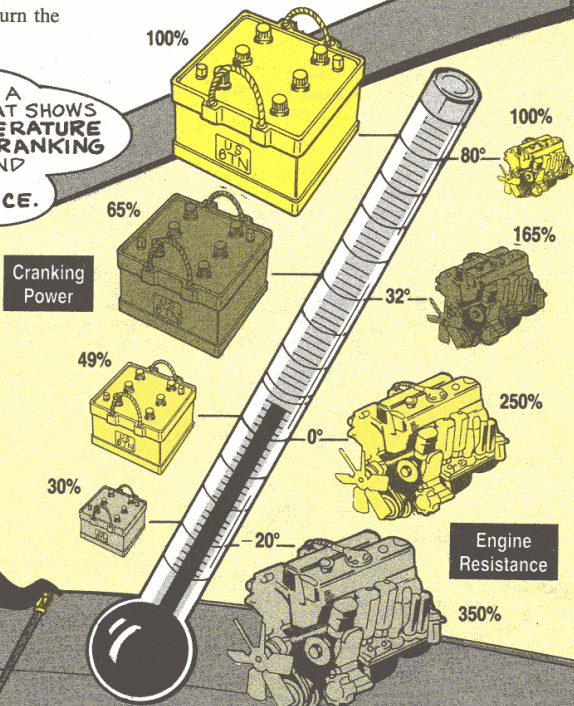
Then use a little adhesive, NSN 8040-00-843-0802, to hold the screws in place. Replace the instruction plate.

# Sapped by the Cold

The time to check that a vehicle's batteries are fully charged is before the first big chill hits. When the temperature drops, the amount of power a lead-acid battery supplies drops, too. At 32°F, a battery can only supply 65 percent of the cranking power it can supply at 80°.

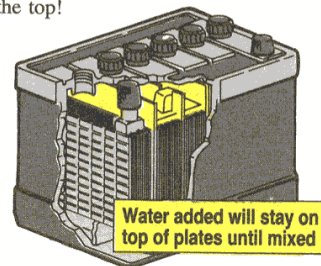
At the same time, your engine is harder to crank. The oil thickens, metal parts shrink, and the starter has to work harder just to turn the engine over.

HERE'S A TABLE THAT SHOWS HOW TEMPERATURE AFFECTS CRANKING POWER AND ENGINE RESISTANCE.



COLD WEATHER CRANKING IS NO PROBLEM WHEN I'M FULLY CHARGED!

How you check them is important, too. If you've just added water, you won't get a true reading, because you're testing the water that's still at the top!



Check the electrolyte before you top off the battery. If you have to add water, start the engine and let it run for at least 15 minutes. That'll give the charging system a chance to mix the water and electrolyte.

Mixing the electrolyte also heads off having the water freeze and cracking the battery.

The best time to test the battery's electrolyte is right after the engine is shut off.

DETAILS ON TESTING AND MAINTAINING BATTERIES ARE IN CHAPTER 3 OF TM 9-6140-200-14.

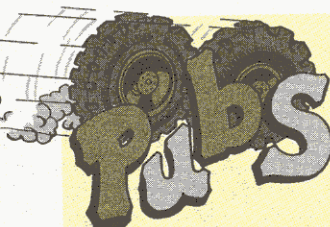
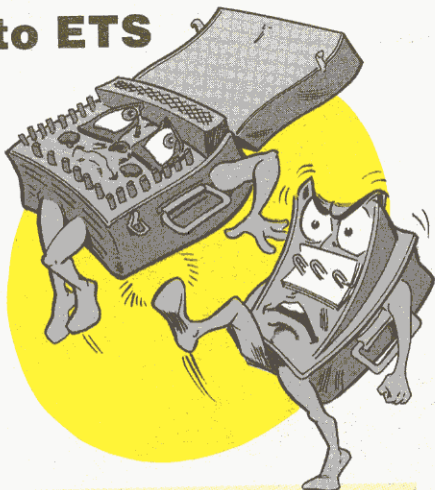


# Time to ETS

All good things have to come to an end, and that includes the Low Voltage Circuit Tester's hitch with the Army.

The tester, NSN 4910-00-092-9136, is being replaced by the Simplified Test Equipment/Internal Combustion Engine-Reprogrammable (STE/ICE-R), engine analyzer set, NSN 4910-01-222-6589.

When you get STE/ICE-R, turn in your LVCT. The turn-in procedure is spelled out in Chapter 7 of AR 725-50. Your authority for the turn-in is AMC Msg AMCTM-S 100830Z Jul 89.



**TB 1-1520-236-30-1** Feb Installation of AIM-1 laser gunsight system, AH-1F

**TB 1-1520-237-20-121** Feb Quick positioning system installation, EH-60A/UH-60A/UH-60L

**TB 1-1520-237-20-122** Mar One time inspection of all H-60

**TB 1-1520-237-20-123** Mar ODS extension of H-60 retirement life components

**TB 1-1520-237-20-124** Mar One time inspection of cargo hook wire routing UH-60A/L, EH-60A

**TB 1-1520-237-20-125** Apr One time inspection of fire extinguishing system UH-60A/L

**TB 1-1520-238-20-02** Feb One time inspection of all servocylinders for nonconforming hardware on AH-64A

**TB 1-1520-238-20-12** May Inspection of temperature alarm units on AH-64A

**TB 1-1520-238-20-19** Mar Identification/Restricting AH-64A with deice systems

**TB 1-1520-240-20-53** Feb Revision of special inspection intervals for ODS, CH-47D

**TB 1-1520-240-20-55** May One time inspection of transmissions in CH-47D, MH-47D, and MH-47E

**TB 1-2835-205-20-1** Feb Desert operations for auxiliary power unit Model T-62T-2B

**TB 1-2835-208-20-1** Feb Desert operations auxiliary power unit Model T62T-40-1

**TB 1-2840-229-20-1** Feb Desert operations for T53-L-13B, T53-L-13BA and T53-L-703

**TB 1-2840-229-20-3** May Records inspection of T53 engine fuel controls for UH-1/AH-1

## Maintenance Advisories & Safety-Of-Use Messages

**MICOM SOU MSG**—Operational, Advisory, Gives warnings and limitations when transporting the HAWK missile loader transporter with three missiles on a M814/M923 5-ton XLWB truck, AMSMI-WS 141544Z Aug 91.

**TACOM SOU-MSG-91-18**—Advisory, Operational, M992 FAASV automatic fire extinguishing system, Check that the maintenance switch remains in the POWER-ON position at all times, AMSTA-M 192330Z Aug 91.

**TACOM SOU-MSG-91-19**—Limited One-time inspection, M992 FAASV, Gives safety fix on personnel heater, AMSTA-M 201500Z Aug 91.

**TACOM SOU-MSG-91-17**—Limited One-Time Inspection, Perform complete inspection and operational check of the personnel heater system in all combat and tactical vehicles, except the FAASV, AMSTA-M 201515Z Aug 91.

**TROSCOM Maintenance Advisory MSG-91-31**—Oil change maintenance improvement for PU-405A/M, PU-732/M, PP-AN/MJQ-15, PU-406B/M, PU-760/U and PP-AN/MJQ-10A 15-KW and 30-KW power units and power plants equipped with acoustic suppression kits, AMSTR-MEP 212045Z Aug 91.

Your Direct Support or Logistics Assistance Office (LAO) can provide you with more information.

# All Skidding Aside



THANKS FOR THE WINTER DRIVING TIPS, CONNIE, BUT...

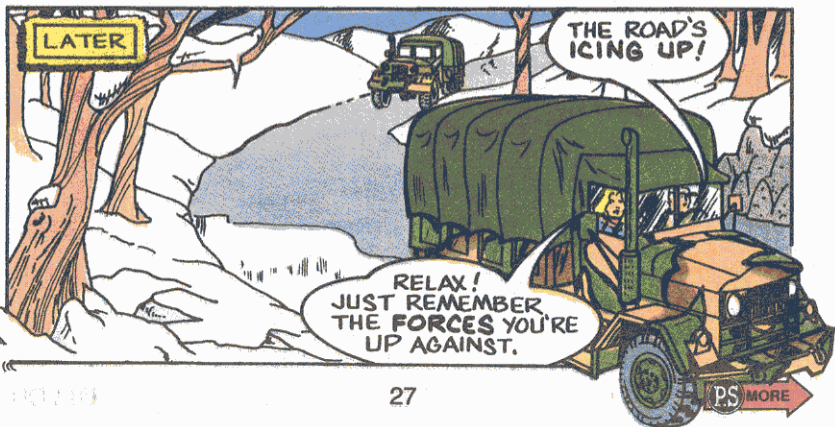
I'VE NEVER DRIVEN ON ICE BEFORE.

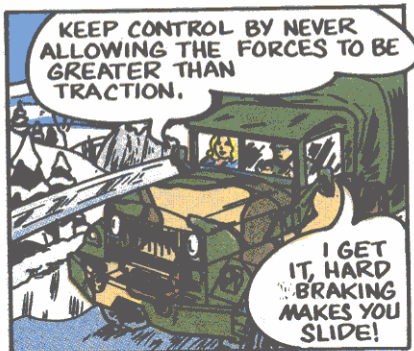
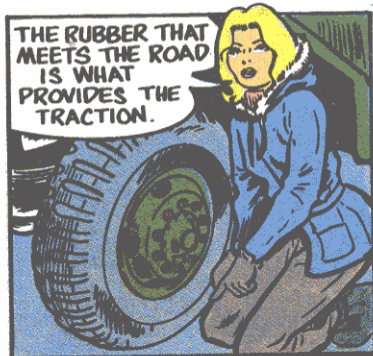
WE HAVE TO DRIVE UP NORTH TO FORT FRIGIDAIR TO DO THESE WINTER TRAINING EXERCISES.

HOW ARE WE GOING TO REMEMBER ALL THIS STUFF?

I'LL TAKE TURNS RIDING WITH YOU.

LET'S SADDLE UP!



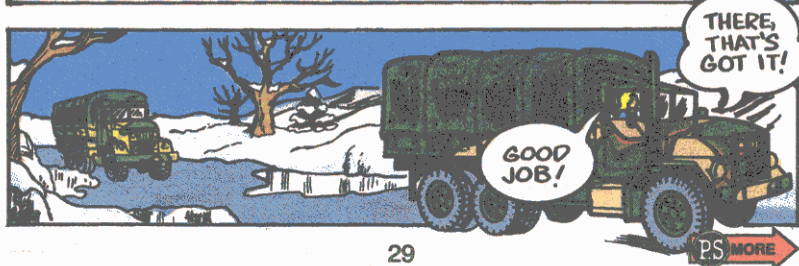
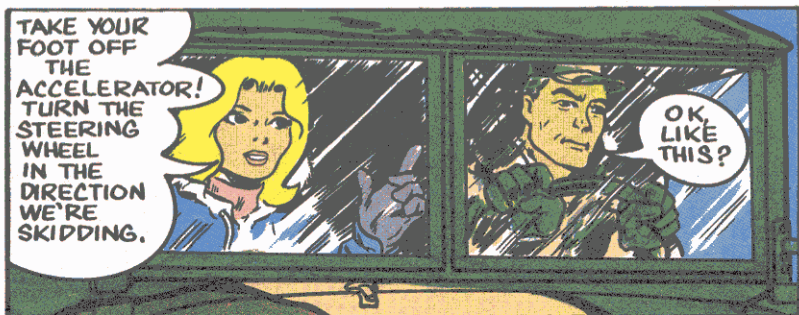


YOU MUST BE IN **CONTROL** OF TRACTION AND MOMENTUM **ALWAYS!**

IT WORKS LIKE SO...



**EASY** SPEED CHANGES AND **EASY** BRAKING KEEP MOMENTUM FROM CANCELING TRACTION... AND YOU **DON'T** SKID!



# Adjust your Driving to the WEATHER and ROAD CONDITIONS

IF YOU'RE DRIVING ON ICE AND SNOW... CAUTION IS THE WAY TO GO. GIVE BRAKES JUST A TAP, TO PREVENT A MISHAP. SO TAPS FOR YOU THEY DON'T BLOW!

SLOW DOWN BEFORE A DOWNGRADE. ENGINE DRAG HELPS! EASE OFF THE ACCELERATOR.

LOOK AHEAD, BE READY TO STOP. EASE UP TO A HALF 20 TO 30 FEET SHORT.

BE FAMILIAR WITH YOUR ROUTE.

SLOW DOWN BEFORE ENTERING CURVES. THEN SMOOTHLY ACCELERATE OUT OF IT TO HOLD TRACTION.

BRIDGES AND OVERPASSES FREEZE FIRST. COLD AIR PASSES UNDER THEM AND FREEZES WATER. ACCELERATE SMOOTHLY AND ROLL THRU TO KEEP TRACTION.

WE HAVE THE WORLD'S BEST EQUIPMENT... *Take care of it*

IF YOU WANT TO DISPLAY THIS CENTERPIECE ON YOUR BULLETIN BOARD, OPEN STAPLES, LIFT IT OUT AND PIN IT UP.

EASE TO A HALT. GIVE YOURSELF 20 TO 30 FEET FOR UNEXPECTED TROUBLE.

IN CLIMBING A HILL, THE MORE MOMENTUM (AMOUNT OF MOTION) YOU HAVE, THE LESS TRACTION (GRIP) YOU NEED!

TO AVOID STOPPING HALFWAY UP THE HILL, LET THE OTHER TRUCK MAKE IT FIRST!

ON THE ROAD

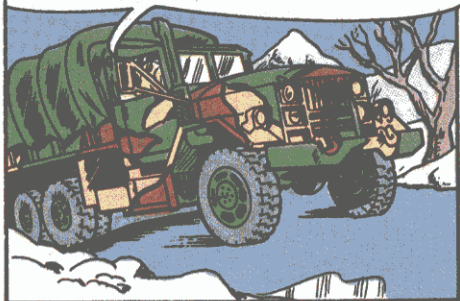
BE CAREFUL, BUT HIT THE HILL AS FAST AS YOU CAN SAFELY GO. MOMENTUM WILL CARRY YOU OVER!

SHIFTING GEARS CAN BREAK YOUR GRIP ON THE ROAD. MAKE EACH SHIFT AS SMOOTH AS POSSIBLE, PARTICULARLY THE DOWNSHIFT.

SLICK SPOTS FORM AT THE BOTTOM OF HILLS, ON BRIDGES AND IN SHADY SPOTS!



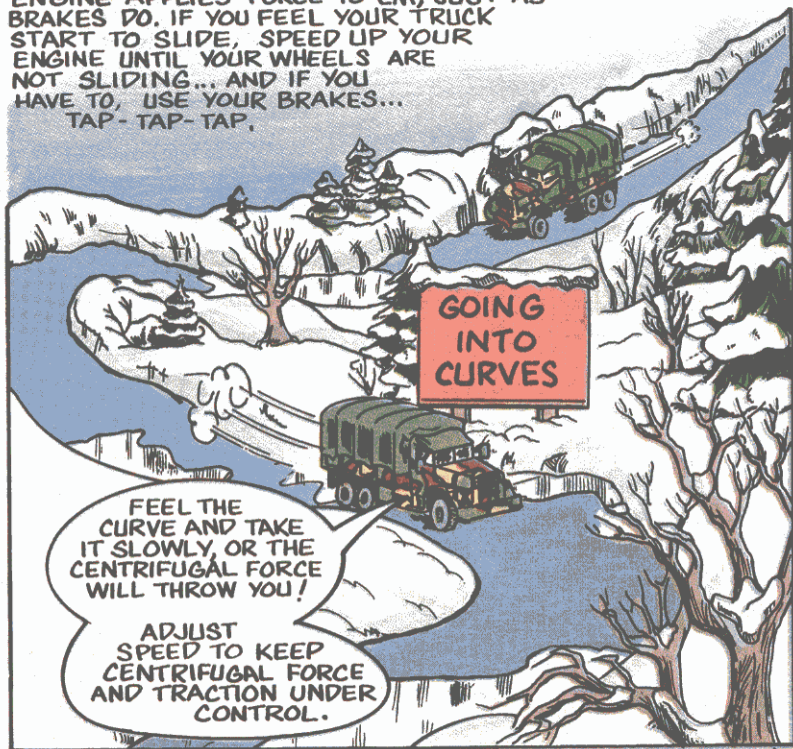
CLIMB HILLS IN ONE SMOOTH UNINTERRUPTED FLOW OF POWER.



CUT SPEED BEFORE STARTING DOWN.

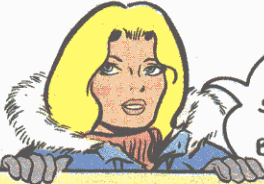


WHEN YOU'RE ON A DRY ROAD, YOU CAN SHIFT DOWN AS LOW AS YOU NEED. GOING DOWN INTO THAT GEAR USES YOUR ENGINE AS A BRAKE, BUT ON ICE, REMEMBER THE ENGINE APPLIES FORCE TO 'EM, JUST AS BRAKES DO. IF YOU FEEL YOUR TRUCK START TO SLIDE, SPEED UP YOUR ENGINE UNTIL YOUR WHEELS ARE NOT SLIDING... AND IF YOU HAVE TO, USE YOUR BRAKES... TAP - TAP - TAP.



FEEL THE CURVE AND TAKE IT SLOWLY, OR THE CENTRIFUGAL FORCE WILL THROW YOU!

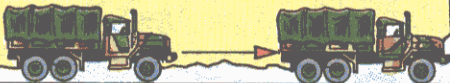
ADJUST SPEED TO KEEP CENTRIFUGAL FORCE AND TRACTION UNDER CONTROL.



LET THE POWERTRAIN SLOW YOU DOWN...NEVER SLAM ON THE BRAKES!! TAP-TAP-TAP SO YOU DON'T LOSE YOUR TRACTION. FRONT WHEELS LOCK WITH HEAVY BRAKING AND YOU HAVE NO STEERING!

UNDER NORMAL CONDITIONS!

TAP-TAP-TAP  
BRAKES HERE



UNDER ICY CONDITIONS IT TAKES 3 TO 12 TIMES AS FAR TO STOP! SO WATCH IT!

TAP-TAP-TAP  
BRAKES HERE

UNDER ICY CONDITIONS!



LOOK,  
CONNIE, WE'RE  
HERE!

GOOD  
JOB,  
SOLDIER!



THANK YOU  
FOR THE DRIVING  
TIPS, CONNIE.

YOU'RE WELCOME,  
PASS THEM ALONG  
TO THE OTHER  
DRIVERS.

WE  
SURE  
WILL!



# Left Out in the Cold



If your toasted tootsies are propped on your desk and all your birds are roosting in hangars, you can stop reading right here.

But... if your feet are freezing at the very thought of doing maintenance on frozen flight-line birds, read on.

**Rule One:** Dress like a five minute maintenance job is going to take an hour. Bundle up and wear gloves. If you don't... if you dress like you're going to your porch to get the newspaper... you'll rush the job, pull poor PM and risk exposure illnesses. Sure, winter clothing is bulky. Just allow more time to do the job and take your time while doing it.

**Rule Two:** Cover your bird. If your bird is covered, you've won half the cold weather battle.



**Rule Three:** Resist the urge to use shortcuts. If the cold is too intense, break your maintenance task into small chunks—or use the buddy system; one mechanic warms while the other works.

# Former Protector

Dear Editor,

The former, Item 17 of Fig 21 of TM 55-1520-228-23P, that holds the transmission cowlings takes a beating when the cowlings is off. The most abused areas are above the pilot and co-pilot crew doors. These are the areas a mechanic steps on when he's doing rotor hub maintenance.

I made a cover for the former out of aluminum sheet, NSN 9535-00-232-0569. You need two 4 1/2 inch wide pieces—one a foot long for the left side and one 7 3/4 inches long for the right. Bend both in a U-shape with a wide lip.

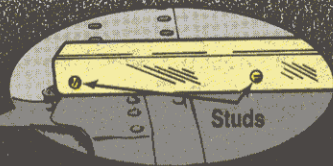
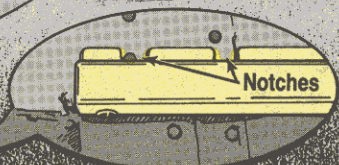
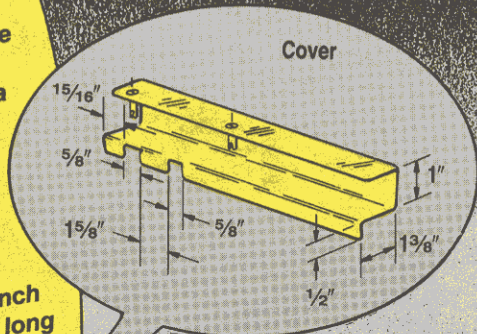
Notch the lip as necessary to fit around cabin roof rivets.

Drill two 1/4-in holes in the cover to match the receptacles on the former.

Lock the cover in place with two turnlock fasteners, NSN 5325-00-281-5069.

SFC Larry Van Dyke  
Ft Eustis, VA

(Editor's note: Good advice for keeping the former from becoming a ladder.)



# Build a FOD

# Prevention Pod

HERE'S HOW TO  
MAKE A DURABLE  
FOD PREVENTION POD.

THAT DOUBLES AS A  
FUEL SAMPLE STORAGE AREA.

AND A FIRE  
EXTINGUISHER  
POINT.

Start with an empty 55-gal drum. Cut off the top with drum cutter, NSN 5110-00-426-9664.

Clean it.

Put about half a 80-lb bag of pre-mixed concrete, NSN 5610-00-985-1800, in the bottom of the drum. Tilt the drum slightly while the concrete hardens.

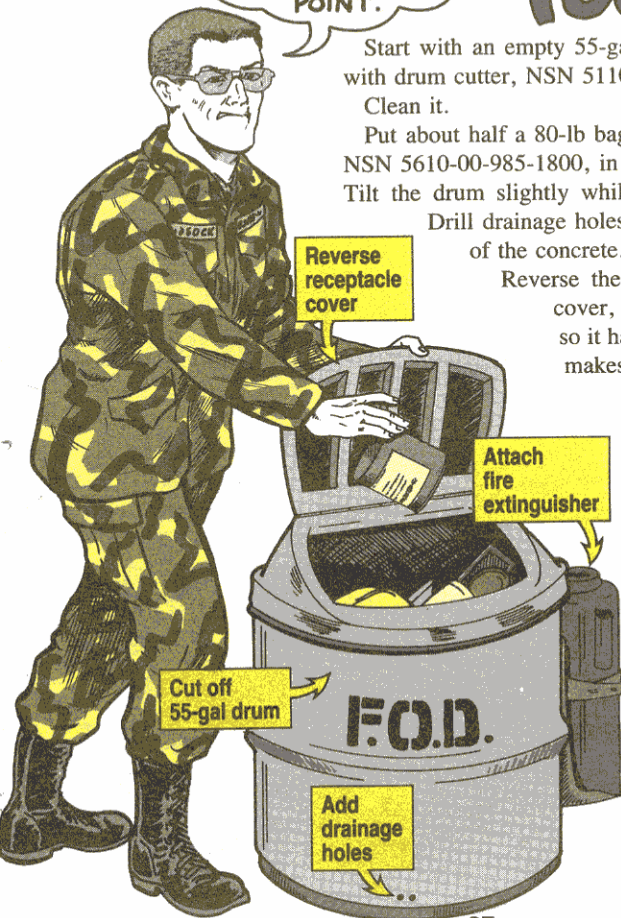
Drill drainage holes just above the low side of the concrete.

Reverse the push top on receptacle cover, NSN 7240-00-783-1044, so it has to be lifted open. That makes for easier access.

Paint a 5-gal fuel can yellow and mark it, "Contaminated Fuel." Put it inside the pod to hold fuel samples until proper disposal.

Use an old, topless 5-gal oil can to hold FOD-causing junk. Put it inside the drum. Even if you fill the can to overflowing, the junk stays safely inside the drum.

NSN 4210-00-257-5343 gets a 20-lb fire extinguisher and mounting bracket for fire prevention.



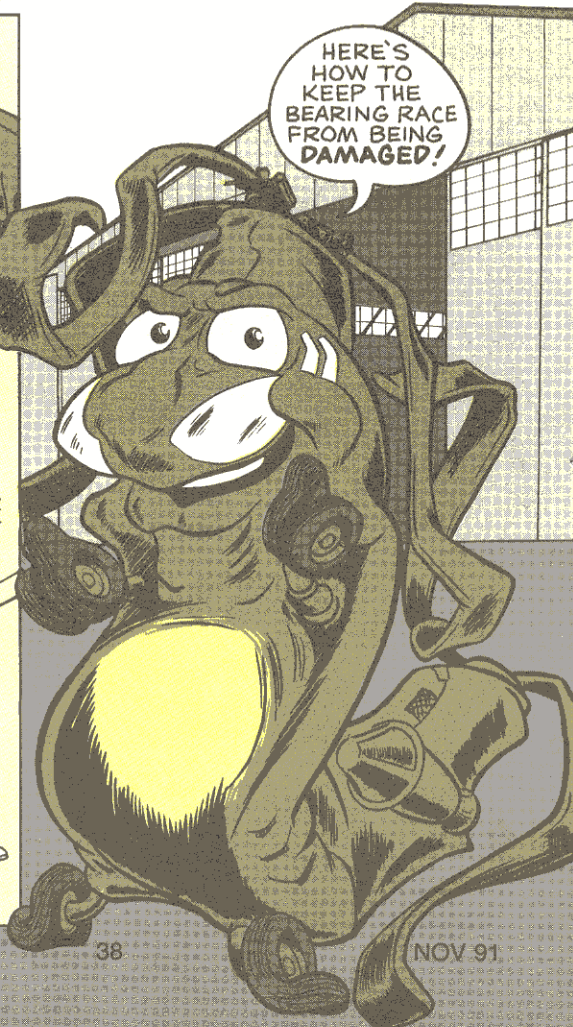
# W The Fallen Race

When you mechanics are tasked to remove the vertical hinge pin oil tanks on your Chinook rotors, pause and remember this: Once you remove the tank, nothing is holding the inner bearing race in place! Out it will fall, damaging itself and anything in its path.

When you remove those oil tanks, be ready to grab the inner bearing race and lower it with your hand.



HERE'S HOW TO KEEP THE BEARING RACE FROM BEING DAMAGED!



# Tow Bar Caster Control

**M**oving a tow bar can be like pushing a shopping cart with a stuck wheel. It goes in every direction but the right one!

To solve that problem, order new, improved casters. A non-swivel caster comes with NSN 5340-01-260-6258. It will stop the runaway tow bar problem. NSN 5340-00-205-5628 gets an improved swivel caster.

Order the new casters in pairs because they're bigger than the old casters.



## Aviation Pubs

**TB 1-1520-228-20-61** May Replacement of separator nozzles on OH-58A/C with T63-A-720 engine

**TB 1-1520-236-30-1** Feb Installation of AIM-1 laser gunsight system, AH-1F

**TB 1-1520-237-20-121** Feb Quick positioning system installation, EH-60A/UH-60A/UH-60L

**TB 1-1520-237-20-122** Mar One time inspection of all H-60

**TB 1-1520-237-20-123** Mar ODS extension of H-60 retirement life components

**TB 1-1520-237-20-124** Mar One time inspection of cargo hook wire routing UH-60A/L, EH-60A

**TB 1-1520-237-20-125** Apr One time inspection of fire extinguishing system UH-60A/L

**TB 1-1520-238-20-02** Feb One time inspection of all servocylinders for nonconforming hardware on AH-64A

**TB 1-1520-238-20-12** May Inspection of temperature alarm units on AH-64A

**TB 1-1520-238-20-19** Mar Identification/Restricting AH-64A with deice systems

**TB 1-1520-240-20-53** Feb Revision of special inspection intervals for ODS, CH-47D

**TB 1-1520-240-20-55** May One

time inspection of transmissions in CH-47D, MH-47D, and MH-47E

**TB 1-2835-205-20-1** Feb Desert operations for auxiliary power unit Model T-62T-2B

**TB 1-2835-208-20-1** Feb Desert operations auxiliary power unit Model T62T-40-1

**TB 1-2840-229-20-1** Feb Desert operations for T53-L-13B, T53-L-13BA and T53-L-703

**TB 1-2840-229-20-3** May Records inspection of T53 engine fuel controls for UH-1/AH-1

**TB 55-2840-233-20-1** Feb Desert operations for T53-L-701 and T53-L-701A



## Aviation Messages

If your unit has not received a message you have an interest in, check with your next higher headquarters.

**AH-64-91-ASAM-11**, Maint Mand, AH-64, inspect main landing gear 011900Z Jul 91.

**AH-64-91-ASAM-12**, Info, AH-64, Engine flameouts, 102330Z Jul 91.

**OV-1-91-ASAM-05**, Maint Mand, One time inspect of main landing gear side brace and actuating cylinder attachment fittings for cracking, 161600Z Jul 91.

**UH-60-91-ASAM-11**, Oper, H-60, requirement to operate with boost

pumps on while burning JP-4 fuel, 172100Z Jul 91.

**AH-1-91-ASAM-13**, Maint Mand, All series aircraft, inspection of MS nuts in critical locations because of cracking due to hydrogen embrittlement and seams, 252100Z Jul 91.

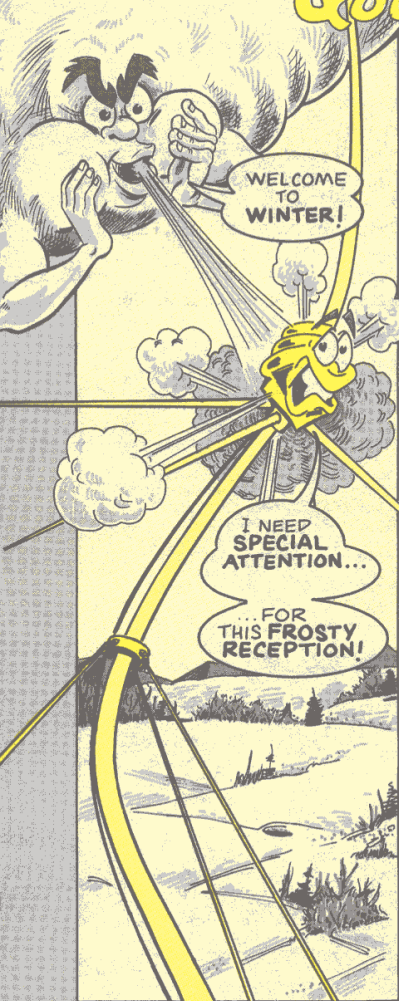
**UH-1-91-ASAM-13**, Info, UH-1H/V, revision to UH-1-91-ASAM-11 on forward engine electrical plug connector, 291800Z Jul 91.

CAT 1 EIR Phone:  
DSN 693-2066  
(24 HOURS)

**UH-1-91-ASAM-14**, Info, UH-1 and EH-1, reporting of discrepant engines IAW Safety of Flight Message UH-1-91-01, 292230Z Jul 91.

**AH-64-91-04**, SOF, Technical, AH-64 that participated in Operation Desert Shield/Storm in SWA, one-time and recurring inspection of M/R strap and lead-lag links, 151300Z Jul 91.

# Good PM Thaws Frostiest Antennas

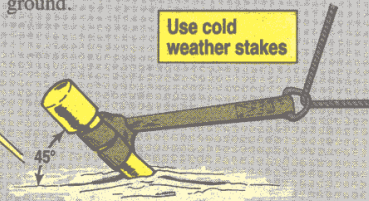


**K**ep your RC-292 and OE-254 antennas standing tall in cold weather. They need special attention when old man winter blows into town.

It's easy to drive guy stakes when it's warm outside, but hammering them into hard, frozen ground is next to impossible.

Cold-weather stakes are just what you need to make the going a little easier. Because they're slimmer than standard guy stakes, cold-weather stakes are easier to drive into the ground.

Use cold weather stakes

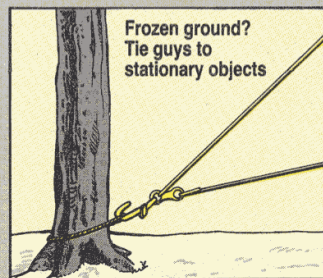


But keep an eye on 'em when the mercury starts to rise. These stakes tend to pull out once the ground starts to thaw.

If a stake begins to pull out of the ground, don't drive it back in. It'll only come right back out. Hammer the stake six inches to the left or right of the original hole.

You can get a cold-weather stake for your RC-292 antenna by using NSN 4030-00-187-5265. Or, if you have an OE-254 antenna, use NSN 4030-00-291-9354. Keep some extras on hand. Even cold-weather stakes can bend or break.

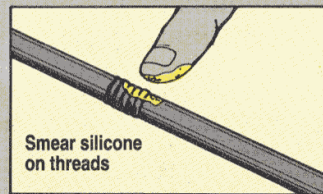
If even cold-weather stakes fail, tie your guy rope to something sturdy, like a tree or pole. In any case, never use fewer guys than your TM calls for—three for the RC-292 and four for the OE-254. If you use less, your antenna may end up on the ground.



## Frozen Joints

To keep your antenna joints from freezing up, just add some lube. A little dab of silicone will usually do the trick.

You can get a 2-oz tube with NSN 6850-00-177-5094. Or, if you need to keep more on hand, get the 8-oz tube with NSN 6850-00-880-7616.



Clean the mating surfaces, inside and out, before applying the lube.

## Dry Bowl

Water that collects in the ceramic bowl of your RC-292 antenna freezes when temperatures drop. When that happens, the bowl cracks.



To prevent this problem, open the bowl and wipe out the inside. Spread a thin film of silicone on both halves before putting the bowl back together again.

## Cable Care

During cold weather, RF cables need more care. The insulation on the cable gets brittle and breaks. This lets moisture in and corrodes the wiring.

Protect the cable by taping it to the antenna. That keeps it from being whipped by the wind.

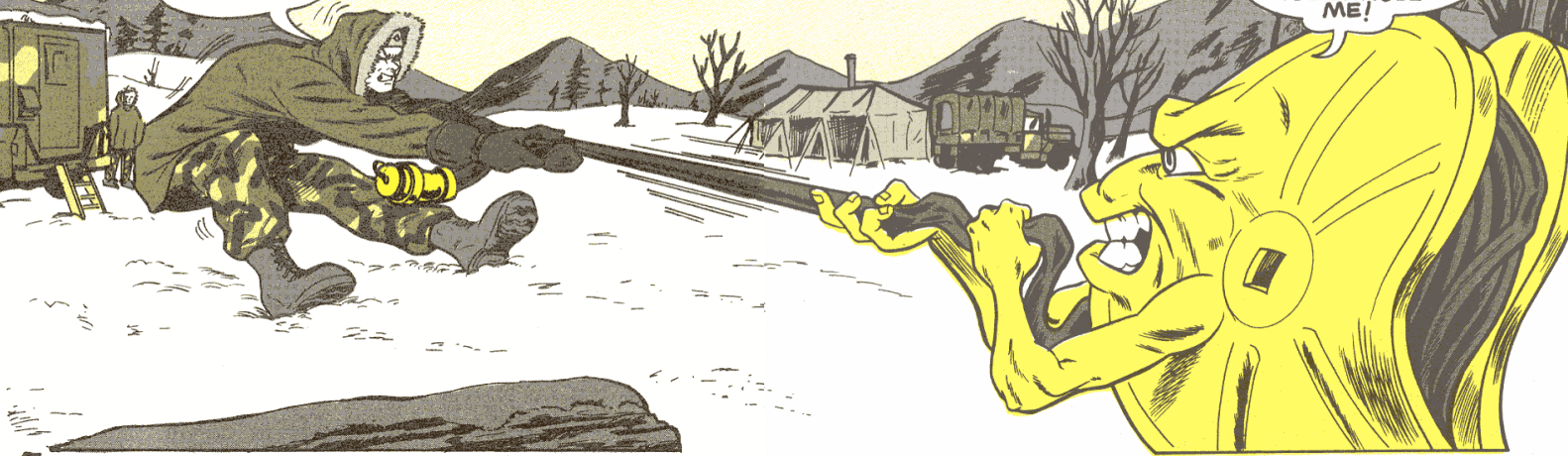
Just any tape won't do, though. Always use cold-weather tape, NSN 5970-00-240-0620. If this won't hold, use the PF-211/G clamps that come with the OE-254 antenna. If you have the RC-292 antenna, order the clamps with NSN 5975-00-563-0229.



# PM Makes Them Able

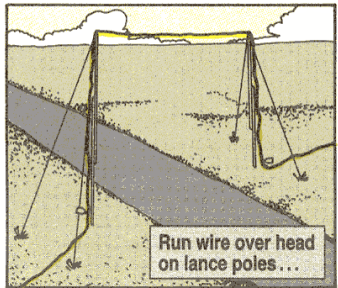
C'MON WHY ARE YOU BEING SO STUBBORN?

BECAUSE I NEED TO BE WARMED UP BEFORE YOU UNROLL ME!

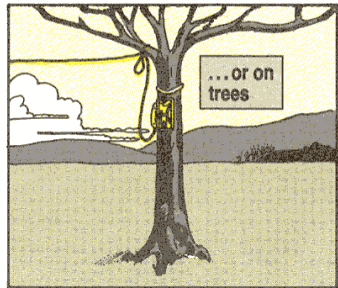


Cables and wires need extra care when the temperature drops below freezing. Keep your commo on line with these PM tips.

- Warm cable a while before unrolling it. Unrolling cable when it's too cold cracks the insulation. The inside wires get cold and break, too.
- Keep cable and wire off the ground. If you can hang the cables overhead, do so. This will help keep the cable from freezing to the ground. When the cable gets stuck to the ground, it's a real pain to recover.

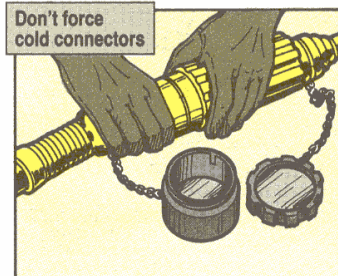


Run wire over head on lance poles...



...or on trees

- Leave a little slack when you lay wire or cable. Metal and rubber shrink in the cold. The wire or cable can break if you pull it too tight.
- Be careful when disconnecting when it's cold. Forcing the connectors can break them.
- Store cable and wire inside a shelter, if possible.
- Use cold weather tape when you have to splice or repair wire. Cold weather electrical tape, NSN 5970-00-240-0620, holds up in the cold. The tape comes in a 30-ft roll.
- Use arctic insulated wire in extreme cold weather. Here are the NSNs:



Item	NSN 6145-01-155-
RL-159 reel with 1 mile wire	4256
MX-30 reel with 1/2 mile wire	4257
DR-8 reel with 1/4 mile wire	4258

# Use the Screen

**I**N THE WINTERTIME, MOISTURE FROM CONDENSATION IS A BIG ENEMY TO YOUR TA-312/PT TELEPHONE SET. MOISTURE GETS INSIDE YOUR TELEPHONE AND STOPS YOUR COMMO COLD.

NEXT TIME, KEEP THE SCREEN ON THE OUTSIDE!



**S**ome of the moisture comes from you when you speak into the mouthpiece. Condensation forms when your warm breath gets inside the cold telephone mouthpiece. Keep moisture out by using a deicing screen, NSN 4130-00-392-7628.

Be sure you install the screen on the outside of the mouthpiece cover where it can do its job. Some folks think that the screen is too easy to lose if installed on the outside, so they put it inside and the screen can't keep out moisture.



The screen won't get lost if it's installed right. It'll stay put if you line up the dot on the screen with the notch on the mouthpiece. Then press the screen evenly around the rim.

Don't use things like screwdrivers and knives on the screen. You'll damage the screen and lose the protective seal.

No screen? In a pinch, you can use the plastic from a dry-cell battery if it's thin enough to talk through.

Store the screen between the set and carrying case when you're not using it.

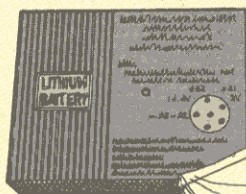
# It Takes Two

In cold weather, your AN/PRC-77 radio set needs extra power to keep it on line.

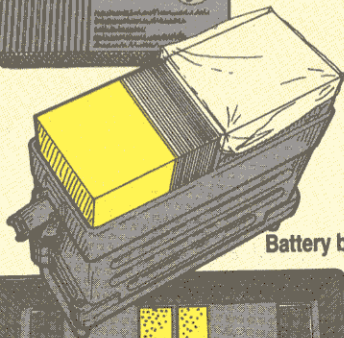
The BA-5598/U lithium battery, NSN 6135-01-034-2239, keeps your AN/PRC-77 radio set operating longer in cold weather.

These lithium batteries are narrower than the regular BA-4386/U batteries, so you can install two of them in the battery box. Then you'll have a spare when the other battery fizzles out.

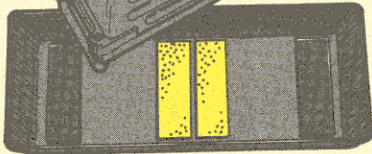
You'll need to add two extra rubber pads, NSN 9320-00-930-0724, to the battery box to keep both batteries snug as bugs in a rug.



BA-5598/U  
Battery



Battery box



Add extra rubber pads

## AN/GSX-1...

# Hold Off Holding the Switch

Never hold a programmer BATTERY TEST/OFF/CHARGE toggle switch in the BATTERY TEST position for more than 30 seconds when you test the battery in your AN/GSX-1 interrogator set programmer. Holding the switch longer damages the battery charger's A1 circuit card assembly. Then the programmer goes to support for a new card.

Also, give the programmer and battery charger a 2-minute rest period between testing the remaining programmer switches.

NOV 91

HOLDING THE SWITCH MORE THAN 30 SECONDS DAMAGES CIRCUIT CARDS!

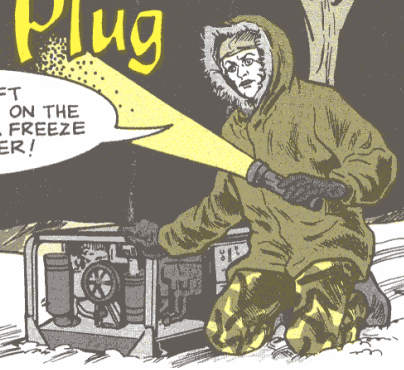


# Don't Let Winter Pull Your Plug

It's COLD AND WET. FRIGID BLASTS OF ARCTIC AIR RUFFLE YOUR TENT WALLS SEEKING A WAY INSIDE.



SOMEONE LEFT THE GENERATOR ON THE GROUND AND PUT A FREEZE ON OUR POWER!

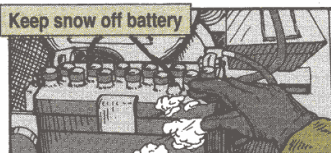


As cold as it is inside, it's much colder outside where your generator is chugging away—providing the power you need for lights and commo. Power you'll lose without proper PM.

Here are a few PM tips to keep your generator on the up-and-up when the temperatures are way down.

- Keep the generator off snow or ice. Use a pallet or trailer so the set won't freeze to the ground. Shelter your set if you can.

- Keep snow and ice cleared away from the generator's components, especially the battery. Battery terminal



covers will help. Order some using NSN 5940-00-738-6272. Be sure the battery cap vent holes are open and that the battery is fully charged. Use a battery solution tester, NSN 6630-00-171-5126, to make sure the electrolyte's specific gravity is 1.280.

- Move the air filter's intake shutter to WINTER. That lets warm air from the manifold keep the carburetor from freezing up.



- When starting up in temps below  $-25^{\circ}\text{F}$ , hold the master switch in the start position for a full two minutes after the engine comes to operating speed. This will warm the engine enough to allow good operation in extreme cold.

- Store oil and lube inside where it's warmer. It'll make them easier to pour and use later. Lube according to the LO and the temperature range.

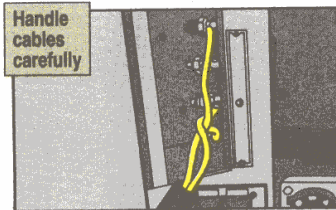
- You may need to change your oil more often during cold weather. The amount of sludge and water contamination tends to increase during these times.

- Keep the fuel tank full when the generator is shut down to head off condensation that can freeze in the fuel line.

- Use the right fuel icing inhibitor. Gas uses technical methanol. Diesel fuel takes fuel system icing inhibitor. The ratio for both is one pint per 40 gallons of fuel. You can get one gallon

of methanol with NSN 6810-00-597-3608 or five gallons with NSN 6810-00-275-6010. Inhibitor comes in 5-gal cans, NSN 6850-01-057-6427, and 55-gal drums, NSN 6850-01-089-5514. If it's really cold,  $-25^{\circ}\text{F}$  or lower, you should use arctic grade diesel fuel in your diesel generators.

- Handle all cables and wiring as little as possible. Insulation becomes brittle in the cold and may break.

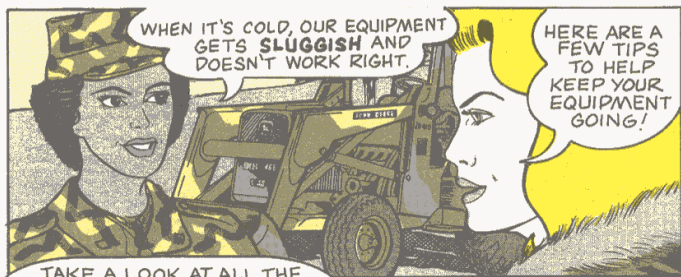


- Check your set frequently for unusual noises or gage readings. Check the troubleshooting sections of your TMs to find what to do in each instance.

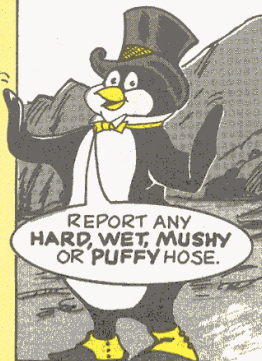


# Dig That Cold T-L-C!

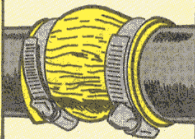
When old man winter breathes his icy breath down the back of your shirt, you get cold. And so does your construction equipment.



TAKE A LOOK AT ALL THE HOSES. HOSES **ROT, HARDEN** OR **CRACK** WITH AGE!

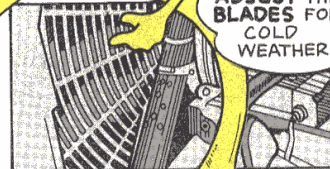


New hose needed



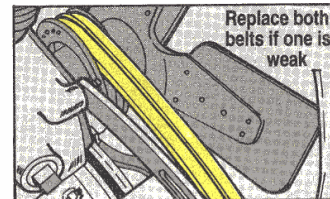
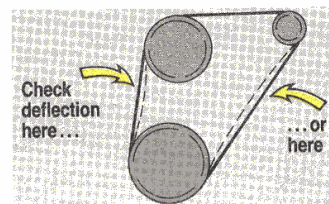
## Cat Cooling Fans

Make sure Cat tractors with reversible fan blades are set for winter. Turn 'em so they pull warm air from the radiator over the engine.



## Belts

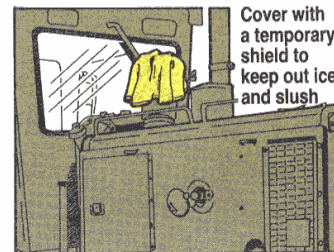
Keep drive belts tight. A quick and easy check is to use your thumb. Push down mid way between the two pulleys with your thumb (about 25 pounds). Deflection should be about 1/2 inch—about the width of the belt—for each 12 inches of span length.



## Air Cleaners

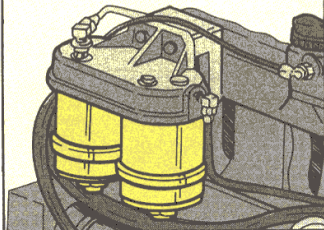
Clean off air cleaner inlets before starting the engine. Engines need lots of clean air to keep running. The engine can't get air if the air cleaner inlet is choked with snow or ice.

Shield the inlet with a piece of scrap tarp to keep snow and sleet out. If you can't add a cover, brush away snow and ice from around the intake before you try to start the engine.



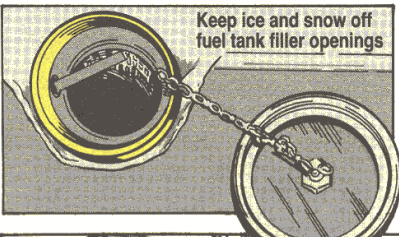
## Fuel

YOU CAN'T KEEP ALL MOISTURE OUT OF FUEL, SO DRAIN FILTERS DAILY.



To keep ice and snow out of the fuel tank, wipe off the fuel tank filler opening, filler cans and hose nozzles before refueling.

Keep ice and snow off fuel tank filler openings



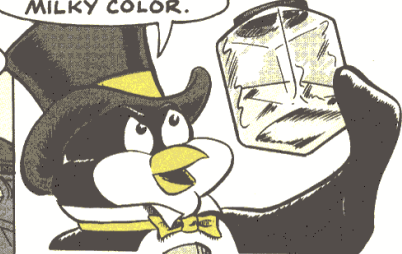
YOU SHOULD BE ABLE TO BEAT OLD MAN WINTER WITH THOSE TIPS.



THANKS, CONNIE!

WAIT, THERE'S MORE!

DRAIN INTO A CLEAR CONTAINER UNTIL YOU SEE CLEAR FUEL. FUEL WITH MOISTURE IS A MILKY COLOR.



### No Ether Cans

When it's cold and the starting gets rough, some operators use ether in a spray can to help start engines.

**But don't!**

You can damage—or ruin—the engine. (And you know who pays that bill, don't you?)

## Batteries

Keep batteries fully charged. Use the antifreeze and battery tester to make sure batteries test 1.280 specific gravity. It takes fully charged batteries to turn over those big engines.

THIS CHART SHOWS YOUR BATTERIES' CRANKING ABILITY UNDER DIFFERENT CONDITIONS.



Temperature	Specific Gravity	Cranking Ability
80°F	1.280 (Full charge)	100%
80°F	1.225 (Half charge)	46%
80°F	1.180 (Nearly discharged)	25%
32°F	1.280 (Full charge)	65%
32°F	1.225 (Half charge)	32%
32°F	1.180 (Nearly discharged)	16%
0°F	1.280 (Full charge)	40%
0°F	1.225 (Half charge)	21%
0°F	1.180 (Nearly discharged)	9%

PS END

## Rubber Covers for Terminals

You can rid your battery box of one source of sparks, shorts and fires by using rubber covers over the battery terminals.

Use cover, NSN 2530-01-089-4992, for single terminals and cover, NSN 5940-00-738-6272, for dual terminals.

They keep screwdrivers, wrenches, battery box covers, and other metal objects from touching both terminals, or the positive post and metal, at the same time.

WE'RE A COUPLE OF SPARK STOPPERS!



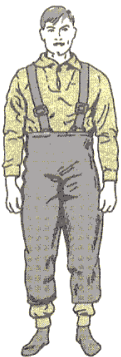
YEAH, WE GOT IT COVERED!

# PM Prevents Poor Performance

The Extended Cold-Weather Clothing System (ECWCS) can't perform the way it should if you don't perform PM.



**Undershirt, cold weather; Drawers, cold weather**



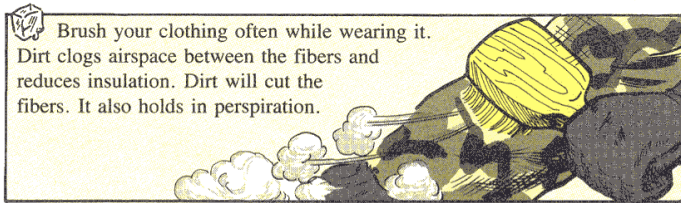
**Overalls, cold weather**



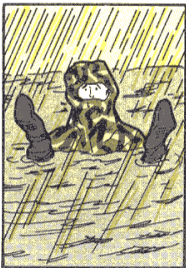
**Shirt, cold weather**



**Parka, cold weather; Trousers, cold weather; Hood, balaclava**

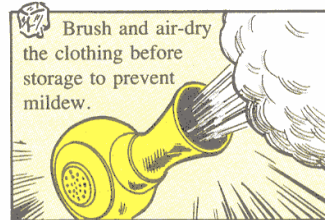


Brush your clothing often while wearing it. Dirt clogs airspace between the fibers and reduces insulation. Dirt will cut the fibers. It also holds in perspiration.



Keep clothing dry. Wet clothing is cold clothing. Dampness also increases body heat loss.

If you get any piece of your ECWCS wet, get out of it as soon as you can. Hang wet clothing to dry on a non-metallic hanger—but not so close to a stove as to burn it.



Brush and air-dry the clothing before storage to prevent mildew.

When packing clothing, wrap it in paper and store it in a heavy cardboard box. This makes sure it doesn't touch sharp objects that will tear it.



## Cleaning

The parka and trousers are water repellent. Before you wash and dry them, eyeball them for rips and tears. If you see any, repair them.

Wash the garments with a mild powdered detergent, not a liquid detergent. Liquid detergents wash away water repellency. Rinse clothing real good in clean, warm water to get rid of all the detergent.

Restore the water repellency by steaming the parka and trousers. Set your iron on STEAM. Hold it about ½ inch above the garment. Steam all over, but DO NOT PRESS!

Underwear needs extra care when you wash and dry it, too.

Wash the underwear in COLD water using cold water detergent. Rinse in cold water, too. Never use bleach or starch.

Drip drying is the best method. To drip dry, wring out all the water you can, then hang on a rust-proof hanger. If you must use a dryer, tumble dry at the lowest setting. Keep a close eye on your underwear and remove them as soon as they're dry.

Wash the other items the same as you do the underwear.

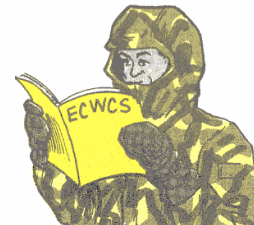
For instructions on stain and spot removal, eyeball Appendix D of FM 21-15, Care and Use of Individual Clothing and Equipment.

## Repair

You'll find repair information in a handy pamphlet on the ECWCS prepared by the Natick RD&E Center. If your unit needs copies, order **Use and Care of the ECWCS** using item number AD 187998 from:

**Defense Technical Information Center  
National Technical Information Service  
US Department of Commerce  
Springfield, VA 22161**

And for more repair info eyeball Chap 20 of TM 10-8400-201-23.



# Keep Your Feet Warm

**C**old feet can turn a good day into a nightmare! The black cold-weather boots and the white extreme cold-weather boots will keep your feet warm and comfortable with these PM tips:

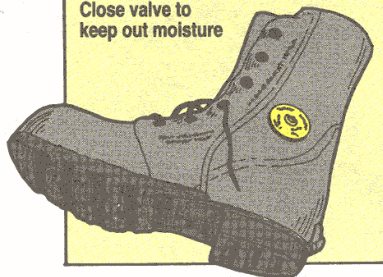
Watch your step. If you puncture—either on the outside or inside—a boot, it can put them out of action... for good. Water gets in the layer of insulation that's sealed inside. Wet insulation lets the cold through, and your feet freeze.

Patch holes as soon as you find them using the cold-weather maintenance kit, NSN 8465-00-753-6335. Put the adhesive to both the boot and the patch. Don't depend on the patches to hold up long in the field, though. They're good only for emergencies. When you come back in from the field, turn the boots in to be tested.



If open, the air pressure relief valve will let moisture in, too. Keep the valve closed unless you're going up in an aircraft.

Close valve to keep out moisture



Clean your boots by washing them with a mild detergent and water. Wash the insides at least once a month. Take the laces out and clean between the tongue and the eyelets. Dirt or grit there can wear a hole in the boots.

For stubborn stains, use a spray-on general purpose detergent, NSN 7930-00-357-7386. Excessive heat will damage boots, so never dry them near a fire or other heat source.

Get replacement white laces for your extreme cold-weather boots with NSN 8335-00-131-6538. Use NSN 8335-00-945-3969 to get black laces for your cold-weather boots.

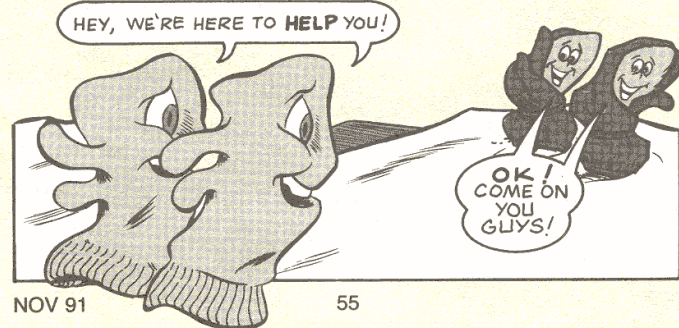
## Inserts for Cold Weather Mittens

Your cold weather mittens, NSN 8415-00-926-1526, won't be enough to protect your hands when the temperature drops to below freezing. You'll need to wear trigger finger mitten inserts inside them. The mitten inserts come in two sizes:

Medium NSN 8415-00-160-0769

Large NSN 8415-00-160-1376

Make sure the inserts are the right size. Oversize mittens mean cold air pockets.





# Helpful Hints for Hoods

**BRRR... I'M FREEZING!**

THE COLD HARD FACT IS YOU SHOULD HAVE PERFORMED BETTER PM ON THAT HOOD!



If your head's warm, your whole body feels warmer. The extreme cold-weather hood, NSN 8415-00-782-3004, will keep the frigid winter air away from your head.

Wet fur gets matted and prickly, so brush frost and snow off the fur ruff often.

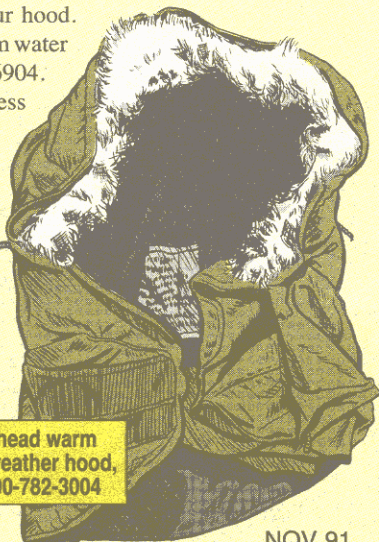
Oil, grease and mud on the fur will irritate your face, too. Keep the hood and its fur ruff clean.

Never machine wash or machine dry your hood.

That will damage it. Handwash it in lukewarm water with a mild detergent, NSN 7930-00-985-6904.

Rinse it in clean water, shake out the excess and hang to dry.

BRUSH THE RUFF TO MAKE IT SOFT AND FLUFFY IF IT GETS MATTED DURING WASHING.



Keep your head warm with cold-weather hood, NSN 8415-00-782-3004

# Extra Long Fuel Hose

Get an extra long rubber hose assembly, NSN 4720-00-021-3320, to use with the 5-gal fuel can on the M17 Decon or any size generator.

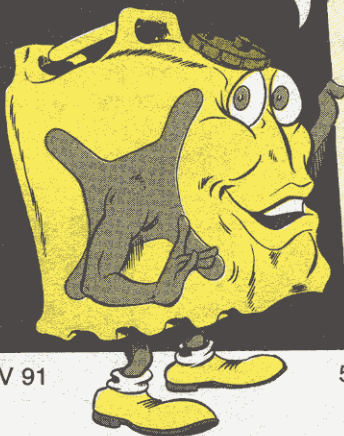
THE HOSE ASSEMBLY COMES WITH A 25-FT HOSE, TWO ADAPTERS, TUBE NIPPLE AND WELDLESS CHAIN. HERE ARE THE NSNs:

Item	NSN
Hose	4720-00-289-9197
Adapter	4730-00-842-2201
Nipple, tube	4730-00-040-7450
Chain, weldless	4010-00-186-9412

Order a siphoning pump, ball assembly with NSN 2910-01-176-1175.

## Plastic Water Can

HERE ARE A FEW **BRIGHT** IDEAS TO PROTECT ME DURING **COLD TEMPERATURES.**



- 💡 Leave room for expansion. Water in the cans will freeze. To prevent damage, fill cans to within 3 inches of the top.
- 💡 Never apply heat to a frozen can. The plastic will melt.
- 💡 Keep the cans off the ground. Set 'em on cribbing.
- 💡 Place the cans in insulating cases, NSN 7240-00-125-9061.

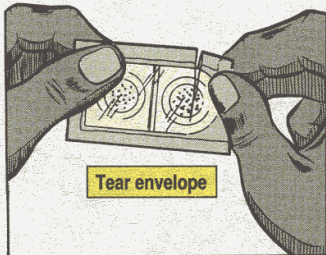
# Make Sure It Works

If the tickets in the M18A2 detector kit aren't able to detect V and G vapors, they can be a ticket to doom for your unit.

Test three tickets before you use the kit. Do the check in an area you know to be uncontaminated. At least two must turn blue or the belt of tickets is unusable. Dispose of all tickets used for tests.

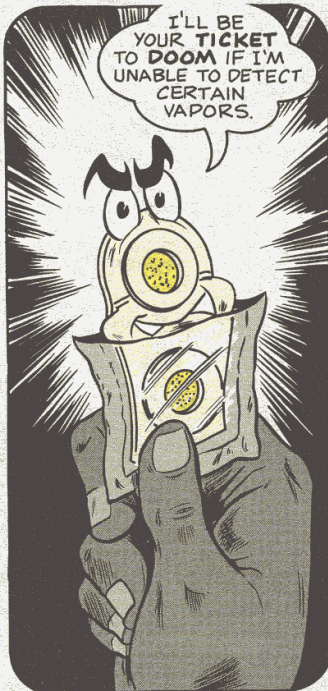
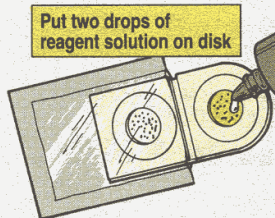
Test a kit's tickets like this to be sure they work:

1. Tear a ticket's envelope 1/2 inch from the top of the ticket's round end.

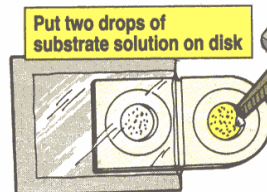


2. Push the round end out of the envelope.

3. Put two drops of reagent from the white-marked bottle onto the ticket's disk. If the disk doesn't wet easily, push the ticket back in the envelope and rub the round end until the disk is wet all over.



4. Put two drops of the substrate solution from the red-marked bottle on the disk. Put the ticket in the envelope and rub the ticket. If the disk does not turn blue in three minutes, the ticket's bad.

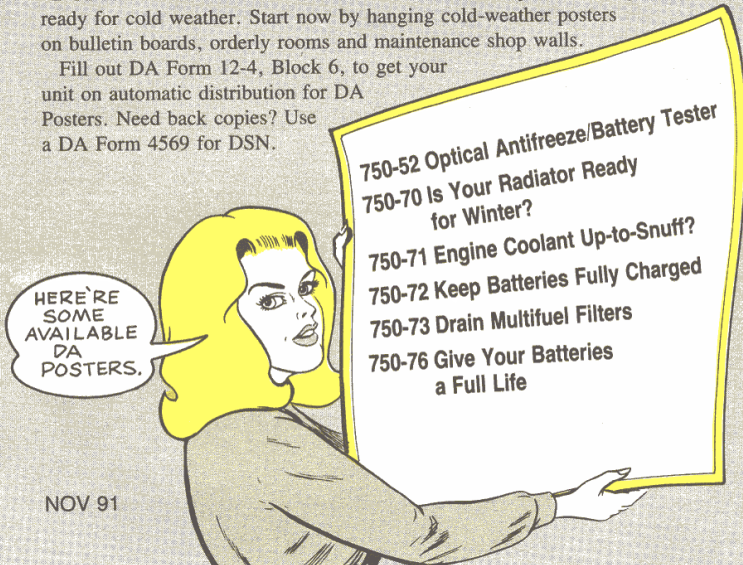


If two of three tickets fail to turn blue, turn in the ticket belt and substrate bottle for disposal. Order the M30A1 refill kit with NSN 6665-00-909-3647. If the tickets pass, they're considered good for one week. Then test them again. AMCCOM Maintenance Advisory Message 91-03 has the word.

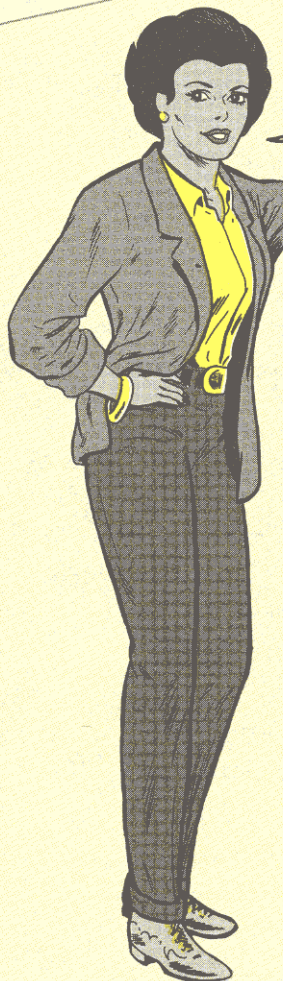
## Cold-Weather Posters

You don't need to wait until winter's here to remind your unit to get ready for cold weather. Start now by hanging cold-weather posters on bulletin boards, orderly rooms and maintenance shop walls.

Fill out DA Form 12-4, Block 6, to get your unit on automatic distribution for DA Posters. Need back copies? Use a DA Form 4569 for DSN.



# Safety Signs



HERE'S A LIST OF SAFETY SIGNS FOR YOUR MAINTENANCE AREA. ORDER THEM FROM GSA.

Legend	Size (inches)	NSN 9905-
Caution Hearing Protection Required	10 x 14	01-100-8205
Caution Hearing Protection Required	8 x 18	01-031-1247
Caution High Noise Area Wear Ear Plugs	10 x 14	01-122-1140
Caution Eye Protection Required	10 x 14	01-100-8203
Caution Do Not Operate Without Eye Protection	10 x 14	01-100-8204
Caution Wear Goggles When Using This Machine	7 x 10	00-956-6324
Caution Highly Flammable	10 x 14	01-054-0428
Caution Highly Flammable	7 x 10	01-054-0427
Caution Watch Your Step	10 x 14	01-054-0450

Order the last four signs on DD Form 1348-6 and note in the Remarks block that the NSNs are not on the AMDF. Use an RIC of GSA.

If you have a noisy gear that requires a black-on-yellow noise caution plate, order it with NSN 9905-00-198-2728. The sign is 2.13 x 4.6 inches and has an adhesive backing. Use an RIC of B14.

AR 385-30, Safety Color Code Markings and Signs, tells you which type and color signs and symbols to use in dangerous areas.

THANKS FOR ALL  
YOUR HELP BUT, YOU NEVER  
TOLD ME YOUR NAME.

QUINN,  
CONNIE,  
P.N. QUINN!

#### 4K/6K Forklift Air Filter NSN

The NSN for an air cleaner element on the 4K and 6K Hyster forklifts is not listed in TM 10-3930-658-14&P. You can order the element with NSN 2940-00-934-7989.

#### Black Electrical Tiedown Straps

For weather-resistant, black plastic, electrical-tiedown straps, order one hundred 3½-in long straps with NSN 5975-00-903-2284; NSN 5975-00-899-6582 for 6¼ inch; and NSN 5975-00-899-4606 for 13¼ inch.

#### Rubber Tiedowns by NSN

Rubber tiedown straps for canvas covers, bundles and other gear that doesn't have issue straps can be ordered in four different sizes. They're authorized by CTA 50-970, Appendix A, and come with S-hooks on each end. The cost is under a buck for each strap.

NSN	Length, inches	Stretch, inches
5340-00-340-0980	10	15-20
5340-01-029-9084	15	20-30
5340-01-030-3098	21	26-42
5340-01-029-9085	31	36-42

#### M16 Bolt Replacement

TM 9-1005-319-23&P (May 91) is wrong when it says on Page C-2-1 the SMR code for the M16A2 rifle bolt assembly (Item 4) is PAOFF. Only support can change bolts because they must head-space the rifle with the new bolt. Change the code to PAFFF.

#### Tarp Tiedowns

Get ¾-in polypropylene rope tiedowns for vehicle tarps with NSN 4020-01-058-3483. The olive drab rope comes in a 1200-ft roll. Get natural color manila rope with these NSNs:

NSN 4020-00-	Length (feet)
171-4566	150
231-2581	1220
689-5688	75
834-0708	600

#### Recharge Fire Extinguishers

All 5-lb and larger portable fire extinguishers used in wheeled and combat vehicles should be recharged instead of thrown away. Turn empties over to your support unit so they can get them to the local fire station for recharging.

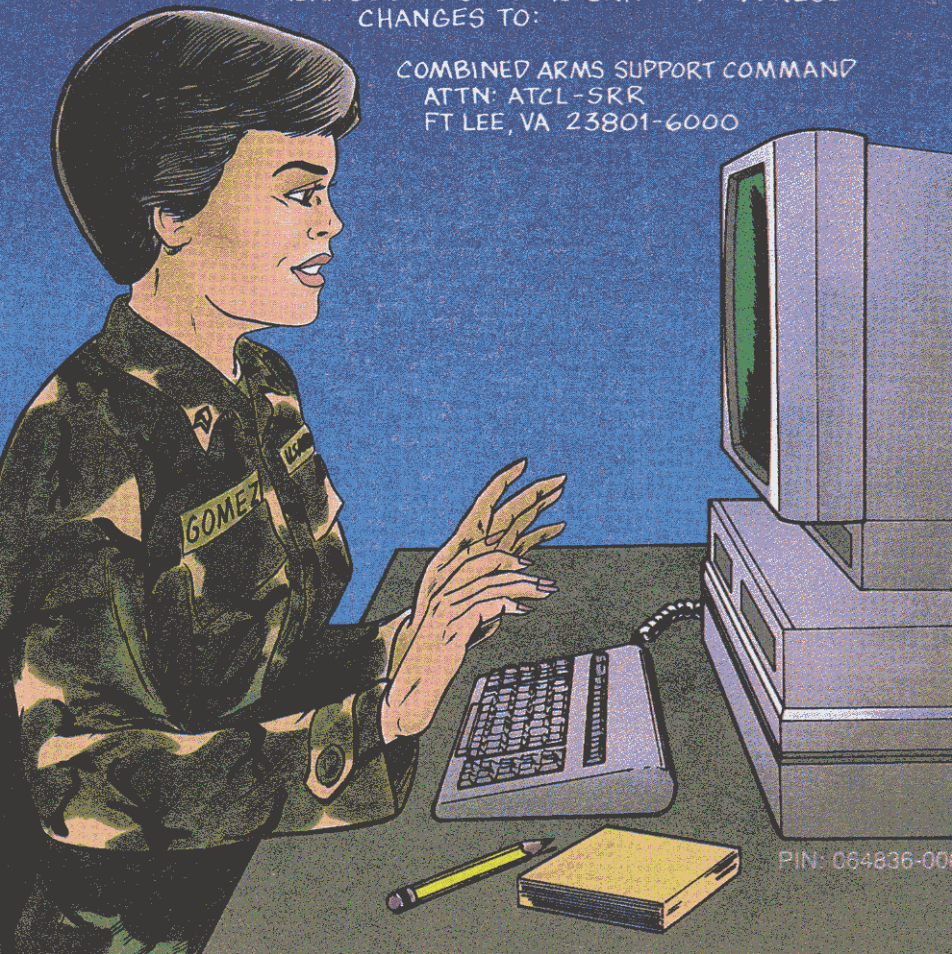
Distribution: To be distributed in accordance with DA Form 12-34-C-R, for TB-43-series.

Would You Stake Your Life *right now* on  
the Condition of Your Equipment?

# Standard Army Maintenance System (SAMS) Users

MAKE SURE YOU GET THE LATEST USER MANUALS WITH  
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