

Issue 378

PS

★  
May  
1984

# THE PREVENTIVE MAINTENANCE MONTHLY



For Maintenance  
Award Winners  
see page 1



# Maintenance Excellence Awards!



WE ARE PLEASED TO ANNOUNCE...

...THE WINNERS OF THE SECOND ANNUAL...

...CHIEF OF STAFF, ARMY...



## LIGHT UNIT WINNERS

Active MTOE C Co, 1/35 Armor, Erlangen, Germany (USAREUR)  
Active TDA D Co, 1/29 Inf, Ft Benning, GA (TRADOC)  
Reserve MTOE 419th Trans Co, Salt Lake City, UT (FORSCOM)

## LIGHT UNIT RUNNERS-UP

Active MTOE 46th Trans Co, Camp Carroll, Korea (EUSA)  
Active TDA Jefferson Proving Grounds, Madison, IN (DARCOM)  
Reserve MTOE 2d Bn, 351st Reg, 84th Tng Div, Fond Du Lac, WI (FORSCOM)

## INTERMEDIATE UNIT WINNERS

Active MTOE 533d Trans Co, 67th Maint Bn, Ft Benning, GA (FORSCOM)  
Active TDA Motor Trans Div, 29th Area Spt Grp, Kaiserslautern, Germany (USAREUR)  
Reserve MTOE 889th S&S Co, Great Falls, MT (FORSCOM)

## INTERMEDIATE UNIT RUNNERS-UP

Active MTOE A Btry, 278 FA, Bamberg, Germany (USAREUR)  
Active TDA 275th Sig Co (DCSOPS), 41st Sig Bn, Camp Coiner, Korea (USACC)  
Reserve MTOE 354th Ord Co, Morgantown, WV (FORSCOM)

## HEAVY UNIT WINNERS

Active MTOE 525th Ord Co, Siegelbach, Germany (USAREUR)  
Active TDA J.S. Army Fld Sta, Okinawa (INSCOM)  
Reserve MTOE 410th Evac Hosp, Topeka, KS (FORSCOM)

## HEAVY UNIT RUNNERS-UP

Active MTOE 6th Bn, 37th FA, Camp Essayons, Korea (EUSA)  
Active TDA Davison Avn Cmd, Ft Belvoir, VA (MDW)  
Reserve MTOE 298th Lt Equip Maint Co, Altoona, PA (FORSCOM)

## NG OMS WINNER

154th S&S Bn OMS, Cape May, NJ (NGB)

## NG OMS RUNNER-UP

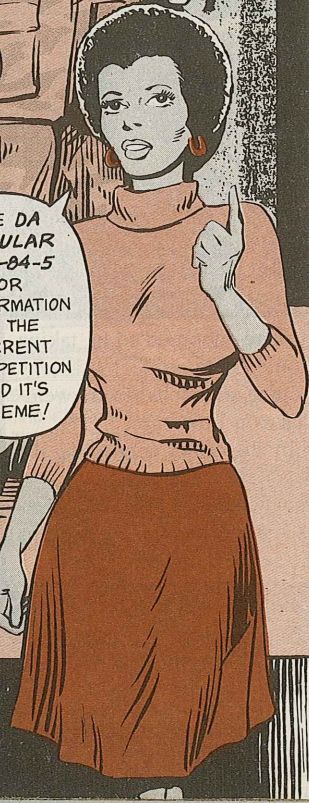
203d Engr Bn (Cbt Hv) OMS #13, Neosho, MO (NGB)

# Awards!

...AWARD FOR MAINTENANCE EXCELLENCE! THEY ARE...



SEE DA CIRCULAR 750-84-5 FOR INFORMATION ON THE CURRENT COMPETITION AND IT'S THEME!





THE  
PREVENTIVE  
MAINTENANCE  
MONTHLY

Published by the Department of the Army for the information of all soldiers assigned to combat and combat support units, and all soldiers with organizational maintenance and supply duties.  
Within limits of availability, older issues may be obtained direct from Editor, PS Magazine, c/o US Army Materiel Readiness Support Activity, Lexington, KY 40511.

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MAY 1984

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PS wants your ideas and contributions, and is glad to answer your questions. Name and address are kept in confidence. Just write to:

MSG Half-Mast  
PS Magazine  
Lexington, KY  
40511

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TACFIRE

# COMPUTING

# PM



REMEMBER, SOPHISTICATED EQUIPMENT LIKE THIS VFMD STILL NEEDS BASIC PM!

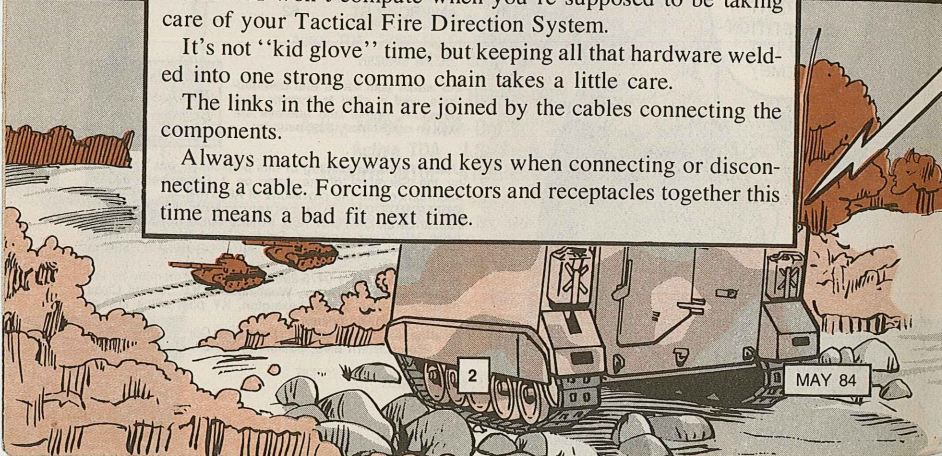
RIGHT ON, BONNIE!

Bad PM won't compute when you're supposed to be taking care of your Tactical Fire Direction System.

It's not "kid glove" time, but keeping all that hardware welded into one strong commo chain takes a little care.

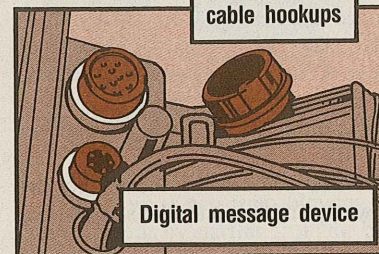
The links in the chain are joined by the cables connecting the components.

Always match keyways and keys when connecting or disconnecting a cable. Forcing connectors and receptacles together this time means a bad fit next time.



Snug is enough when hooking the cable to your Digital Message Device (DMD), for instance. Too much muscle can break the plastic receptacle from the plastic case.

Easy with cable hookups

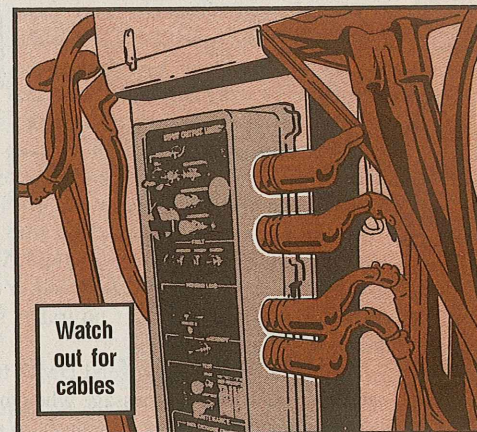


Digital message device

Binding, cutting or stepping on cables can break the chain. You either cut the outside insulation, which lets water in, or you can break wires.

Cables are everywhere inside one of the TACFIRE shelters. Bump one or drop something on it and you can break

connections or the cable itself. That means downtime.



Watch out for cables

Passing digital traffic requires good contact. To get it, watch receptacle pins. Getting tarnished? Go over them with a rubber pencil eraser.



KEEPING TACFIRE'S COMMO CHAIN TOGETHER IS THE KEY TO FAST FIRE SUPPORT RESPONSE!

PS MORE



## DMD Protection

The first link in your TACFIRE chain is the DMD. The keyboard is protected by a plastic membrane. Using sharpies like pencils—or fingernails—to punch out a message breaks the seal and lets in moisture.

The display screen's anti-glare coating helps you see even when the sun's at its brightest. You protect the coating by blowing dust and dirt off the screen. Using a rag can scratch the surface and destroy your protection.

Don't store it in the sunlight or even a hot place. Heat might warp the front and let gas (which gives you a display) escape. Then you've got a blank screen. Leaving the DMD in its canvas carrying case doubles your protection.

Running on vehicle power? Be sure you turn off your commo gear before you start the vehicle. Turn off the DMD, too.

Don't let a blank screen fool you. Your DMD could be on. Remember the 24-second delay feature? If no traffic shows up in that time, the screen goes blank to save power.

When you get ready to send DMD traffic, be sure no one else is using the radio. If you send your message when the net is busy, your message will be lost.

If you're using wire or an FM radio in good alinement, your wait after keying is less than a second. If your AN/VRC-12 series is badly alined, tho, you might have to wait up to 4 seconds. Turn that set in to your support for alinement.



## ELP Help

Link number 2 is the Electronic Line Printer (ELP). Its job is to give you a hard copy of message traffic.

Your big worry here is carbon dust. The ELP burns its message onto the paper. The dust from burning paper builds up on working parts.

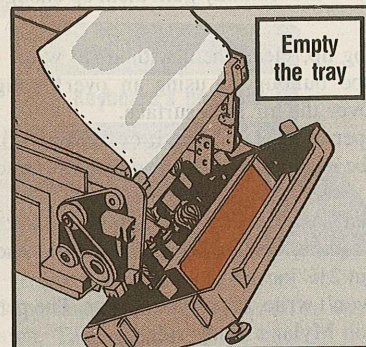
Eyeball the printer daily for dust on the helix and movable parts. If you find any in the tray, dump it. Before you do, tho, turn off the power. The ELP's high voltage can "bite."

Before you shut down your Variable Format Message Entry Device (VFMED) or Battery Display Unit

(BDU), tell anyone who might send you traffic that you'll be off-line. Tell them any time you're off, like when you're changing ELP paper.



Before dumping the ELP's tray, brush the dust from moving parts. Use the soft brush in your tool roll.



Now go back over the printer with an air hose. Keep from blowing dust into circuits by starting from the back.

TURN POWER OFF BEFORE DUMPING TRAY...

... ELP'S HIGH VOLTAGE CAN BITE!

GRRRR!



## VFMED Prescription

Easy on the muscle with this remote computer terminal. When you tighten bolts holding the keyboard in place, easy does it. Too much force strips them.

When you're punching out a message, easy on the keys. Mashing keys can break them.

Keep your display screen clean so you'll be able to see what people are sending you. Keeping the set out of the sun will help, too. It'll help prevent overheating.



Any time you connect cables, turn the power off. That prevents arcing damage.

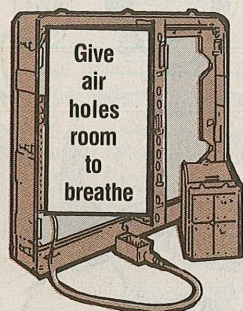
Finally, test troubleshooting lamps daily. A burned-out bulb can't tell you anything.





## Mapping Maintenance

Your Digital Plotter Map (DPM) sucks air to hold the map in place. When you put tape over the air holes, you'll eventually gum them up enough so they can't do their job.



If holes clog up, clean them with small wire. Prevent tape buildup by using an overlay big enough to cover the air hole surface.

Cut the paper to fit. Doubling it over won't do. There won't be enough clearance for the write-head pen.

Out of Mylar? Any overlay paper will substitute. Keep it 4 feet square, though, because the write-head goes to within 2½ inches of each side.

If the pen won't write, check your paper. The pen won't write on Mylar's shiny side.

## Drying Out?

Don't let the pen cry "how dry I am," either. It dries out pretty fast. If it hasn't been used in an hour or so, a little patience will get it writing. Then, when you're finished for the day, replace its plastic cover.

Once the ink is gone, toss the pen away. Get a kit of 24 pens with NSN 7010-01-112-0127.

Another part you may need doesn't have a part number. That's the write-head eye lens. Make your own, or have your training and audiovisual support center fabricate one for you. Find a piece of clear material and trace the current eye lens. Cut out the new lens and draw cross hairs on it.

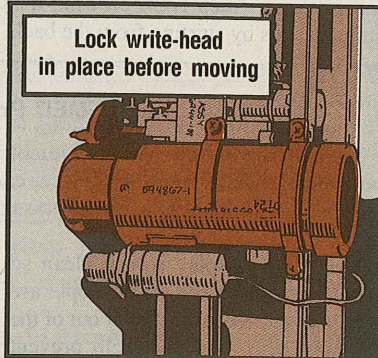
Keeping your write-head assembly healthy starts with locking it into place whenever you move and unlocking it before you use it. Then, when you're through, let it down with the hand control before you turn the power off.

It drops on its own if you don't. If it drops, it can get damaged. If you hear it dropping, you have to grab the spline to stop it. That puts dirt and oil from your hand on the spline... not to mention the possibility of damage to **you!**

Watch the DPM bridge, too. It moves "on its own." It can do you real damage if it catches you.

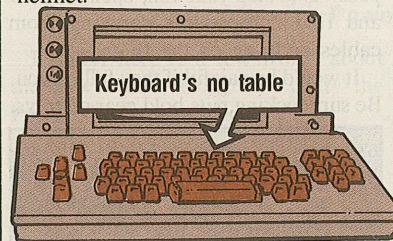
Keep the spline lightly oiled. **Lightly.** If you can see oil, it's on too heavy.

Lock write-head in place before moving



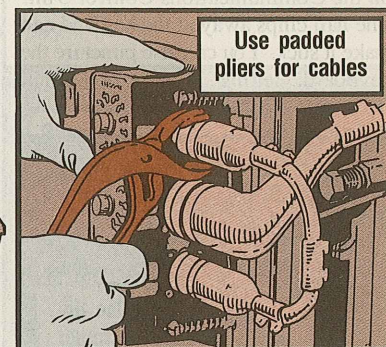
## ACC PM

The Artillery Control Console keyboard is not a table for snacks or sodas. It's not an arm rest or a hanger for your helmet.



Likewise, you don't have to be Superman to edit or type out a fire mission. Take it easy on the keys.

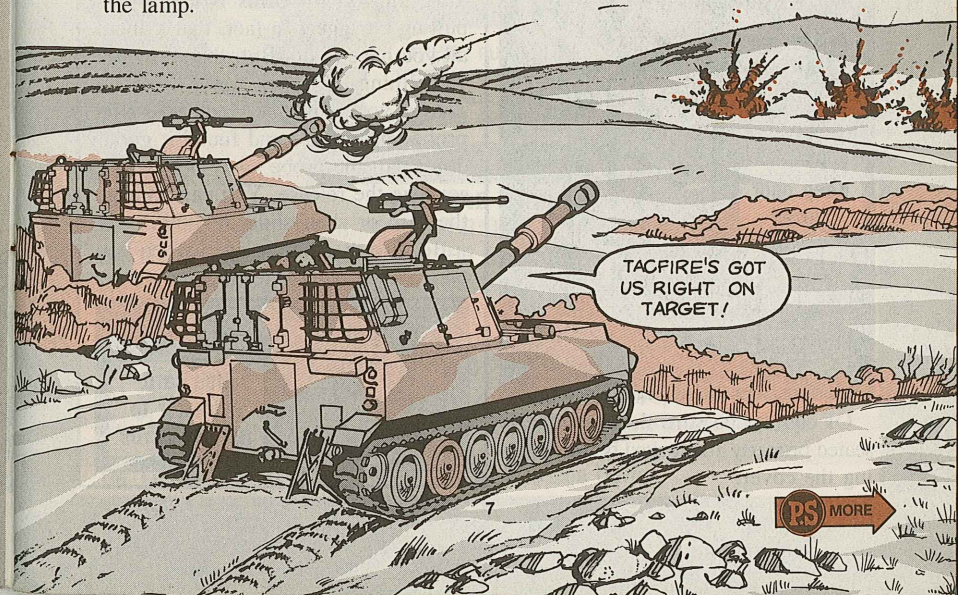
Need to connect or disconnect cables? Use the handy, padded pliers in your tool roll for the job.



Be sure you're using the right lamps for your switch panel. The ones you need, lamp number 3150, are NSN 6240-00-433-7706.

Just snug the new bulb in the socket when you replace it. Too much muscle makes it hard to remove. Quit when you meet a little resistance. It's probably seated.

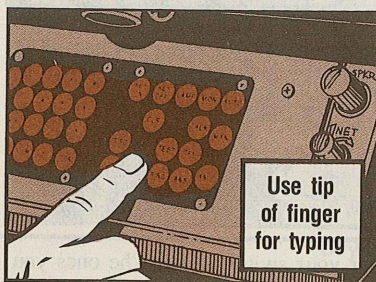
If you find a broken bulb, you might try this removal procedure: Put a drop of glue in the lens and put it back on the lamp. Let the glue dry and then remove the lamp.



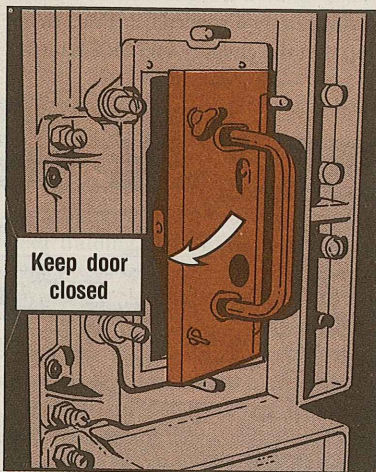
PS MORE



Use the tip of your finger, not the fingernail or other sharp objects, to type on the Communications Control Unit. The nail chips away at the key and can make it stick. You can also puncture the keyboard, letting in moisture. That results in a continuous error.



The Magnetic Tape Unit should always be left closed to keep dirt from getting into the tape well.



Of course, be sure the cartridge is seated properly and locked before latching the cover.

Secure all equipment in the racks. It would be mighty embarrassing (and expensive) to stop your van, open the door and find components dangling from cables or lying on the floor.

It would be painful if they fell on you.  
Be sure locking nuts hold gear on trays.



Any time you take gear out to work on it, pull on something sturdy. Cable elbows are not for pulling!

Testing circuit cards is as easy as pulling a trigger. In fact, that's about all you have to do. But, there are still some things to watch for.

After you've put the Module Test Set probe on the card and found it good, don't pull the probe away before you squeeze the release. You can damage the card or shelf slide, or both.

Be sure the slide is open when you take a card out for testing.



If you can't see to make your tests, maybe you need a new bulb for your S-280 shelter. Order one with NSN 6240-00-155-7965.

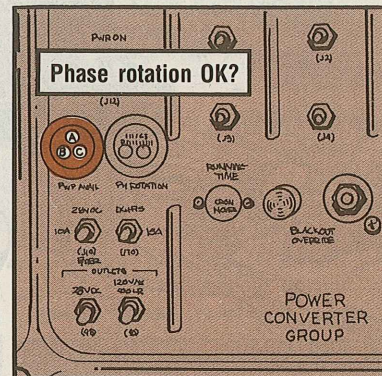
Finally, here're a few words about the power behind all this gear—the Power Converter Group.

When connecting or moving cables, watch ID bands. They'll keep you from making a wrong connection.

For instance, the cable from your Electronic Tactical Display (ETD) goes to the group's J4. A J3 connection mistake will stop power to the blower motor. This overheats your ETD.

Don't switch J7 and J8 on the group's receptacles either. That switches circuitry.

Finally, before applying power to the equipment, check your phase rotation. ABC is OK. If it's anything else, check cabling to your power source.



THESE PUBS WILL  
KEEP YOU UP-TO-DATE  
WITH ALL OF YOUR  
TACFIRE COMPONENTS!

TM 11-7440-240-10-1 thru -10 and -HR OA-8389 Processing and Display (Bn)  
 TM 11-7440-241-10-1 thru -10 and -HR OA-8390 Fire Direction Center (Div)  
 TM 11-7440-242-23-1 thru -3, and -23P AN/GSG-10(V) Fire Direction Center  
 TM 11-7440-243-13 OA-8389 Processing and Display and OA-8390 Fire Direction  
 Center, Fault Catalog  
 TM 11-7440-244-10 OA-8389 and -8390 Reference Data  
 TM 11-7440-251-10 and -HR AN/GSQ-122 Battery Data Display  
 TM 11-7440-253-10-1 thru -5 and -HR AN/GSC-21 Variable Format Message  
 Entry Device  
 TM 11-7440-281-12&P AN/PSG-2A Digital Message Device



## Idler Drain and Lube



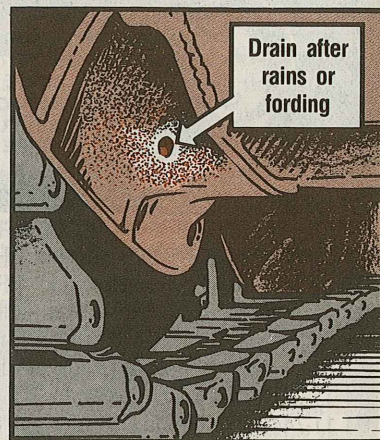
Water in the rear idler arm on your M110-series howitzer will ruin the idler bearing quick-like.

The water gets into the idler arm when it rains and the howitzer's not protected by its tarp. The water runs into the hull and then collects in the idler.

You can stop most of the water from getting into the arm by using the 12×17 tarp, NSN 8340-00-841-6456, that's part of your vehicle's BII.

However, if you don't have the tarp, drain the water after every hard rain. Also drain water after you ford the howitzer.

There's a plug on the underside of the idler arm just for draining. After you drain the water, be sure to lube the idler

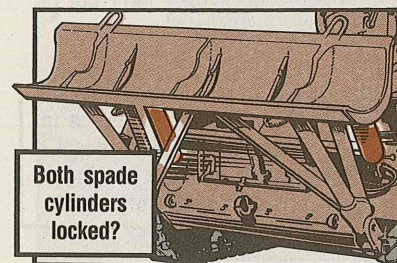


arm and hub so you get new grease on the bearings to prevent rust and eventual bearing failure.

## Spade Cylinder Lockup

It's a false savings when you lock just one of the spade cylinders before firing, or when the spade is completely raised.

You may think you're saving a minute or two during emplacement or in moving to a new firing position. But it'll cost much more than that in time and money to repair the damage.

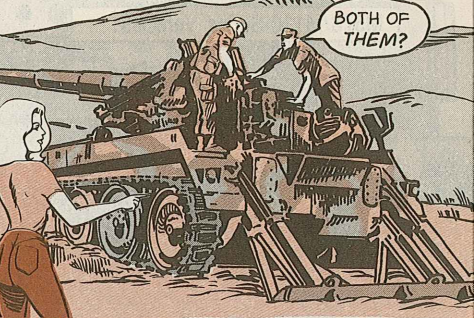


The spade cylinder doing all the work can rupture. The cylinder eye can even break off if one detent handle is in LOCK and the other is in UNLOCK.

When you have the spade completely raised, or before you fire, make sure both handles are in the LOCK position. And both of them should be in UNLOCK when you raise or lower the spade.

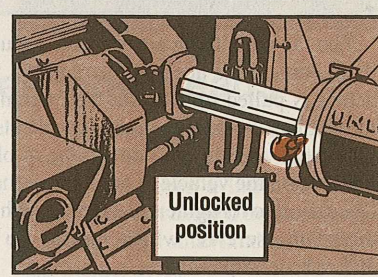
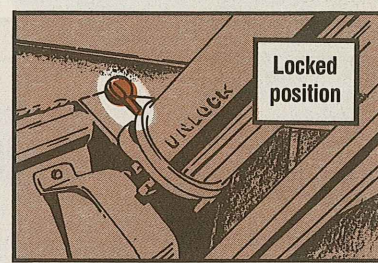
So how do you know whether the handles are in the right position? Check the stenciled LOCK and UNLOCK markings on the cylinders.

If the ones on your howitzer have



been painted over or are worn off, get your organizational maintenance to stencil 'em back on with ½-in letters.

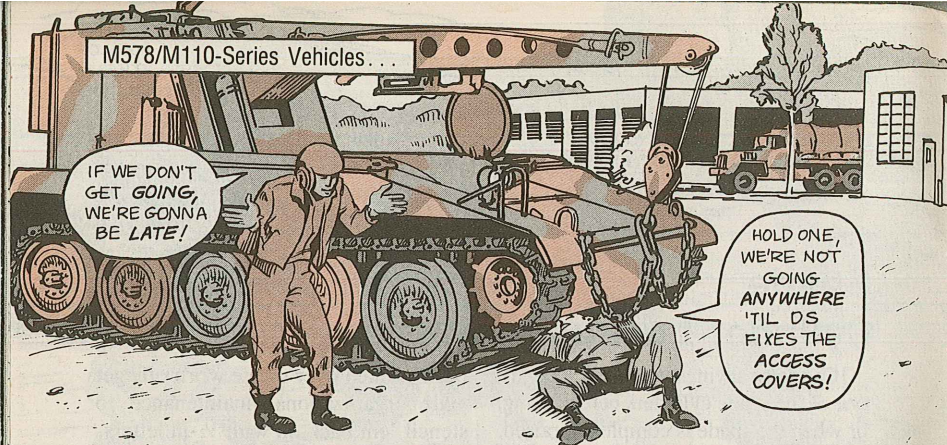
The UNLOCK position is with the handle knob turned as far outboard as it will go. LOCK is 90° from UNLOCK with the handle upright and pressed against its inboard stop.



All of this effort is worthless, tho, if you don't take a couple of extra minutes to make sure the spade cylinders are locked or unlocked like they're supposed to be.



## M578/M110-Series Vehicles...



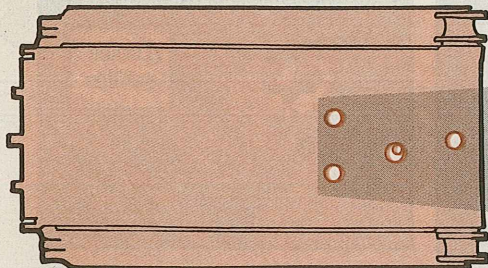
IF WE DON'T  
GET GOING,  
WE'RE GONNA  
BE LATE!

HOLD ONE,  
WE'RE NOT  
GOING  
ANYWHERE  
'TIL DS  
FIXES THE  
ACCESS  
COVERS!

## If the Engine Goes, It's Too Late

So what if one or more of the hull access covers are missing on your vehicle. Nothing's going to happen any time soon, right?

Wrong! An overheated engine can seize up real quick!



These 5 covers must be in place and tightened down if your vehicle's cooling system is to work right!

The fan pulls fresh air over and around the engine and radiators to help keep them cool. If the access covers aren't in place and sealed, dirt, dust and other debris is pulled up thru the hull openings. It clogs the radiators and sticks to the engine. Soon the engine overheats.

So why wouldn't the covers be in place all the time? The hull is pretty thin underneath the vehicle. There aren't many threads in the cover mounting holes. It's easy to overtighten the screws, which strips the threads. It's easy to cross-thread the screws, which messes up the hull threads and makes mounting difficult or impossible.

Either way, the covers won't seal right or won't stay on at all. And support has to fix the damage.

The solution to the problem? Make sure the threads on the screws and in the hull are clean. Don't cross-thread the screws, and go easy on the muscle. Use your -20 TM's torque value guide to find the right torque **before** you tighten 'em.

## M110-Series Howitzers...

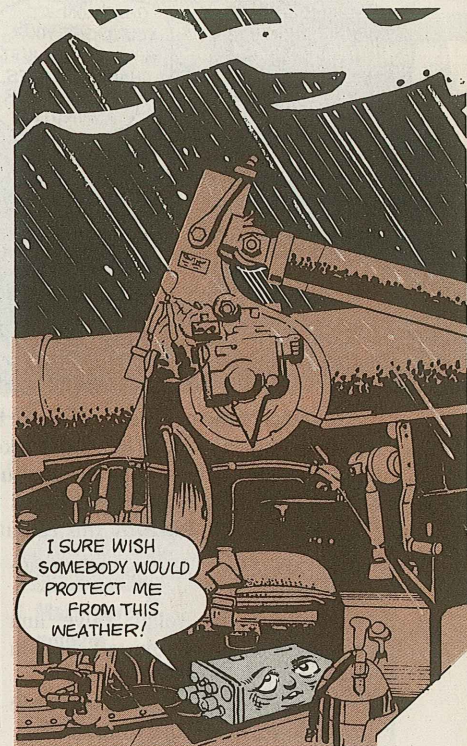
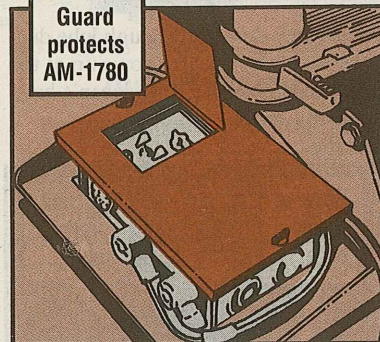
## AM-1780 Protection

Send in the guard when you want to protect your M110-series howitzer's audio frequency amplifier.

Foul weather or careless feet can do it in without the guard assembly called for in the installation harness. If yours is missing, get another with NSN 5830-00-179-7736. SB 11-131 is your OK.

Careful when installing it, tho. Be sure the access door is over the power switch. Otherwise you'll have to remove the guard to get at the switch.

Guard  
protects  
AM-1780



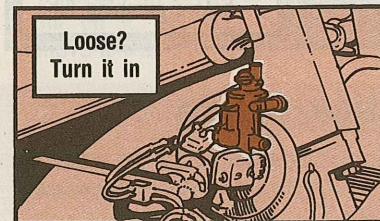
I SURE WISH  
SOMEBODY WOULD  
PROTECT ME  
FROM THIS  
WEATHER!

## M110A2 Howitzers...

## No Loose Telescope Heads

All gunners, check your M115 panoramic telescope head assembly for looseness.

Loose?  
Turn it in



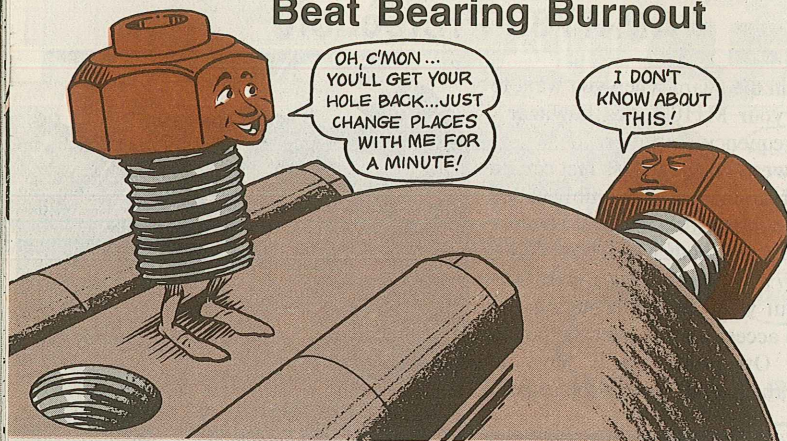
Grasp the assembly and slowly and gently try to turn it from side to side. If it moves, even a little bit, it's too loose. This can cause a deflection error, resulting in a round landing outside of the impact area.

Turn the assembly in for repair. Don't try and fix it yourself.

When you get the pantel back, check it again from time to time. It needs to be tight to ensure range safety.



## Beat Bearing Burnout



Roadwheel bearings are burning out because they don't get enough lube during the pumping cycle. The grease takes the easy way out. It shows up at the relief valve, so you stop pumping. But the outside bearing still doesn't have enough lube on it, so it runs hot and eventually burns up.

You can beat burnout by this reroute method:

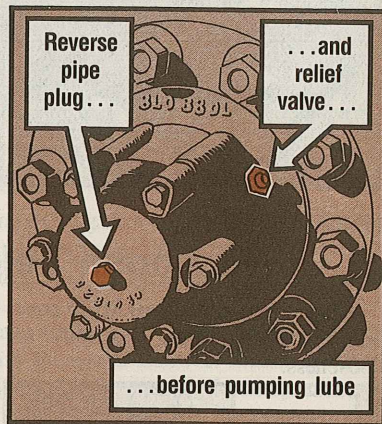
✓ Remove the pipe plug in the roadwheel hubcap.

✓ Remove the relief valve and adapter bushing and reinstall them in the hubcap.

✓ Put the pipe plug in the hole where the relief valve was and pump in lube.

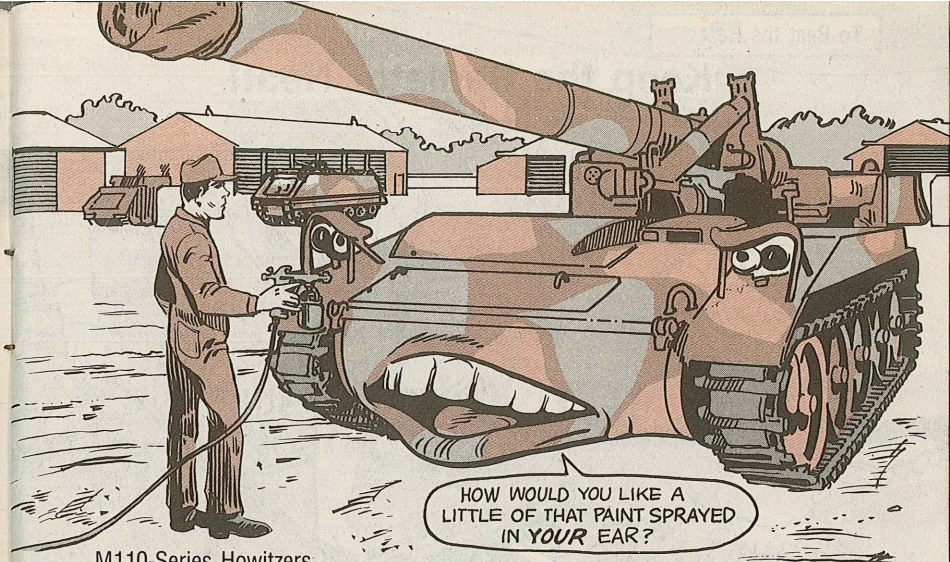
When the lube comes out the relief valve in the hubcap, you'll be sure there's plenty of grease on both bearings.

✓ Finally, move the pipe plug and relief valve back to their original places. That will protect the fitting from damage.



## 8V71T Dipstick Guide

NSN 4710-01-021-6014 gets you the dipstick guide for the 8V71T engine used in M578 recovery vehicles, M110-series howitzers and M109-series howitzers. The NSN is not listed in the vehicle's -20P's.



M110-Series Howitzers...

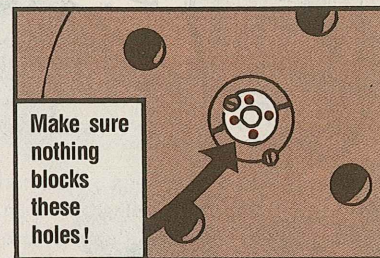
## No Paint on the Check Valve

The check valve on your M110-series howitzers must be free of paint (or anything else) to do its job.

During counter-recoil, some oil or moisture or both is forced out the 4 little holes in the center of the valve. That's what is supposed to happen. It prevents vacuum buildup in the counter-recoil cylinder.

A vacuum in the cylinder will pull oil past the counter-recoil rod piston. So-o-o-o, if there's paint or something else blocking the 4 holes, you're going to have recoil problems soon.

Look at your check valve. If there's paint on it, get your mechanic to remove it with a wire brush.



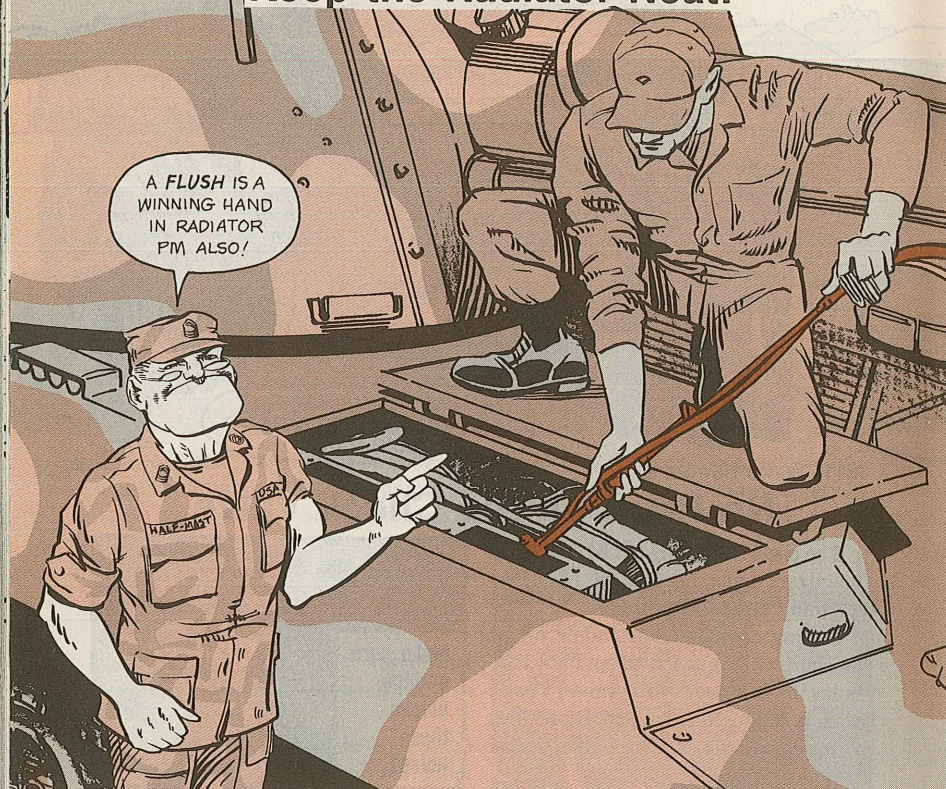
No paint? Then check the valve's operation. First, be sure the travel lock is secured before retracting the tube. Put your hand in front of the 4 little holes while another crewman retracts the gun tube and returns it to the in-battery position. If no air comes out, tell your artillery mech. He'll fix it.

## M110/M578 V-Belt NSN

NSN 3030-01-049-3068 gets you the wide powerband belt with 4 vees. Use it to replace the 4 separate fan belts on your howitzer or recovery vehicle cooling system.



## Keep the Radiator Neat!



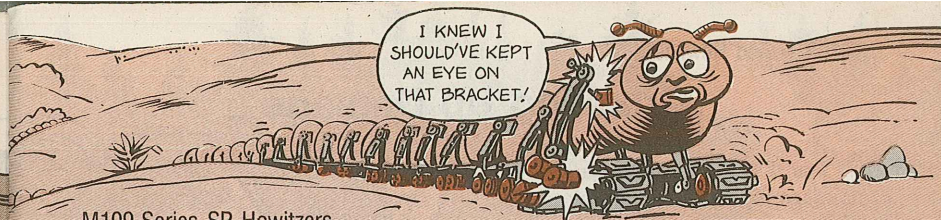
The usual recipe for an overheated engine in an M109-series howitzer reads like this:

- ★ Take one radiator, low on coolant.
- ★ Add grease spattered on the cooling fins from the fan tower grease fitting.
- ★ Blend in grass, leaves, trash and dirt, which stick to the grease and clog up the fins.
- ★ Operate in a normal manner in hot sun and soon you'll have it—an overheated engine.

Of course, you don't want an overheated engine, right? Make sure you don't get one by keeping the radiator clean.

Fill it up with coolant before operation and remove all the trash and debris. Clean it real good with radiator cleaning tool, NSN 4910-00-494-8257.

Details on cleaning the radiator with the tool are found on Pages 6-34 and 6-35 of TM 9-2350-303-20-1.



M109-Series SP Howitzers...

## Watch That Shock Absorber Mount

Mechs, keep an eye on the front shock absorber mounting brackets on your M109-series howitzers.

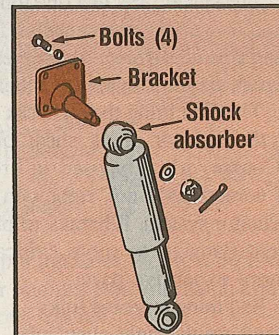
The 4 bolts that hold the bracket to the hull can loosen up and wallow out the holes.

You can see the damage as shiny areas around the bracket or as rust in that area.

If you suspect you've got loose bolts, install new bolts and washers. Torque the bolts to 90 lb-ft.

Then, whenever the power-pack is out, torque them again.

Could save you a bunch of repairs if the shock mounting brackets break loose.



M198 Towed Howitzers...

## Getting Grease to the Axle

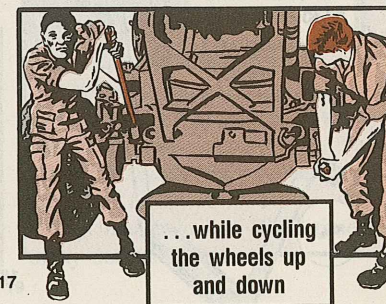
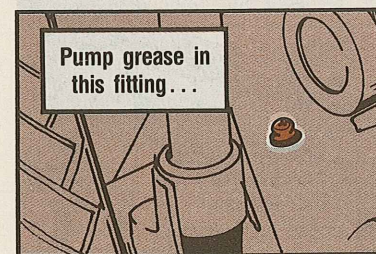
Hear grinding or popping noises when you pump the wheels up and down on your M198?

Not able to release the wheel locks after you've applied hydraulic pressure?

Maybe there's not enough lube getting to the axle and axle bushings.

To get the grease to the parts that need it, here's what you need to do:

- Place the howitzer on its firing platform and raise the wheels to the "full up" position.
- While you pump GPG (general purpose aircraft grease) into the fittings on each axle, have someone else cycle the wheels down and up. Make sure you do this for both sides of the axle.





## Cranking Up Damage

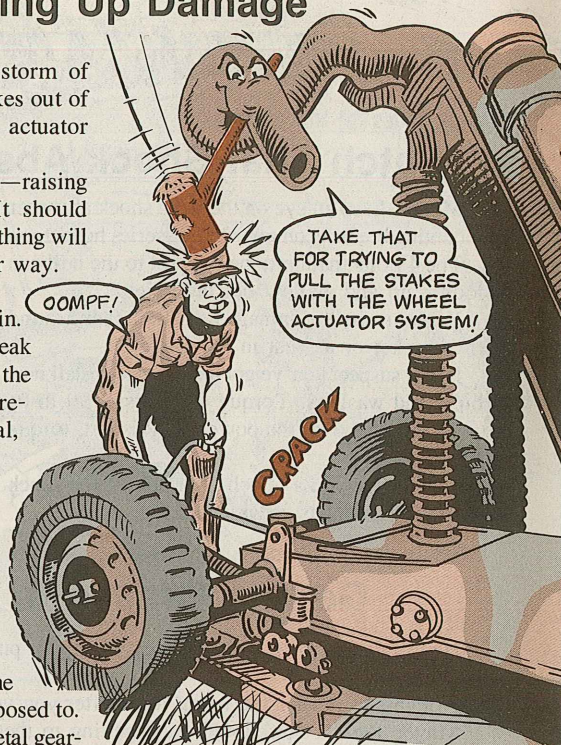
You'll really crank up a storm of damage if you try to pull stakes out of the ground with the wheel actuator system.

The system has just one job—raising and lowering the wheels. It should come as no surprise that something will break if you use it any other way.

The first thing that'll break is the actuator crank shear pin. 'Course, it's supposed to break if something's not right with the actuator system. It breaks to prevent damage to more critical, more expensive parts.

Sad thing is, some folks don't use the right shear pin, NSN 5315-00-999-1573. They use just any old pin or bolt that'll fit.

Then, when they go to crank up the wheels and try to remove the stakes, the pin doesn't break like it's supposed to. What does break is the light metal gearing inside the actuator itself. That's big damage.

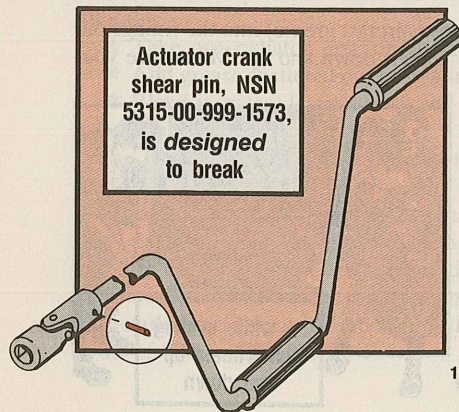


Make sure you've got the right shear pin in the hand crank. And, most of all, remove stakes according to the -10 TM. Use the carriage staff and the sledge hammer from your weapons' BIL.

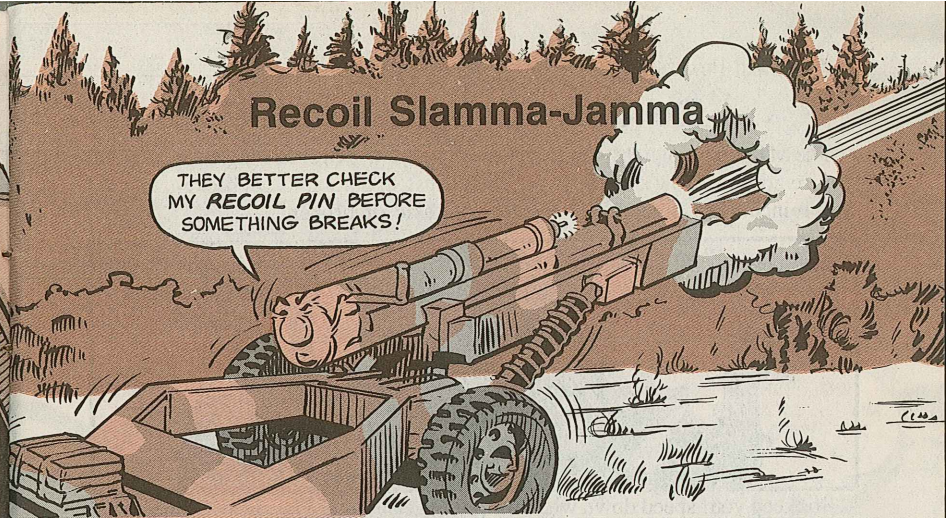


18

MAY 84



## Recoil Slamma-Jamma



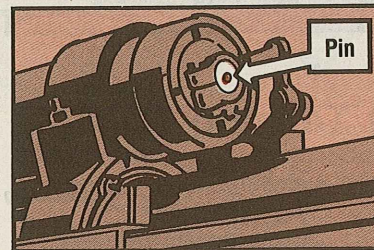
Crews, if your M102 slams into battery when you fire, stop firing and check the recoil pin for the right hydraulic oil level.

If the pin extends more than 3/16 inch on the the M37 recoil mechanism, add

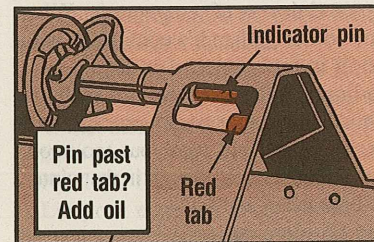
If the pin indicates the right oil level on either one, let your mechanic know about your trouble.

He may need to purge the recoil mechanism of air and check for the right nitrogen pressure inside.

You also need to check to make sure there's no grease or oil on the recoil mechanism rails. If there is, scrub it off with clean rags.



more oil. If the pin extends past the red tab on the indicator pin on the M37A1 recoil mechanism, add more oil.



MAY 84



Whatever you do, don't fire the howitzer until it's repaired. Continued slamming into battery may cause serious damage to the howitzer. It could cause the cradle to crack.

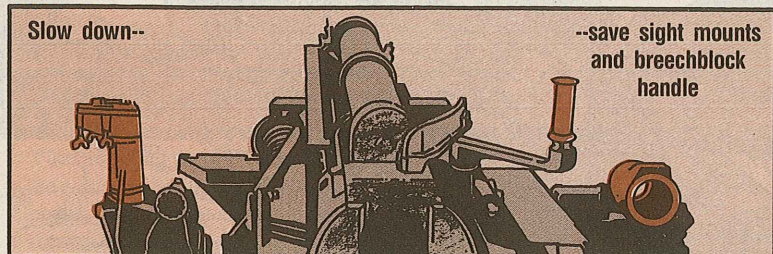
That means lots of NMC time and many dollars spent.

19



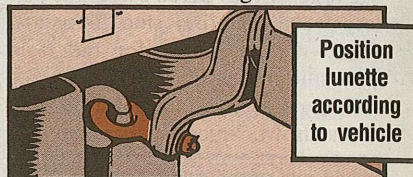
## Go Slow Cross-Country

The M102 is very light—and top-heavy. It will flip over in rough terrain when you're going as slow as 5 MPH. When it flips, sight mounts get broken, twisted and ruined. The breechblock handle gets bent or broken.



So, keep your speed down when the going gets rough. Stay away from sidehill routes. Go uphill or downhill when possible. Avoid ditches and gullies—which means use a ground guide at night when you're traveling in blackout conditions.

Also, make sure the lunette is in the right position for the prime mover being used. Check out TM 9-1015-234-10 for the info.



## Watch That Tension



Metal expands and contracts with the ups and downs of temperature. When it's hot, track parts expand and the track runs looser. When it's cold, track parts contract and track runs tighter, at least until it gets stretched in use.

If you tighten your track past its tension limits in the summer, it'll really be tight in the winter. That's just a law of nature. That tight track can cause hull damage (bent roadarms, bent roller arms, etc.) and will wear out too soon.

You also need to remember that if you don't tighten track enough in the winter, it'll be so loose in the summer that it'll come off real easy.

The secret is to tighten to the limit, and no more or less.

## Turbos and Heat



Heat is the biggest cause of damage to moving parts. And few parts move faster than the blades of a turbocharger. Oil takes care of the heat problem, but only as long as the engine is running. That's why turbocharged engines in tanks, self-propelled howitzers, personnel carriers or other combat vehicles need to idle before shutdown.

At full speed, the turbo on your vehicle can spin at up to 100,000 RPM. If you shutdown quickly, that turbo must spin to a stop, which can take up to 90 seconds or more, without any oil being forced into it.

Temperatures inside the turbo can reach 1,100°F. That means damage to bearings and smooth surfaces.

At idle, the turbo spins about 10,000-15,000 RPM. Temperatures inside are about 300°F. Shutdown then means the turbo spins without oil for a short enough time that there is little heat damage. It doesn't affect the "lifespan" of the turbo.

So-o-o-o, the next time you're tempted to shut down and run to make an early date, remember that hard-working, overheated turbo.

Let your engine idle for about 5 minutes before shutdown. That way, it'll be ready the next time you crank up to go.



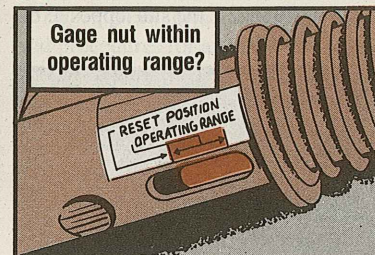
PROWLING  
AROUND...  
LOOKING FOR  
TROUBLE?...

... THAT'S  
THE NAME  
OF THE PM  
GAME!

# Chaparral PM Prowl

Check the gage nut. It should be within operating range of the sleeve gage marker.

Gage nut within  
operating range?



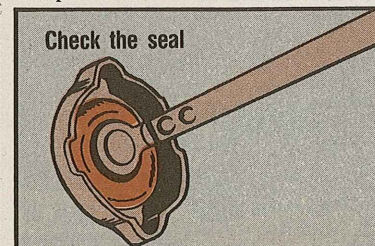
Be extra careful when checking generator drive belt tension. Do not overtighten belts. That will bind the bearing...which builds heat and reduces bearing, seal and generator life.

## MPU Leak

When you check the oil level in your gasoline engine MPU, take a look at the dipstick seal.

If the seal is missing or damaged, get it replaced. Otherwise, oil will be forced up past it and leak into the compartment.

Check the seal



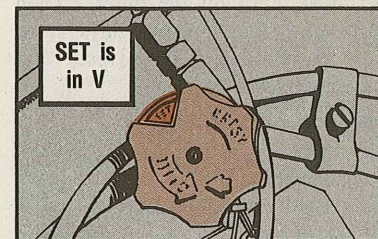
## Fire Extinguishers

Crewmen who install fixed fire extinguishers behind the M730 driver's seat or in the MPU compartment should think knobs.

If a control knob's not set right, your supervisor or an inspector will put your whole Chaparral system down until he's sure your extinguishers are OK.

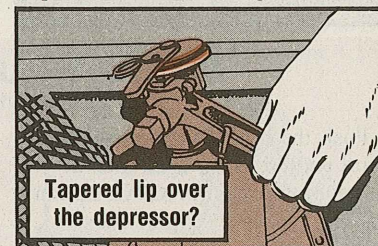
Some extinguishers have a SET position, which shows on the V of the knob.

SET is  
in V



Some knobs have a tapered lip. The thinnest part of the lip is over the depressor when the extinguisher is full.

Tapered lip over  
the depressor?

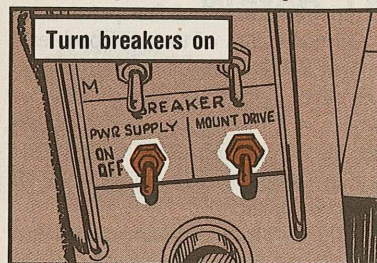


Set them right. If they're out of position it could mean the seal is gone or the extinguisher has been used.

Think "ON" with the power supply and mount drive circuit breakers before you apply power in the gunner's compartment of your Chaparral missile system.

If you forget to flip those breakers on, a surge or overload can damage the mount circuitry. The breakers help prevent it. Flip them on. Turn power on.

Turn breakers on



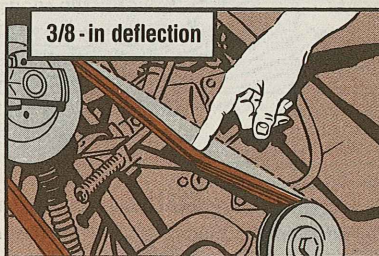
## Belt Tension

Loose belts and worn bearings on your M730 carrier's generator reduce belt life and electrical output.

When you do your PMCS check on generator belt tension, you should have

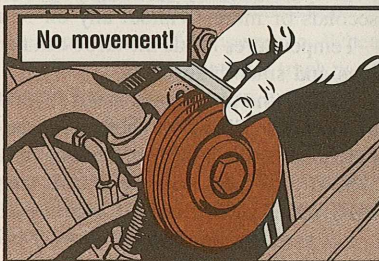
about 3/8-in deflection midway between the pulleys. Move the pulleys

3/8-in deflection

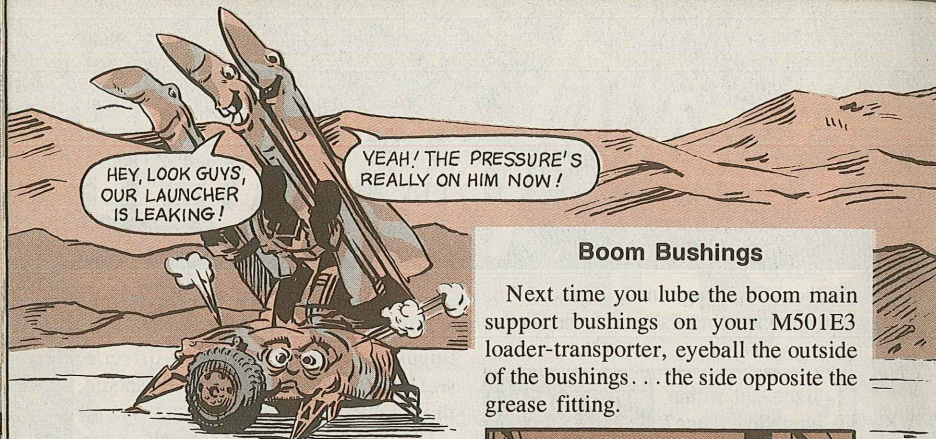


from side to side to be sure the bearings aren't worn. There should be no noticeable movement. Mechanics should check and adjust drive belts by the TM.

No movement!



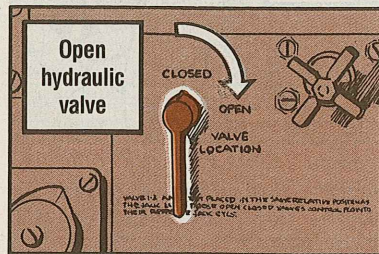




## HAWK Talk

After shutdown, remember to dump the pressure on your HAWK system's M91E2 launcher hydraulic lines.

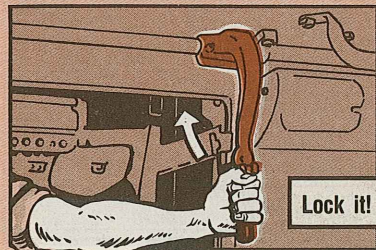
If you don't hit the dump switch (hydraulic valve), pressure stays on the lines, fittings and check valves... and can cause leaks.



## M163A1 Vulcan Lock

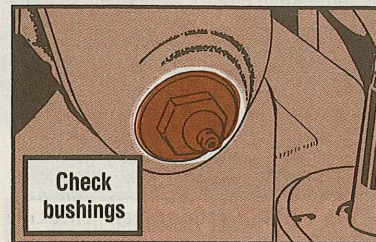
Push the ramp locking handle forward and up (locked) as soon as you raise or lower your M163A1 Vulcan's ramp.

If you leave the locking handle down... and turn the turret, the sight current generator (SCG) will bang into the handle. That spells damage.



## Boom Bushings

Next time you lube the boom main support bushings on your M501E3 loader-transporter, eyeball the outside of the bushings... the side opposite the grease fitting.



Look for unusual wear. The check's not in your crew PMCS, but if you spot it and tell your mechanic, the bushing can be replaced before it fails.

Due to location of the grease fitting, the inner side gets ample lube, but the outside gets almost none. That causes extra wear.

Modified L-T's have 2 fittings on the upper and lower bushings.

## M2 MG Gages & Locks

\*TB 43-0196

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

### INSPECTION AND CERTIFICATION OF GAGES — SMALL ARMS

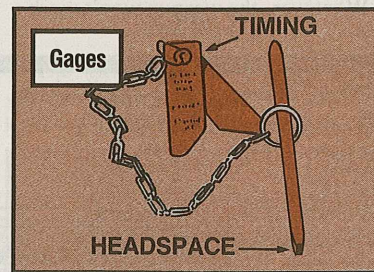
Headquarters, Department of the Army, Washington, D.C.  
29 July 1981



TB 43-0196 lays out requirements and procedures for annual inspection of timing and headspace gages used on M2 machine guns.

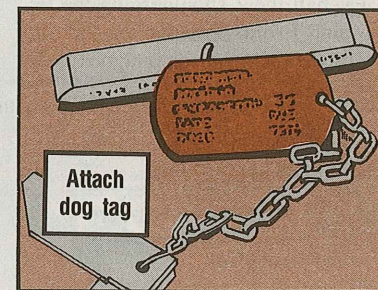
As a backup, armorers can keep the blue copies of DA Form 2407 on unit gages checked out by DS.

If you want to be sure your own gages get back to you, latch onto some blank dog tags and stamp them with your unit ID. Attach the dog tag to the



So how do you tell when calibration is due?

Crews can check with their armorer or supply sergeant, who most commonly file the DA Forms 3023 which record Direct Support's inspection dates. Armorers keep the DA Form 3023 on their own gages.



gage. You NCO's, range instructors or anyone else with gages would do well to turn them in to your armorers so DS can use a micrometer on them.

## Breech Lock

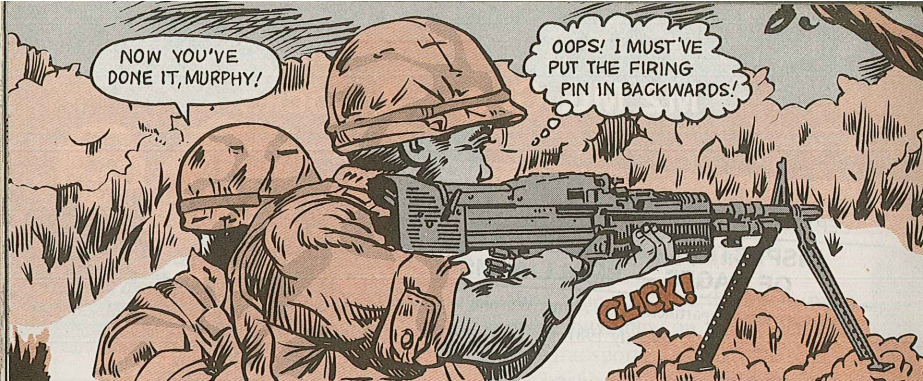
Take a second look at the breech lock in the barrel extension before you slip its pin into place.

The beveled edges should face the front of the barrel extension (where the barrel screws in).

If you reverse the breech lock, the gun will get one round off... and stop.

Beveled edge faces front



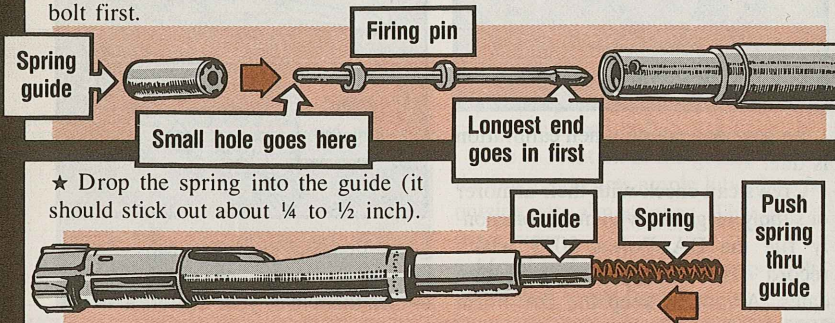


# Murphy and the M60 Machine Gun

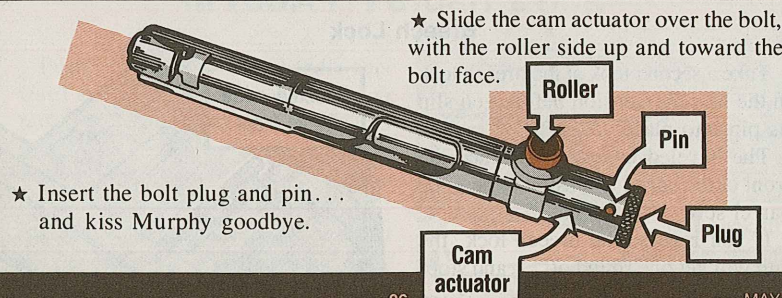
Murphy's Law states, more or less, that if anything can be put in backwards, somebody will do it that way.

A lot of somebodies are pulling a lot of Murphies on the M60, mostly on the firing pin, spring, guide and cam actuator. Whatever, the weapon won't work. You can beat the odds like so:

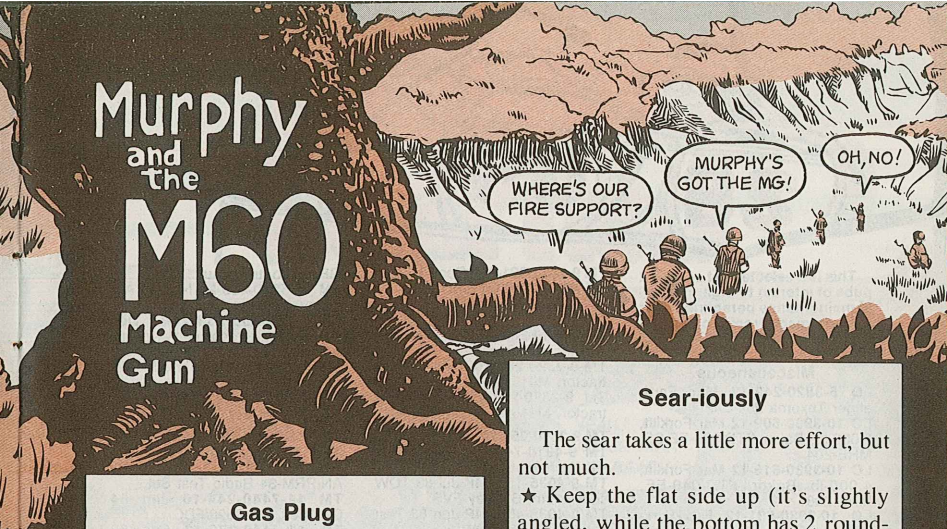
- ★ Eyeball the 2 shoulders on the firing pin. From shoulder to tip, the longest end of the firing pin goes in the bolt first.
- ★ Then, slip the spring guide, small hole first, onto the short end of the firing pin.



- ★ Drop the spring into the guide (it should stick out about 1/4 to 1/2 inch).



- ★ Insert the bolt plug and pin... and kiss Murphy goodbye.



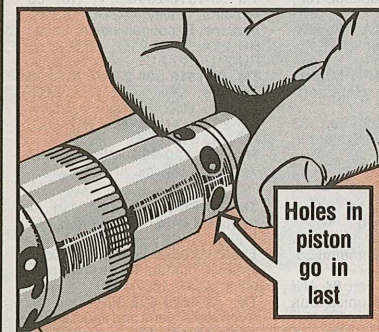
## Sear-iously

The sear takes a little more effort, but not much.

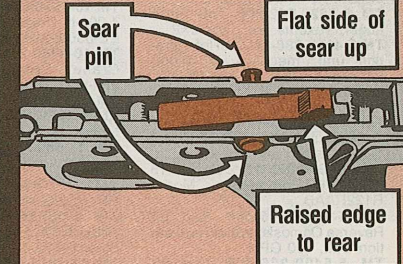
- ★ Keep the flat side up (it's slightly angled, while the bottom has 2 rounded sections).
- ★ Keep the raised edge to the rear of the trigger mechanism.
- ★ Insert the sear pin.

## Gas Plug

- ★ The gas piston is easy to keep straight. The end with the gas ports—holes—and the closed end should be to



the rear. (The gas ports in the cylinder and piston should be on the same end.)



If you assemble any of those parts backwards, the weapon won't work. Take time to do it right. If you've got questions, check your TM.

## Small Arms Cleaning

Small arms must be cleaned after firing... 1 time. The need to clean weapons 3 days in a row after firing went out with improved powder, primers and cleaners. TM's were revised to 1-time-after-firing. The only remaining TM with the 3-day cleaning bit is 9-1005-249-10 (Apr 77). An upcoming revision will eliminate it. TB 43-0001-36-2 (Jul 78) also eliminated the 3-day cleaning ordeal.



BS UP

This is a selected list of recent pubs of interest to organizational maintenance personnel. This list was made from a computer printout provided by The Adjutant General.

#### Miscellaneous

LO 5-3820-242-12 Mar Earth auger Texoma 254-8X2  
LO 10-3930-609-12 Mar Forklift, 2,000-lb, Baker FTD-020-EE-SS, MHE-204  
LO 10-3930-615-12 Mar Forklift, 4,000-lb Baker FTD-040-EE, MHE-208  
LO 10-3930-631-12 Feb Forklift, 4,000-lb Allis-Chalmers ACE40A33144, ACE40AEE180, MHE-22

#### Technical Manuals

TM 3-6680-316-10 Nov 83 Tester, gas-particulate filter unit M39  
TM 5-2805-213-24P Feb 84 14 HP Mil Std A042 Gas Engine  
TM 5-3820-242-20P Feb Earth auger, Texoma, Inc., 254-8X2  
TM 5-4110-238-14 Jan Refrigeration unit, mechanical, 10,000 BTU/HR, A.R.E. Model RQMD-K/I-10, and A.R.E. Model REMD-K/I-10  
TM 5-4310-372-14 Sep 83 Air Compressor, 15 CFM, Model C-20X-80/6E  
TM 5-4310-375-14 Dec 83 15 CFM Air Compressor, Model R122RAAB  
TM 5-4610-215-24P Sep 83 Reverse Osmosis, Water Purification Unit, 600 GPH  
TM 5-5420-226-20P Aug 83 M48A5 AVLB Launcher M48A5  
TM 5-6115-545-24P Dec 83 MEP006A, MEP105A, MEP115A, MEP006AWF, MEP006AWE, MEP006ALM, and MEP006AWM Generator Sets  
TM 5-6115-603-24P Oct 60-KW gas turbine generators  
TM 9-243 Dec 83 Use and Care of Hand Tools and Measuring Tools  
TM 9-1265-373-10-1 Dec 83 MILES M82 on M1 tank  
TM 9-1430-600-24P Oct 83 AN/MSQ-104, Patriot

TM 9-1430-601-24P Dec 83 Radar set AN/MPO-53, Patriot  
TM 9-2320-283-20-1 Dec Truck tractor, M915A1  
TM 9-2320-283-20-2 Dec 83 Truck Tractor, M915A1  
TM 9-2320-283-20-3 Dec Truck tractor, M915A1  
TM 9-2320-283-20P Jan Truck tractor, M915A1

TM 9-2350-253-20P-1 Feb M60A3  
TM 9-4910-749-10 Nov 83 Test set, tachometer dwell  
TM 9-4935-454-24P Jul 83 TOW subsystem, Bradley FVS  
TM 9-4935-455-24P Jun 83 Test set AN/TAM-5, TOW 2  
TM 9-4935-603-12 Dec 83 Test set AN/TSM-165, Patriot  
TM 9-6920-485-20P Mar 84 Lance training equipment  
TM 10-3930-237-20P Mar Forklift, 2,000-lb Clark 20B-1632032-100, MHE-192  
TM 10-3930-625-20P Apr Forklift, 4,000-lb Drexel Dynamics FL-40-EE-6550, MHE-218  
TM 10-3950-264-14&P-1 May 83 Crane, Container Handling, 250-ton  
TM 11-2300-467-14-2 Sep 83 AN/BYK-29 Computer System in M561  
TM 11-5805-256-13 Feb TA-43 telephone set

TM 11-5805-486-14 Feb SB-3259/G switchboard  
TM 11-5815-602-10 Sep 83 AN/UGC-74A(V)3, Communications Terminal  
TM 11-5815-602-24 Jan 84 AN/UGC-74A(V)3 Communications Terminal  
TM 11-5820-401-20-1 Jan 84 Organizational Maintenance for AN/VRC-12-series Radio Sets, w/o Intercom Set  
TM 11-5820-401-20-2 Jan 84 AN/VRC-12-series, Radio Sets w/Intercom Set  
TM 11-5820-401-20P Jan 84 AN/VRC-12-series Radio Sets  
TM 11-5820-489-10 Nov AN/ GRA-6 control group  
TM 11-5820-489-20 Nov AN/

GRA-6 control group  
TM 11-5820-489-20 Nov 83 AN/ GRA-6, Control Group  
TM 11-5855-263-23P Dec AN/AVS-6 aviator's night vision imaging system  
TM 11-5985-262-14 Jan AS-1729 antenna  
TM 11-5985-262-15 Jan 84 AS-1729 Antenna

TM 11-5985-262-24P Jan 84 AS-1729, Antenna  
TM 11-6625-3015-14 Oct 83 AN/PM-34 Radio Test Set  
TM 11-7440-244-10 Jan 84 OA-8389, OA-8390/FDC  
TM 11-7440-279-13 Sep 83 Maintenance Shop and V-452 Storage Facility  
TM 11-7440-283-12-1-1 Apr OL-200 cannon battery computer system computer group  
TM 55-1510-209-23P-1 Nov 83 Airplane, Utility U-21A, U-21G: Airplane, Reconnaissance, Utility, RU-21A, RU-21B, RU-21C, RU-21D, RU-21H  
TM 55-1510-209-23P-2 Nov 83 Airplane, Utility, U-21A, U-21G: Airplane, Reconnaissance, Utility, RU-21A, RU-21B, RU-21C, RU-21D, RU-21H  
TM 55-1520-239-23P Nov 83 Helicopter, Attack, AH-1S (Modernized Cobra)

TM 55-1730-227-13&P Jan 84 Standard Aircraft Maintenance Trailer  
TM 55-1905-219-14-6 Mar Maintenance manual for landing craft utility (LCU) 1667-1670  
TM 55-4920-428-30P Dec 83 AVIM repair parts and special tools list for integrated lower controls actuator branch test set  
TM 55-4920-429-13 Nov 83 Test Set, Line Advanced Flight Control System  
TM 55-4920-429-23P Dec 83 Advanced Flight Control System (AFCS) Line Test Set  
TM 55-4920-431-23P Dec 83 Auxiliary Power Unit Electronic Sequence Unit Multi-Purpose Test Set

#### AUDIO-VISUAL STUFF

Available at battalion or post Learning Center

#### TEC Lessons

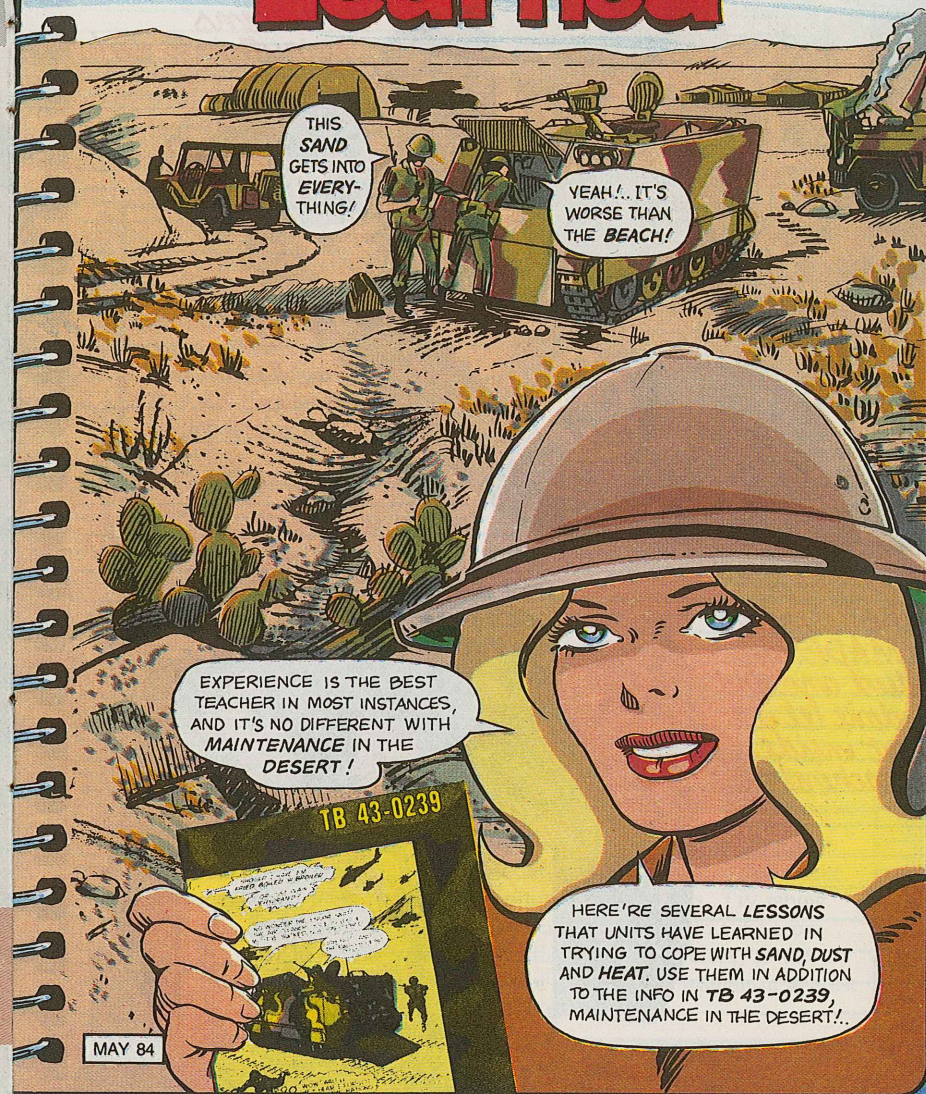
020-171-5801-A Install/remove the AN/VVS-2 night viewer  
600-551-8821-F Using the power-dyne torque wrench

#### TV Tapes

TVT 9-63 M3 borescope: Assembly and Use  
TVT 9-66 Hydraulic brakes: Principles of operation, Part I, (drum

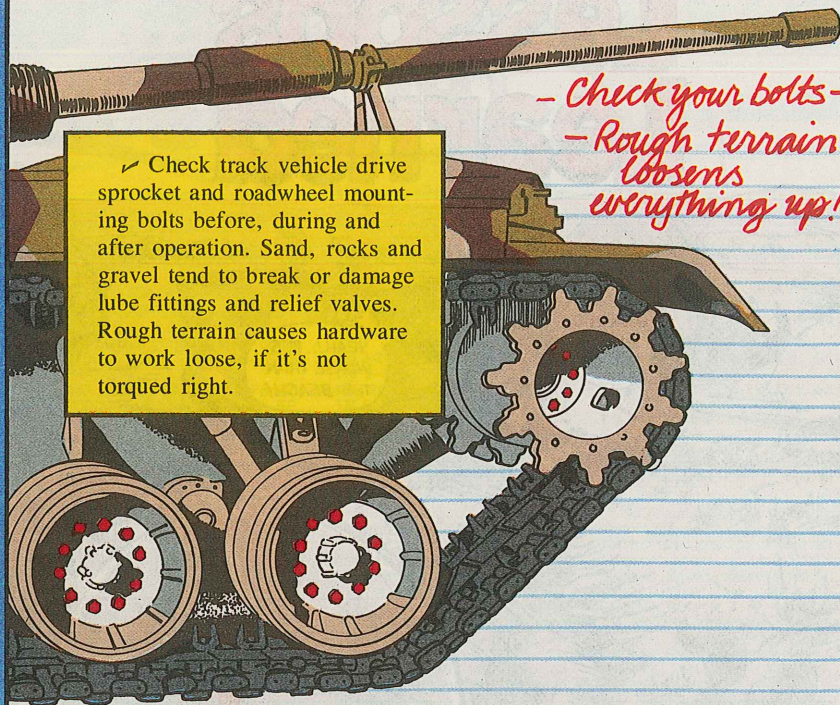
brakes)  
TVT 9-67 Hydraulic brakes: Principles of operation, Part II, (disc brakes)

# Lessons Learned



MAY 84





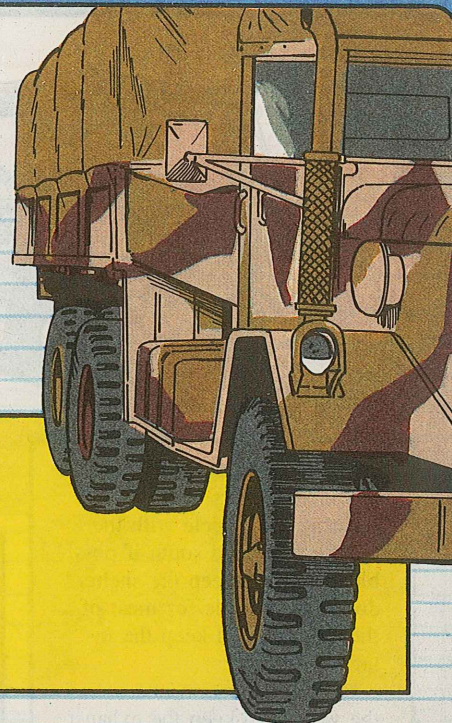
*- Check your bolts -  
- Rough terrain  
loosens  
everything up!*

✓ Check track vehicle drive sprocket and roadwheel mounting bolts before, during and after operation. Sand, rocks and gravel tend to break or damage lube fittings and relief valves. Rough terrain causes hardware to work loose, if it's not torqued right.

*The desert is  
MADE of  
dust and dirt -  
don't let it  
get inside  
machinery!*



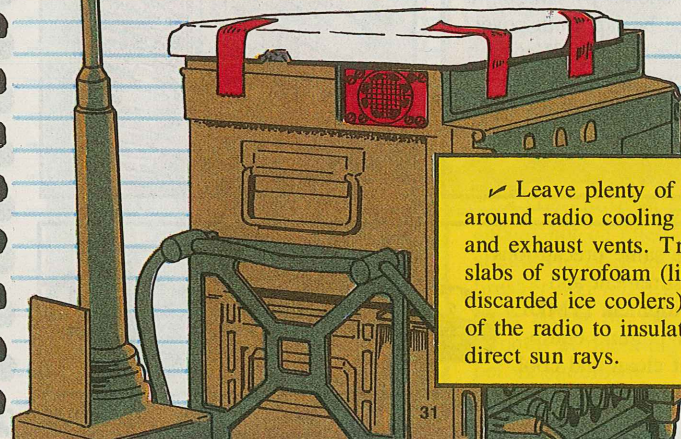
✓ Before inspecting air induction systems, wipe all hoses and canisters free of dust. Make sure you have plenty of wide tape available to help seal hoses if breaks occur.



*- Abrasive rocks and  
sand wear holes  
in tires real quick!*

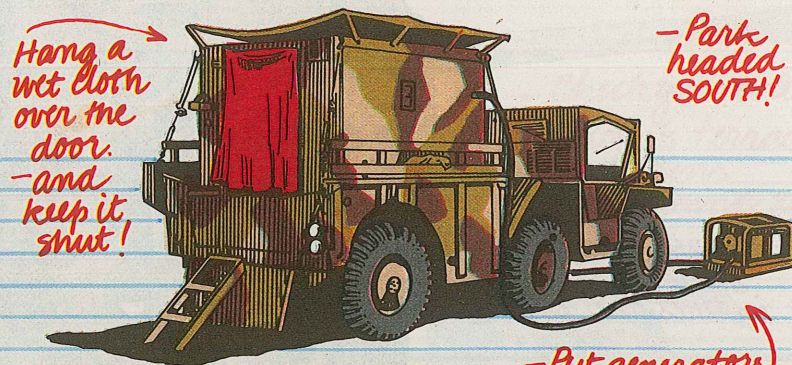
✓ Check tires frequently for cuts and wear. Extra care is needed when traveling over lava patches and rough ground. Plan on lots of flats. Also, use inner tubes on all tubeless tires. Tubeless tires go flat easily when traveling over very rough terrain.

*Remember V.I.P. -  
Ventilation  
Insulation  
Protection*



✓ Leave plenty of air space around radio cooling fan intake and exhaust vents. Try taping slabs of styrofoam (like from discarded ice coolers) to the top of the radio to insulate it against direct sun rays.



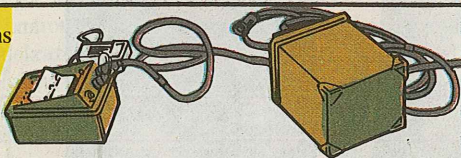


✓ The positioning of vehicle-mounted shelters is critical. Position the vehicle with the front end headed south if possible. This will keep the shelter door in the shade for most of the day and will keep the interior cooler.

Put all generators in front of the vehicle to keep the exhaust and noise from entering the shelter.

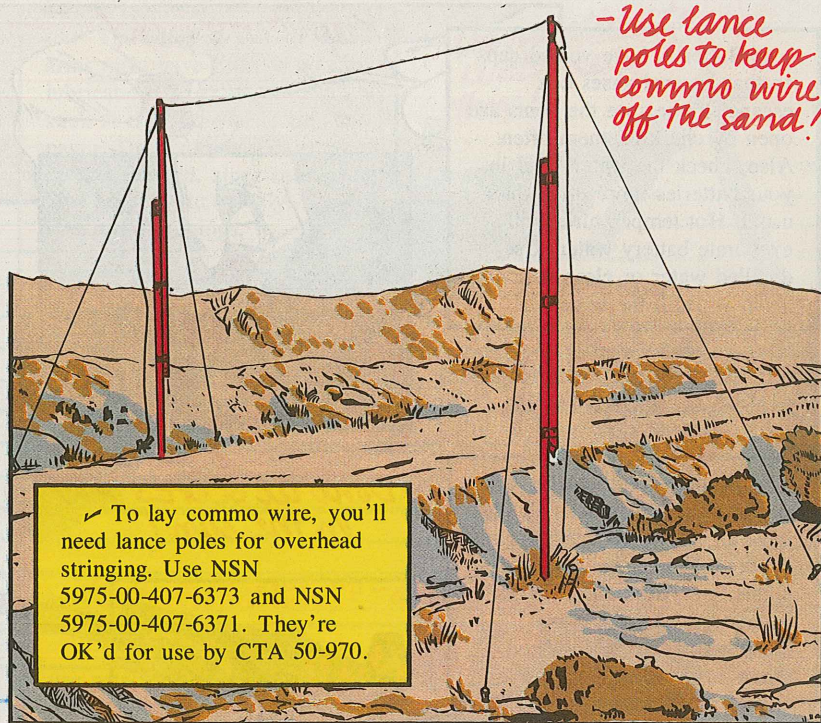
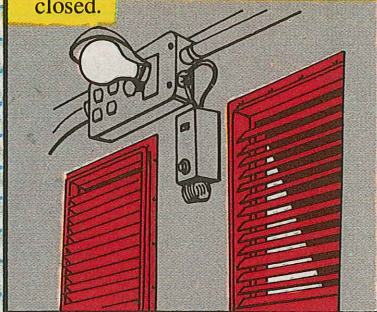
You can lower the inside temperature of a non-air-conditioned shelter by hanging a water-soaked burlap cloth cover over the door air inlet. Wet the cloth often and keep the door closed. Clean the door filters when checking or cleaning the air filters.

✓ Take the same precautions for test, measurement and diagnostic equipment (TMDE) as you do for commo equipment. Keep it clean and cool.



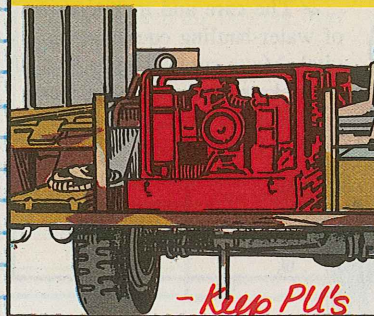
*-Put generators out in front*

✓ RATT rig shelters have several dust covers, a door vent, side vents and exhaust vents. Keep them all clean. Keep the side vents closed. When the equipment is not in use, keep the dust covers closed.

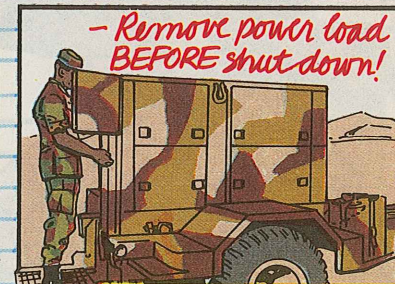


✓ To lay commo wire, you'll need lance poles for overhead stringing. Use NSN 5975-00-407-6373 and NSN 5975-00-407-6371. They're OK'd for use by CTA 50-970.

✓ Small portable power units must be level during operation. The "splash type" lubrication system won't work right if the units are placed on sidehill sites.



*-Keep PU's level!*



✓ Diesel-driven generator sets should not be idled. Before shutdown, open the circuit breaker and remove the power load. Allow the engine to run 3 minutes at operating speed before shutdown.

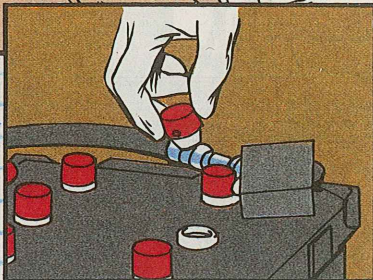


✓ Batteries have vented caps so that internal gases can escape. Make sure the vents are open by checking them often. Also, check the water level in your batteries more often than usual. Hot temperatures will evaporate battery water. Use distilled water or clean drinking water to refill the batteries.

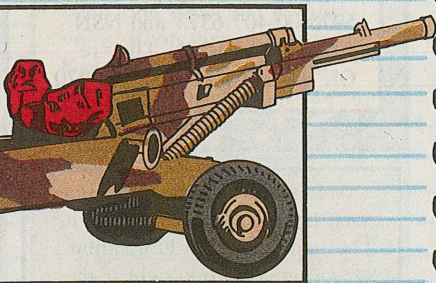
*- Check water levels more often than usual!*

✓ Equipment stored or parked for extended periods should have all fire control instruments covered. Periscopes, telescopes, sights, etc., are subject to sun discoloration of the glass elements. Keep 'em covered when not in use.

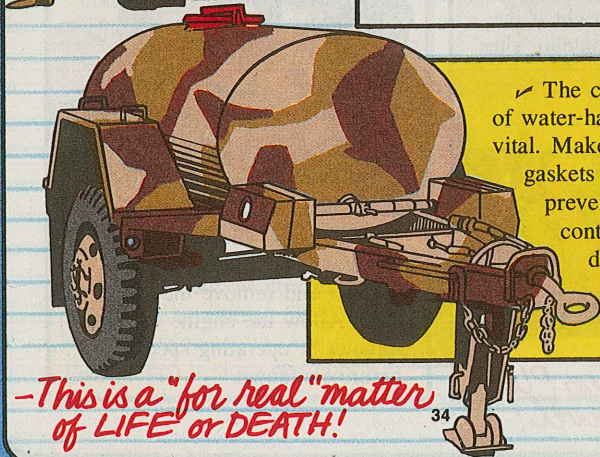
*- Keep VENTS open!*



*- Don't let SCOPES bake in the sun!*



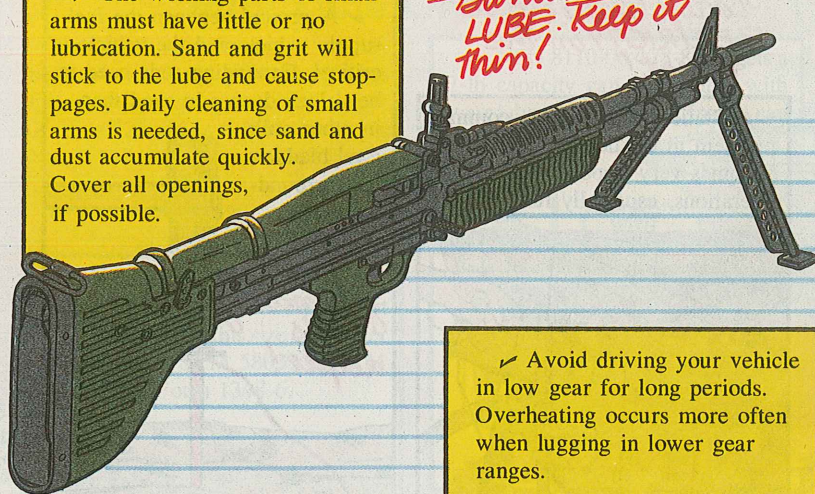
✓ The care and maintenance of water-hauling equipment is vital. Make sure all seals and gaskets are in top shape to prevent evaporation and contamination. Sand and dust will penetrate anywhere there is an opening.



*- This is a "for real" matter of LIFE or DEATH!*

✓ The working parts of small arms must have little or no lubrication. Sand and grit will stick to the lube and cause stoppages. Daily cleaning of small arms is needed, since sand and dust accumulate quickly. Cover all openings, if possible.

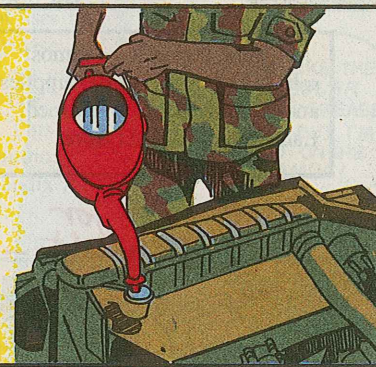
*- Sand sticks to LUBE. Keep it thin!*



✓ Avoid driving your vehicle in low gear for long periods. Overheating occurs more often when lugging in lower gear ranges.

*- Keep the water IN - and the dust OUT!*

✓ When you refill radiators, use potable water. If you use just any water, you may create calcification problems. That happens when the water you use has a lot of chemicals in it. The chemicals cause a crusty coating inside the radiator that can clog it up. Blow out sand and dust from the radiator fins every so often to keep air flowing over the fins.



✓ Be aware of winter-time variances in weather.

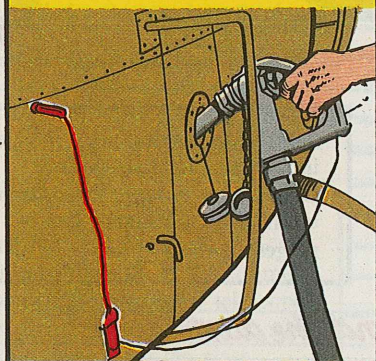
Deserts have winters, too. Altho the temperature may be high in daytime, the nights can be very cold. The winds can blow very strong, leading to wind chill figures rivaling the northeast US. Also, winter-time is usually the rainy season in the desert. Be prepared with the right type of clothing.

*- Deserts get COLD, too!*

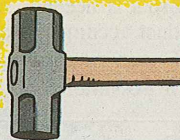


*-You must be more careful with STATIC ELECTRICITY in the desert!*

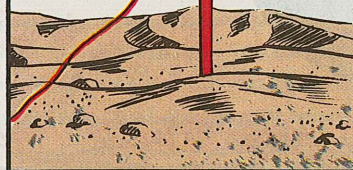
✓ Static electricity is a common problem in the desert. Grounding becomes very important in all operations, especially refueling.



✓ A ground between the fuel supply vehicle and the vehicle is critical. Grounding rods need to be driven deeper in sand than in other soils. Fuel bladders need grounding, too.



*-Drive grounding rods deeper!*



✓ Vehicles must be almost self-sufficient as far as supplies and equipment are concerned. Each vehicle should have:

- ✓ A small tool kit
- ✓ Flashlight and highway reflector
- ✓ Fire extinguisher
- ✓ Compass, binoculars, maps
- ✓ Communications equipment
- ✓ Shovel, sand ladders and tow rope or cable
- ✓ 5 gallons of water for each vehicle occupant
- ✓ Personal clothing, food and equipment, goggles, lip balm, sunscreen lotion
- ✓ Siphoning hose (½-in OD, 6- ft long)
- ✓ Slave cables
- ✓ Mounted air compressor with reservoir and air hose
- ✓ Jack support plate
- ✓ Oil, hoses, fan belts, tape, filters, wire, and sandbags.

*-Be prepared for desert hospitality-*

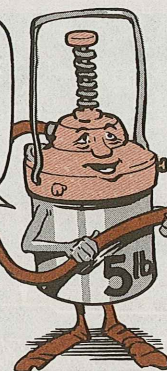


## Mini-Lube Grease Gun

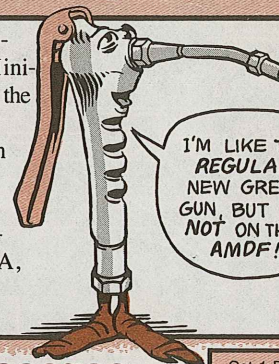
You birdmen who support Hueys need more info if you're going to use the new grease gun, NSN 4930-01-108-6524, that's authorized for your No. 2 AVUM set (page 43, PS 366). The lube container's not part of the set. Here're some options:

✓ NSN 9150-00-145-0268 gets a 5-lb can of WTR grease. To convert your lube gun for this size can, order pump tube, FSCM 58039 PN KM 64 on DD Form 1348-6.

DON'T FORGET TO ORDER THE PUMP TUBE IF YOU USE ME!



✓ NSN 4930-01-103-9055 gets a Mini-Lube gun that uses the 5-lb can of grease. The NSN is not on the AMDF. The RIC is S9C. This lube gun is authorized by Appendix A, CTA 50-970.



I'M LIKE THE REGULAR NEW GREASE GUN, BUT I'M NOT ON THE AMDF!

✓ NSN 8110-00-178-8292 gets a 7-lb capacity can that works with your lube gun. You fill it from a can of bulk grease.



I WORK WITH FATSO HERE!



## Aviation Messages

If your unit has not received a message in which you have an interest, check with your next higher headquarters.  
CH-47-84-01 SOF Technical, Changes to inspection of CH-47A/B/C/D rotor head assemblies. 122000Z Jan 84  
CH-47-84-02 SOF Operational, Additional change to night operations restriction on CH-47C. 181915Z Jan 84  
CH-47-84-03 SOF Technical, Urgent MWO to change dual AFCS circuit wiring on UCH-47D and CH-47D. 202000Z Jan 84  
UH-60A-84-01 SOF Maintenance

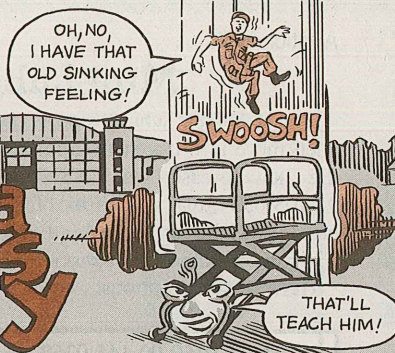
Mandatory, OV-1, RV-1 inspection of escape hatch pneumatic release pin. 242103Z Jan 84  
T53-84-01, SOF Maintenance Mandatory, Distribution, tracking and confirmation of SOF messages sent to Multi-National forces in Sinai. 131930Z Jan 84  
MIM-AH-1-MEM-84-01 Field maintenance support of new heavy-duty AH-1S ground handling wheel. 051640Z Jan 84  
MIM-AH-1-MEM-84-02 Maintenance revisions and notices for AH-1. 201600Z Jan 84  
MIM-UH-1-MEM-84-01 UH-1 collective lever bearings, 092000Z

Jan 84  
MIM-UH-1-MEM-84-02 UH-1 collective lever bearings. 171530Z Jan 84  
MIM-CH-47-MEM-84-01 CH-47 fiberglass rotor blade de-ice program. 101340Z Jan 84  
MIM-T53-MEM-84-01 Engine torque available values for UH-1H, UH-1M, EH-1X, EH-1M and AH-1G/TH-1G. 051115Z Jan 84  
MIM-T53-MEM-84-02 Maintenance policy and overhaul spares proposal on T53-L-13B engines deployed in Sinai environment. 201930Z Jan 84

Cat 1 EIR Phone:  
AUTOVON 693-2006  
(24 hours)

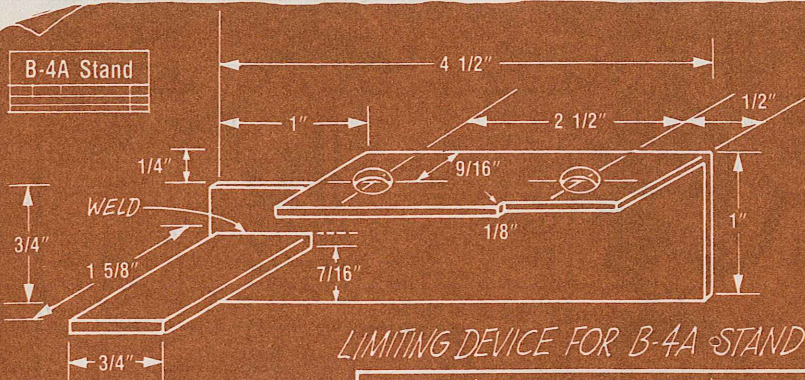


# Let Them DOWN easy



The B-4A and B-1 maintenance stands can lower too fast when you open the release valve. That can damage the stand or force hydraulic fluid out the reservoir vent.

Slow down your stand with a limiting device on the release valve, like so:

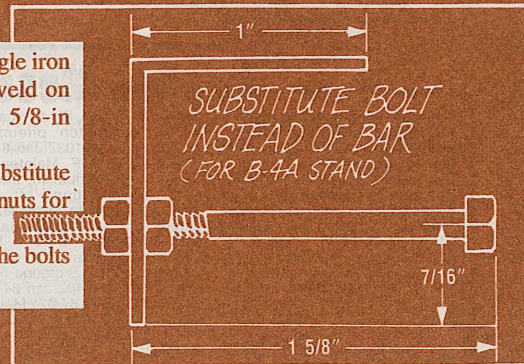


*LIMITING DEVICE FOR B-4A STAND*

Cut a 4 1/2-in piece of 1-in angle iron as shown, drill the holes and weld on a piece of 1/8 x 3/4 x 1 5/8-in barstock.

If you don't have a welder, substitute a 2-in long bolt and a couple of nuts for the barstock.

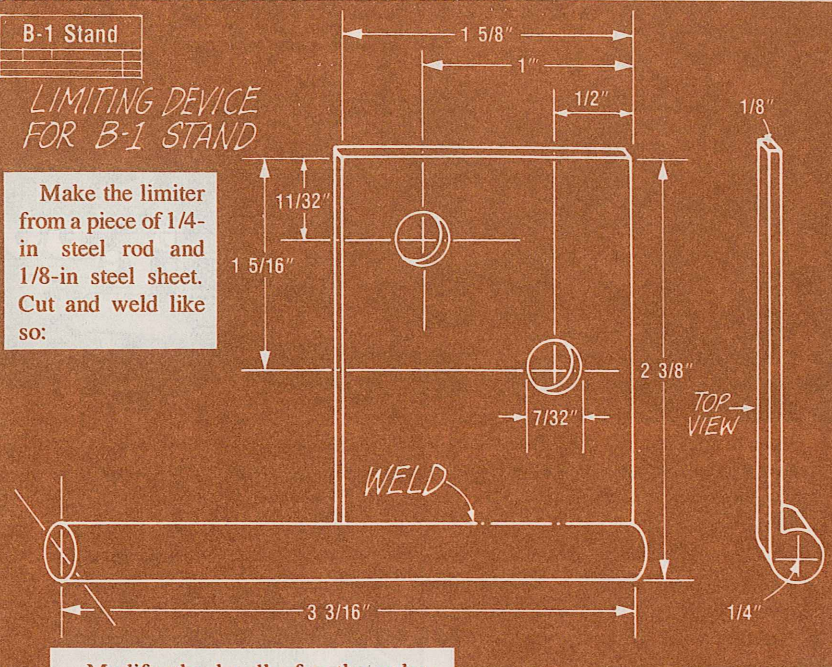
Attach the limiter using 2 of the bolts on top of the pump housing.



**B-1 Stand**

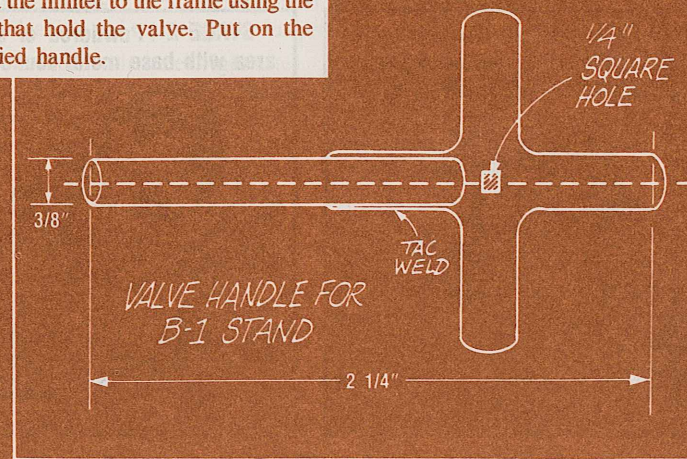
*LIMITING DEVICE FOR B-1 STAND*

Make the limiter from a piece of 1/4-in steel rod and 1/8-in steel sheet. Cut and weld like so:



Modify the handle for the valve. Here's how:

Bolt the limiter to the frame using the bolts that hold the valve. Put on the modified handle.





SURE IS DAMP  
AND SPOOKY  
OUT HERE  
TONIGHT!

# That Ol' Devil, Rust!

Rust brings lots o' grief to tactical vehicles—chewing on metal like a dog gnaws a bone. In hard-to-see and hard-to-reach places, rust destroys your vehicle without you knowing it.

Head off rust damage—have your vehicle rustproofed like it says in TB 43-0213. (New vehicles are factory rustproofed or designed to be corrosion resistant.)

The vehicles and trailers listed in the TB must now be inspected for corrosion damage (rust) twice a year. TACOM Msg DRSTA-MTC 211400Z (Oct 83) has the word. When updated, the TM's will add the inspection as an organizational PMCS.

The best way to beat rust is to stop it before it starts. But maybe you've already got a rust problem! Eyeball your vehicle for these rust stages:

**STAGE 1—Red, black or white surface deposits. There may also be pitting, but the base metal is sound.**



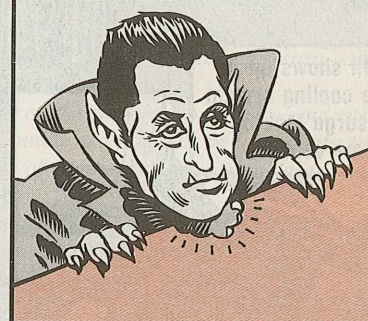
**STAGE 2—Powdered or scaled area with base metal sound.**



**STAGE 3—Pin holes thru corroded surface.**



**STAGE 4—Corrosion has eaten thru the metal.**



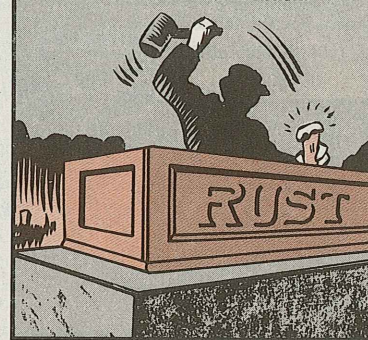
Fight the first two stages of rust by cleaning, priming and topcoating. Vehicle showing signs 3 or 4? It may need repairs or even new parts.

After cleaning and repairing—or rustproofing—prevent rust comeback like this:

- Wash with fresh water right after operating in salty areas—salt in the air or on roads.
- Keep under shelter when possible.
- Get rid of fiber or rubber floor mats.
- Keep underside drain holes open and clean.
- Prop up trailers and dump beds to head off water build-up.
- Never use steam to clean rustproofed vehicles.

If solvents are used, take care not to get it on rustproofed areas.

**Prevent rust comeback!**



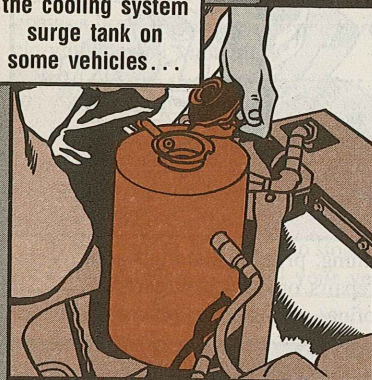


LOOK AT THAT  
PRETTY RAINBOW  
IN THERE!

THAT'S A PRETTY  
GOOD SIGN OF  
SERIOUS ENGINE  
TROUBLE!

# Tip-Off to Trouble!

Oil shows up in  
the cooling system  
surge tank on  
some vehicles...



Dear Half-Mast,

There's oil in my diesel engine's cooling system. It shows up in the radiator as a rainbow-colored slime.

I've had the cooling system flushed several times and even had the radiator changed. But the oil keeps coming back.

Where's the oil coming from? Is it a sign of trouble? If so, what can be done about it?

SP4 J. M. S.

...or in the radiator  
of others...



Check for oily  
slime or greasy glop

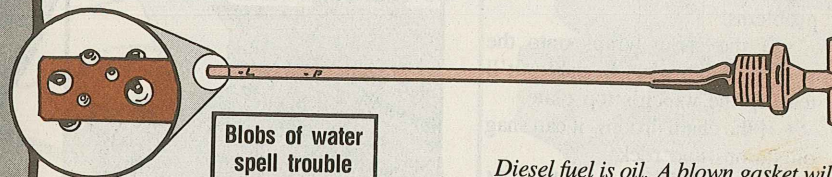


Dear Specialist J. M. S.,

First off, you deserve a pat on the back for noticing this condition and reporting it.

For sure, oil in the cooling system is a sign of big trouble! Your engine's probably got a cracked block or a blown head gasket—or both!

If a cracked block is letting oil get into the cooling system, there's a good chance coolant's getting into the oil. This'll show up as blobs of water on the oil dipstick. The oil/water mix makes sludge in the crankcase. Sludge plugs lube passages in the engine. Bad news for bearing lubrication!



Diesel fuel is oil. A blown gasket will let this oil get into the cooling system—and

maybe coolant into a cylinder. Double-barreled trouble!

There's a lot of pressure in the cylinders on the compression stroke—and even more on the power stroke. Fresh fuel or unburned fuel will be forced into the cooling system. You should notice a loss of engine power in such cases. And you should see bubbling in the radiator.

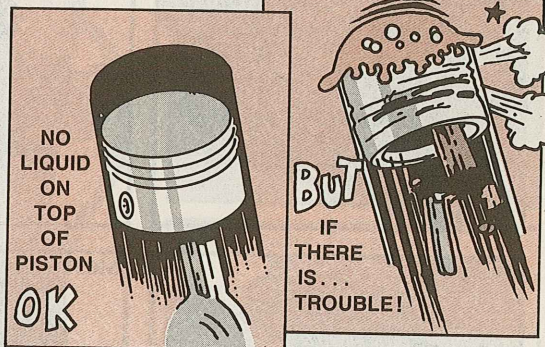
Exhaust gas in the cooling system makes acid—and this eats any metal it touches!

Worse, tho, coolant leaking into a cylinder sets your engine up for hydrostatic lock. Water sitting on a piston is like a rock when the piston moves up on the compression stroke. Engine damage—like a busted connecting rod—is a sure bet! You get the 'whole story on hydrostatic lock on

Pages 3-6 & 3-7 of FM 21-305, Manual for The Wheeled Vehicle Driver.

Oil in the cooling system is a problem for your support to solve. A cracked block means engine replacement. If it's only a matter of replacing a bad gasket, they may need to clean the cooling system to make sure all the oil's out and nothing's plugged.

Half-Mast





# Stow Cable

# Right !

HERE'S  
A HANDY  
REFERENCE!

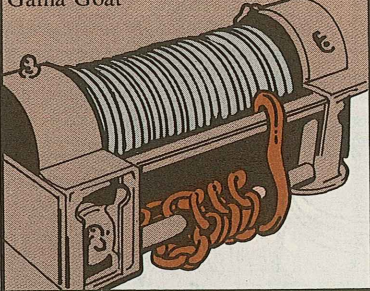
It's no secret: A truck's winch cable reeled in wrong can make problems:

- If the chain wraps onto the winch's drum with the cable, it'll tear up the winch's top plate.
- If the chain droops, it can snag on stumps and rocks.

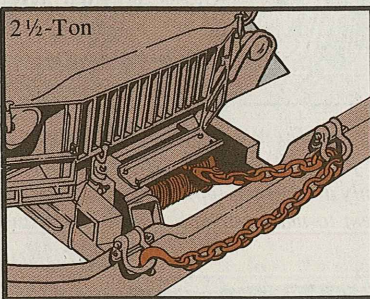
In most cases, your -10 TM shows how to stow the winch's hook and chain right.

## Front Winches

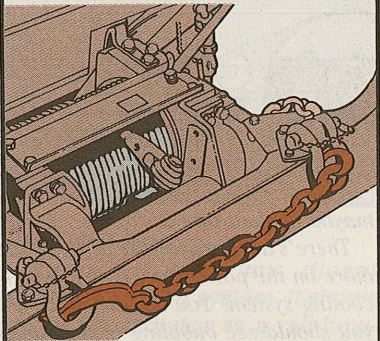
Gama Goat



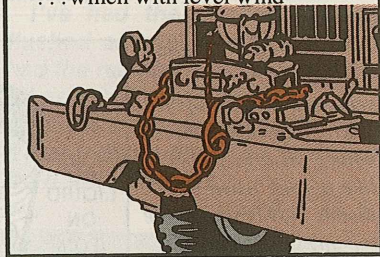
2 1/2-Ton



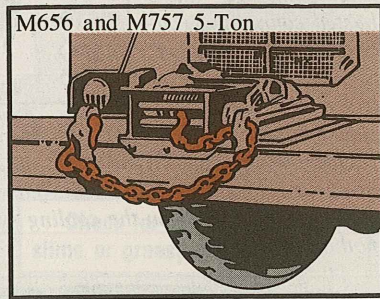
M39-, M809-, and M939-Series  
5-Ton Winch without level wind. . .



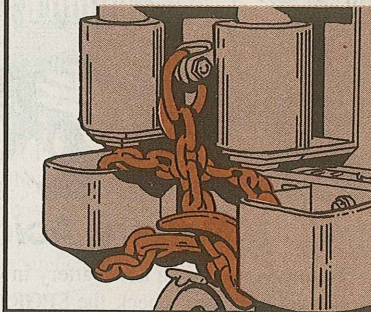
. . . winch with level wind



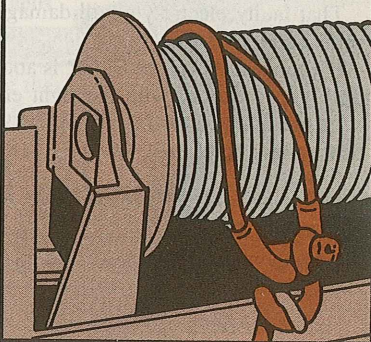
M656 and M757 5-Ton



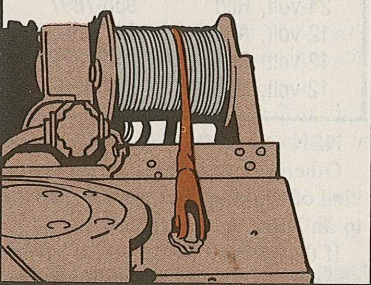
Rear Winches  
M62, M543-Series, M816, M936  
5-Ton Wreckers



M916, M920 Tractor Truck

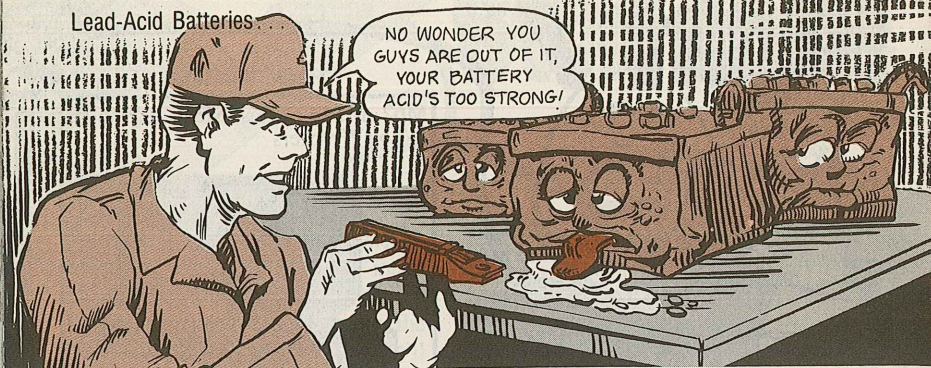


M911 Tractor Truck





## Lead-Acid Batteries



## Battery Acid Too Strong!

Before you install a new battery in your truck, tank or other equipment using lead-acid batteries, check the SPGR (specific gravity) of the electrolyte (battery acid). The electrolyte put in the battery by your support may be too strong—1.840 SPGR instead of 1.285.

That faulty electrolyte will damage the plates inside the battery, leading to early battery failure.

If your test shows the SPGR is above 1.285, turn in the battery to your support. Get a battery with the right electrolyte in it.

Instructions for testing are in TM 9-6140-200-14, Para 3-6. You use the optical tester, NSN 6630-00-105-1418, in your common tool set.

## Warning Light NSN's

Does your command require a rotating warning light for your wrecker or emergency vehicle? Eyeball this list and pick out the right one.

| Warning Light  | NSN 6220-00- |
|----------------|--------------|
| 24-volt, Amber | 947-7570     |
| 24-volt, Blue  | 947-7621     |
| 24-volt, Red   | 958-7897     |
| 12-volt, Amber | 947-7535     |
| 12-volt, Blue  | 947-7572     |
| 12-volt, Red   | 892-4507     |

Authority for ordering is Appendix A, CTA 50-970.

Some of these warning lights are the sealed beam type. Get a 12-volt replacement unit with NSN 6240-01-133-4551. Until it appears on the AMDF, order it on a DD Form 1348-6. Write "NSN not on AMDF" in the Remarks block. Use RIC S9G.

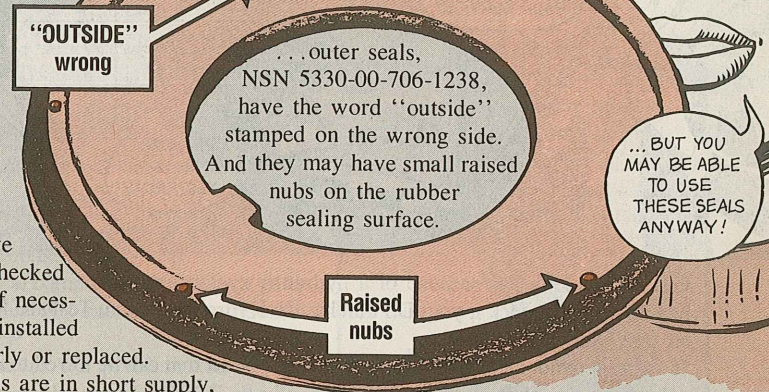
NSN 6240-00-635-4643 gets you a 24-volt sealed beam unit. Others come without sealed beam units. To get a replacement lamp for this kind of warning light, remove the old lamp and cross-reference its part number to an NSN on the MCRL-1.

If that doesn't work, you'll have to identify the light's manufacturer and get your support to local purchase a lamp.

## 2½-Ton Trucks...

## Bum Seals Issued

Oil leaking from rear axles of your 2½-ton truck may be a sign of faulty seal manufacture. A bad batch of...



Have 'em checked and, if necessary, installed properly or replaced.

Seals are in short supply, so it may be necessary to repair and reuse these faulty ones. Just trim off the raised nubs, but be careful not to gouge the sealing surface.

## Unsafe Wheel Lift Truck

Dear Half-Mast,  
There's talk that some wheel lift trucks, NSN 4910-00-554-5983, aren't safe. What's the story?  
1LT A. F.



Check the label for the name of the manufacturer

Dear Lieutenant A. F.,

Lift trucks made by Rust Manufacturing, Inc., were found to be unsafe a couple of years ago. These trucks were recalled, so chances are slim that any are still in the field.

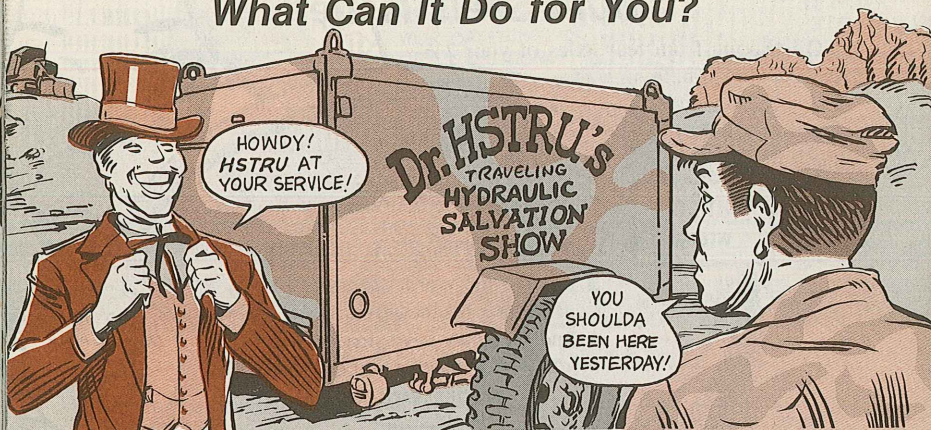
Check for the Rust label. If the label's missing, you can identify the Rust truck by its blue color, plastic rollers on the vertical lift guards and no bearings in the wheel rollers.

If it's a Rust job, don't use it. Turn it in and order another under the same NSN. You'll get one made by a different manufacturer.

*Half-Mast*



## What Can It Do for You?



Got a vehicle down because of a hydraulic system problem? Maybe you're in luck if your DS unit has the Hydraulic System Test and Repair Unit (HSTRU).

It's a trailer-mounted hydraulic maintenance outfit that can be towed to a field site by your DS contact team.



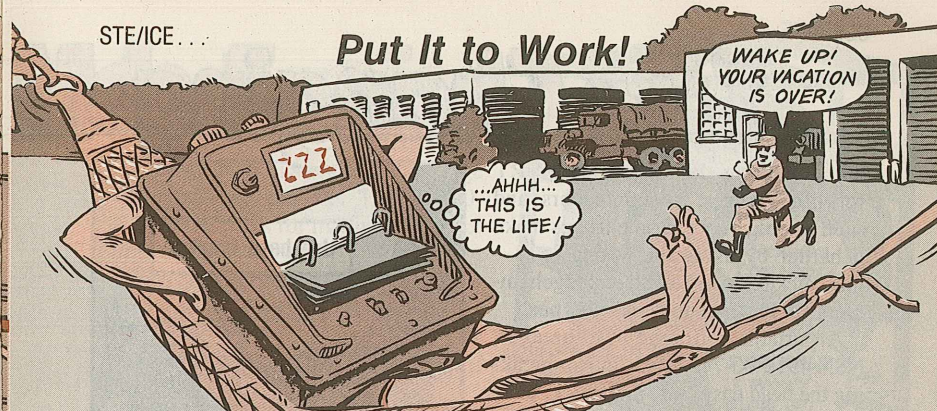
- Pressure testing
- Hydraulic system flushing and cleaning
- System checkout
- Component testing
- Flow testing
- Building or repairing flexible or rigid hydraulic lines
- Fabricating round and square O-rings.

The HSTRU was developed mainly for construction equipment, but it can be used on most vehicular hydraulic systems.

Ask your DS unit about the HSTRU if you need hoses or lines repaired, or if you've got trouble-shooting problems. It's a good bet that the unit can save you time and money.

STE/ICE...

## Put It to Work!



Got a problem with your STE/ICE (Simplified Test Equipment for Internal Combustion Engines)?

TM too complicated? No repair parts available? No one trained to operate your set?

Whatever the problem, there's no need to just let your STE/ICE sit idle. Call your local LAR (Logistics Assistance Representative) for help. No help? Call the STE/ICE HOTLINE at the Tank-Automotive Command:

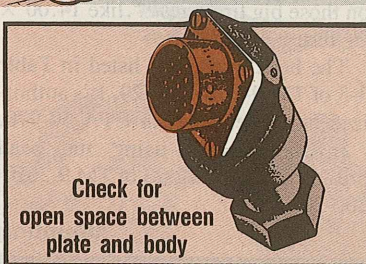
|            |                    |
|------------|--------------------|
| AUTOVON    | 786 6230/6278/8291 |
| FTS        | 973 " " "          |
| Commercial | 313-574 " " "      |

### Screw Check

The 4 screws on the TK34 pulse tachometer of your STE/ICE may need some do-it-yourself repair work.

Newer TK34's have potted connector/transducer bodies with sealed screws.

On some of the early TK34's, screws back out and leave a space between the connector plate and transducer body. Eyeball it where the plate and body join.



Check for open space between plate and body

Eyeball the screws, too, but don't test them with a screwdriver. If you can see that they've backed out, turn each one out a full turn.



Back off screws and apply sealer

Put a couple of drops of sealing compound, NSN 8030-00-081-2337, on each screw and give it time to flow down the threads.

Retighten each screw just until it bottoms (don't overtighten), and let the sealer dry 3 hours or so before you use the TK34.



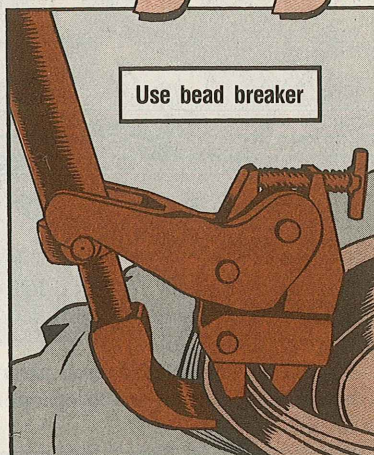
# Tire Changing Made Easier

Demounting the large tires on RT forklifts, cranes, scoop loaders and such is a big chore. Some troops make it harder by using the wrong tools—like pickaxes, mattocks, sledgehammers or forklifts to break the bead.

A portable hydraulic bead breaker, NSN 4910-00-773-9341, makes breaking the bead easy, safe and quick, even on those big tire sizes...like 14.00 × 24 thru 37.50 × 33.

The bead breaker is listed in Table 3-3 of TM 9-2610-200-20. It's authorized by Appendix A of CTA 50-970.

Instructions on using the bead breaker are in Para 2-23 of TM 9-2610-200-20.



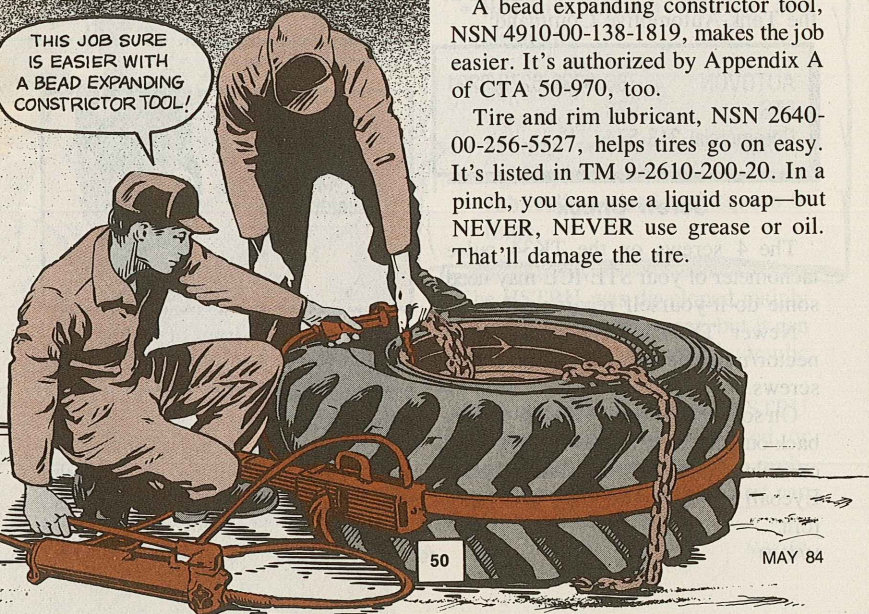
## Mounting Made Easy

Mounting big tires is another chore where you need all the help you can get.

A bead expanding constrictor tool, NSN 4910-00-138-1819, makes the job easier. It's authorized by Appendix A of CTA 50-970, too.

Tire and rim lubricant, NSN 2640-00-256-5527, helps tires go on easy. It's listed in TM 9-2610-200-20. In a pinch, you can use a liquid soap—but NEVER, NEVER use grease or oil. That'll damage the tire.

THIS JOB SURE IS EASIER WITH A BEAD EXPANDING CONSTRICTOR TOOL!



50

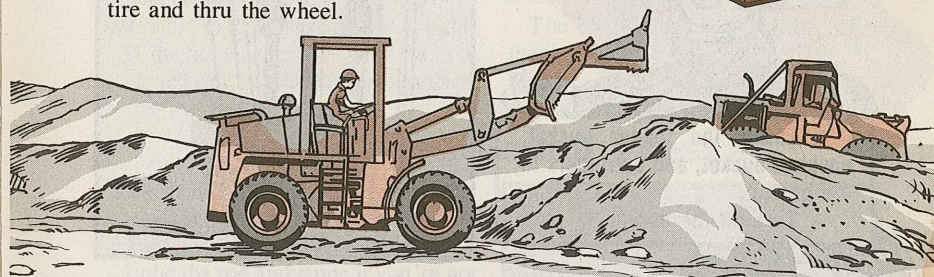
MAY 84

# made Easier

For safety's sake, use a tire cage when inflating the tire. TM 9-2610-200-20 has plans for making a cage for tires up to 14.00 × 24.

You can get one that'll handle bigger tires with NSN 4910-00-025-0623. It's not on the AMDF, so order on a DD Form 1348-6. The RIC is FPZ, and it costs \$2930.

If you don't have a cage, you can use 2 safety chains. Wrap them around the tire and thru the wheel.



## 645M Loader Filters

Use these part numbers/NSN's to get filters for your 645M scoop loader equipped with the Fiat-Allis engine.

| Item  | PN/NSN            |
|---|-------------------|
| Oil filter element                                    | 74059373          |
| Gasket, Fleetguard filter                             | 70926772          |
| Gasket, Luberfine filter                              | 5330-01-133-3257* |
| Element, oil filter/cooler<br>(for engine PN 4035483) | 74023548          |
| Oil filter, spin-on<br>(for engine PN 4029398)        | 74035556          |
| Fuel filter   | 74028945          |
| Water filter  | 74029089          |
| *Not on AMDF  |                   |

MAY 84

THE FSCM IS 90940...

...AND THE RIC IS 39C!



## Reduce Pressure, Then Switch

You've got to get rid of the pressure in the hydraulic lines of your JD410 loader-backhoe before switching the drill, shovel, or impactor. Then, the quick disconnect couplings will hook (or unhook) with only a small bit of hot fluid leakage. And that sure beats getting a shot of hot oil all over yourself.

HERE'S WHAT YOU DO...

- ✓ Lower the loader bucket, backhoe bucket, and outriggers to the ground.
- ✓ Turn off the engine.

THEN...  
DO EACH  
OF THESE  
SEVERAL  
TIMES!

- ✓ Turn the steering wheel right and left.

- ✓ Work the hydraulic control valve handles for the bucket, backhoe, and outriggers.

- ✓ And...what everybody forgets...hit the impactor diverter pedal.

Cutting the engine shuts off the hydraulic pump. The hydraulic fluid drains back into its reservoir. Results? No pressure and little leakage from the couplings.

If this doesn't work...if you still "feel" pressure...work the controls again. Still no go? Get your mech to have a look.

## Torque Rear Bolts Tighter

During a long road haul, the rear wheel bolts have a nasty habit of coming loose. Then the rim works free... bolt threads get scuffed up...rim mounting holes wallow out...and there goes a rear wheel.

Tighten the bolts 425 lb-ft, like Section 10 General, Page 25-11 of TM 5-2420-222-14&P-2 says. But first, clean off any rust, dirt or paint around the bolt hole area.

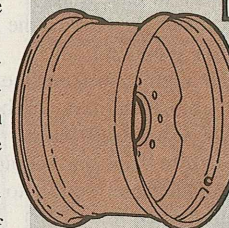
Retorque the bolts after the first day of operation and every 200 hours of operation to make sure they stay tight.

If the bolts come loose and ruin the bolts and rim, here're the replacements:

Wheel  
16.9 × 24 inches  
PN AT 57181

Cap screw,  
3/4 × 2 1/4 inches  
PN 19H 2431

Washer,  
hardened  
PN U 43180



The FSCM for all is 75160. Order them on a DD Form 1348-6. Use RIC S9C.

## Head Off Indicator Freeze

The bucket level indicator can freeze up on your JD410...like when you haven't used the tractor for a while.

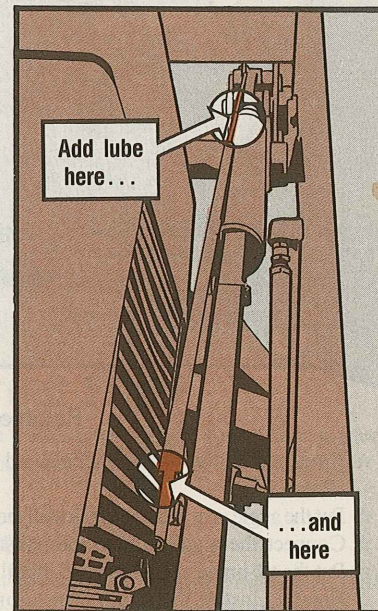
Lube the rod and guide if you're not going to be using the loader regularly. Engine oil will do just fine.

During operation, tho, dust, grit or sand will mix with the lube and cause another kind of freeze-up.

KEEP AN EYE ON IT AND  
AN OILY RAG HANDY!

Add lube  
here...

...and  
here





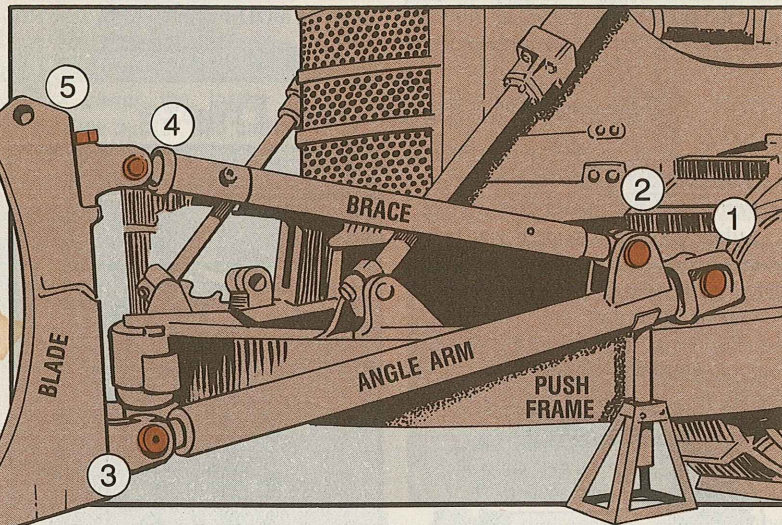
## Angle Arm Squeeze Hazard

Work by the numbers when you remove the angling blade arm on your D8 Caterpillar dozer and you'll head off a "squeeze" hazard.

If you take the wrong pin out first, the angle arm could swing up and hit the brace... squeezing anything caught between them!

Here's the safe way to take it apart:

- ☆ Put a support under the rear of the angle arm, like a jackstand from the No. 1 Common shop set.
- ☆ Disconnect the angle arm from the frame at the ballstud (Point ①).
- ☆ Support the tilt brace and remove the angle arm-to-brace pin (Point ②).
- ☆ Remove the angle arm-to-blade bracket pin (Point ③) and remove the angle arm.
- ☆ Remove the brace-to-blade bracket pin (Point ④) and remove the tilt brace.
- ☆ Finally, remove the blade bracket-to-blade pins (Point ⑤) and remove the blade brackets.



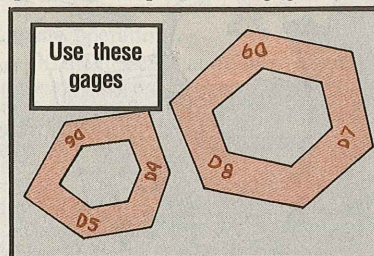
### Reassembly

- ☆ First, mount the blade brackets and install the blade brackets-to-blade pins (Point ⑤).
- ☆ Put the angle arm in place and install the angle arm-to-blade brace pin (Point ③).
- ☆ Connect the angle arm to the ballstud (Point ①).
- ☆ Put the tilt brace in position and install the brace-to-blade brace pin (Point ④).
- ☆ Finally, install the angle arm-to-brace pin (Point ②).

## Gage Those Sprockets!

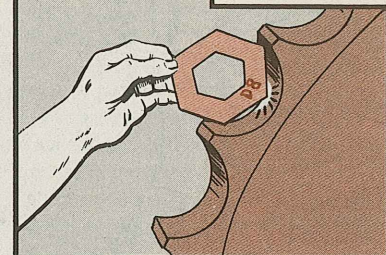
Depending on the model Cat you have, you'll need one of 2 different gages—maybe both. Order PN 5P8616 for the D4, D5, and D6, or PN 5P8617 for the D7, D8, and D9. Use FSCM 11083 with both. Order from S9C.

Gaging sprockets is quick and simple. Take the point of the gage marked



for your tractor and put it between the teeth of the drive sprocket. If the point doesn't touch, the sprocket is OK. If it does touch, get your DSU to replace the sprocket.

If point touches, the drive sprocket's shot



## M4K RTFL Hoses Rub

Are the lift mast hydraulic hoses on your forklift showing signs of wear? Do they frequently jump off the guide pulleys?

If so, your forklift is probably an early model—Serial No. 9150572 or below—and it needs new guide pulleys.

Replace the old pulleys with pulley kit, NSN 3930-01-158-9369. You'll find the instructions in Para 3-3c of TB 43-0001-42-3 (Jul 83).



## MW24B Fuel Filter

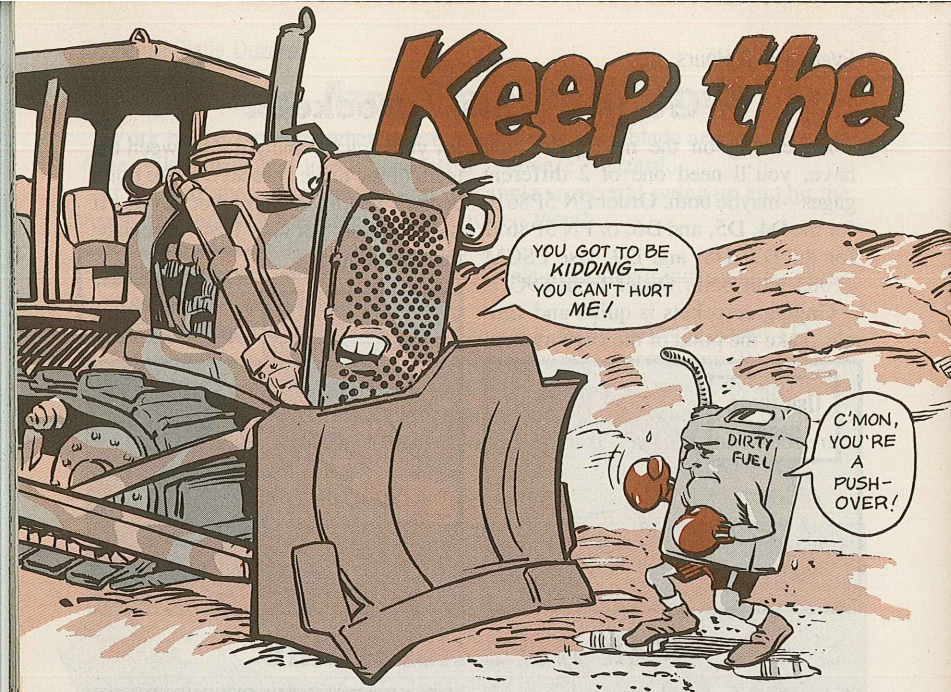
NSN 2910-00-401-4189 will get you a fuel filter kit for your scoop loader. This gets you one primary and one secondary spin-on filter element.

## Grove Crane Tires

Use NSN 2610-01-156-9461 to get 14-ply 11.00x20 tires for the Grove TMS 300-5 25-ton crane. This NSN replaces the NSN on Page 52 of PS 368.



# Keep the



Your D7 Caterpillar dozer is one tough hulk, but dirty fuel will put it down in a hurry.

Dirt clogs the strainer or the filter. Water can rust out the tank and damage the engine's injectors.

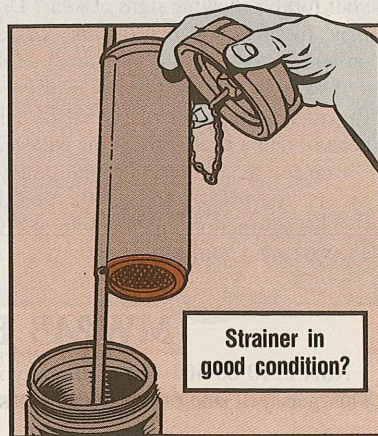
Keep your fuel supply covered and protected.

Drain off water and sediment from the fuel tank before you start up.

When you refuel your Cat, wipe off any dirt around the filler cap.

Make sure the fuel tank strainer's in place and in good shape. If it's damaged or missing, get it replaced.

Be careful when you put the fuel nozzle in the tank. You could tear a hole in the side of the strainer or knock out its bottom.



When it's raining or dust is blowing, lay a clean rag around the nozzle while you refuel.

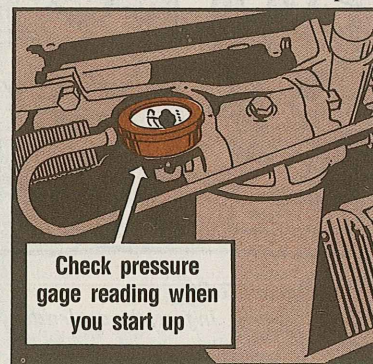
When refueling's done, replace the

# Dirt Out Front!



cap and snug it down to keep dirt out during operations.

Fill the fuel tank at the end of opera-



D7-Series, D8K Tractors...

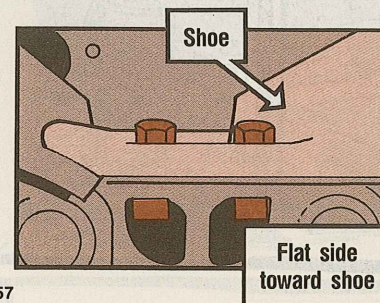
## NUTS!

If the track shoe nut is installed upside down, it'll loosen...you could lose a shoe...and put your big Cat down.

There's a flat side and a round side on the nut. To keep the nut tight in the track link notch while you're tightening the bolt, install its flat side toward the shoe.

You have to get bolts tight, too. For the D7-series, tighten the bolts to 180-260 lb-ft, then give the bolts another 1/3 turn (120°).

For the D8K, tighten the bolts to 200-300 lb-ft, then give another 1/3 turn (120°).



tions to help prevent condensation in the tank.

When you start up, check the fuel pressure gage on the final filter. If the gage is reading below NORMAL, shut down and drain the filters. If the gage is busted, get a new one.

Catch the fuel you drain in a clean container. Drain until you get clean fuel free of water.

If draining doesn't help, clean or replace the filter elements.

After you're done, prime the system.

With good fuel PM, you'll keep the dirt where it belongs—out in front of the blade!



# Is Cold All Wet?

TIERRA DEL FUEGO

HEY, NORTON, WHAT A GREAT PLACE TO COOL OUR HEELS!

YEAH, LEO, IT'S PERFECT, COLD AND DRY!

Dear Macon,  
Does it do any good to keep dry-cell batteries in a refrigerator?

We do, but we always seem to be fighting condensation damage.

Are you in favor of this "cold storage" for batteries? If so, how can we head off moisture problems?

SSG R.R.

Dear Sergeant R.R.,

Keep 'em cool. In fact, the cooler the better.

The experts say that at  $-20^{\circ}\text{F}$ , you can completely stop battery discharge.

'Course, you can't always get 'em that cold outside a freezer section. But, even at  $35^{\circ}\text{F}$ —which your 'frig can do—you slow down dry-cell discharge.

So, aim for a temp somewhere between  $0^{\circ}$ – $35^{\circ}\text{F}$ .

To get an idea just how much you can slow discharge, eyeball SB 11-30. It shows how long a battery will last after refrigerated storage.

After 2 years in cold storage, a BA-30 will last 18 months stored at  $50$ – $70^{\circ}\text{F}$ . At  $30$ – $40^{\circ}\text{F}$ , it has up to 35 months of shelf life left.

ABOVE  $35^{\circ}\text{F}$ , I'M LOSIN' MY ZIP!

BETWEEN  $0^{\circ}$  AND  $35^{\circ}\text{F}$ , I STAY CHARGED UP!

You're right about condensation, tho. It's a problem. Here's how to beat it.

Use the refrigerator only for batteries. When the door opens and closes many times a day, say for sodas or snacks, the warm outside air hits the cool inside air. That forms condensation on your batteries.

Storing batteries in the freezer, too? Defrost when battery stocks get low. That keeps the number of warmed-up

QUIT OPENING AND CLOSING THE REFRIGERATOR DOOR!

KEEP ME UNDER WRAPS IF YOU CAN!

(and wet) batteries to a minimum. You can wrap these few dry-cells in heavy paper or a blanket to keep 'em cool during the defrosting.

If your refrigerator is used to store other things which require frequent door openings, use plastic bags or a plastic wrap. And, if your dry-cells come sealed, leave them sealed. The condensation forms on the plastic and not on what's inside.

You can also put desiccant in the frig. It will absorb much of the moisture in the air and keep it from the dry-cells. If you have trouble finding desiccant locally, see Section II of CTA 50-970.

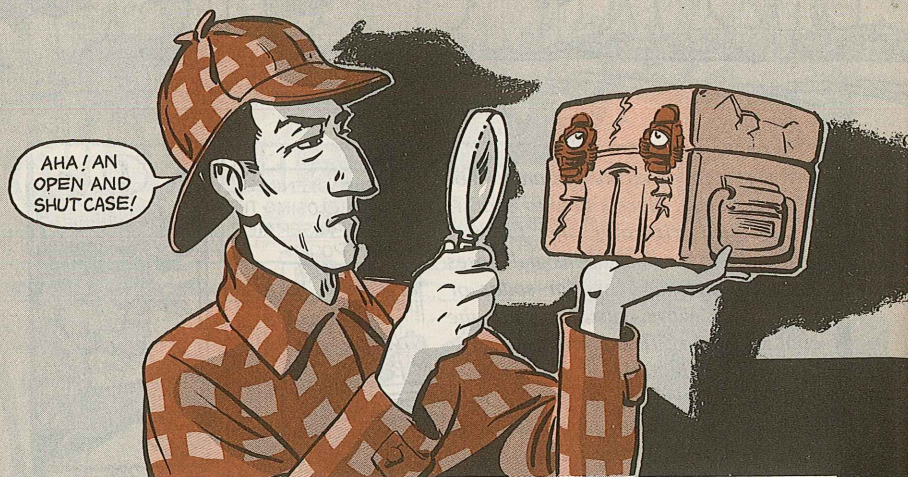
When it's time to put a cold dry-cell to work, let it warm up for an hour or so at room temperature. That gives it plenty of time to "sweat." Wipe it dry and put in in your gear.

If your unit needs a refrigerator for storing batteries, your authority is Chap 21 of CTA 50-909.

Macon

LET US WARM UP FOR AWHILE BEFORE USING US!





## A Case for Multimeter PM

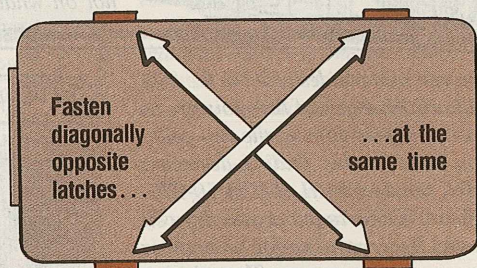
Put too much pressure on your AN/USM-223's latches and something **cracks**. That something is the case.

Remember, the case is plastic. The latches are held by metal screws. Guess what gives!

Throw in the tight, weatherproof fit the case gives you, and you have all the ingredients for trouble.

Head off trouble by taking your time. And, don't store extra testing hardware inside the case. That just makes a tight fit tighter.

Fasten diagonally opposite latches at the same time. Close the front right and rear left latches in one motion. Then, fasten the other 2. That'll spread out the strain.

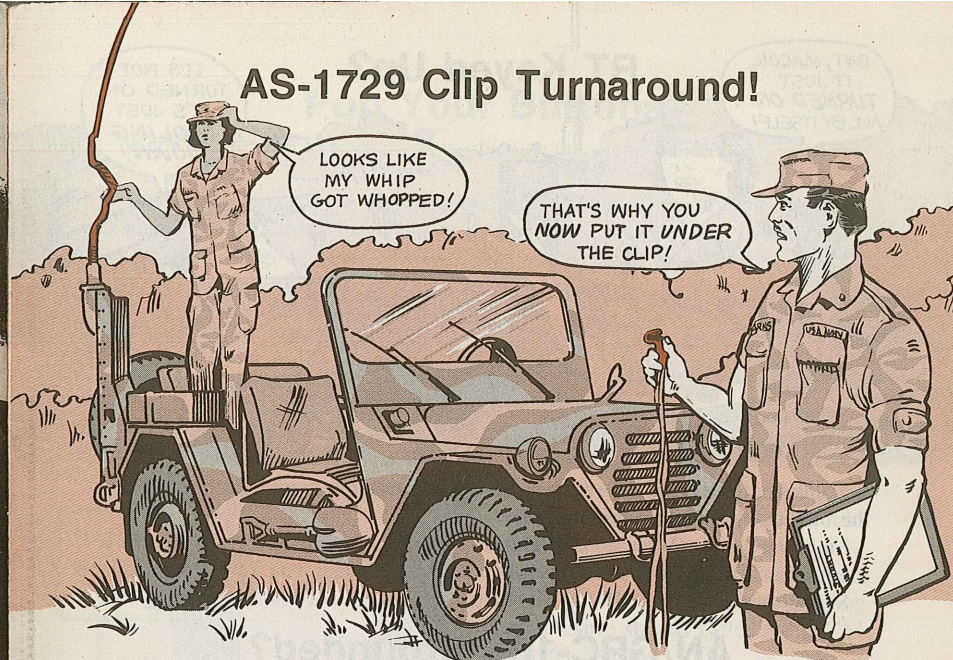


Here are a couple of tips to get better service from your tester.

Adjust your multimeter in the same position it'll be in when you use it. The best position is lying down. That way, it won't get knocked down—and maybe out—during operation.

Remove the batteries when you're through with the tester for the day. Left in the meter, they'll corrode.

## AS-1729 Clip Turnaround!



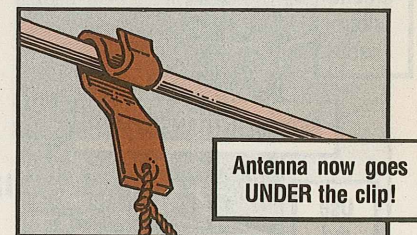
Tying down your AS-1729 antenna? Be sure it goes **under** the clip.

That's the word in TM 11-5820-401-10-1 and -2. Any time your vehicle moves, be sure your antenna is held securely under the clip.

Safety is the reason. An antenna slipped into the top of the clip can spring free without you knowing.

Standing tall, it can bang into things that can break it.

It can also hit power lines and that can be a killer.



## M882/M892 Commo Cables

Power cables missing from your truck-mounted commo system?

If it's the cable feeding your M882 or M892's power junction box, use NSN 2590-01-050-9134. Your support replaces it for you. It's Item 4 of Fig 110C in TM 9-2320-266-34P.

The CX-10463 cable which powers your AN/GRC-122, -142 radio teletype-writer set is NSN 5995-01-012-3629.

You'll find it in the components of end item list added by C7 to TM 11-5815-334-12.



BUT, MACON,  
IT JUST  
TURNED ON  
ALL BY ITSELF!

## RT Keyed Up?

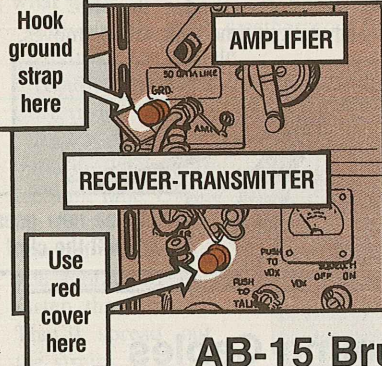
IT'S NOT  
TURNED ON,  
IT'S JUST  
COOLING  
DOWN!

Think your AN/VRC-12-series receiver-transmitter is turning itself on 'cause the blower kicks in on its own?

Maybe it's just staying cool. The blower runs each time you key the RT. A thermostat also starts it when the set heats up, whether you key it or not.

So, before you pack the RT up for repair action, be sure it's not just cooling off.

## AN/GRC-106 Grounded?



Your radio set binding posts look alike, but only one gives grounding protection.

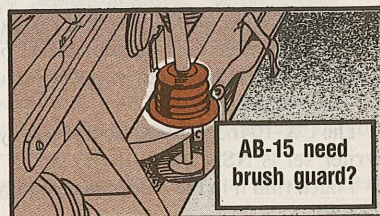
Always hook your ground strap to the AM-3349 amplifier's GRD binding post.

To warn you not to use the RT's post for grounding, cover it with a red rubber cover, NSN 5999-00-254-2243. If you need a grounding kit, ask for NSN 5820-00-089-9656.

## AB-15 Brush Guard

Get a brush guard for your M151 truck's AB-15 antenna base with NSN 5820-00-937-3174.

You won't find that number in the base's TM 11-5985-230-14P, tho. Eye-ball your radio installation kit listing in SB 11-131 instead.



## Pop Your Buttons

When your H-189 handset starts to give you the silent treatment, give it some PM.

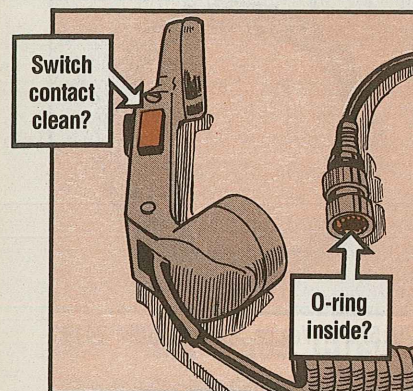
Start with the earphone and mouthpiece elements. They have to touch the handset's copper mesh fuzz buttons or you lose contact.

If yours have gotten mashed down, take a thin, sharp object—like a straight pin—and fluff 'em up again.



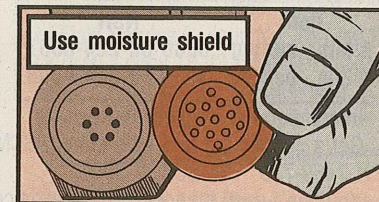
Take it easy, tho. Those buttons aren't fastened down. If you lose 'em, or if they're already gone, support has to replace 'em.

If bad buttons aren't stopping your commo, eyeball your push-to-talk switch. If the contacts are dirty, you can't key the radio.



Eyeball the connector. Tarnished contacts can be shined up with a rubber pencil eraser. Be sure your O-ring is present and accounted for, too.

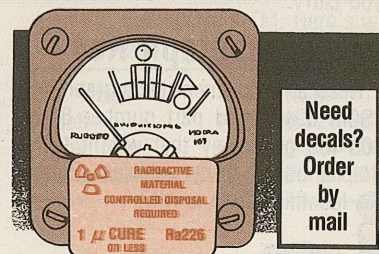
Finally, head off problems by using the moisture shields called for in TM 11-5965-280-15.



## Radiation Warning Decals

Use warning decals to show your commo gear contains radioactive material. Get decals by mail from:

Commander  
US Army CECOM  
ATTN: DRSEL-SF-MR  
Ft Monmouth, NJ 07703



Just give them the NSN and nomenclature of the gear that contains the material. TB 43-0122 lists the CECOM items which contain radioactive material.



# Connie's POST SCRIPTS

CONNIE, HELP!  
OUR RADIATOR OVER-  
HEATED... THEN WE GOT  
DUST IN OUR AIR FILTER...  
THEN WE RAN OUT  
OF WATER...

## Emergency V-Belts

You won't get stranded by a broken V-belt if you carry enough adjustable link belting to make a temporary emergency repair.

The belting is listed in SMART Msg 35. The NSN for the connecting tool is wrong, tho.

Here's what you need:

| Item           | NSN              |
|----------------|------------------|
| 3/8-in belting | 3030-00-224-8357 |
| 1/2-in belting | 3030-00-224-8358 |

Instructions come with the belting.

Get a connecting tool with either FSCM 76157 PN Veelos Tool or FSCM 24161 PN 7469-700. The SOS is S9C.

You don't need the tool, but it makes connecting the belting easier. You can also use a screwdriver or snap-ring pliers to spread the link slot.

Your local command will give you the word on how much—if any—of the belting you carry.

## Tachograph Key

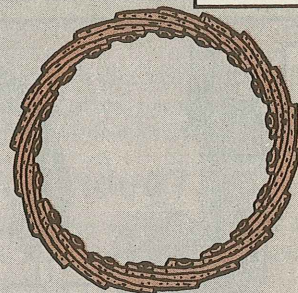
Need a replacement tachograph key? FSCM 59197 and part number 8-127-305-185 get a key that will fit tachographs on all Army vehicles. Routing Identifier Code is AKZ.

## M131A4C Semitrailer

If you need to replace roadside cabinet doors on your M131A4C fuel tank semitrailer, here are the NSN's:

|         |                  |
|---------|------------------|
| Left:   | 2510-01-144-8687 |
| Right:  | 2510-01-143-6952 |
| Center: | 2510-01-143-9516 |

Adjustable  
link belting



## No CLP on Mortars

Lend an ear, mortarmen! You no longer clean and lube your mortars, any mortars, with CLP (Cleaner/Lubricant/Preservative).

Until further word, switch back to RBC for cleaning and PL-S or PL-M oil for lubing on **all** mortar systems. Armament Command (AMCCOM) worldwide letter DRSIMC-MAL-SS(R) (21 Feb 84), Suspension of Use of CLP on Mortar Systems, has the word. Contact your AMCCOM LAR at your nearest LAO.

## M1 Tank Pubs Circular

DA Circular 310-83-SO17 (15 Dec 83) lists the technical publications needed to support the M1 tank, plus information on how to get them. Your pubs people can order it through the regular pubs supply system.

## Tire Repair Kit Reamer

Use NSN 2640-01-101-8355 to get the hole reamer in the tubeless tire repair kit, NSN 2640-00-922-6921. This replaces the reamer listed in SC 2640-98-CL-E01.

☆ U.S. GOVERNMENT PRINTING OFFICE: 1984—759-008/6

SOUNDS LIKE  
YOU JUST WEREN'T  
PREPARED FOR  
THE DESERT!



## Tach Shaft Talk

Need info on replacing the rear flex shaft for your M48A5 or M60-series tank tachometer? Contact your local TACOM Logistics Assistance Representative at the Logistic Assistance Office. Ask for a copy of Field Service Bulletin No. 76 (Jan 84). Or grab a copy TB 43-0001-39-1 (Apr 84) when it hits the streets. Either way, you'll get all the info you need to replace the shaft.

## Brighten Up Your Heater

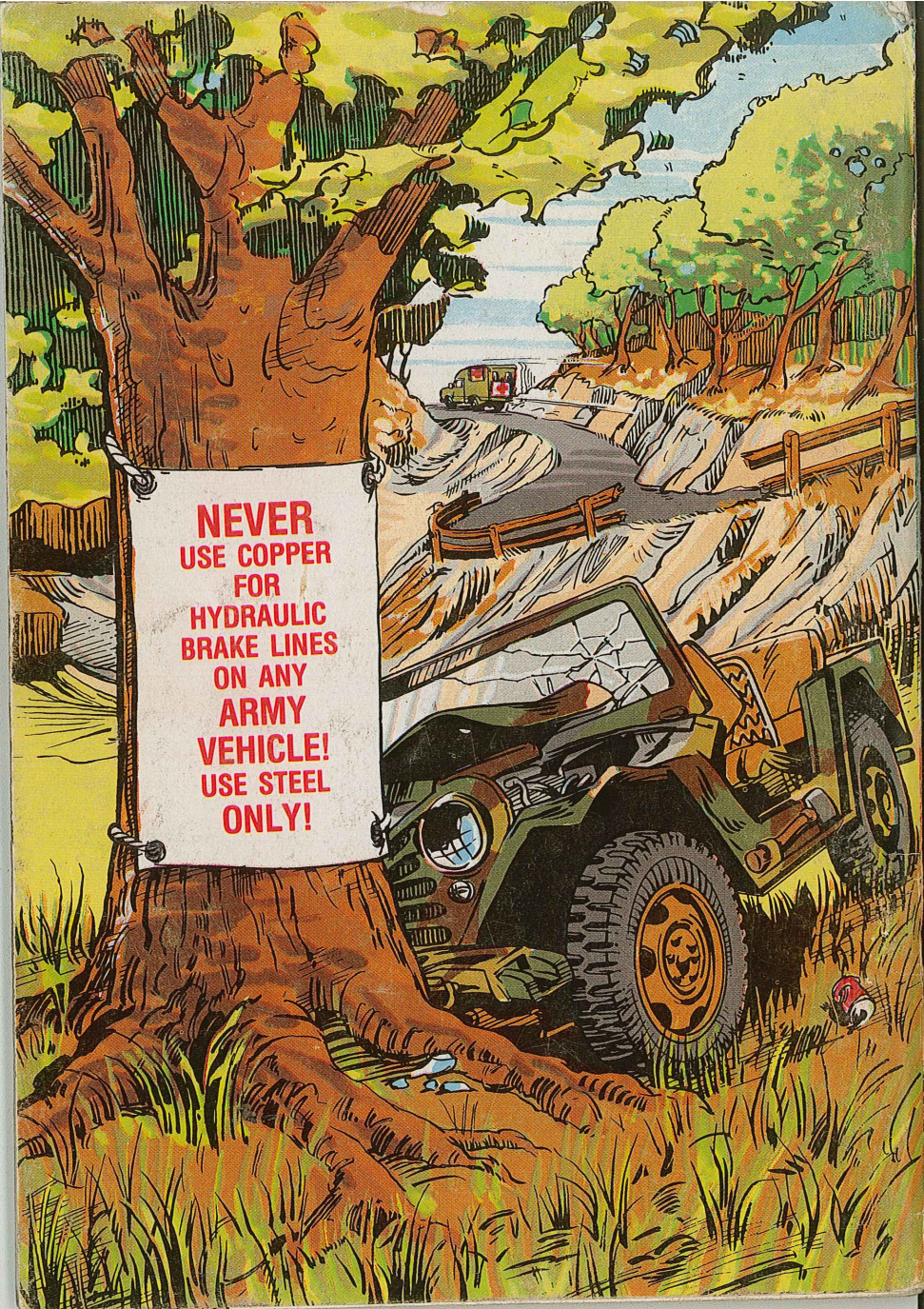
Parts for the M3 heater used with the M13A1 or M8A3 gas particulate filter units aren't in the vehicle's TM. Here's what you can get:

| Item               | NSN              |
|--------------------|------------------|
| Knob               | 5355-00-723-6829 |
| Lens, light        | 6210-00-954-4205 |
| Lamp, incandescent | 6240-00-155-7836 |

Would You Stake Your Life *right now* on

the Condition of Your Equipment?



A cartoon illustration of a military jeep stuck in a ditch. The jeep is green with a white cross on its side, indicating it's a medical vehicle. It's stuck in a deep, muddy ditch with its front end submerged. A large, brown, gnarled tree trunk is on the left, with a white sign nailed to it. The sign has red text that reads: "NEVER USE COPPER FOR HYDRAULIC BRAKE LINES ON ANY ARMY VEHICLE! USE STEEL ONLY!". In the background, another similar jeep is driving away on a road that curves through a hilly, wooded landscape. The sky is blue with some clouds. The overall style is a classic comic book illustration with bold lines and a limited color palette.

**NEVER  
USE COPPER  
FOR  
HYDRAULIC  
BRAKE LINES  
ON ANY  
ARMY  
VEHICLE!  
USE STEEL  
ONLY!**