

Issue 566

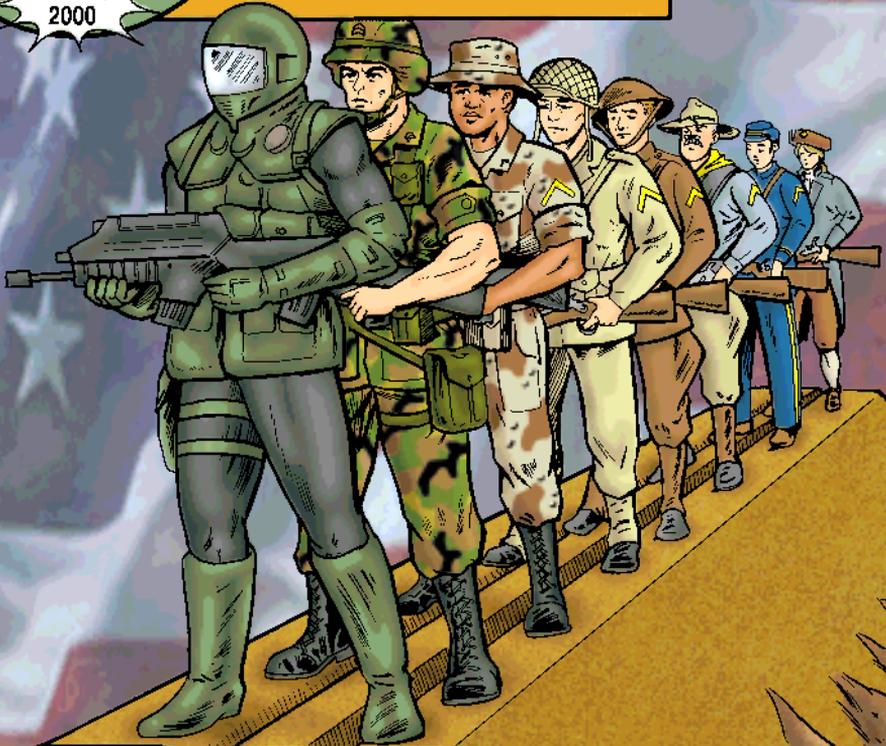
TB 43-PS-566

Approved for  
Public Release;  
Distribution Is  
Unlimited

PS

January  
2000

# THE PREVENTIVE MAINTENANCE MONTHLY



Bugged about PM: The Future  
... See Page 39

# FOD



DON'T LET ME SCREW UP THE WORKS!

MAKE SURE I'M IN YOUR POCKET—NOT THE AIRCRAFT!

DON'T LOSE TRACK OF ME!

PUT ME IN A FOD CONTAINER!

# ONLY YOU CAN PREVENT IT!

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## THE PREVENTIVE MAINTENANCE MONTHLY

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**THE  
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MONTHLY**

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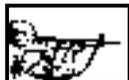
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You are invited to send PS your ideas for improving maintenance procedures, questions on maintenance and supply problems, and questions or comments on material published in PS. Just write to:

**MSG Half-Mast**  
**The Preventive Maintenance Monthly**  
**LOGSA, Bldg. 5307**  
**Redstone Arsenal, AL 35898-7466**

Or E-mail to:  
[psmag@logsa.army.mil](mailto:psmag@logsa.army.mil)

Internet Address:  
<http://www.logsa.army.mil/psmag/pshome.html>

By Order of the Secretary of the Army:

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General, United States Army Chief of Staff

Official:

**JOEL B. HUDSON**

Administrative Assistant to the Secretary of the Army  
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# Why 'PS'?

It's PS, the Preventive Maintenance Monthly, right? So, you ask, why is it PS, not PM? Good question.

PS stands for postscript, like the P.S. you add to a letter.

It's an "Oh, by the way" piece of info. Maybe it's an addition to a technical manual, something that's changed or needs to be changed, but the TM folks haven't gotten around to it yet. Maybe it's a tip on how to improve a tool. Maybe it's a shortcut to solve a problem more efficiently. Maybe it's just that added extra bit of information that fills in the gap and makes your job a little easier.

Most of the info in PS comes from you, our readers. It's the passing on of ways you have found to make things work better, easier, faster, cheaper. You tell us, we check it out and pass it on.

A lot of things have changed in the 49 years we've been publishing PS. The one constant is our mission—to help you maintain and use your equipment. Keeping you up-to-date is why we're here, no matter what you call us.



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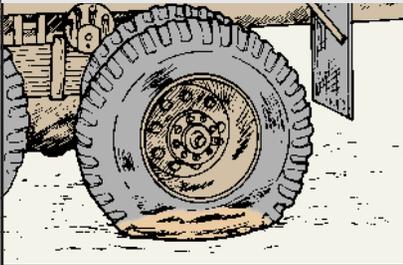
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# Where the Rubber Meets the Road

TO KEEP YOUR WHEELED VEHICLES ROLLING, DRIVERS, YOU'VE GOT TO KEEP A TRAINED EYE ON YOUR TIRES. AFTER ALL, NOTHING ROLLS UNLESS YOUR TIRES DO. TRAIN YOUR EYE TO LOOK FOR THESE PROBLEMS...

## Low pressure

Make sure all tires, including the spare, have plenty of air. If one looks low, put a gauge on it. Add air as necessary before operation, while the tire is cold. You'll get the right amount of air in the tire when it's cold. If the tire is warm or hot, the pressure in the tire will be higher because of the heat, meaning not enough air will be added.



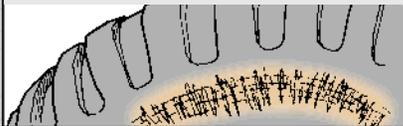
## Flat-makers

Look for nails, metal or rocks dug into the rubber. Find any? Report it.



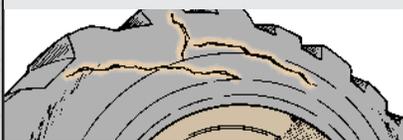
## Abrasions

Tires rubbed raw are a sore sight for good eyes. Abrasions that go through the rubber to the cord or steel below mean you change the tire.



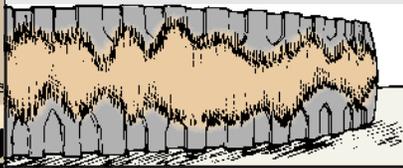
## Cracks

Low tire pressure leads to sidewall cracks. Make sure the crack doesn't go to the cord or steel.



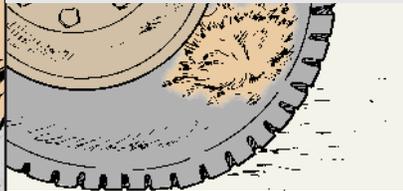
## Overinflation

Look for tires that are worn in the middle. Overinflated tires don't flex enough. The middle of the tire takes all the weight, causing rapid wear. When an overinflated tire hits a large rock or a rut, the cords or steel belts inside snap and break, weakening the tire.



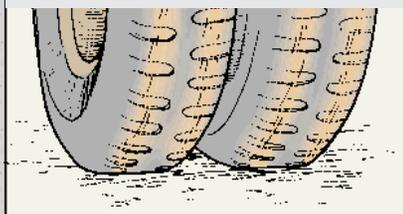
## Wall separations

Most bulges in the sidewall or tread make a tire unserviceable. Radial tires, however, need a closer inspection. Some bulges on radial sidewalls are not defects, but the result of how they are made. Let your mechanic make the decision.



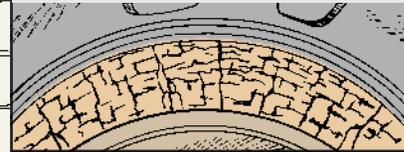
## Underinflation

A sure sign of underinflation is a worn tread at each side of the tire. Underinflated tires flex more than properly inflated tires. The flexing causes heat, which ruins tires.



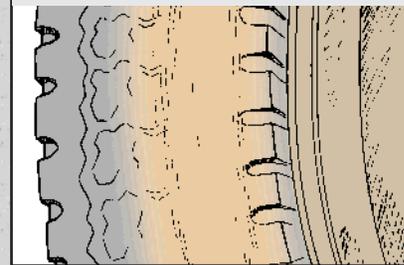
## Weather-checking

Ozone cracks weaken tires. If you find weather-checking that covers large areas of a tire, report it.



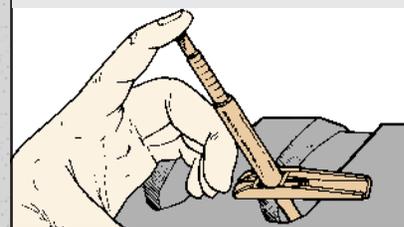
## Wrong caster/camber adjustment

A sure sign of misadjustment is wear on one edge. Tires worn on the inside or outside edge have caster/camber problems. Either way, report it so your mechanic can make adjustments.



## Balding tires

When tire tread gets below a certain height, a tire needs to be replaced. Report any tire you believe to be worn out to your mechanic. He'll measure tread using the wear gauge in the No. 1 and No. 2 Common shop sets to make the final decision.



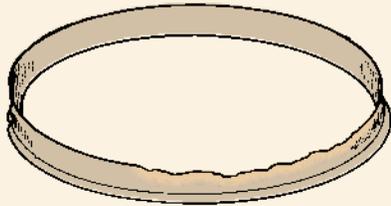
# PM for Split-ring Wheels

Repairing a flat or replacing a tire is the perfect time to inspect split-ring wheels on tactical trucks.

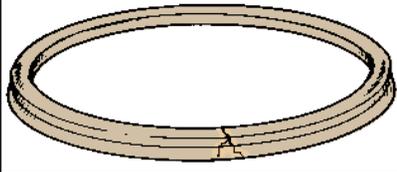
Here's what to look for:

## Split and Lock Rings

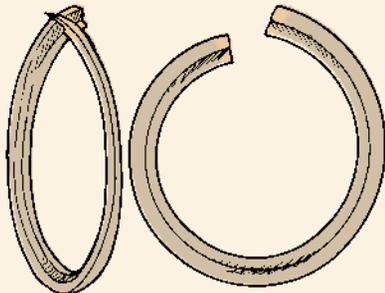
Erosion? Corrosion causes bead seat of lock ring to erode and chip. Then ring won't seat properly, so replace it.



Cracks? Any crack in lock ring means it will break. Don't use it!

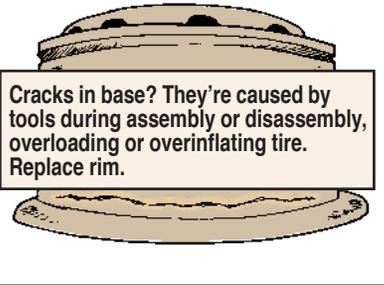


Sprung or out-of-round? Ring won't seat properly into rim. If you find a bum split ring, replace it.

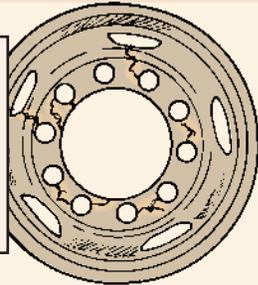


## Wheel Rim

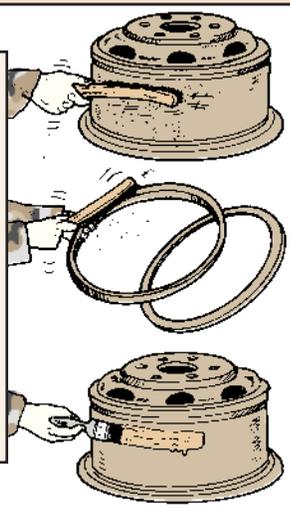
Cracks in base? They're caused by tools during assembly or disassembly, overloading or overinflating tire. Replace rim.



Cracks in disc? They're caused by loose lug nuts or overloading. If you find any damage to rim, replace it.



Rust? Use wire brush to remove it. Then paint rim. If you paint with CARC, refer to TB 43-0242. If you paint with anything besides CARC, see TM 43-0139.



# Transmission-Oil Filter Tips

THAT TAKES CARE OF THAT FILTER.



FILTER? DON'T YOU MEAN FILTERS?!



Like everything else, mechanics, there's a right way to install the transmission oil filter elements on your FMTV. That's right, elements. Plural.

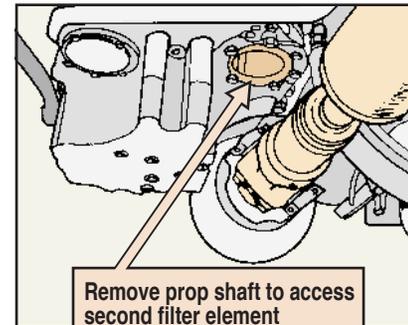
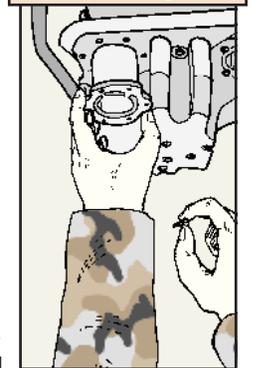
There are **two** oil filter elements that must be changed at each service. One of the elements is easy to get to, but you've got to remove the propeller shaft to reach the other.

Then note this: Do not use the cover screws to draw the cover and element to the sump.

That can break covers, crush elements and pinch seals.

Instead, push the cover and element into the sump and install the six screws finger tight. Then torque the screws in a criss-cross pattern to 38-45 lb-ft.

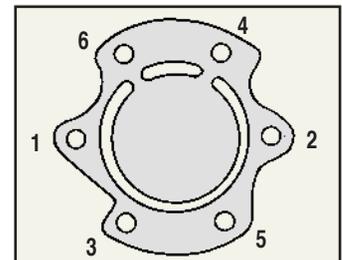
Don't use cover screws to draw cover tight



Remove prop shaft to access second filter element

Don't think you can short-cut the service by skipping the hard-to-get-to element. That won't work. All you're doing is risking transmission failure.

Just as importantly, when you install each element pay attention to the instructions in your truck's -20-3 TM.



Torque screws in criss-cross pattern

## Take a Look at That Plug



**W**hen you FMTV mechanics change a vehicle's transmission oil for the first time, eyeball the magnetic drain plug. It could save a transmission.

The plug is magnetic for a reason. If there are metal particles swimming in the oil, they'll be attracted to the plug. Then they won't be moving around in the oil to mess up something. And, when they're on the plug you can see them, if you look.

Troubleshooting task f20 in your -20-1 TM says to notify your DS if you find metal particles on the drain plug. DS then knows the C6 thrust bearing in your truck's transmission is wearing. DS will make repairs before something really bad happens.

Later, any time you change the transmission oil to meet an AOAP requirement, look closely at the plug. If the plug needs a "shave," include some of the metal particles in your next required sample. Note on the bottle label that particles were found on the plug.

## Keep Door and Window Handles Tight



**G**etting out of a military vehicle is just as important as getting into it, drivers.

So, keep an eye out for loose door and window handles inside your FMTV.

Field reports say these handles don't stay tight for very long when they're used. Eventually, the screws come loose and you're left with no way to open the door except to roll down the window, and maybe no way to roll the window up or down.

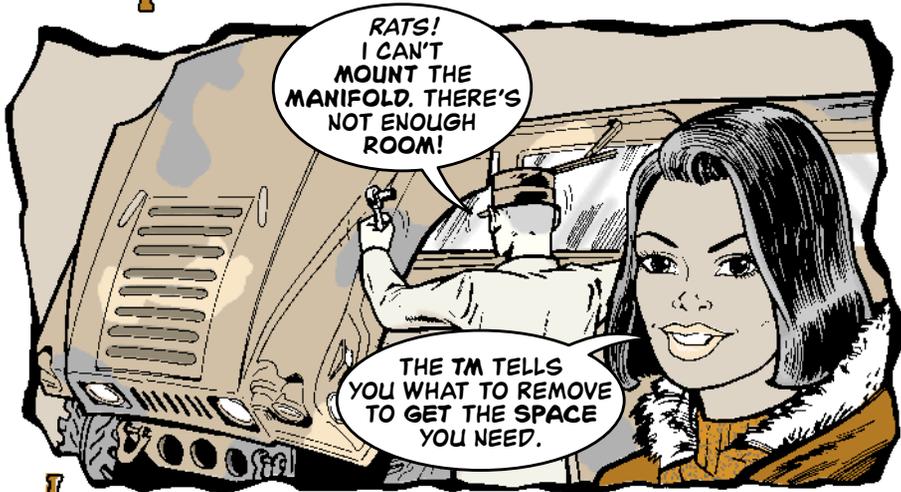
Does your truck already have loose or missing door or window handles? Report it to your mechanic now, before you come up handle-less in an emergency.

Information on door repair and adjustments is found in Paras 16-5 and 16-6 in both TM 9-2320-366-20-4 (for 5-ton models) and TM 9-2320-365-20-4 (for 2<sup>1</sup>/<sub>2</sub>-ton models).

## FMTV Transmission ECU

NSN 2520-01-361-1091 gets the electronic control unit (ECU) for the FMTV's transmission. The NSN shown as Item 6, Fig 103 of TM 9-2320-365-24P and Item 6, Fig 125 of TM 9-2320-366-24P is no longer available.

# Stop Exhaust Manifold Breaks



It's a tough job, but you can mount the exhaust manifolds on a HMMWV engine right, tight and in one piece.

What it takes is patience and experience. Here's what you need to know:

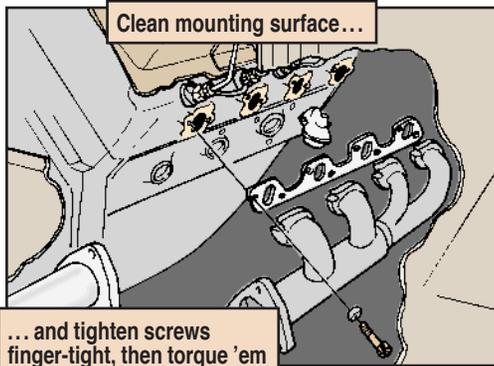
- ❖ Make sure you have enough room to work so the manifold can be mounted properly on the engine head. Remove everything the TM tells you to remove so you have plenty of elbow space.

Working in tight spaces can create leaks and broken flanges as you try to make things fit where there's no room.

- ❖ Clean the head mounting surface and the manifold mating surface. Remove all traces of old gasket material. Leftover gasket material leads to seal leaks and a repeat job you don't need.

- ❖ Finger-tighten all screws and the alternator stud, and then torque them to 25–33 lb-ft.

Alternate the screw and stud tightening. This reduces the strain on manifold flanges and prevents leaks. Flanges often break when each screw is tightened completely before others are snugged up.



# Grounded to a Halt?

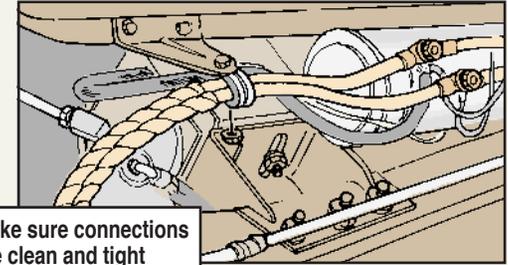
Mechanics, when you first go out to troubleshoot an electric winch that's reportedly busted, take a hard look at its ground point.

That ground point is usually covered in dirt or mud, which means the last time it was checked for a tight, clean connection was not yesterday.

Because electric winches pull a lot of amps in operation, a clean, tight ground connection is required for operation.

Remove the dirt or mud and disconnect the ground strap. Clean the strap and the mounting stud, making sure that all corrosion is removed.

Use a bristle brush, any corrosion-removal compound, rags and lubricating oil to prevent rust's return. Then reinstall the strap, tighten the nut and test the winch.



Chances are, the report that the winch was busted was a bust itself.



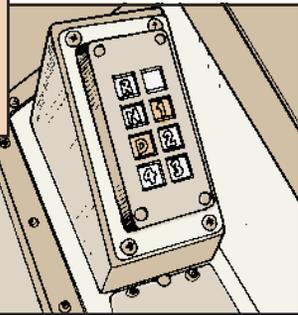
# Operator Lessons Learned

The palletized loading system (PLS) truck is different from anything else the Army has, and operators have learned (often the hard way) that it must be handled differently.

Here are some items you operators should put to memory:

- Never shift the transmission into first gear while the PLS is moving.

Never shift into first gear when PLS is moving

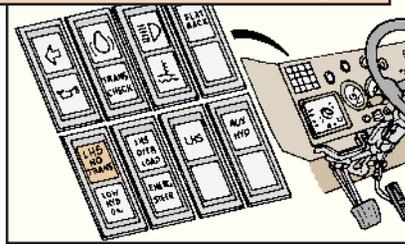


- Keep an eye out for overhead power lines or other obstructions before beginning load handling system (LHS) operations. The LHS hook

reaches a height of 17 feet 2 inches when lifting a standard shipping container.

- Do not back up while the LHS hook arm is attached to a flatrack. A flatrack roller could get caught in a pothole or uneven ground, damaging cylinder rods and the flatrack.
- Never drive the PLS with the LHS NO TRANS light on. When the light

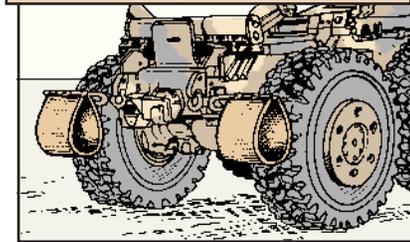
Never drive PLS with NO TRANS light on



is on, the LHS load locks are not engaged and the LHS is not fully stowed. You can lose your load and damage your equipment.

- The mudflaps hang real close to the tires—so close that it’s a good idea to hook ’em up any time you’re traveling in mud or snow. It’s easy for the flaps to “catch” and be pulled over the tires. Be sure to hook ’em before you load a flatrack.

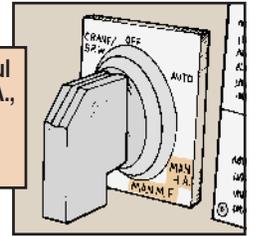
Hook mudflaps up before loading flatrack



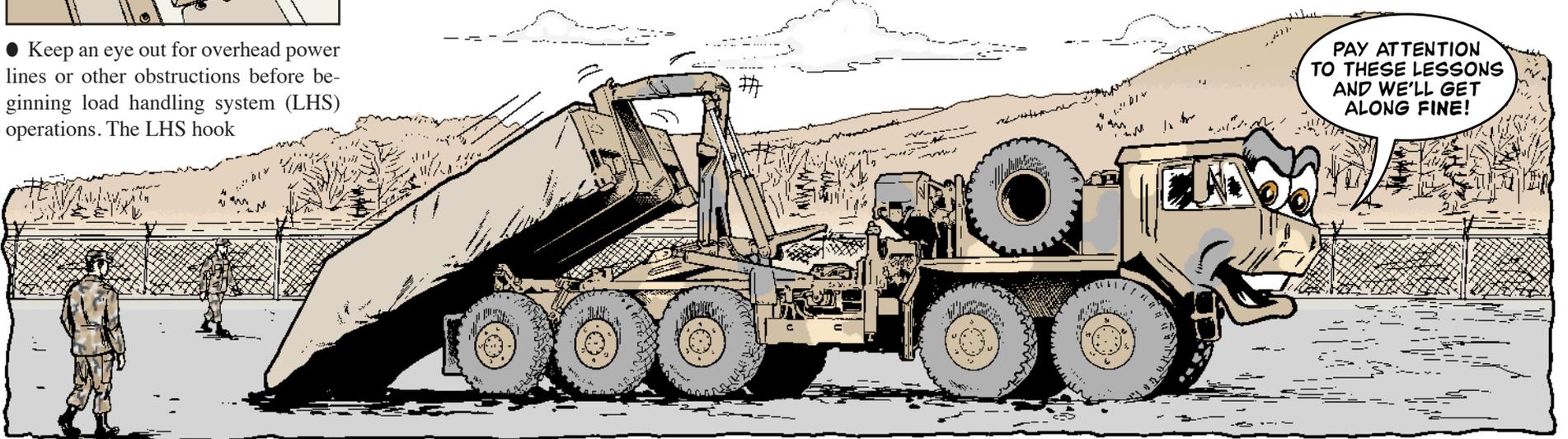
- Do not hold the PLS’ steering wheel at full left or full right for more than 10 seconds. Oil overheating and pump damage can result.

● You must be extra careful when loading and unloading flatracks manually. In MANUAL mode (MAN H.A., MAN M.F. and MAN TRANS), you control every part of the loading and unloading process. You must follow the steps exactly or risk damage. In AUTO mode, the cycle is controlled by the LHS.

Be extra careful using MAN H.A., MAN M.F. and MAN TRANS modes



Keep the instructions in front of you any time you use MANUAL mode. They’ll help you prevent hydraulic seal, hose and cylinder damage, roller damage and hook arm/main frame cylinder damage. See Pages 2-203 through 2-215 in TM 9-2320-364-10 for the details.



# Keep Your Tank Breathing Clean Air

The air induction system on your M1-series tank is like a giant vacuum cleaner—it sucks up anything that gets close.

That's the reason for your tank's seals and filters. They screen out sand and dirt so that only clean air can get through. They also keep out larger debris that can dent, crack or break compressor blades.

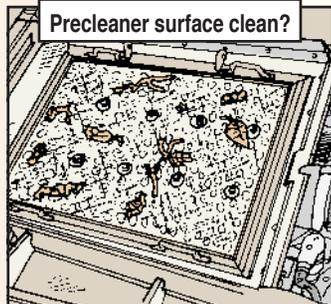
If you want them to continue to stop potential damage, pay special attention to these important PM points:

## Precleaner

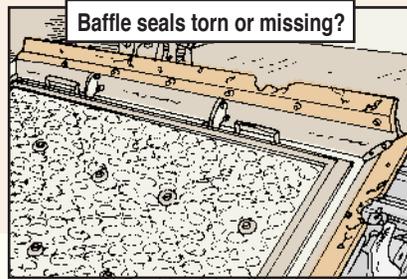
Trees and bushes make a good hiding place for your tank, but they also result in clogged air precleaners.

Leaves that fall on or near the air inlets get sucked onto the precleaner. Enough leaves will cut off airflow and lower power output.

If the AIR CLEANER CLOGGED FILTER light comes on, make the precleaner one of your first checks.

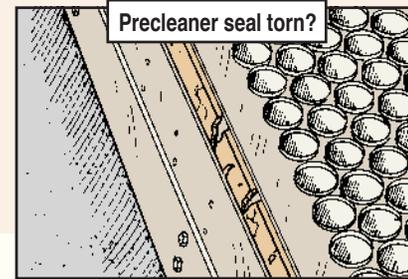


While you're there, take a close look at the baffle seals. Cracked, torn or missing seals allow dirt and oil from the engine to clog the air cleaner assembly element strainers.



NSN 5330-01-225-6106 gets a new short seal. The longer seal is NSN 5330-01-320-3696.

Next, eyeball the bottom precleaner seal. If the seal is missing, loose or



torn, replace it. NSN 5330-01-166-5798 gets a seal for the type A precleaner. The type B precleaner takes NSN 5330-01-329-6614.

A new seal is useless, though, unless you put it on right. Here's how:

1. Clean off the old seal and adhesive completely. To do it right you'll need a lot of elbow grease—combined with a rag, dry cleaning solvent and a wire brush.
2. Spread adhesive, NSN 8040-00-664-4318, in the seal groove. Use enough to hold the seal, but not so much that it squeezes out around the seal. The right amount of adhesive keeps the seal from sticking to the airbox frame and ripping loose every time you remove the precleaner.
3. Apply a very light coat of adhesive to the bottom of the new seal and press it into the groove with your finger. Take extra care not to twist the seal as you put the rounded side in the mounting groove. A twisted seal is not airtight.
4. Let the adhesive dry completely before you put the precleaner back in place. Put a dab of adhesive on a piece of paper. When it's dry, the seal should be, too.

## Skirt Seals

If you're having problems with clogged air cleaner intake filter elements (V-packs), missing fender skirt seals could be the cause. Those rubber strips are there to seal the area between the skirts and hull.



Missing seals allow dirt and dust to be sucked inside the fender skirts. The engine pulls the dirt into the air intake system where it clogs up the V-packs.

All the seals are important, but pay special attention to the seals at skirts 4, 5 and 6 on the left side of the vehicle. These seals are closest to the air intake grills and can let in the most dirt.

NSNs for the seals are listed in Figs 261-264 and 266 of TM 9-2350-255-24P-1 (Oct 92) for the M1, Figs 248-251 and 253 of TM 9-2350-264-24P-1 (Mar 96) for the M1A1, and Figs 235-238 and 240 of TM 9-2350-288-24P-1 (Sep 95) for the M1A2.

### V-Packs

The three V-packs on all tanks not equipped with the pulse jet system (PJS) should be removed, cleaned and inspected after every operation. V-packs on PJS-equipped tanks are self-cleaning. Removing the V-packs on these tanks will ruin the system.

The preferred cleaning method is the V-pack cleaning wand. You'll find info on the wand in the "unusual conditions" section of your -10-2 TM's operating instructions.

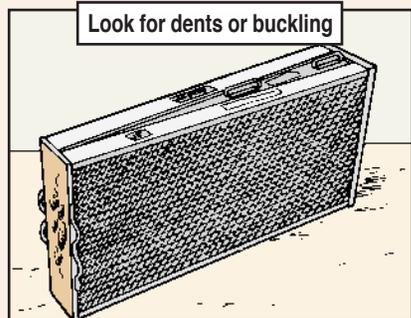


If the cleaning wand isn't available, shake the V-packs, making sure not to hit them against anything harder than your hand. Brush dirt and dust from the elements with your hand. Then, have the elements properly cleaned by your unit maintenance folks as soon as possible.



While the V-packs are out, inspect the plenum box and elements for potential problems:

- ◆ Eyeball the bead on the front face of each V-pack element for dents or sharp edges that could cut the plenum box seal. Then check for buckling on the rear face of the element. Either problem means you need a new V-pack.
- ◆ Look for broken welds and cracks in the plenum air box. Dust trails along the welds and seams of the box are



a good sign of a leak, so tell your mechanic.

- ◆ Look for torn, cracked or missing plenum box seals. A missing seal makes your tank NMC.

Those three seals also deteriorate over time, so check each one by measuring the depth of the depression made by the V-pack bead in the seal. If the depression measures more than  $\frac{3}{16}$  inch, get the plenum box seal replaced.

Here's another way to check the seals:

1. Apply chalk to the raised portion of the V-pack bead.
2. Install the V-pack and secure the holding clamp.
3. Remove the V-pack and eyeball the plenum box seal. There should be a complete chalk line around the seal from contact with the V-pack bead.

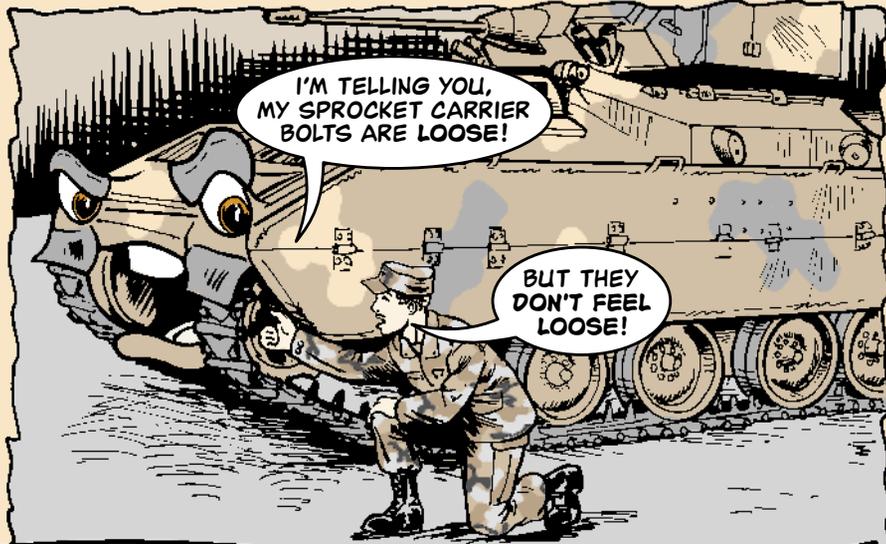


If the chalk line is broken, the V-pack may not be sealing correctly. So, get your mechanic to install a new seal, NSN 5330-01-098-6807. Remember to wipe the chalk off the V-pack bead and seal after testing.

This method works especially well if you are putting new V-packs in **without** replacing the plenum box seals. But, it's a good idea to put in new seals along with the new V-packs whenever possible.



# Keep Carrier Bolts on the Mark



Dear Editor,

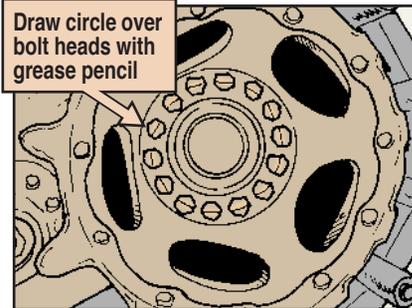
Crewmen are supposed to keep a sharp eye out for loose sprocket carrier bolts on all M2/M3-series Bradleys.

But unless the bolts have loosened enough to move with your fingers, it's hard to tell a tight bolt from one that's just started coming loose.

A simple grease pencil solves this problem. After the bolts are torqued in place, we use the grease pencil to draw a line over each bolt head, forming a circle all the way around the face of the sprocket carrier.

If one of the bolts comes loose, the line on the bolt head moves and is easy to spot.

SFC Duaine Buck  
3/3d ACR  
Ft Carson, CO



FROM THE DESK OF THE Editor 

We give you high marks for that idea!

# DU Help for You

BECAUSE OF ITS STRENGTH, DEPLETED URANIUM -DU- IS USED TO MAKE THE ARMOR FOR SOME M1 TANKS AND AMMO ROUNDS FOR THE M1 AND BRADLEY. DU IS NOT HIGHLY TOXIC UNLESS THE METAL JACKET OR STEEL ARMOR ENCLOSING THE DU IS RUPTURED. THEN THE RADIATION CAN BE HAZARDOUS.

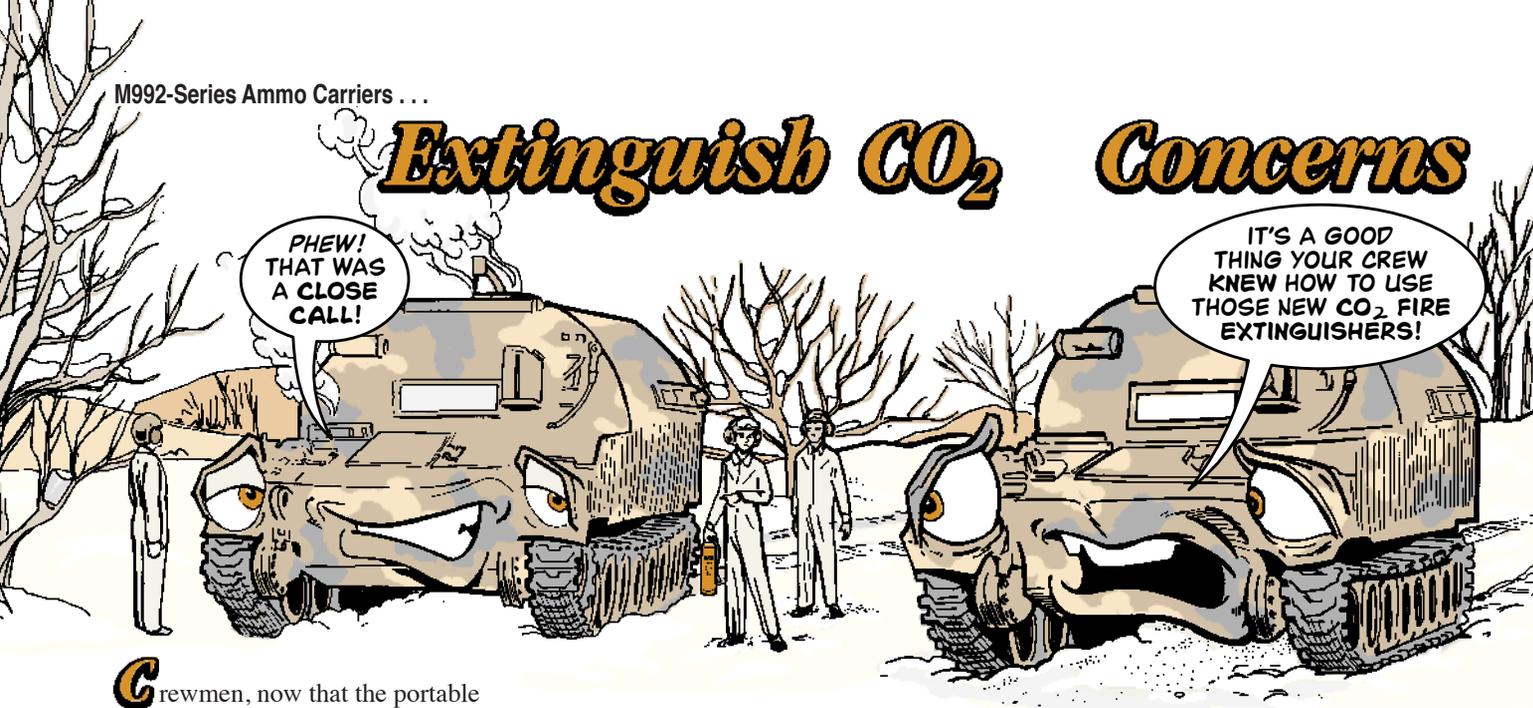


You can tell if your tank's armor has DU by checking its serial number. If it ends with a U, it's DU. Bradley M919 ammo rounds are DU, as are the M1/IPMI's M900, M833 and M874 ammo and the M1A1/M1A2's M829, M829A1, and M829A2 ammo rounds.

If your unit's vehicles have DU armor or use DU rounds, order TB 9-1300-278, which gives the lowdown on handling DU safely.

If you have questions about DU, call the Radioactive Waste Disposal Office at TACOM-Rock Island, DSN 793-2989 or (309) 782-2989.

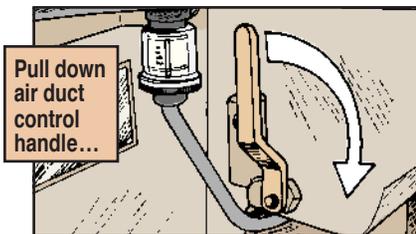
# Extinguish CO<sub>2</sub> Concerns



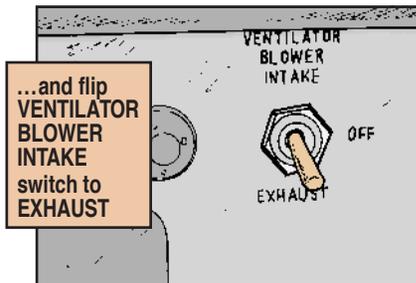
Crewmen, now that the portable fire extinguisher in your ammo carrier is filled with carbon dioxide (CO<sub>2</sub>) instead of Halon, you've got a whole new set of safety concerns.

If they're not used right, CO<sub>2</sub> extinguishers pose some dangers—including severe frostbite and suffocation. So, follow these tips for safe CO<sub>2</sub> use:

1. Shout a warning to all crewmembers before using the fire extinguisher.
2. After hearing the warning, the driver should pull down the air duct control

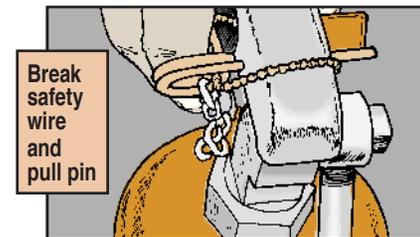


handle to open the vent door and turn the VENTILATOR BLOWER INTAKE switch to EXHAUST.



If the vent door doesn't open, or the blower motor doesn't work, open all hatches and doors to reduce the concentration of CO<sub>2</sub>.

3. Pull the two latches to release the fire extinguisher.
4. Break the plastic safety wire and remove the ring pin.



5. Aim the discharge nozzle at the base of the flame and squeeze the trigger until the fire is out.

Once you've begun using the extinguisher, avoid breathing the CO<sub>2</sub>. It causes rapid breathing, loss of consciousness and suffocation.

Keep your hands away from the nozzle to avoid frostbite and exit the vehicle as soon as possible.

6. Continue ventilating the vehicle until it's clear of all smoke, fumes and CO<sub>2</sub>.

## Don't Bet Your Life!

Crewmen, checking the track on your M113-series vehicle is a life or death matter.

Several soldiers have been killed in recent accidents because they didn't follow the suspension system PMCS in their -10 TMs. Those TMs spell out critical maintenance checks and deadlining information, such as:

- Never extend the track adjuster more than 17 inches or it may buckle during operation.
- Use the track and sprocket gauge, NSN 5220-01-041-9920, to check wear limits for sprockets and cushions.
- Eyeball roadwheels, idler wheels and hubs for rubber chunking, loose hardware, and proper lubrication.
- Check shock absorbers for heat, leaks and loose or missing bolts after every operation.

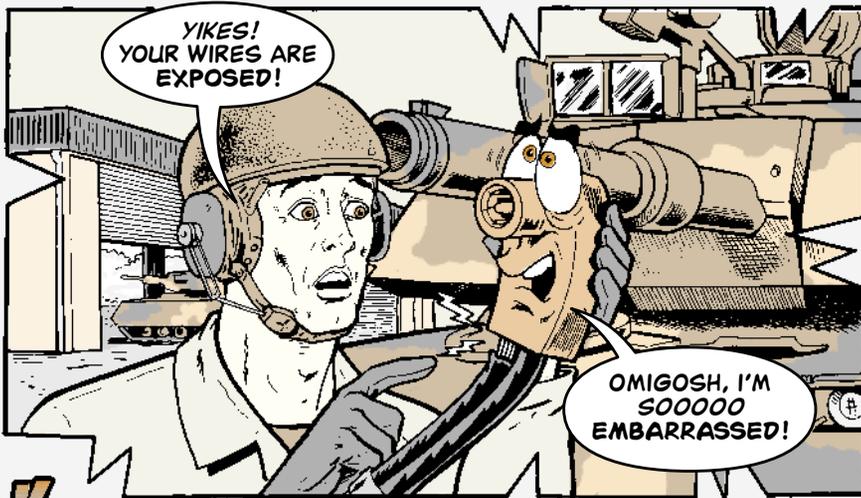
All of these are after-operation checks, but it's a good idea to do them before operating your vehicle, too. In fact, the following warning will soon be added to your -10 TMs:

### WARNING

**Bad track has killed/injured. Do these checks before and after vehicle operation.**

Even when you've checked your track, accidents still happen. That's the reason for the thrown track warning at the front of your -10 TM. Learn and practice the instructions in the warning so you'll know **exactly** what to do in the event of a thrown track.

# BE FREE OF 'SLAVE



**K**nowing how to use the NATO slave cable is important, but knowing how to fix a broken cable is even better.

NSN 6150-00-398-6527 gets a cable *without* end connectors

NSN 6150-01-022-6004 gets a cable *with* end connectors

NSN 5935-00-567-0128 gets one end connector

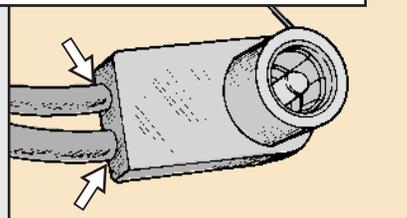
NSN 5935-00-322-8959 gets a connector adapter for each end to fit two-hole receptacles (two come with complete cable)

## Shock Stopper

Before slaving your vehicle, eyeball where the wiring goes into the end connector. Look for bare or exposed wires where insulation has pulled back from the connector housing.

You'll get a real charge from your slave cable if you touch one of those

Check here for bare or exposed wires



# CABLE PROBLEMS'

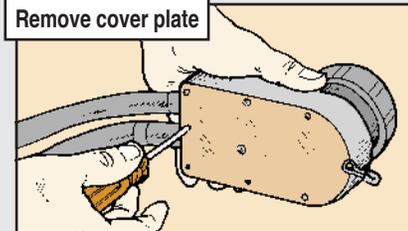
bare wires while you're hooking up. Here's how to make it safe again:

1. Remove the connector's back plate, then disconnect the cable from the connector.
2. Cut off the terminal lugs. Strip back just enough insulation to put on new terminal lugs, NSN 5940-00-115-5004.
3. Reconnect the cables to the connector. Make sure the positive lead (+) is reconnected to the center post and the negative lead (-) is reconnected to the negative cup of the connector.
4. Reassemble the connector.

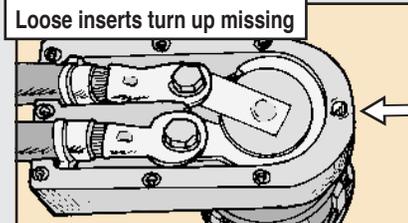
## Connector Cover Fix

If the connector inserts pull out, the cover won't seal tight. Water gets inside and corrodes the cables. Fix loose insert problems like this:

1. Remove the cover.



2. Remove the loose inserts by threading in a screw and gently wiggling each



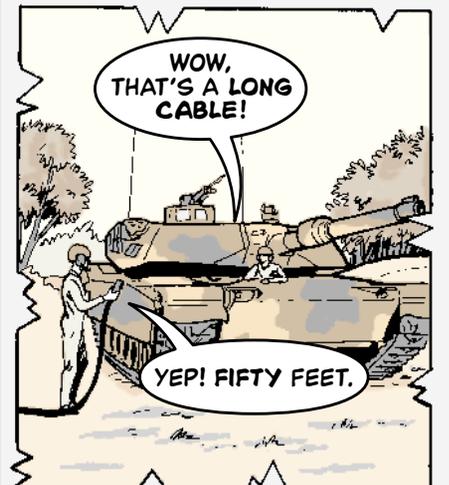
insert until it comes out the body of the connector.

3. Fill each hole about halfway with silicone adhesive caulk, NSN 8040-00-865-8991.
4. Press the inserts back into their holes, making sure they're flush with the surface of the connector.
5. Run a thin bead of silicone adhesive caulk around the connector and screw down the cover. Wipe off any caulk that oozes out. Let the caulk cure for an hour or two before using the cable.

To get back into the connector the next time, remove the screws and use a sharp knife to cut the caulk.

## Longer Version

Solve your long-distance slaving problems with the 50-ft power cable, NSN 6150-01-310-1829. It comes with NATO connectors and covers.



# Your Minefield Insurance Policy

MY INSURANCE AGENT SAYS MY NEW POLICY COVERS EVERYTHING.

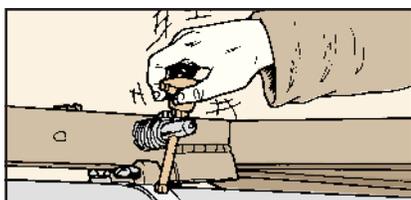
EVEN MINEFIELDS?

THAT'S WHERE I COME IN! GOOD PM IS THE ONLY INSURANCE I NEED!

If you're operating in areas that have been mined, you should appreciate your MK-155 mine clearance line charge (MICLIC). It's your best insurance against being blown up. But you need to keep your MICLIC policy paid up with PM. Here's how:

### PMCS

Make sure the hand knobs on the launcher rail move in and out freely. They often get bent during use. If the

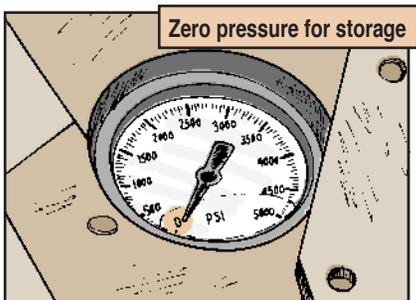


Hand knobs move in and out freely?

knobs can't be screwed all the way down, you can't mount the rocket. Your repairman can replace bent knobs.

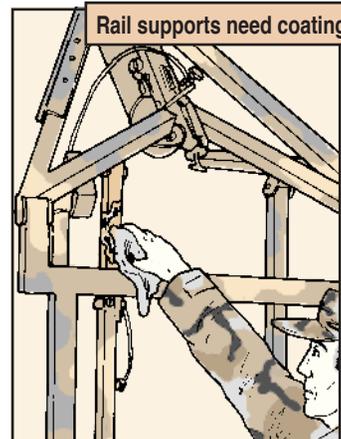
### Storage

If you leave the pump pumped up during storage, the pressure wears out the pump fast. So, hit the release valve and raise and lower the launcher rail until the pressure is 0.



Zero pressure for storage

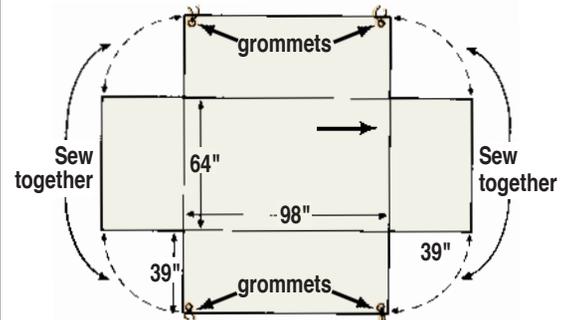
Don't let the MICLIC sit for weeks without attention. Rust can lock it up. Follow the lube chart on Page 3-1 in TM 9-1375-215-13&P and pay special attention to the two launcher rail supports. They need a coating of OHT before you park and leave the MICLIC.



Rail supports need coating of OHT

At least weekly, raise and lower the launcher rail to make sure it's moving smoothly. Relube the supports if necessary.

Don't leave the MICLIC uncovered. Rain can wash out lubricants and also get in the hydraulic pump and ruin it. You can have your canvas shop make a cover for your MICLIC with this pattern:

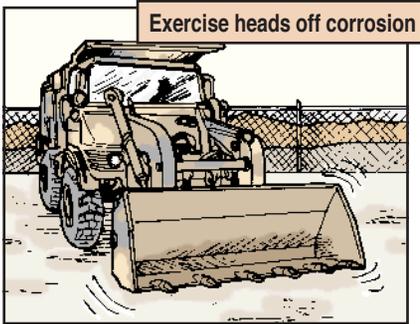


If that's not possible, use a cover from something like a 1 1/2-ton trailer.

# Circulate the Hydraulic Oil

Operators, everyone knows that exercise is good for you...look what it's done for Sammy Sosa and Mark McGwire.

It's good for the SEE, too. Exercise heads off hydraulic system corrosion, keeps the hydraulic system moving freely and lubes seals. It also heats up the oil and creates friction between moving parts. Friction creates heat that gets rid of water that collects in the oil from condensation.



Left alone, that water reacts with the oil to form acid. Acid causes rust, breaks down filter elements and damages valves and seals. You'll get leaks, pressure loss and vehicle breakdown.

Your tractor needs exercise about once a month.

Start by warming up the engine—idle at 750 rpm for 3–5 minutes. That's like the stretching you do before exercising.

Then, move on to the exercise. Operate the SEE for 30 minutes. Be sure to move every control, valve and lever that operates the tractor's backhoe and

front loader bucket. That'll circulate oil through every line and cylinder.

Finally, don't just shut down the SEE, cool it down. Idle the engine at 750 rpm for a 3–5 minutes while the engine cools.

## Remember Filters

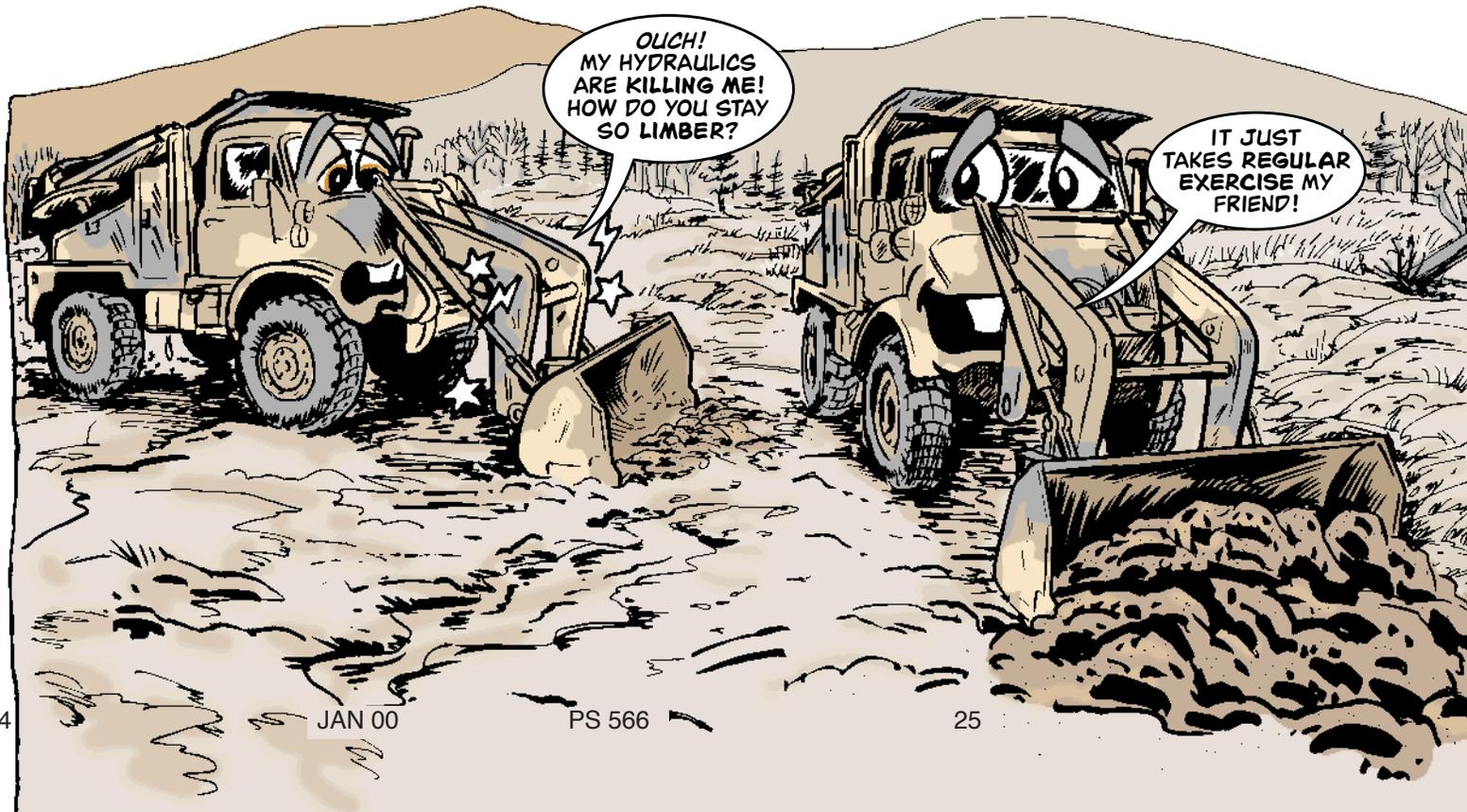
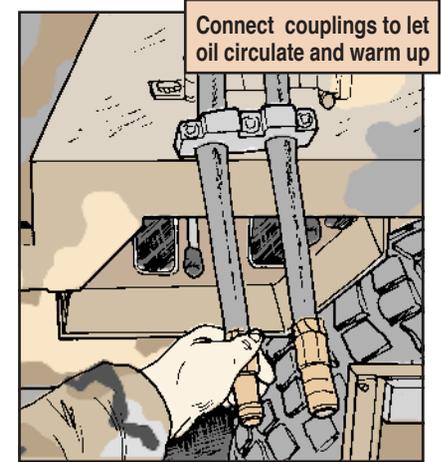
Regular exercise doesn't mean you can forget the filters on the hydraulic tanks for the backhoe and front loader bucket. Your mechanic needs to change the filters during scheduled services or when the red indicator button pops up on the service filter indicator.

If your SEE is going to be stored for several months, your mechanic should follow the storage procedure on Page 2-36 of TM 5-2420-224-20-1.

## Auxiliary Tool Warmup

In cold weather, extend the SEE's warmup to the hydraulic oil for the tractor's auxiliary tools.

Before operation, preheat the oil by connecting the two auxiliary hose quick disconnect couplings. Let the oil circulate and warm up for a few minutes. That way the auxiliary tools will operate smoothly right away.



# Keep Transmission

**A**n AOAP report just came back from the lab. It says the transmission fluid in your dozer is contaminated with metal shavings.

What gives? You always change the transmission's primary filter.

What gives is a clogged screen in the transmission system's magnetic strainer.

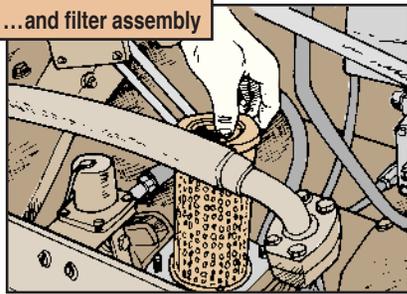
A clogged screen restricts oil flow in your D7G's transmission. The result is wear and tear in the engine and transmission, and a bad AOAP report.

Cleaning the screen and magnets is a 250-hour service in LO 5-2410-237-12 and TM 5-2410-237-20.

- Here's how:
1. Remove the cover and spring, then remove the filter assembly.



Remove cover...



...and filter assembly

**METAL SHAVINGS!?**

**BUT I JUST CHANGED THE PRIMARY FILTER!**

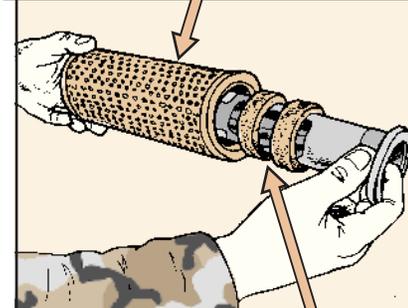
**DID YOU CHECK MY MAGNETIC STRAINER?**

AOAP

# Filter Clean

2. If you're in the motor pool, steam clean the screen and magnets, and then dry them with pressurized air. In the field, wash the screen in P-D-680 dry cleaning solvent. Clean the magnets with a stiff bristle brush. Don't use a **wire** brush! That can scratch or demagnetize them. And, don't drop or tap the magnets. That can demagnetize or break them.

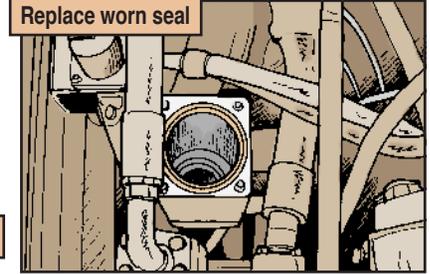
Wash screen in P-D-680 dry cleaning solvent



Use stiff bristle brush to remove shavings

3. Check the cover seal for cracks, tears or mashed edges. If you find any, replace the seal, NSN 5330-00-863-5549.

Replace worn seal



4. Install the magnets, screen, spring and cover, in that order. Torque the cover nuts to 31-34 lb-ft dry (no oil) or 23-25 lb-ft wet (threads lubed with oil).

5. With the engine running and the transmission in neutral, pull the dipstick to measure the oil level. Add oil to bring it to the FULL mark on the dipstick.

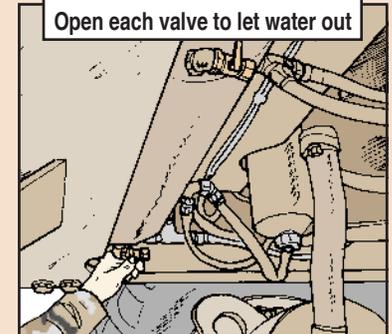
# Bleed the Brakes

**O**perators, you've got to bleed your 130G graders' air brakes each day after use.

If you forget, moisture in the air lines leads to corrosion. Corrosion plugs up brake valves and cylinders and leads to brake failure.

So drain the water from each air tank at the end of the day. Just open each tank's valve until no more water comes out. Close the valve tightly when you're done.

Open each valve to let water out



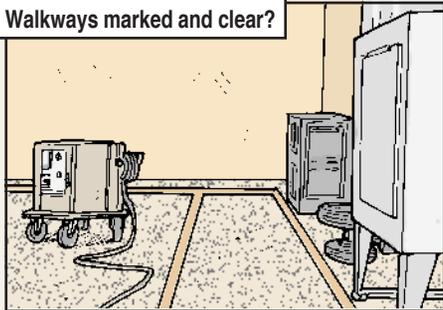
# Keep Hangers Clean and Organized

**T**here's never enough time to do everything that needs doing in your hangar. Would you believe that taking a few minutes to answer these questions and take corrective action could save you hours of aggravation? Here are the questions to ask as you walk around your hangar:

**Are the aisles clear and walkways marked?**

Stumbling and stepping over cowlings and other parts is hazardous to your health. Mark areas for walkways and keep equipment out of them.

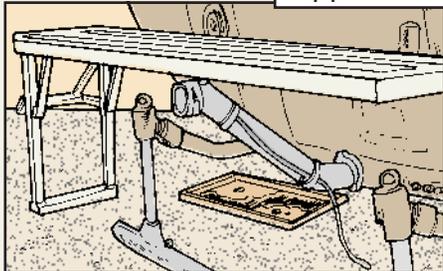
Walkways marked and clear?



**Are drip pans in use?**

Sure, you always take care of oil spills with sweeping compound as soon as you can, but a pan takes care of the mess before it happens.

Drip pans in use?



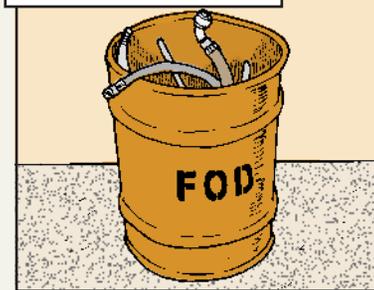
**Are oily rags in a self-closing metal can? Is the can emptied daily?**

Chemical-soaked rags can cause fires and produce harmful fumes. It's not enough to keep them in a container. A self-closing lid is a must.

**Do you have a metal container labeled FOD? Is it easy to get to?**

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

Container for FOD marked?

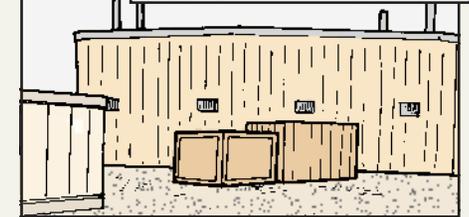


**Are weatherproof items outside the hangar?**

Not everything needs to be inside. Keep your hangar uncluttered

by using outside space for things that can stay outside, like shipping containers.

Shipping containers kept outside?



**Are fire extinguishers handy and ready to use?**

Make sure all fire extinguishers are fully charged, and their inspection dates are current. For fire prevention, NSN 4210-00-257-5343 gets a 20-lb fire extinguisher and mounting bracket.

**Have you prevented static electricity?**

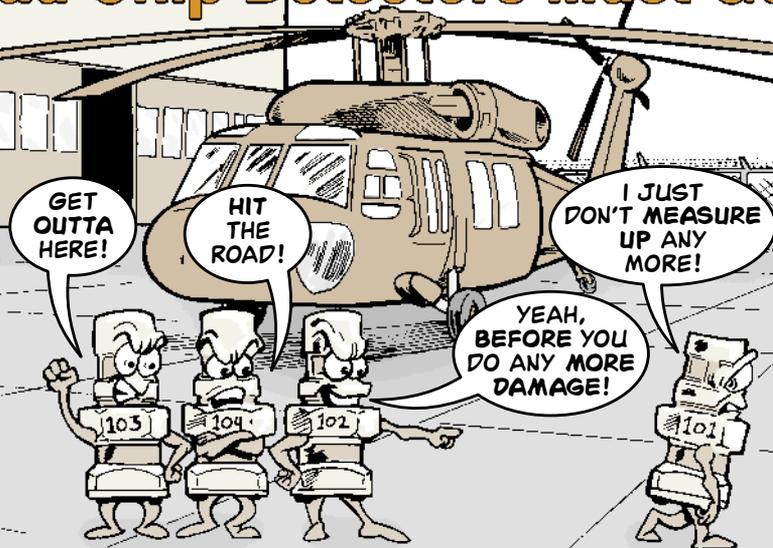
If there's a leak in an aircraft fuel system, a spark can ignite the fumes. To stop sparks, all aircraft must be grounded. If there's a chance of someone tripping over the grounding wire, make it more visible with red tape.

**Is your powered ground support equipment parked out of the way?**

Paint lines on the floor to reserve parking places for your ground support equipment. Reserve places for jacks, maintenance stands, and ground-handling wheels, too.

How'd you do on the questions? Remember, there's always room for improvement. A clean, well-organized hangar is a safe place to work, and a sign of a first-class maintenance operation.

# Bad Chip Detectors Must Go!



**D**o **NOT** use chip detector, part number (PN) 70351-08249-101, in the UH-60A/L accessory module or in the UH-60L input module. Its probe is too short to open the self-closing valves in these modules. That means oil and metal chips do not pass the detector. The result is that there may be delayed warning of an impending failure of an internal component.

Dispose of all on-hand stock of the bad chip detectors and inspect all Black Hawks to see if any are installed. The bad chip detectors have PN 70351-08249-101 stamped on the electronics pod attached to the end of the chip detector cable. The vendor number—G5034—is stamped on the end of the chip detector probe.

If you find bad chip detectors, replace them. The current TM 1-1520-237-23P-2 (Nov 98), shows PN 70351-08249-103 (NSN 1615-01-263-8725) as the replacement. But, PN 70351-08249-102 (NSN 1615-01-106-1944) is also OK.

The TM will soon be updated to add PN 70351-08249-104 (NSN 1615-01-459-7960) and the following:

### **CAUTION**

*Do not use PN 70351-08249-101 chip detector. If installed, replace with chip detector PN 70351-08249-104.*



<b>Subject</b>	<b>Issue/Pg</b>	<b>Subject</b>	<b>Issue/Pg</b>
M68 Sight—Remove for storage	562 45	TAMMS input	556 51
Sight adjustment	565 38	Transport case manufacturer number	565 61
<b>CARC</b>		ULLS—Computer transport cases	562 60
Spot painting information	557 53	ULLS—System care	560 58
Unit ID marking colors	563 7	ULLS-G—AMSS reports	555 56
<b>CARRIER, AMMO, M992</b>		<b>CONCERTINA WIRE</b>	
APU filter wing nut	59 22	Posts, gloves	564 57
APU hydraulic check valve	561 20	<b>CONSTRUCTION EQUIPMENT</b>	
Engine access grill support	554 21	Fuel filter cleaning	559 24
Gear shift grease fittin	557 21	Hydraulic cylinder exercise	555 26
Radiator shroud shields	554 22	Parking in cold weather	564 22
Rear door knob staking	557 21	Tire PM	562 26
Roadwheel grease fitting cap	564 21	Tire cage for largest tires	555 7
Starter NSN	554 21	Tire tread direction	561 22
Vaneaxial fan differences	555 21	<b>COOLING SYSTEMS</b>	
<b>CARRIER, PERSONNEL, M113 FOV</b>		Antifreeze NSNs changed	559 61
Antifreeze drain extension	560 15	<b>COTS</b>	
Driver's hatch bumper	554 20	Aluminum—Rivets, straps, cover	564 56
Exhaust system clamps	561 17	Insect netting	562 55
M1068—Rubber floor matting	555 20	<b>CRANES</b>	
M113A2—Engine wiring harness clamps	565 15	Grove 22-Ton—Cab handholds	558 26
M113A2—Slobber cup draining	559 16	P&H 25-ton—Alternator	559 26
M113A3—Steer lock conversion	561 17	<b>DECON</b>	
M113A3—Transmission oil pressure unit	565 15	M12A1—Exhaust extensions, fuel, starting	563 44
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<b>TRUCK, PALLETIZED LOADING SYSTEM</b>		TOW launcher loading, MILES	556 40
Aftercooler filter, winch drum, CTIS tube	562 7	Tan-colored tarp	557 16
Air brake chamber	562 61	Track guard bolts	555 17
Air cleaner stud NSN	556 7	Turret fan box attachment	560 13
CTIS circuit breaker	562 61	<b>VEHICLE, RECOVERY, M88A1</b>	
Fuel tank check valve	562 61	Boom winch cable	559 20
Headlight assembly	562 61	Generator vent	558 19
Hydraulic pump fittings	560 61	Heat diversion addition	554 61
M1074—Fuel tank check valve	562 6	Main winch Cable	562 16
M1076 PLS—Tow ring assembly	555 8	Roadwheel, road arm lubing	563 19
M1077 Flatrack—Stowage box repair	555 8	Roadwheel nut troque	565 61
<b>TRUCKS, GENERAL</b>		Steering linkage lube	557 20
Air line alcohol evaporator	564 11	Track fender hinges	559 21
Antifreeze NSNs changed	559 61	Track inspection	561 18
Brake cylinder boot leak checks	563 5	<b>VEHICLE, RECOVERY, M88A2</b>	
CTIS extension valve	557 11	Oil changes, auxiliary winch	560 16
Dump hydraulic cylinder leakage	564 26	Oil samples, filters, winch	556 16
Fuel tanker grounding and bonding	562 10	Winch cable retrieval	558 18
Fuel tanker—Grounding	555 9	<b>VEHICLES, GENERAL</b>	
Hydraulic dump cylinder leakage	564 26	A-20 Global replacement heaters	564 20
Hydraulic seals damaged by paint	556 8	Antifreeze NSNs changed	559 61
JP-8 fuel use	556 9	Antifreeze & battery tester check	564 6
Motor vehicle tow bar checks	559 10	Compressed air can for optics cleaning	555 21
NATO slave receptacle cover	565 5	JP-8 fuel use	556 9
Radiator testing kit adapter kit	565 7	Key ring NSNs	559 61
Rear reflective decals	555 5	Lead-Acid battery care	564 2
Rubber buffing fluid NSNs for tire repairs	560 10	Lead-Acid battery care	564 8
Rubber preservatives allowed	556 4	Lubrication in desert conditions	560 2
Tire chain NSNs	562 9	Petroleum center POCs	559 9
Tire pressure gauge	557 11	Rubber buffing fluid NSNs for tire repairs	560 10
Trailer backing techniques	561 2	Stewart-Warner heater—Burner repair kit	564 19
Turn signal control	555 3	Tire cage for largest tires	555 7
Unit ID marking colors	563 7	Trailer backing techniques	561 2
Wheel lifts	563 11	Unit ID marking colors	563 7
Wheel weights for balancing	555 6	Winter driving techniques	554 2
Window cleaning	561 11	<b>WATER PURIFICATION UNITS</b>	
Winter driving techniques	554 2	Repair kit for fabric tanks	564 58
<b>VEHICLE, FIGHTING, M2/M3 BRADLEY</b>		<b>WATERCRAFT</b>	
Armor tile brush guard mounting holes	561 14	LCU-2000—Oil change interval change	557 61

# Bugged About PM: *THE FUTURE*

GREETINGS AGAIN. REMEMBER ME? WE MET HERE LAST MONTH. I'M A MILLENNIUM BUG. NO, NOT THAT ORNERY Y2K CRITTER. I'M THE YPM BUG.

## WHY PREVENTIVE MAINTENANCE?

AT THE START OF EVERY MILLENNIUM ONE OF MY FAMILY SHOWS UP TO ANSWER THE QUESTION, "WHY PREVENTIVE MAINTENANCE?"

LAST MONTH YOU MET MY FATHER AND HE TOLD YOU ABOUT THE LAST THOUSAND YEARS OF PM. NOW IT'S MY TURN TO TAKE CENTER STAGE AND TALK TO YOU ABOUT THE FUTURE.

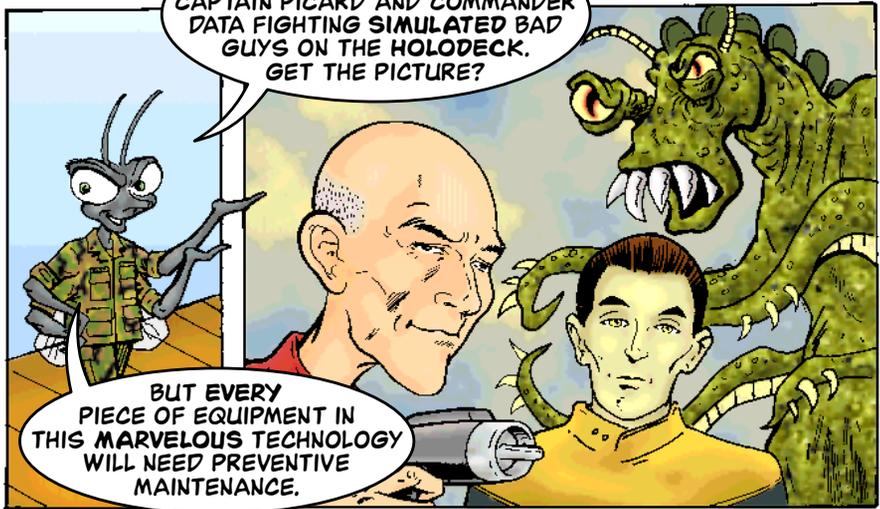
NO, I'M NOT CLAIRVOYANT. BUT BASED ON THE PRESENT, I CAN PEEK AROUND THE CORNER AND GIVE YOU AN EDUCATED GUESS ABOUT THE NEXT 20 YEARS—THE YEARS YOU'LL BE DOING MAINTENANCE!

A GREAT DEAL OF TRAINING FOR FUTURE BATTLES WILL TAKE PLACE INSIDE THE CLASSROOM USING MODELING AND SIMULATION TECHNOLOGIES. THESE TECHNOLOGIES WILL CREATE VERISIMILITUDE—A BIG WORD THAT MEANS EVEN THOUGH IT'S FAKE, IT WILL SEEM REAL.

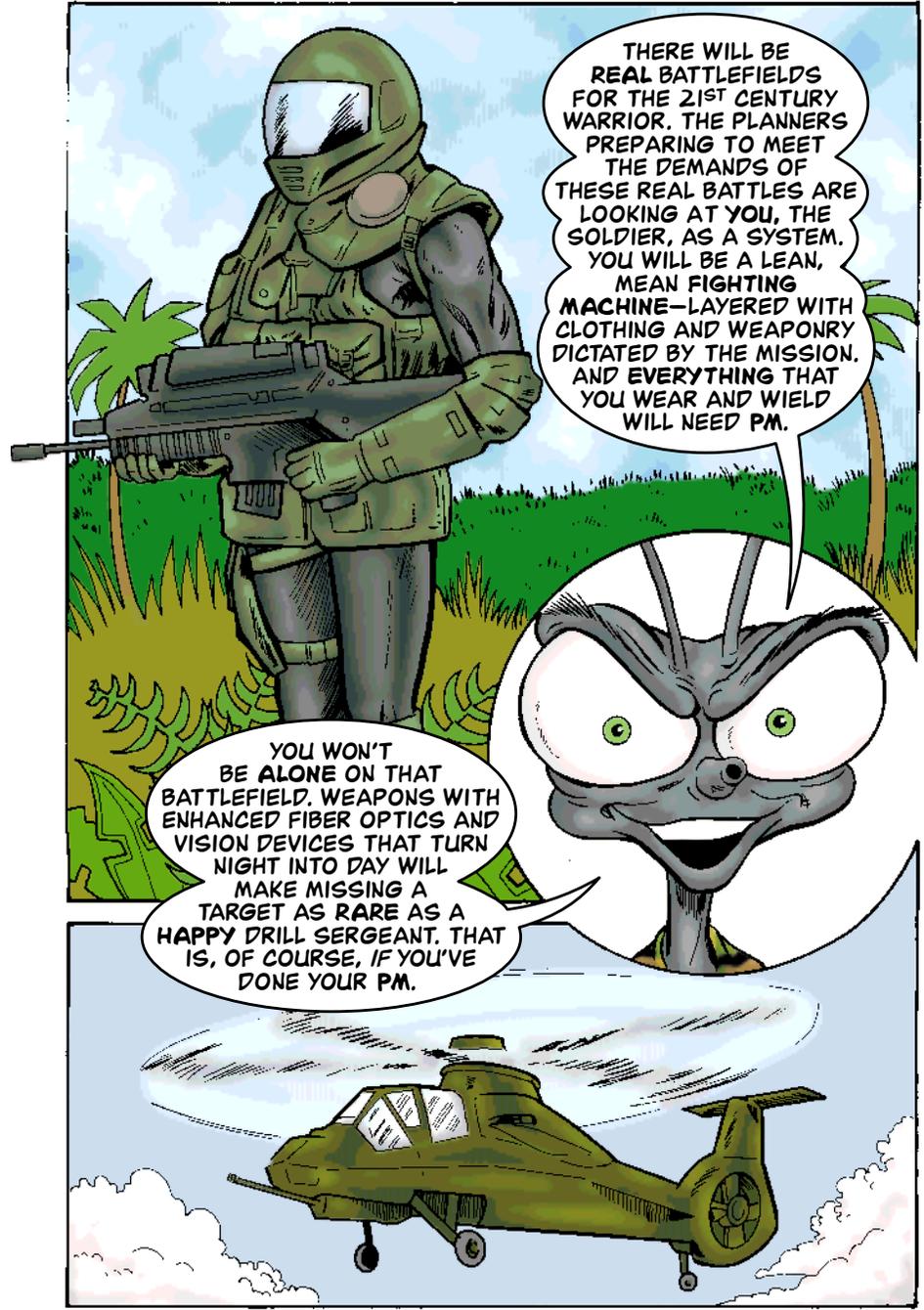


WOW!  
THIS SEEMS  
SO REAL!

FOR ALL YOU  
STAR TREK FANS, THINK OF  
CAPTAIN PICARD AND COMMANDER  
DATA FIGHTING SIMULATED BAD  
GUYS ON THE HOLODECK.  
GET THE PICTURE?



BUT EVERY  
PIECE OF EQUIPMENT IN  
THIS MARVELOUS TECHNOLOGY  
WILL NEED PREVENTIVE  
MAINTENANCE.



THERE WILL BE  
REAL BATTLEFIELDS  
FOR THE 21ST CENTURY  
WARRIOR. THE PLANNERS  
PREPARING TO MEET  
THE DEMANDS OF  
THESE REAL BATTLES ARE  
LOOKING AT YOU, THE  
SOLDIER, AS A SYSTEM.  
YOU WILL BE A LEAN,  
MEAN FIGHTING  
MACHINE—LAYERED WITH  
CLOTHING AND WEAPONRY  
DICTATED BY THE MISSION.  
AND EVERYTHING THAT  
YOU WEAR AND WIELD  
WILL NEED PM.

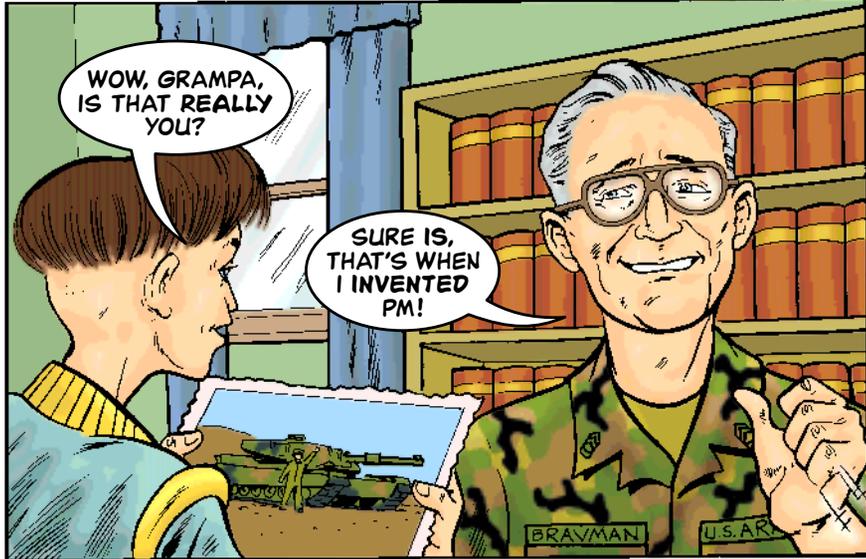
YOU WON'T  
BE ALONE ON THAT  
BATTLEFIELD. WEAPONS WITH  
ENHANCED FIBER OPTICS AND  
VISION DEVICES THAT TURN  
NIGHT INTO DAY WILL  
MAKE MISSING A  
TARGET AS RARE AS A  
HAPPY DRILL SERGEANT. THAT  
IS, OF COURSE, IF YOU'VE  
DONE YOUR PM.

*What the future holds we don't know,  
As on the river of time we all flow.  
But one thing is certain,  
We'll surely be hurtin',  
If PM's not the star of the show!*



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

CHANCES ARE YOU'LL BE SHOWING YOUR GRANDCHILDREN MOTH-EATEN UNIFORMS AND FADED PHOTOS AND LYING ABOUT YOUR GOOD OLD ARMY DAYS LONG BEFORE THE FOLLOWING STUFF APPEARS IN THE INVENTORY.



WOW, GRAMPA, IS THAT REALLY YOU?

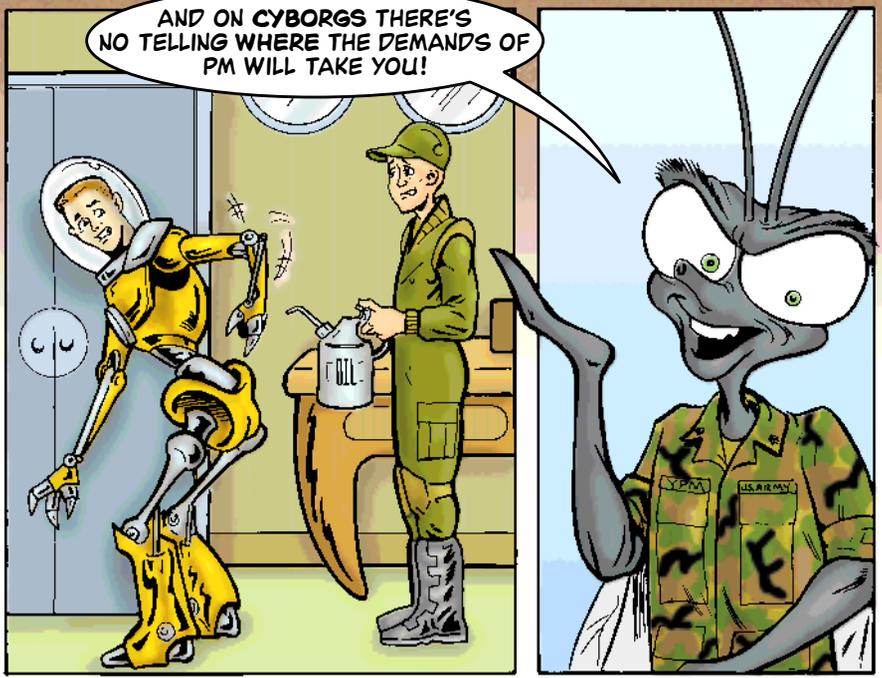
SURE IS, THAT'S WHEN I INVENTED PM!

BRAVMAN U.S. ARMY



BUT TO GET TO POINT B, WE MUST START AT POINT A—AND THAT'S YOU! IF YOU DON'T DO PM NOW, PERHAPS YOUR DESCENDANTS WON'T HAVE THE CHANCE TO DO PM LATER. AND THERE WILL BE A LOT OF PM TO DO, TOO.

"FOR TRANSFORMERS TO TRANSFORM, SOMEONE BETTER BE READY WITH THE GREASE AND OIL. BECAUSE A HALF-TRANSFORMED TRANSFORMER IS A SITTING DUCK!"



AND ON CYBORGS THERE'S NO TELLING WHERE THE DEMANDS OF PM WILL TAKE YOU!



AS YOU CAN TELL,  
I'M SERIOUS ABOUT PREVENTIVE  
MAINTENANCE. AND YOU SHOULD BE,  
TOO! YOU HAVE THE WORLD'S BEST  
EQUIPMENT, BUT IF YOU DON'T TAKE  
CARE OF IT, YOU'LL END UP WITH  
THE WORLD'S BEST JUNK.  
*SO DO YOUR PM!*

AND IF YOU  
DON'T, I'LL  
SHOW UP AND  
"REMIND" YOU.

# *NSNs to the Rescue*

Dear Editor,

In my role as the AMCOM logistics assistance representative at Ft Stewart, I've come up with a few tips that should help Avenger and Stinger units everywhere:

- The umbilical cap for the Stinger's M167 captive flight trainer and M160 field handling trainer is not listed in the Stinger TMs. Order it with NSN 6920-01-248-9245.
- The window glass and windshield NSNs are not found in the Avenger TMs, but in the HMWWV's TM 9-2320-280-24P-1. Order the window glass for the passenger door with NSN 2510-01-188-7381 and for the driver door with NSN 2510-01-189-9748. Order the passenger side windshield with NSN 2510-01-289-8258 and the driver side windshield with NSN 2510-01-289-2233.
- To inventory the S-250 shelter-housed Avenger organizational shop set, use TM 9-4935-432-24P.

Hope these tips help.

Johnny Johnson  
Logistics Assistance Office  
Ft Stewart, GA

FROM THE DESK OF THE Editor 

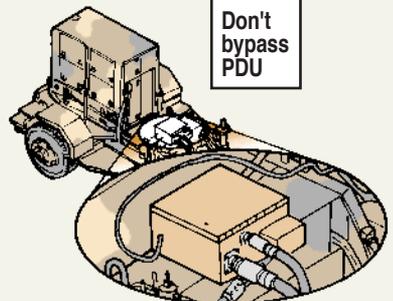
You LARs always seem to be on top of things. Thanks.

## Generator PDU Ps & Qs

**T**he power distribution units (PDU) for the Patriot's 30-KW generators are there for a purpose. They provide safety features that protect you and the equipment by allowing you to operate the generator remotely.

If you bypass the PDU, those safety features disappear. So never hook power cables directly to the generator, even if there's something wrong with the PDU. It's better not to operate than to bypass the PDU. The correct hookup procedure begins on Page 4-3 in TM 9-6115-647-14&P.

A number of PDUs in the field are missing their schematic plate. No replacements are currently available. Until they are available, use the wiring diagram on Page 4-32 in the -14&P.

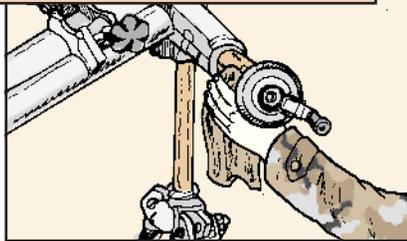


If your M224 mortars sit for months in the arms room unnoticed and uncared for, they eventually stop working. Lack of lubrication causes moving parts to bind and then freeze. Then when it's finally time to fire, the M224s give you the Big Freeze.

To prevent the Big Freeze, pay attention to lubing, mortarmen and armorers. Of course, follow the lubing instructions beginning in Work Package 17 in TM 9-1010-223-10 (Sep 98). But give the bipod extra attention—it needs it.

Lube the bipod's unpainted parts weekly with general purpose lubricant

Put GPL on unpainted surfaces weekly



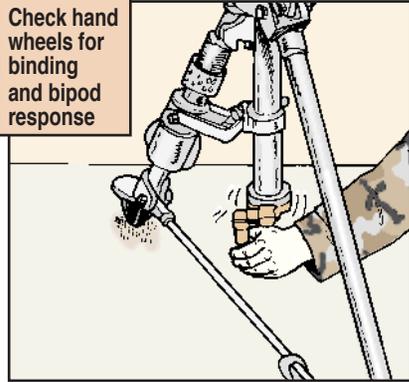
(GPL). Fully extend the left leg and run the traversing, cross leveling and elevation mechanisms through their full range so you can get at all unpainted areas.

If any of these mechanisms bind, the bipod needs to go to support. Only support can clean and lube them.

# The Big

Support also needs to look at the handwheels if they can be turned more

Check hand wheels for binding and bipod response



FORGET ABOUT ME AND I WON'T BE READY WHEN YOU NEED ME.

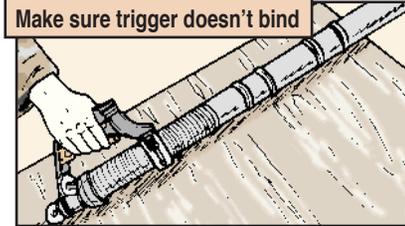


# Freeze

than 1/8 turn without the bipod responding. Something's wrong.

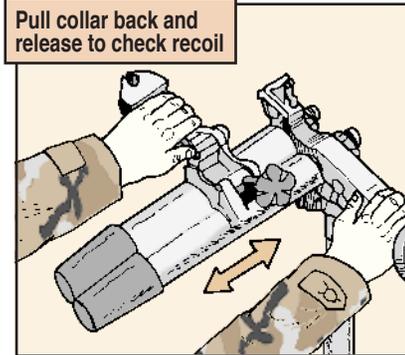
Weekly, lube the firing mechanism with LAW through the fitting on the top of the handle. Lube the trigger and firing selector, then work the trigger back and forth until it moves freely. If the trigger still binds, support needs to look at it.

Make sure trigger doesn't bind



Pull the collar shock absorber assembly back and release it. It should return slowly and smoothly. If it doesn't, support needs to clean and lube it.

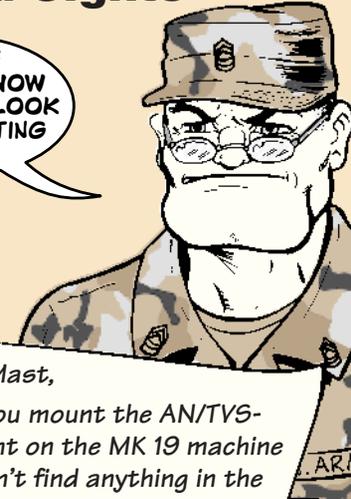
Pull collar back and release to check recoil



Test the M7 baseplate for 360° rotation and the M8 baseplate latch for smooth operation. If they bind, lube them with GPL.

## Mounting Lights and Sights

YOU'VE GOT TO KNOW WHERE TO LOOK FOR MOUNTING INFO.



Dear Half-Mast,

How do you mount the AN/TVS-5 night sight on the MK 19 machine gun? We can't find anything in the MK 19 TMs on this.

1LT R.R.

Dear Lieutenant R.R.,

Rarely will you find mounting information for a night sight or aiming light in the TMs for the rifle or machine gun it's mounted on. Mounting info is always found in the TMs for the sight or light.

For example, mounting info for the AN/TVS-5 mount, NSN 5855-01-045-5482, is found on Page 2-8 of the AN/TVS-5's TM 11-5855-214-23&P.

If the night sight or aiming light TM is not listed in Appendix A of the weapon's TM, look for it in DA Pam 25-30, Consolidated Index of Army Publications and Blank Forms.

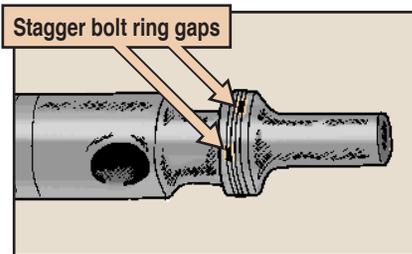
Half-Mast



# GIVE IT THE GAS

Your M16 rifle needs gas to push its bolt back to the lock position after a round is fired. If it doesn't get enough gas, either rounds won't chamber or the rifle will suffer short recoil and your rifle stops firing.

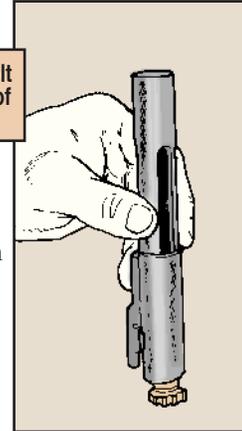
Bad gapping of the bolt's gas rings is often the cause of a gas shortage. If the ring's gaps are lined up, too much gas escapes. The gaps must be staggered. If those on your bolt aren't, stagger them.



A good test of the condition of the gas rings is to stick the bolt in the bolt carrier. Turn the bolt carrier upside down. If the bolt falls out, the gas rings

probably need to be replaced. Tell your armorer.

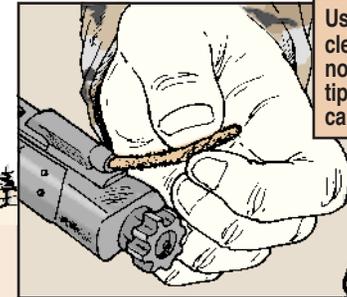
Does bolt fall out of carrier?



Cleaning carbon out of the gas system is also important. If the gas system's plugged, gas can't go where it's supposed to. Clean the carrier key thoroughly with an old bore brush, CLP (or RBC), and a pipe cleaner. To get out every bit of carbon, work the bore brush all the way back in the key.

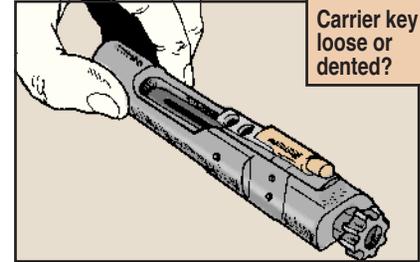
But never use a cotton tip instead of a pipe cleaner. The cotton comes off, mixes with lube and carbon, hardens, and plugs the gas port.

Use pipe cleaner— not cotton tip— on carrier key



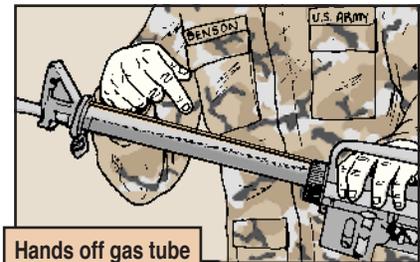
If the carrier key is dented, loose, or worn, it probably needs replacing. Tell your armorer.

Carrier key loose or dented?

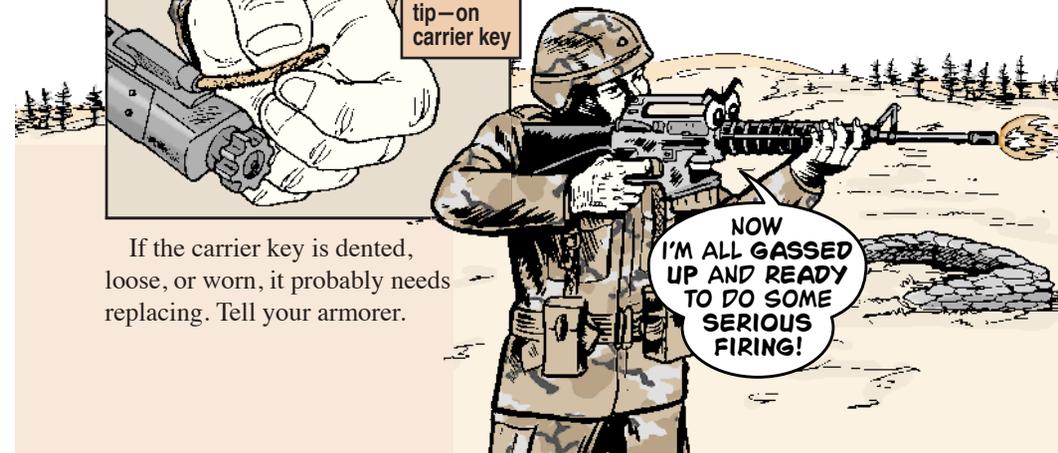


Clean the outside of the receiver end of the gas tube with a bore brush and CLP (or RBC). But do it carefully. If you bend the tube, it won't mate with the carrier key. Then gas can't push the bolt back.

When the handguards are off, keep your hands off the gas tube. It doesn't take much pressure to bend the tube.



Hands off gas tube

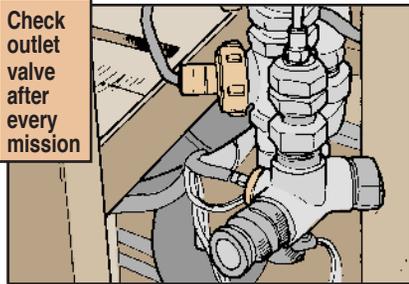


# Delightful Deconning with PM

**D**econning with your M17 may not actually be delightful with this PM, but it will certainly be easier.

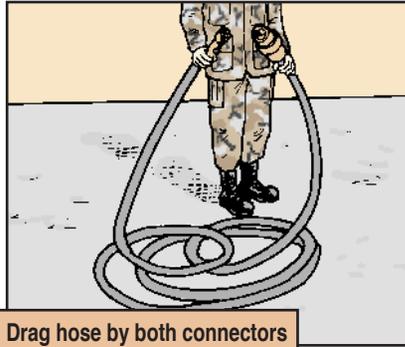
## Descaling

Page 2-16 in TM 3-4230-228-10 says to check the outlet assembly of the heat exchanger coil for scaling during PMCS. If the scale buildup reaches 1/16 inch or more, your repairman can do the descaling procedure that begins on Page 2-82 of TM 3-4230-228-23&P. Otherwise, the burner will take forever to heat water.



## Hoses

Don't let the hose connectors drag on the ground. That breaks the quick-disconnects and the hoses can't be secured to the M17. Hold the hose by both connectors to drag it.



## Shutdown

When you're through deconning, drain as much water out of the M17 as you can. Water left in the M17 leads to corrosion, which locks up the water

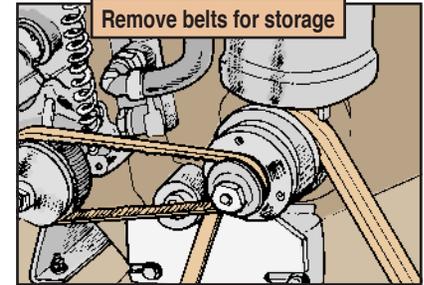
pump and causes leaks. To get out the water, run the engine up to MAX for 35-40 seconds and then throttle down to idle.



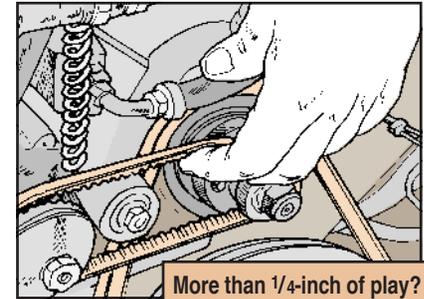
Never let the water pump run more than 1 minute without water. That cooks the pump.

## Storage

If your M17 is going to sit in the motor pool for more than a few days, take off the water and fuel pump belts and store them in the M17 toolbox. You can just rotate the belts on and off the belt pulleys. If they're left on, they stretch and dry rot.



When you put the belts back on, make sure they're tight. If there's more than 1/4 inch of play, tell your repairman. He can adjust them like it says on Page 2-31 in the -23&P or replace both belts if necessary.



## NBC Protective Masks . . .

### No Polish Please

**S**tay away from plastic polish, NBC NCOs.

Several of the M40 and M42 TMs list plastic polish, NSN 7930-00-935-3794, for repairing eyelens and outserts scratches. But the polish can scratch lenses, so you shouldn't use it.

Optical cleaning compound, NSN 6850-00-592-3283, is the only thing that should be used on lenses. It can be found in the M40/M42-series unit maintenance -20&P technical manuals.

If you want to avoid scratched lenses, make sure that outserts are on the masks before they leave the NBC room and that everyone in your unit leaves them on.

# Agent vs Agent

DS2 decon agent has to be powerful stuff to kill powerful nerve agents. That's why you must use and store it carefully in your M13 decons, NBC NCOs.

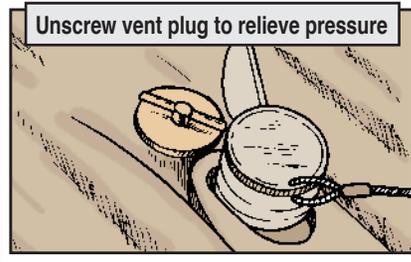
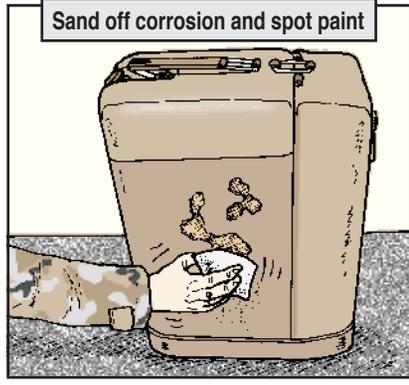
For one thing, DS2 is highly corrosive. You can't store and forget M13s filled with DS2, unless you want a big

mess of leaking DS2. Check the M13s every month for signs of corrosion. If you spot any, use a wire brush or sandpaper to rub it out. Use paint, NSN 8010-01-144-9874, to touch up bare spots.

Remember, never store DS2 in the same room as STB. If their fumes mix, they can start a fire.

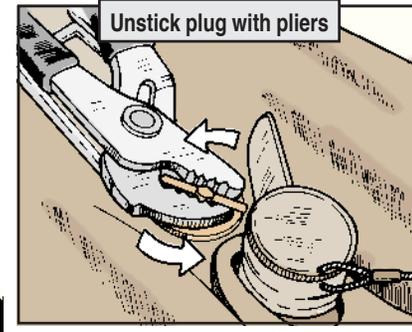
Make sure everybody in your unit knows the correct way to open an M13 filled with DS2:

Unscrew the vent plug first before



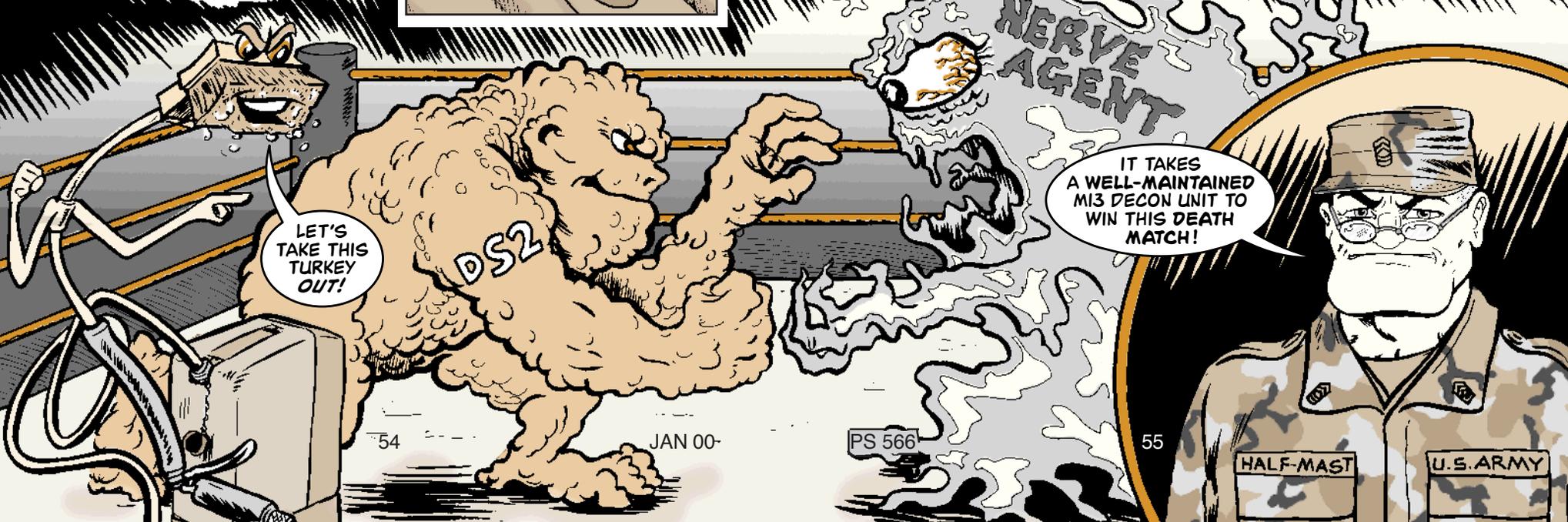
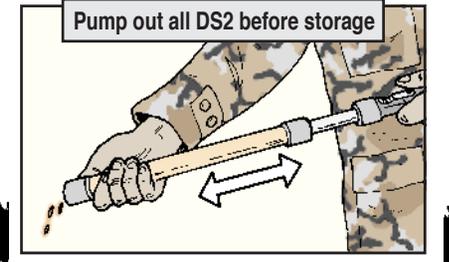
removing the fluid cap assembly and piercing the seal. If they forget, built-up pressure causes DS2 to spray all over the operator.

If the plug is stuck with rust, don't try to break it free with the spray wand. That just busts the plug. Instead, lay



pliers flat along the plug's prongs, then twist counterclockwise until the plug breaks loose. If the prongs get bent, bend them back.

Also make sure every bit of DS2 has been pumped out of the pump and hose before storing them. Stretch out the hose and pump until nothing else comes out. DS2 eats up the hose and corrodes the pump.



# Truck Radio Installation Kits

GETTING THE RIGHT SINGARS INSTALLATION KIT FOR YOUR M939-SERIES VEHICLE AND ITS RADIO CONFIGURATION CAN BE A REAL CHALLENGE. BUT THE CHART BELOW SHOULD HELP CLEAR UP THE CONFUSION.

BUT WHAT ABOUT MY HUMVEE?

GETTING THE RIGHT RADIO INSTALLATION KIT FOR YOUR HUMVEE AND ITS RADIO CONFIGURATION CAN ALSO BE DIFFICULT. CHECK OUT THIS INFO FOR SOME HELP!



## M939-Series Truck SINGARS Installation Kits

Radio (Series)	Vehicles	Kit	NSN
AN/VRC-87, AN/VRC-88 AN/VRC-90	M923-M939 (except M934 and M935 expando vans)	MK-2378/VRC (single radio, 1RT)	5895-01-225-0518
AN/VRC-87, AN/VRC-88 AN/VRC-90	M934, M935 expando vans	MK-2207/VRC (single radio, 1 RT)	5895-01-291-3215
AN/VRC-89, AN/VRC-91 AN/VRC-92	M934, M935 expando vans	MK-2331/VRC (dual radio, 2 RTs)	5895-01-292-6542
AN/VRC-89, AN/VRC-91 AN/VRC-92	M934, M935 expando vans	MK-2847/VRC (2 dual radios, 4 RTs)	5895-01-441-1338

## HMMWV Radio Installation Kits

Radio	Vehicles	Kit	NSN
AN/VRC-46, AN/VRC-64 AN/VRC-160	M966, M996, M997, M998, M1025, M1026, M1036, M1038	MK-2502/VRC	5820-01-208-1901
AN/VRC-12, AN/VRC-47	M966, M998, M1025, M1026, M1036, M1038, M1097	MK-2503/VRC	5820-01-208-1902
AN/VRC-44, AN/VRC-48	M966, M998, M1025, M1026, M1036, M1038, M1097	MK-2504/VRC	5820-01-208-1903
AN/VRC-49	M966, M998, M1025, M1026, M1036, M1038	MK-2505/VRC	5820-01-208-1904
AN/VRC-87A, AN/VRC-87D AN/VRC-88A, AN/VRC-88D AN/VRC-90A, AN/VRC-90D	M966, M996, M997, M998, M1025, M1026, M1036, M1038, M1097	MK-2325/VRC	5895-01-225-0510
AN/VRC-89A, AN/VRC-89D AN/VRC-91A, AN/VRC-91D AN/VRC-92A, AN/VRC-92D	M966, M996, M997, M998, M1025, M1026, M1036	MK-2326/VRC	5895-01-225-3332
AN/VRC-89*, AN/VRC-91* AN/VRC-92*	M998, M1038, M1097	MK-2327/VRC	5895-01-229-1285
AN/VRC-87**, AN/VRC-88** AN/VRC-89**, AN/VRC-90** AN/VRC-91**, AN/VRC-92**	M998, M1038, M1097	MK-2328/VRC	5895-01-297-8000
AN/VRC-97	M998 (2-door)	MK-2564/VRC	5895-01-368-6231
AN/VRC-97	M998 (4-door)	MK-2564/VRC	5895-01-368-6230
AN/VRC-97	M1025	MK-2564/VRC	5895-01-261-2901
AN/VRC-91	M1025A2, M1114	MK-2801/VRC	5895-01-421-0798
AN/GRC-106, AN/GRC-106A	M998, M1038, M1097	MK-2506/GRC	5820-01-208-1905
AN/GRC-193A	M998, M1038, M1097	MK-2541/GRC	5820-01-227-5842
AN/GRC-213	M998, M1038, M1097	MK-2542/GRC	5820-01-227-0528
AN/GRC-213	M1025, M1026	MK-2585/GRC	5820-01-320-6746

\* Any combination of two SINGARS radios.

\*\* Any combination of one each -87, -88, -90 and one each -89, -91, -92.

# AN/VRC-97 MSRT INSTALLATION KIT

There's a different installation kit for each vehicle in which the AN/VRC-97 mobile subscriber radio-telephone terminal (MSRT) is installed.

Each kit has the same designation, MK-2564/VRC, but each has a different NSN.

Here's what you need:

Vehicle	NSN
M1008A1	5895-01-261-2894
M1009	5895-01-261-2899
M1025	5895-01-261-2901
M113A1/A2	5895-01-261-2897
M113A3	5895-01-386-5938
M557A1/A2	5895-01-261-2898
M998 (2 door)	5895-01-368-6231
M998 (4 door)	5895-01-368-6230

You can also get a Stand-Alone Field Kit, MK-2565/VRC, with NSN 5820-01-246-6873.

Finally, get a copy of TB 11-2300-480-12. It has the installation instructions you'll need. And get a copy of TM 11-5820-1021-23&P for any needed replacement parts.



AS-3916, AS-1729 Antennas ...

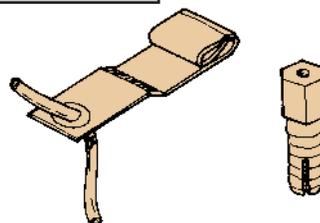
## Two Tiedowns and a Collet

The AS-3916 antenna is feeling a little slighted. Its cousin, the AS-1729 antenna, has its own TM, but the AS-3916 doesn't.

That shouldn't bother you, though. You can find repair parts for the AS-3916 in the SINGGARS manual, TM 11-5820-890-20P.

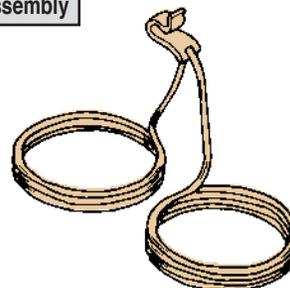
Check out Fig 108A. It has a couple of items you're probably looking for. Item 8 is the wire-rope tiedown assembly, NSN 4010-01-381-1581. Item 15 is the collet—locking nut—that holds the antenna on its base. It's NSN 1560-01-435-8079.

Tiedown and collet

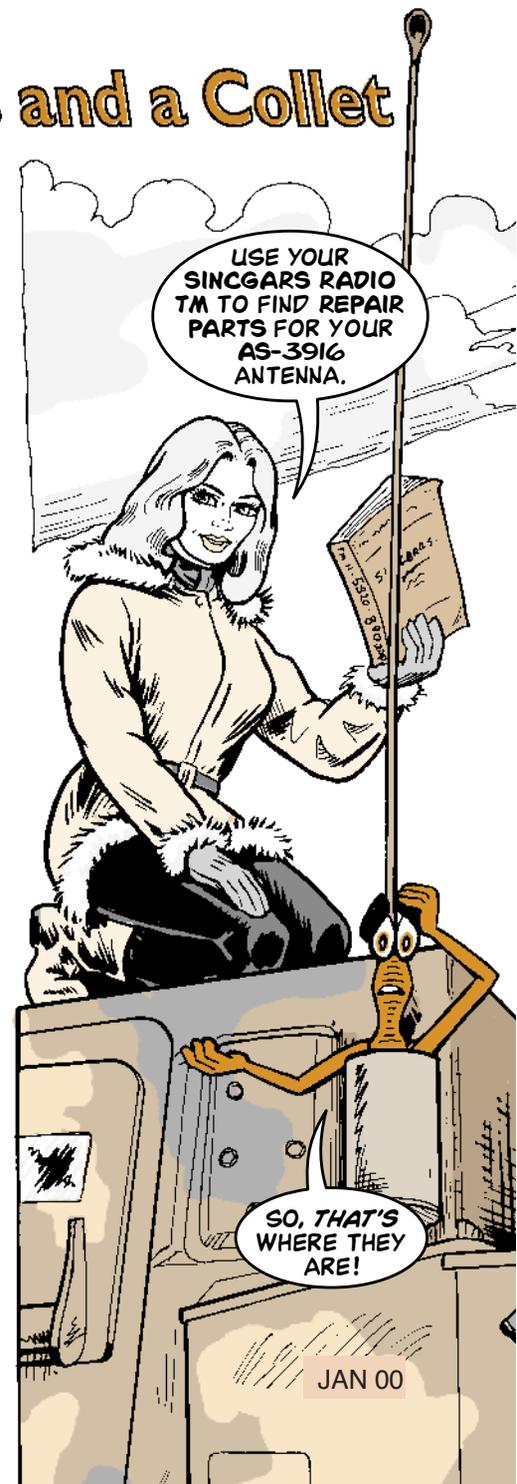


And just so the AS-1729 doesn't feel slighted now, we'll tell you that its fiber-rope tiedown assembly is NSN 4020-00-908-6416. It's Item 6 of Fig 1 in TM 11-5985-262-24P.

Tiedown assembly

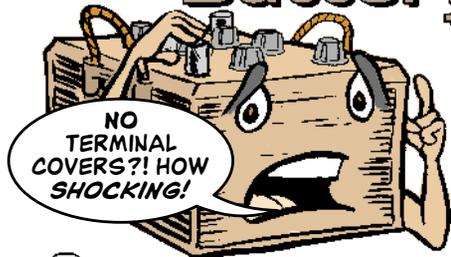


PS 566



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# Battery Covers



**Q**uiz time. What is the purpose of battery terminal covers?

Don't know?

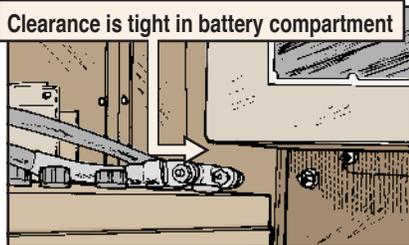
That's not surprising, because far too many 15-KW tactical quiet generators have uncovered battery terminals.

If you knew, they'd be covered!

The main reason for terminal covers is to prevent metal objects from touching the battery posts.

When metal touches either or both posts plus some other metal, at the least sparks will fly. At the worst, **you** could fly—backwards, that is, after a nasty shock.

Think the odds of that happening are small? Maybe so, but the generator's design greatly increases them. There's very little clearance between the metal door to the battery compartment and the negative terminal of the first battery.

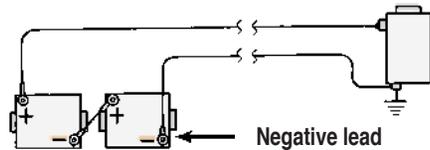


So put battery terminal covers, NSN 5999-01-382-8223, on your generator batteries right now.



Do it safely. Remember, the battery is live even when the generator is shut down.

Disconnect the negative lead first. That's the one that runs to the ground.



Negative lead is removed first and connected last

Then disconnect the interconnecting cable between the two batteries.

Now remove the positive lead.

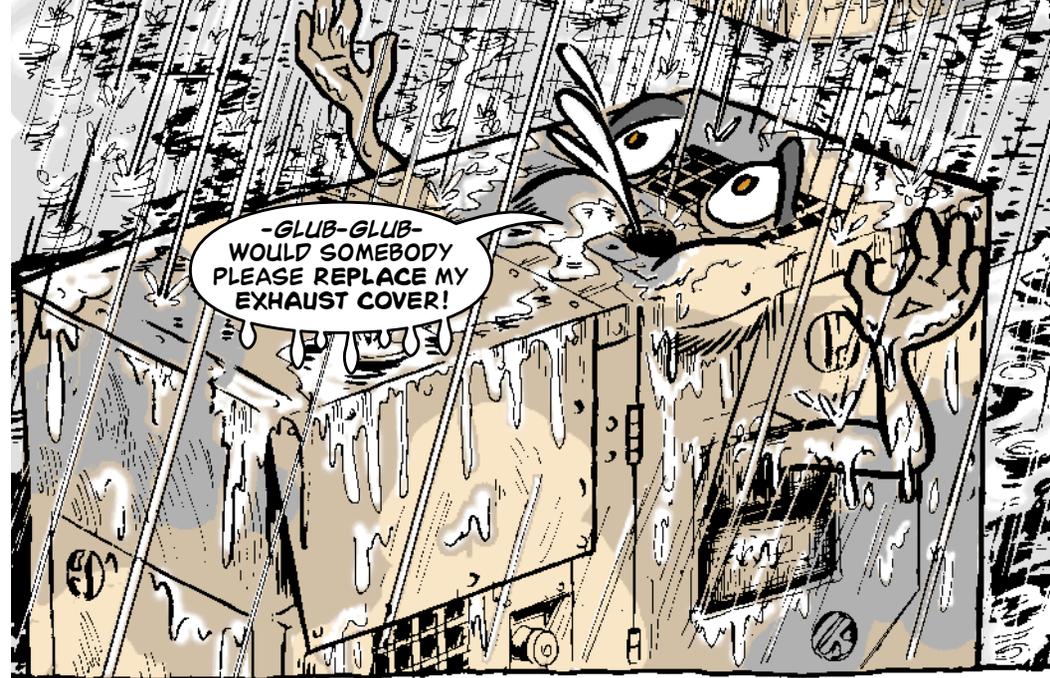
While you're there, check the battery case for corrosion and damage. Check the cables and battery caps for breaks.

Wear gloves to do the inspection. Battery acid can burn your skin.

Clean and repair as needed following the good words in TM 9-6115-643-24.

Now put the terminal covers on and reconnect the battery—positive lead, interconnecting cable, and then negative lead.

# KEEP EXHAUST COVERS



**T**actical quiet generators (TQG) without exhaust covers are a sad sight in the motor pool. Without a cover, the exhaust system is open to whatever Mother Nature brings—rain or snow. Both mean corrosion in the system.

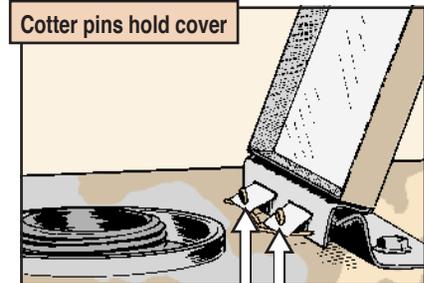
The covers go missing because their edges catch on camouflage netting and get pulled off, or they blow off going down the road. There is nothing to secure the cover to its hinge.

Here's how to make sure the cover stays on:

Remove the cover and its mounting bracket (hinge). Drill a 1/8-in hole in the center of each finger on the mount.

ing bracket, 1/4 inch from the end. Insert the fingers of the mounting bracket through the slots on the cover. Insert a cotter pin through each hole and spread it apart.

Put the mounting bracket back on the generator.



# REPEL THOSE H<sub>2</sub>O INVADERS

LAUNDRY

SUPPLY

I'M SOAKED!  
I THOUGHT THIS  
C-COLD WEATHER  
GEAR WAS WATER  
R-REPELLENT!

YOU NEED  
TO RESTORE  
YOUR REPELLENCY.  
ONLY DUCKS HAVE  
BUILT-IN WATER  
PROOFING!

ONCE YOU HAVE  
THE REPELLENT, FOLLOW  
THESE EASY STEPS (OR THE  
MANUFACTURER'S LABEL) TO  
RESTORE WATER  
REPELLENCY.

1. Following the ECWCS care label instructions, run your clothing through the entire wash cycle and then run them through the rinse cycle again to make sure all soap residue is gone.
2. Next, set the water temperature to WARM and let the washing machine fill until all clothing is completely covered with water.
3. Add the recommended amount of repellent. If the directions are not clear, use 2 ounces for each jacket or pants and 3 ounces for jacket and pants.
4. Continue the wash cycle until the water drains. **Do not run the rinse cycle.** Rinsing removes the repellent.
5. Take the clothing from the washer and let it tumble dry at the highest heat recommended on the care label.
6. A light ironing helps improve repellency.

THIS TREATMENT  
SHOULD LAST THROUGH  
THREE OR FOUR NORMAL  
WASHINGS.

If your post laundry does the work, no sweat. If it's up to you, and you can't get the repellent you need locally, see your supply sergeant. Units can order a case (24 eight-oz bottles) of repellent using NSN 8030-01-408-9446, through GSA or go directly to the manufacturer with an IMPAC card. Those suppliers and their product names include:

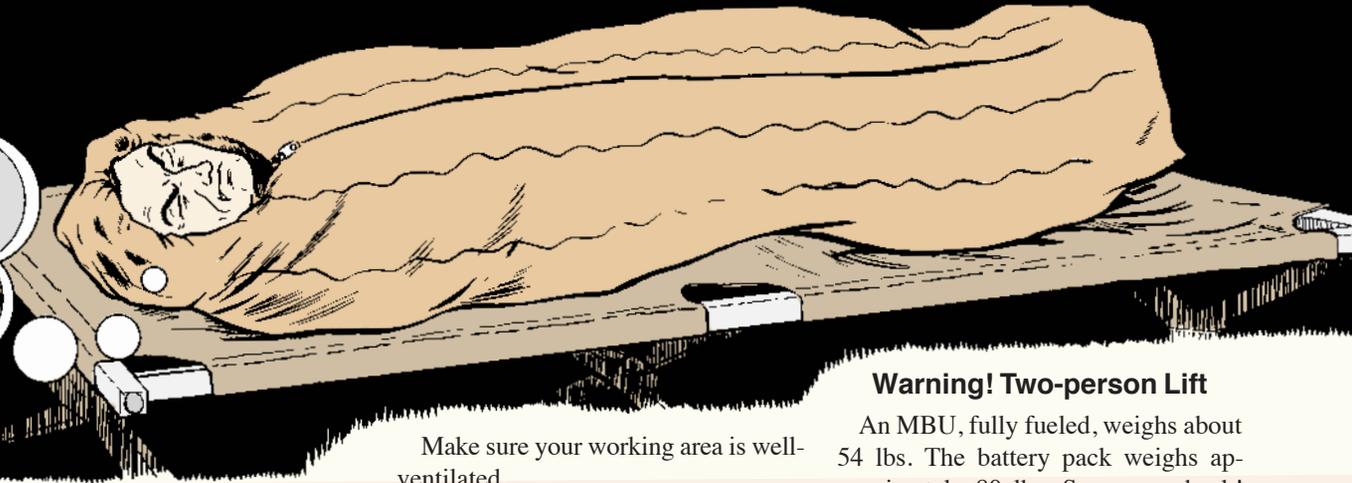
Evergreen Specialties, Inc. (Storm Shed),  
(800) 330-8760 or fax (800) 834-1809;

M&M Technologies, Inc. (Protex 2000),  
(800) 658-5958 or fax (302) 658-3734;

Caled Signal Chemical (X-Pel)  
(800) 652-2533 or fax (973) 696-4290.

Normal washing removes the water repellency from your extended cold weather clothing system (ECWCS). When you're standing out in the cold is no time to find out that your clothing won't keep you dry. If you think your ECWCS has lost its water repellency, put that protection back in ASAP.

# Dreamy New Technology



**I**t's 0300. *Grooaaan!* Time to rise and shine if you're gonna get those M2 burners fired up in time to get breakfast on the line.

A few more *zzzz*'s would be wonderful, but it will take hours to get those burners fired up before hungry troops show up for breakfast.

### The Light Dawns

Hold it—you don't have to get up yet! The old M2 burners in your unit have been replaced by modern burner units (MBU). They're sitting there, in place, fueled up and ready to light with the touch of a button. You can roll over and catch some more *zzzz*'s.

No, you're not dreaming. Though there are still more than 40,000 M2 burners in the field, the MBU is replacing them at the rate of several thousand a year.

The MBU is different in many ways from your old M2. Here are some tips from the headshed and TM 10-7310-281-13&P to keep in mind while you get used to your new burner.

### Warning! Electric Shock

Repairmen, the MBU power converter uses high voltage. Always shut off the external power before you start any maintenance.

When you hook up the cables again, keep them out of the foot traffic—and make sure they are not lying in water.

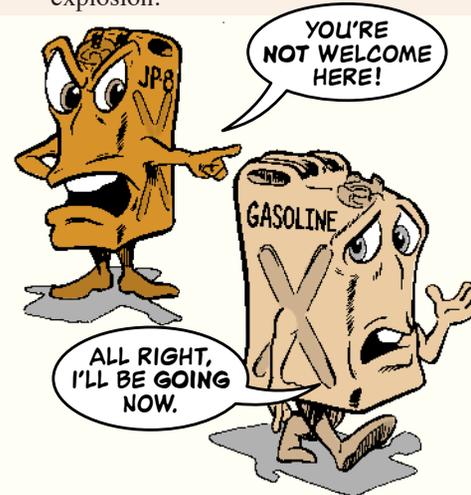
### Warning! Carbon Monoxide

Operators, the MBU produces carbon monoxide when it's operating, just like the old burners. You can't taste it, smell it, or see it, but it can cause drowsiness, headache, dizziness, and loss of muscle control.

Make sure your working area is well-ventilated.

### Warning! No Gasoline!

Never use gasoline in the MBU—**Never!** Use **only** JP-8 or an approved substitute diesel fuel. Using gasoline creates the danger of fire and explosion.



### Warning! Two-person Lift

An MBU, fully fueled, weighs about 54 lbs. The battery pack weighs approximately 80 lbs. Save your back! Use two people to carry either one.

### Use buddy system to carry MBU



### Warning! Noise

If more than six MBUs are operating at the same time in a field-feeding system, and you will be exposed to their noise for more than seven hours per day, wear hearing protection. They make enough racket to damage your ears.

## Final Words from the Wise

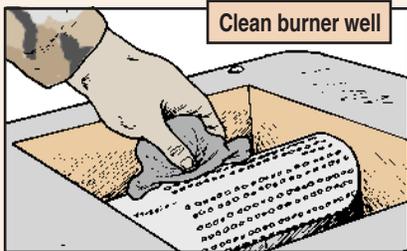
Get an extra fuel filter, NSN 7240-01-462-6765, and air filter, NSN 7310-01-462-4913. The TM tells you to replace the fuel filter and air filter after 300 hours of operation. You only get one extra set of filters with the new MBU, so have replacements ready. Then you don't have to wait for them when the time comes to change them the second time.

### Keep extra filters on hand



Keeping your MBU clean prevents corrosion and keeps sensors and vents from malfunctioning. The burner well must be kept clean. Wipe it off daily with a damp rag.

When the burner unit needs cleaning, wipe it off with rags and soapy water. Don't submerge it in water, or use a pressure washer to clean it. The



MBU has been designed to be water-resistant, but it is **not waterproof**. Towel it dry.

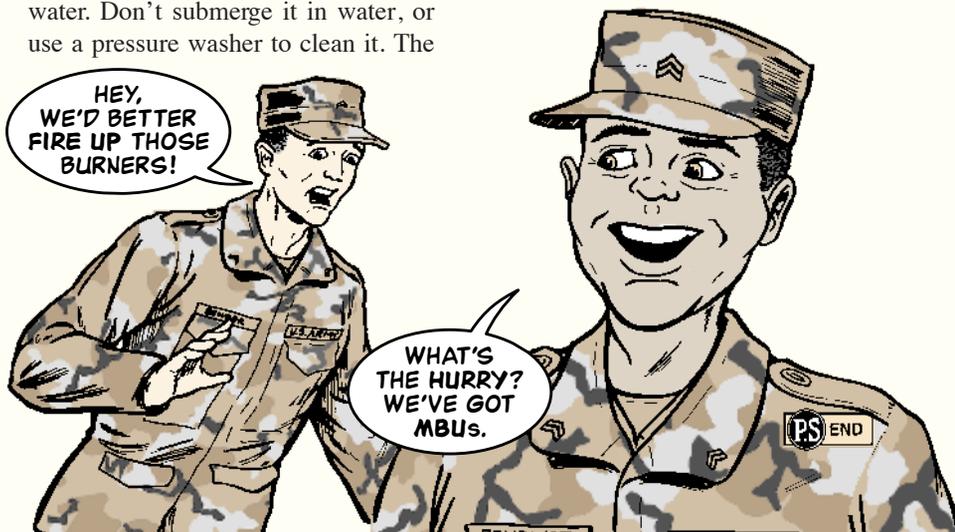
Pay special attention to the air vents on the regulator and float valve assemblies. They have to be clean to keep air flowing and your MBU's flame burning brightly. Keep them cleaned off with a clean paint brush.

Use a dry brush to clean all connectors, including those on the power cables.

Wipe the battery pack and power converter housing with a damp rag to remove any dust or stains.

## Sweet Dreams

So, next time you wake up at 0-dark-30 for kitchen duty, you can roll over and snooze a little longer, thanks to the MBU.



# Taping Your Tent Together



**P**roblem: You've got tents and tarps with small holes, leaks or tears. The damage isn't major yet, but it will be if you don't make repairs—soon!

Solution: Get a roll of tent repair tape, NSN 8315-01-423-6231, that's 3 inches wide and 50 feet long.

Here's how to use it for permanent small repairs on your canvas or vinyl tent or tarp:

- ◆ Spread out the tent or tarp on a flat surface.
- ◆ Clean the areas to be patched. Brush off loose soil or dirt, then clean the area with a solution of mild detergent

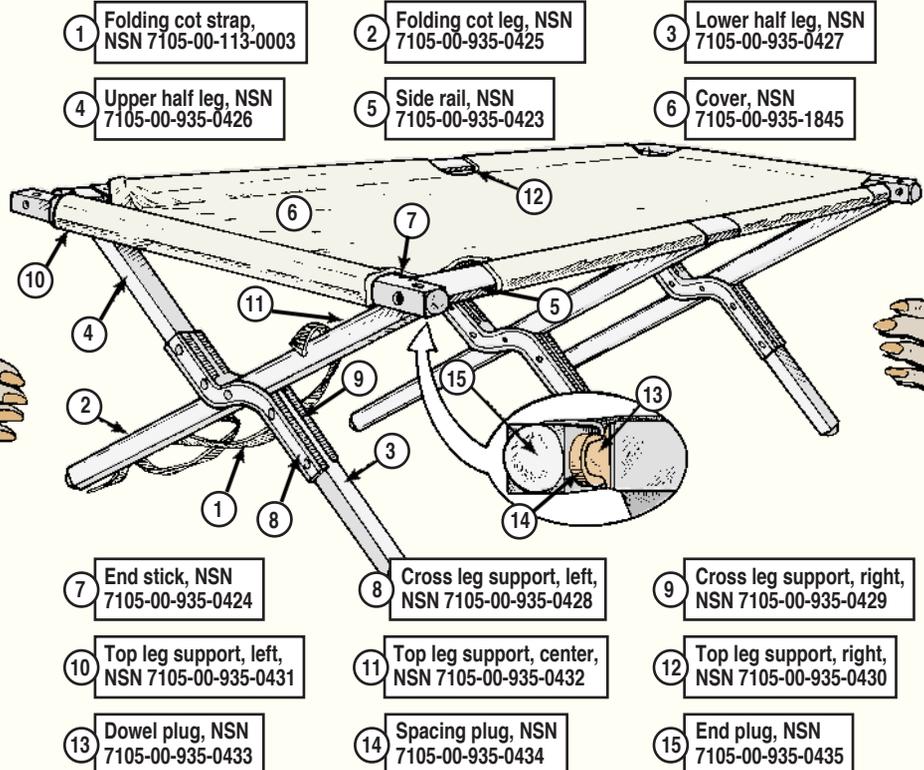
and water, rinsing with clean water.

- ◆ Allow the fabric to dry completely.
- ◆ Cut a circle from the tape slightly larger than the area you want to cover. The circle's rounded edge makes it less likely to peel off.
- ◆ Flatten the tape completely against the outside of the fabric.
- ◆ Allow the tape to set as long as you can. Overnight is best, but at least 20–30 minutes.

Holes bigger than 2 inches in diameter should be repaired by DS with machine-sewn patches.

# Give It a Rest

HERE'S THE REST OF THE STORY ON REPAIR PARTS FOR YOUR ALUMINUM COTS...



## Bradley Newsletter

Need the most recent safety and maintenance info on your M2/M3-series Bradley? Then *Bradley Bits* is for you. This newsletter is published three times a year by the Bradley project manager's office. Check it out on the Internet at: [www.pmbradley.org/Log/Bits/BITS.HTM](http://www.pmbradley.org/Log/Bits/BITS.HTM) No web access? Get a hard-copy subscription by calling DSN 786-8696/5859 or (810) 574-8696/5859. Or send an e-mail to: [kingstrk@tacom.army.mil](mailto:kingstrk@tacom.army.mil)

## Bradley Ramp Pump Line

Fig 200 of TM 9-2350-284-24P-1 left out the hydraulic "S" line that goes to the M2A2/M3A2 Bradley's ramp pump. Order the metal "S" line with NSN 4710-01-439-4424. Make a note until the TM is updated.

## Use Project Codes

Getting repair parts quickly is vital in keeping equipment readiness rates high. So use all the supply tools at your disposal, such as priority designators (PD), required delivery dates (RDD) and mission-oriented project codes. PDs and RDDs are decided at unit level, but project codes come down through your supply chain of command. Without project codes, your requisitions lose priority. Two of the latest project codes are ACE for the armored combat earthmover and DT6 for the HEMTT.

## Water Can Cancelled

If your water can requisitions are being cancelled, check the NSN. NSN 7240-00-242-6153 is still listed on the AMDF as "Use Until Deleted" but it's no longer available. Get the green plastic water can with NSN 7240-01-365-5317. For the lusterless sand color, use NSN 7240-00-089-3827.

## Bradley Wiring Harness

Need a new wiring harness for the hull navigation system in your M2A2/M3A2 or ODS Bradley? Get the 1W414 harness with NSN 6150-01-465-9532. The 1W415 harness comes with NSN 6150-01-461-1282. Make a note until the harnesses are added to TM 9-2350-284-24P-1.

## SUSV Coolant Sight Glass

NSN 6680-99-361-7623 gets a new radiator coolant sight glass for your SUSV. The NSN is missing from Item 21 in Fig 35 of TM 9-2350-285-24P. Mechanics, when you install the sight glass, finger tighten the bolts and then add a half turn with a wrench. Any more than that can crack the glass.

DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 340312, requirements for TB 43-PS-Series.

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