



**THE  
PREVENTIVE  
MAINTENANCE  
MONTHLY**

ISSUE 582 MAY 2001

TB 43-PS-582, The Preventive Maintenance Monthly, is an official publication of the Department of the Army, providing information for all soldiers assigned to combat and combat support units and all soldiers with unit maintenance and supply duties. All information published has been reviewed and approved by the agency responsible for the equipment, publication or policy discussed. Application of the information is optional with the user. Masculine pronouns may refer to both genders.



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By order of the Secretary of the Army:

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**JOEL B. HUDSON**

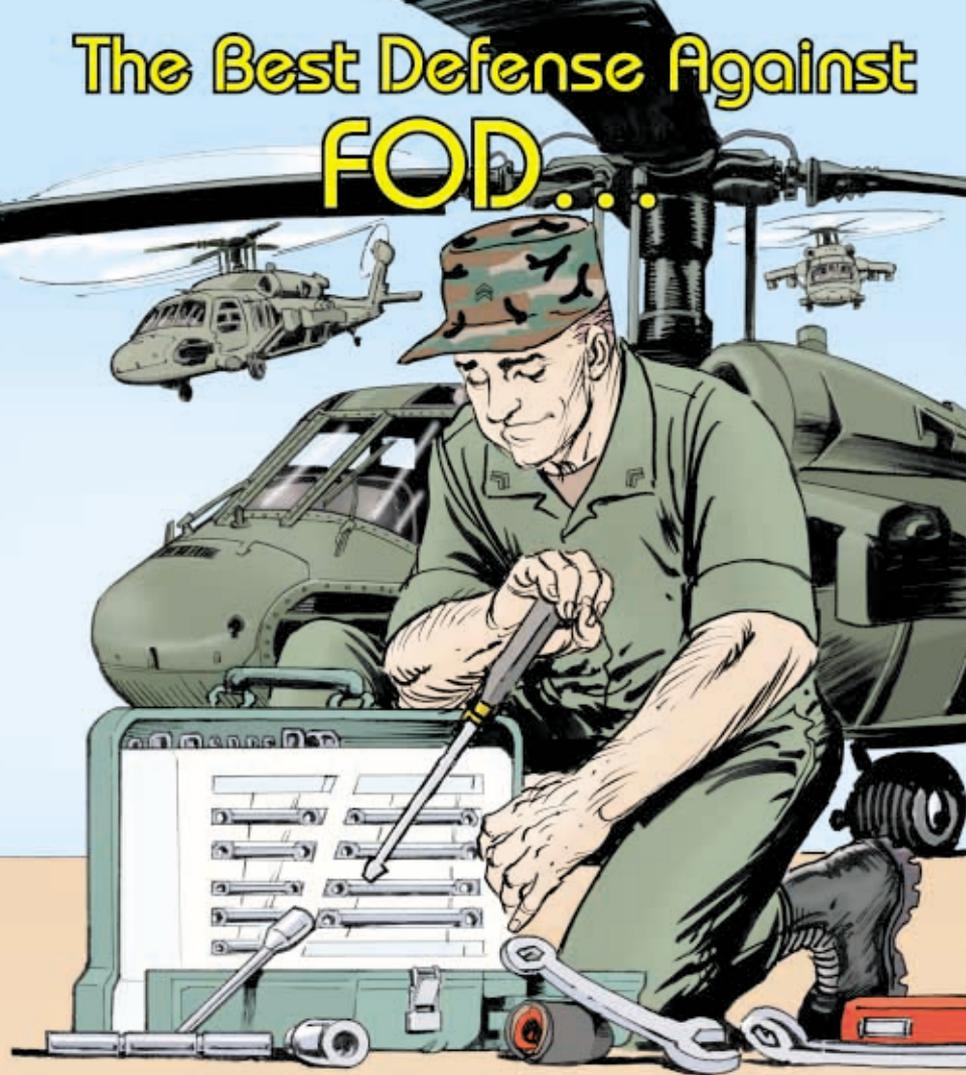
Administrative Assistant to the Secretary of the Army

0107202

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# The Best Defense Against FOD...



...is to keep track of your tools and return them to the toolbox at the end of maintenance!

Issue 582

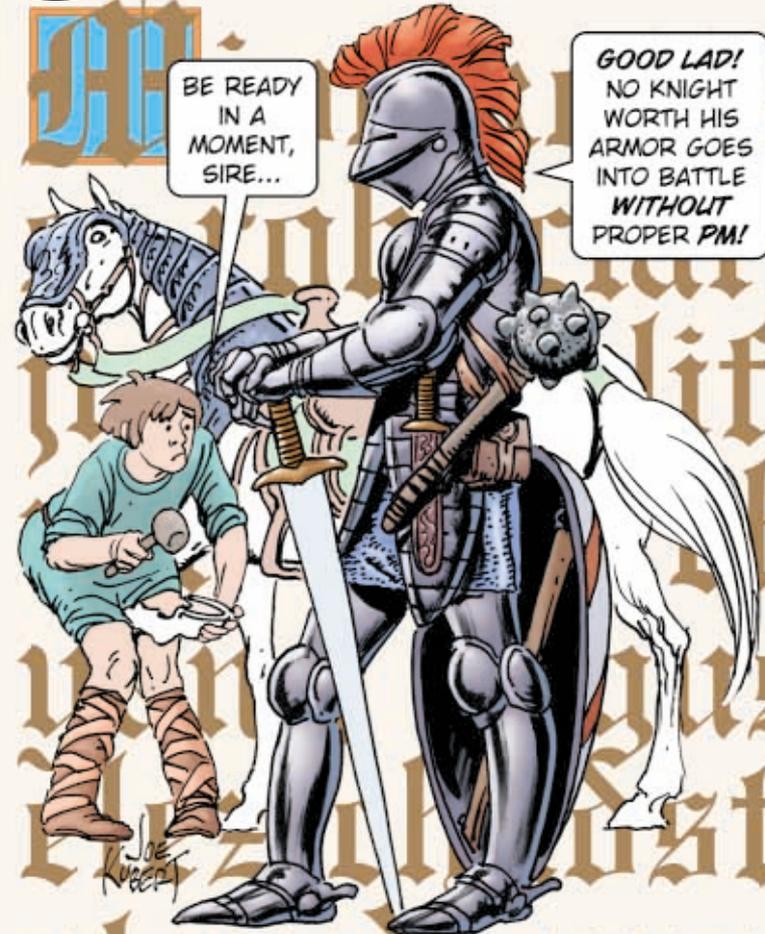
# PS

May  
2001

## THE PREVENTIVE MAINTENANCE MONTHLY

TB 43-PS-582

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# CHOICES, CHOICES, CHOICES



**O**ur whole life is a series of choices. If we make mostly right choices, we live mostly healthy, happy lives.

If we make mostly wrong choices, we live mostly short, unhappy lives.

If we choose to stay in good shape and give Uncle an honest day's work—every day—then we earn our monthly paycheck, get promoted and eventually re-up.

But if we choose to avoid responsibility, to put off until tomorrow what we can do today, to put minimum effort into everything we do... well, we get passed over for promotion, get out after our first hitch and draw unemployment while we look for another job.

The same choices often apply to preventive maintenance, no matter what equipment you operate or maintain, or what kind of unit you belong to.

Do **you** pull PMCS when it's scheduled or postpone it 'til tomorrow?

Do **you** go by the book or rely on your memory for how-to?

Do **you** use the right tools or use whatever tools you can scrounge up at the last minute?

These choices are yours to make more often now than ever before.

What are **your** choices?

# PS

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# New Transmission



**G**rab some pine, drivers, and take notes on new fluid checks that'll help reduce transmission failures on M35A3-series trucks.

For openers, the checks are now part of the before-operation PMCS, not after-operation as before. This will ensure there's enough fluid in the transmission for operation. Improper fluid levels are one of the biggest causes of transmission failures.

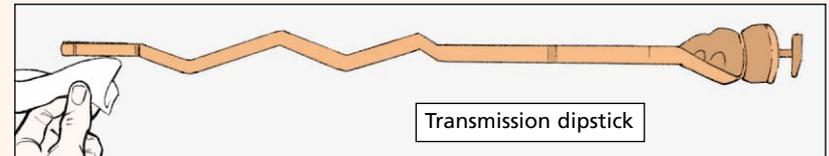
Cold-run level checks and hot-run level checks are performed at least twice each during the before-operation PMCS.

Cold-run level checks are made only to ensure there is enough fluid in the transmission to operate it for the hot-run level checks.

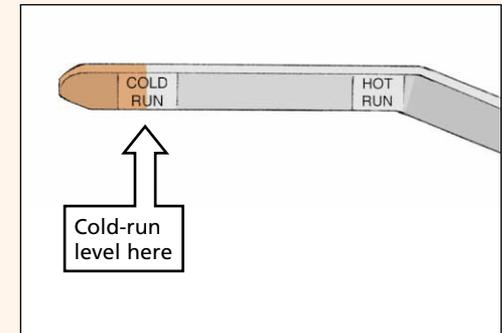
# Fluid Checks

## Cold-run Level Check

1. Park the vehicle on a level surface, apply the parking brake and chock the wheels.
2. Run the engine in neutral (N) at 1,000-1,500 rpm for 1 minute. Then allow the engine to return to idle. Shift the transmission to drive (D) and then to reverse (R) to clean hydraulic circuits of air. Then shift to N. The transmission temperature should be between 60°-160° F.
3. Clean off the access door, dipstick handle and the end of the filler tube so dirt, dust or grit won't get into the transmission. Remove the dipstick, wipe it clean and check the fluid level. Then wipe the dipstick the second time and check the fluid level again.



If the fluid level is within the cold-run band, you can operate the transmission until it is hot enough to make a hot-run check. If it's not within the band, add or drain oil as needed to bring the level to the middle of the cold-run band. The fluid level should never be above the top of the cold-run band in a cold-run check, according to the transmission manufacturer.



4. Once the level is OK, put the dipstick all the way into the filler tube and turn the T-handle until it's tight.

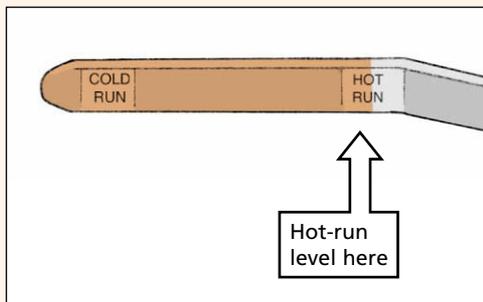
## Hot-run Level Checks

Make these checks only after the transmission fluid temperature reaches 160°-300°F. The fluid must be hot to make an accurate check.

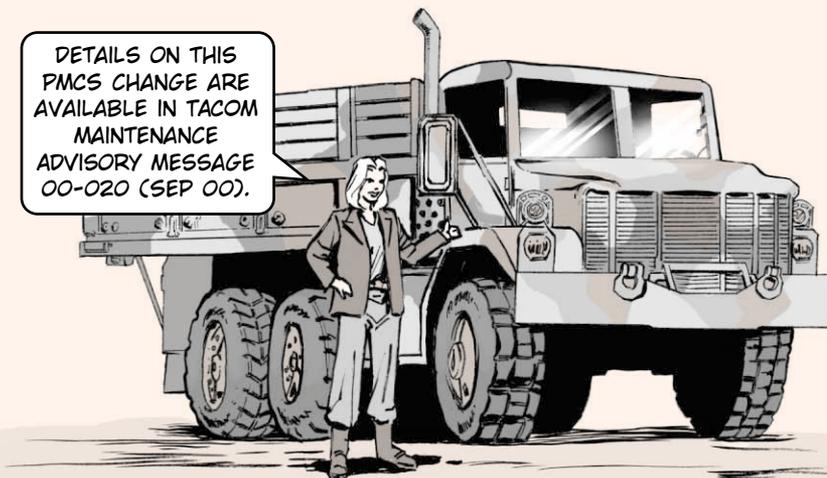
1. Park the vehicle on a level surface and shift into N, letting the engine idle. Apply the parking brake and chock the wheels.
2. Remove the dipstick, wipe it clean and check the fluid level. Then wipe the dipstick clean again and check the fluid level. The level is OK if it is anywhere within the hot-run band on the dipstick. Add or drain fluid as needed to bring the level within the band.
3. Once the level is acceptable, push the dipstick all the way into the filler tube and turn the T-handle until it is tight.

If you are getting level readings that are inconsistent or always wrong, have your mechanic check out the transmission vent tube.

Vent tube blockage can cause overpressure in the transmission, which can alter the fluid level readings and cause fluid to blow out of the dipstick tube if the T-handle is not installed tightly.



DETAILS ON THIS PMCS CHANGE ARE AVAILABLE IN TACOM MAINTENANCE ADVISORY MESSAGE 00-020 (SEP 00).



Dump Trucks...

# Safety Latch Is Enough

Dear Half-Mast,

Sometimes we have to haul troops between work sites in our dump trucks. Para 2-17b(2) of AR 385-55 says we need a positive locking device to haul troops. Does the safety latch on the dump control lever meet that requirement?

SFC M.J.



Dear Sergeant M.J.,

It sure does and that's all you need. Never use a bolt or pin to lock the dump body to the frame. Bolts work, but if the driver forgets it's there and raises the bed later during operations, the bed and the hydraulic system both get damaged.

Half-Mast



M939-Series Wreckers...

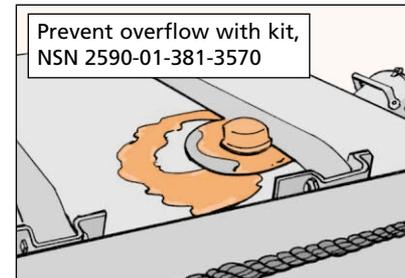
## PLUG HYDRAULIC GEYSER

Cleaning up after hydraulic fluid gushes out of the old-style reservoir when you retract the boom on your M939-series wrecker is a job you don't want.

Here's the way to prevent gushers: Install a kit, NSN 2590-01-381-3570, to move the hydraulic tank vent from the return side of the tank to the outlet side. You can continue to use the old-style tank **and** prevent the leaks caused by the vent being on the wrong side.

If you already have the new tank with the vent on the outlet side, you don't need the kit.

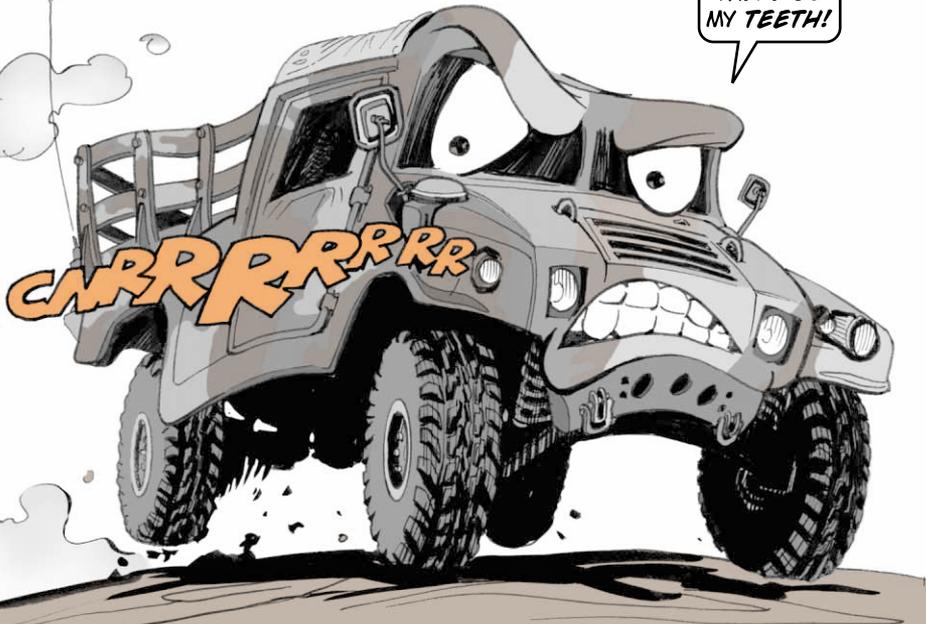
Prevent overflow with kit, NSN 2590-01-381-3570



HMMWV...

# TRANSFER·R·R GEAR·R·R

THERE GO MY TEETH!



**G**rind your own teeth long enough, drivers, and your friendly dentist will have a field day with you in the chair.

So, you'll understand that grinding is not good when you try to shift transfer gears with the engine running on your HMMWV. It means that someday a mechanic may have to repair gear damage.

HERE'S WHAT YOU CAN DO TO SAVE THE TEETH ON TRANSFER GEARS:



# G·G·G·GNASHING

## For Drivers

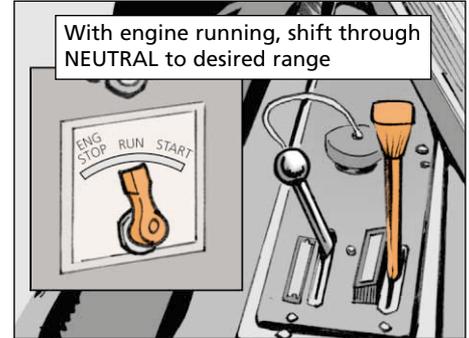
⇨ When a transfer range change is necessary with the engine running, stop the truck and shift the transmission to neutral. Never shift on the fly. That'll tear up driveline parts.

Shift the transfer shifter forcefully through neutral to the desired range. Some gear clash may occur and is normal, but you should be able to make the shift easily. However, the longer you leave the shifter in neutral, the more gear clash will occur. That's because even in neutral, engine rotation spins the transmission output shaft.

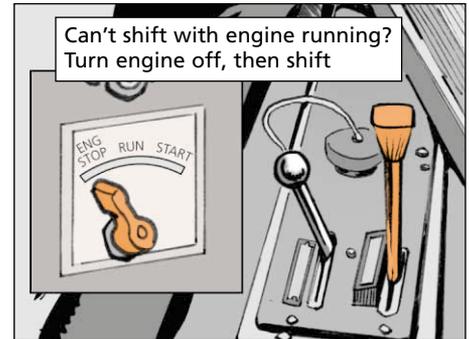
⇨ If you can't shift easily, turn the engine off and then shift the transfer. Restart the engine and continue the mission.

⇨ When your mission is complete, let your mechanic know that you had to stop the engine to shift the transfer.

With engine running, shift through NEUTRAL to desired range



Can't shift with engine running? Turn engine off, then shift



## For Mechanics

When transfer shifting problems are reported, check the engine idle rpm before troubleshooting. The correct idle speed for 6.2-liter engines is 650 rpm. For 6.5-liter engines, it's 750 rpm.

The amount of gear clash is related to engine speed and to the length of time the transfer is left in neutral with the engine running.

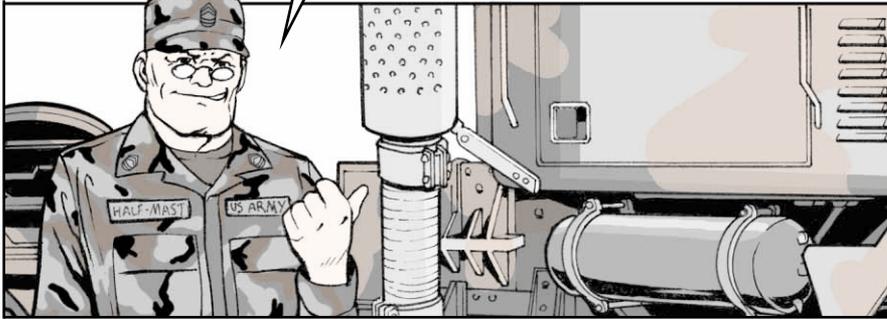
Engine idle adjustment procedures are on Page 3-83 of TM 9-2320-280-20-2. Once the idle is adjusted, shift the transfer to see if the adjustment made any difference. If not, troubleshoot the transfer.

After troubleshooting, if you find no problems with the transfer, return the truck to service.

ARE YOU EXHAUSTED TRYING TO KEEP FLEX PIPES FROM LEAKING?

# LIVING WITH

# EXHAUST FLEX PIPES



Most of you probably figure an exhaust leak at the flex pipes is a fact of life for M915-M920 and M915A1 trucks.

That's because every truck you've ever worked on has had an exhaust leak at the flex pipes at one time or another.

But it doesn't have to be that way. The problems are known—and so are the solutions:

### Problem 1

The flex pipes don't fit over or inside the exhaust pipes. They butt up against them, held in place by couplers. When the flex pipe and exhaust pipe separate, you get leaks at the couplers. Tightening the couplers won't help. All that does is make the leak worse.

### Solution

Make sure the exhaust pipe and flex pipe are in good condition. Look for cracks, distortion or burning at the edges. Make sure the pipes fit against each other evenly. If there's damage or they don't fit, replace them. Always use a new coupler when you put things back together.



### Problem 2

Are you exhausted trying to keep flex pipes from leaking? You may notice when you check out the pipes that the diameter of the flex pipe is larger than the diameter of the exhaust pipe. This messes up the fit between the pipes, and the coupler won't seal the joint.

### Solution

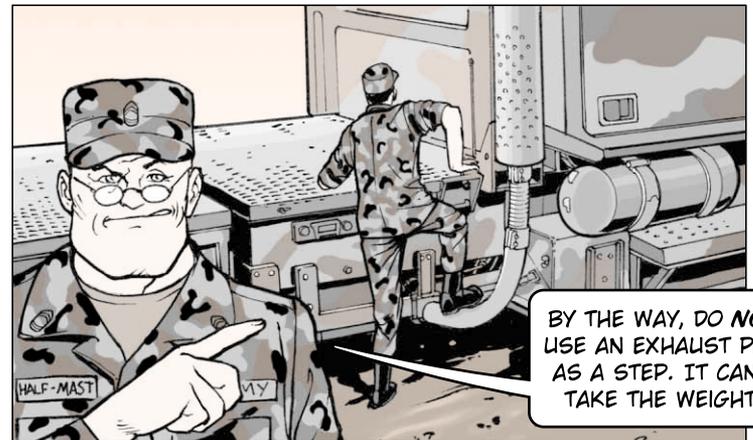
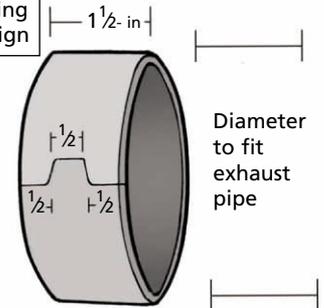
If the flex pipe is too big, you can fabricate a metal shim to use until you get the right-size pipe.

Make the shim from any 1/16-in thick metal that's easily bent. Cut and form the shim as shown.

Wrap the shim around the end of the exhaust pipe and butt the flex pipe up to the shim. Secure the pipes with new couplers.

Since the couplers are sensitive to too much tightening, torque them to 45 lb-ft and no more. Eyeball Para 4-35 in TM 9-2320-273-20 for the full picture.

Fabricate shim using this design



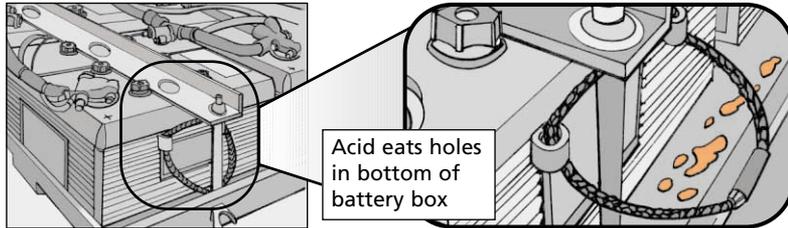
BY THE WAY, DO NOT USE AN EXHAUST PIPE AS A STEP. IT CAN'T TAKE THE WEIGHT.

# BEWARE "THE BATTERY BOX BLUES"



Dear Editor,

Battery corrosion eats holes right through the bottom of the fiberglass battery box on the M1074/ M1075 PLS.



When enough damage is done, the battery holddowns have nothing to hold onto so the batteries are unsecured. The vehicle is NMC until you can get a new battery box.

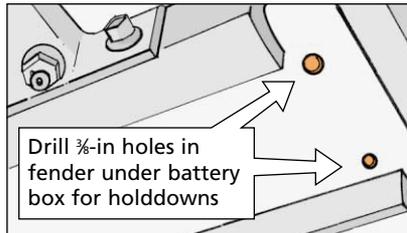
We've saved our unit a lot of down time with some quick modifications to the battery box.

First, we cover the bottom of every battery box with corrosion-resistant matting. The matting soaks up acid and helps keep it off the battery box.

A 1x100-ft roll of the matting comes with NSN 6160-01-389-1966. Just cut it to fit the bottom of each battery box.

Second, we drill two 3/8-in holes through the fender just below where the holddowns attach to the battery box. Then we run the holddowns through those holes and up into the battery box.

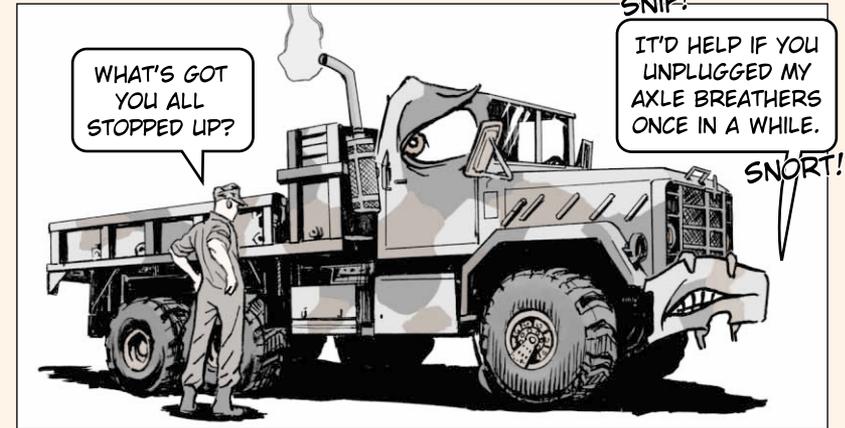
Even if acid gets through the matting and dissolves the bottom of the battery box, the holddowns keep the batteries secure. The vehicle stays FMC until you can get a replacement battery box.



SPC Billy Maxwell  
15th Trans Co,  
212th Bde  
Ft Sill, OK



# TWIST, PULL BREATHERS



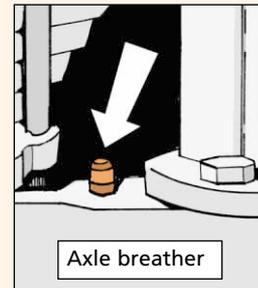
Breather valves on gearcases and axles like those on the front axles of M939A2 series trucks must be clean and open to let off the pressure that builds in those assemblies.

If vents are plugged, the seals blow, lube goes, and gears go, too.

Keeping the breather valves clean is simple: Twist the valve's cap to loosen any dirt stuck inside. Then pull up on the cap to make sure it's moving freely. If the cap won't turn and pull up, get a new valve.

Make sure the new valve is good by blowing into the threaded end. If you can't easily blow through the breather, it won't do the job for your equipment. The cap on a good breather opens at a little under 1/2 psi—almost no pressure at all.

Then give all breather valves the twist-and-pull test after each operation in mud or heavy dust. Your gearcases and axles will live longer if you do.





STOCK UP ON  
THESE WHEELED  
VEHICLE "SHORTS"

## M939A2 Steering Line

NSN 2530-01-470-9033 gets the M939A2-series power steering line shown as Item 1 in Fig 313 of TM 9-2320-272-24P-1. NSN 4710-01-471-5060 gets Item 7 of the same figure. The NSNs shown for Items 1 and 7 are for M939/A1-series trucks.

## HEMTT Oil Filter Gasket

NSN 5330-01-466-1532 gets the gasket for the hydraulic oil filters on M977, M984A1 and M985 HEMTT cranes. The NSN shown for Item 16 in Fig 412 of TM 9-2320-279-24P-2 is wrong.

## Fan Solenoid for M919

Use NSN 4810-01-414-3138 to get the fan solenoid for the M919 concrete-mobile mixer truck. It replaces Item 13 in Fig 30 of TM 9-2320-273-24P, which is no longer available. Make a note until the TM is updated.

## M939/A1 Spring

Use NSN 5360-01-470-6574 for the helical spring for your M939/A1-series truck. The NSN shown as Item 17 in Fig 183 of TM 9-2320-272-24P-1 is wrong.

## FMTV Brake Spider

NSN 2530-01-467-4098 gets the replacement brake spider for FMTV trucks. The spider shown as Item 9 in Fig 133 of TM 9-2320-365-24P for 2 1/2-ton FMTVs, and as Item 9 in Fig 161 of TM 9-2320-366-24P-1 for 5-ton models, is obsolete. Make a note 'til the TMs are updated.

## M915A1 Switch

NSN 6685-01-081-9721 gets the thermostatic switch for the tractor truck's engine. The NSN shown as Item 3 in Fig 42 of TM 9-2320-283-24P is no longer available.

## M35A3 Wheel Assembly

NSN 2530-01-398-2022 gets the tire beadlock that's shown as Item 2 in Fig 117 of TM 9-2320-386-24P. Order the grommet (Item 11) and plain nut (Item 12) with NSN 5325-01-437-5810 and NSN 5310-01-445-6872. The TM parts info is wrong. Make a note until the TM is updated.

## M35A3 Alternator Brackets

You need two brackets to hold the M35A3's alternator in place, but you don't get NSNs in TM 9-2320-386-24P. Make a note in Fig 51 until your TM is updated:

Item 3, upper bracket--NSN 5340-01-397-3421  
Item 12, lower bracket--NSN 5342-01-444-9149

## M35A3 Fitting

NSN 4730-01-391-8317 gets a T-fitting for the air line on the M35A3's rear wheels. The parts info shown for Item 9 in Fig 171 of TM 9-2320-386-24P is wrong.

## HMMWV Spring Ring

NSN 5325-01-135-4290 gets the retaining ring that secures the gas springs on the HMMWV's rear cargo-shell door. The NSN is missing from Item 35 in Fig 235 of TM 9-2320-280-24P-1.

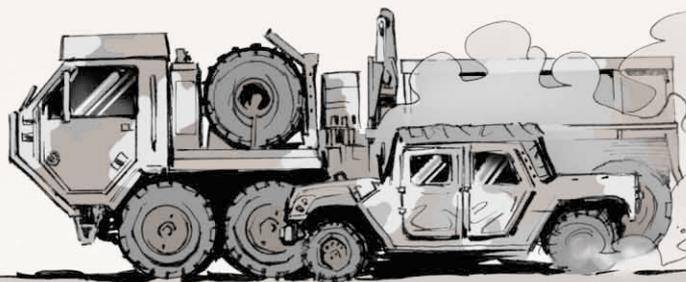
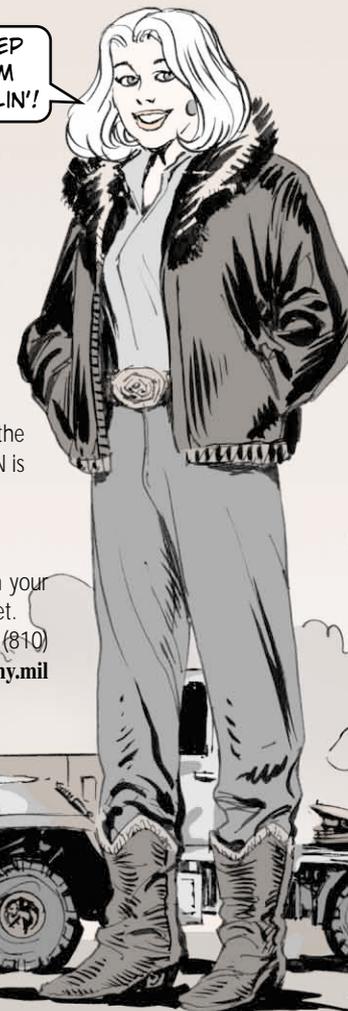
## HMMWV Ax Bracket

If the pioneer ax and its sheath won't fit in the bracket on your M1114 up-armored HMMWV's tailgate, get a bigger bracket. It's free when you call TACOM at DSN 786-6212/8398 or (810) 574-6212/ 8398. You can also e-mail: [yasonia@tacom.army.mil](mailto:yasonia@tacom.army.mil) or [marar@tacom.army.mil](mailto:marar@tacom.army.mil)

## PLS Lift Pin

NSN 5315-01-411-2482 gets the PLS tractor truck's lift pin shown as Item 9 on Page B-5 of TM 9-2320-364-10. NSN 5315-01-419-8204 gets the lift pin shown as Item 10 on the same page. Make a note until these NSNs are updated in the TM.

KEEP  
'EM  
ROLLIN'!



PS 582

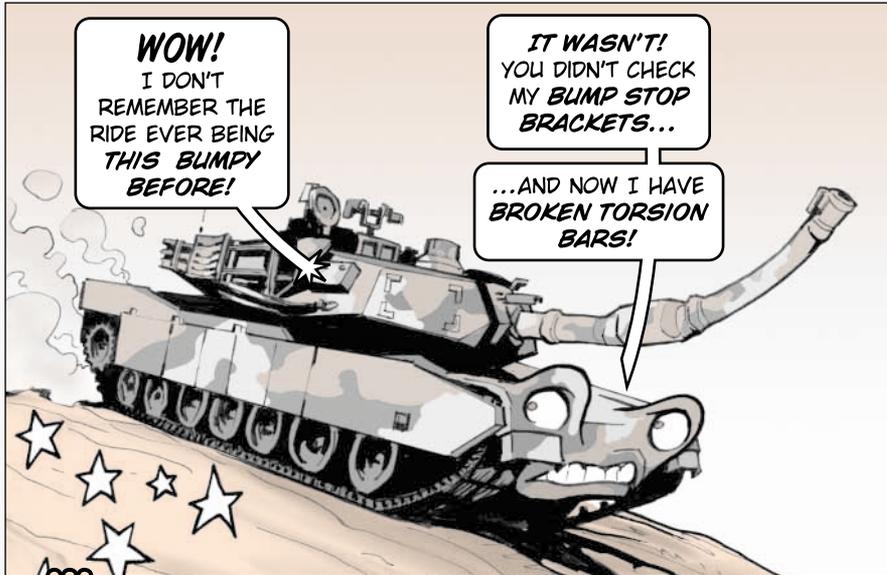
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PS 582

# Smooth Out

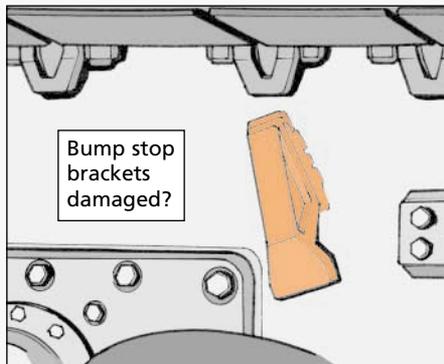


When you're tooling around in your tank, you want the ride to be as smooth as possible. That's why you need to keep an eye on the roadwheel arm bump stop brackets.

The brackets are installed at the No. 1, 2 and 7 roadwheel arms to keep them from moving beyond their limits. If the brackets are damaged or missing, the roadwheel arms move too far and you end up with broken shocks and torsion bars.

So eyeball the bump stop brackets as part of your after-operation PMCS. Look for cracked, bent or missing brackets.

Check the shock absorbers for leaks or a housing that's colder than the rest. A cold housing means the shock's not working.



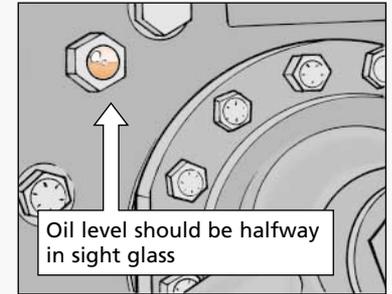
# the Ride

Make sure the shock's oil level is halfway up on the sight glass.

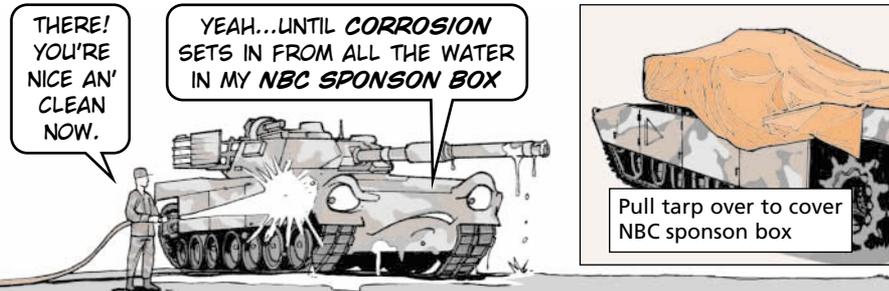
One or more bars may be broken if your tank tilts to one side or the No. 1 and No. 7 roadwheels and track are off the ground.

If you can lift a roadwheel with a tanker's bar at the No. 2 through No. 6 roadwheel arms, chances are a torsion bar is broken.

Report these problems to your mechanic. He'll replace the bump stop bracket behind the No 2 roadwheel on each side of the vehicle with NSN 5340-01-065-6143. DS has to replace bad brackets behind the No. 1 and No. 7 roadwheels.



# WEATHER THE STORM



Your tank's NBC system is designed to keep out all sorts of bad stuff. But it needs your help to keep out water.

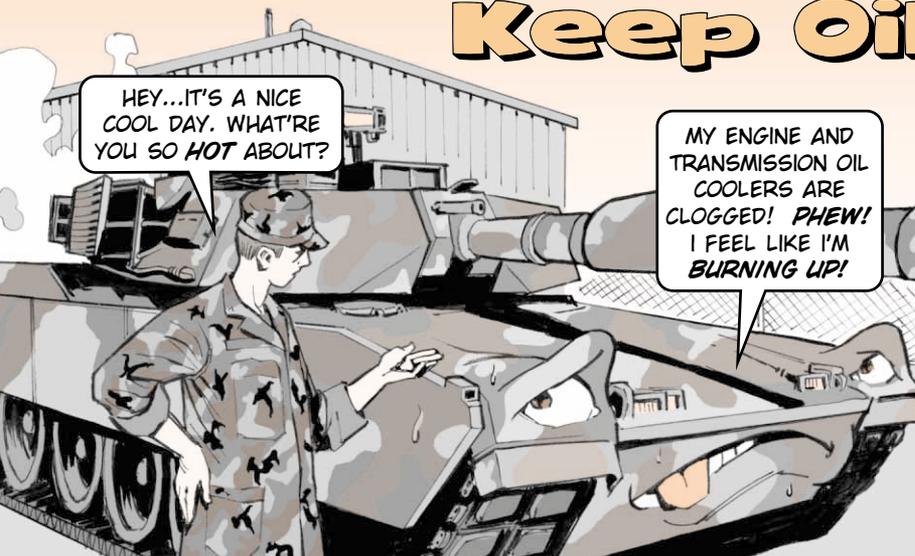
When water—whether from cleaning or from rain—gets inside the NBC sponson box, components corrode and wiring shorts out. No NBC system means your tank is NMC.

Protect the NBC system by keeping high-pressure water below track level.

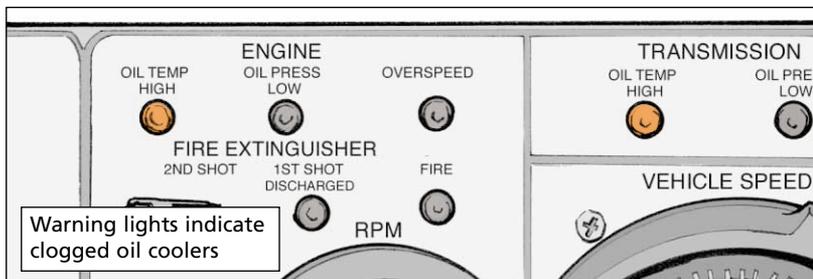
Then shield the system from the elements by pulling the protective tarp over the NBC sponson box.

If you protect the NBC system, it'll protect you.

# Keep Oil



**D**rivers, an ENGINE OIL TEMP HIGH or TRANSMISSION OIL TEMP HIGH light is a good sign of clogged oil coolers on your tank.



The fans that drive cooling air through the engine and transmission oil coolers use air that is drawn from outside the tank as it moves. If the outside air is dusty or wet, a deposit builds up on the coolers. Leaking oil or fuel also ends up on the coolers.

The thicker the build-up, the more

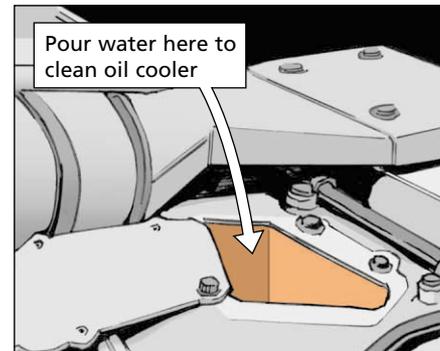
oil temperatures rise. Eventually, the coolers clog and the warning lights come on. Then you've got to troubleshoot to find the problem or risk burning up the engine.

Your mechanic cleans the oil coolers thoroughly using steam or solvent during semiannual maintenance.

# Coolers Clean

But between these cleanings you can keep the oil coolers clear like this:

1. Open the access hatches on the rear deck of the tank. Older model M1s don't have the hatches. You'll need to remove the rear deck to gain access.
2. Remove the two access covers on the top of the engine ductwork.
3. Pour large amounts of water through the openings in the ductwork while the engine is running. The fans force the water against the backs of the coolers and wash away dirt and oil. Hot water works best, but even cold water will remove most of the deposits.
4. Replace the access covers and hatches.



THAT'S NOT EXACTLY WHAT I HAD IN MIND WHEN I SAID MY HEAT SHIELDS NEED NEW TAPE!

# Tape Up Heat Shields

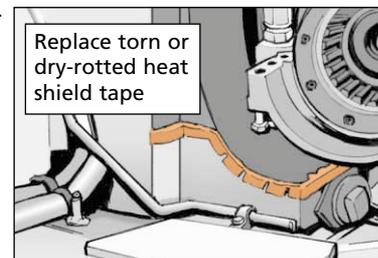


**M**echanics, the tape on the edges of a tank's fuel cell heat shields takes a lot of rough treatment. Fuel, oil and water lead to dry rot. Bumps and rubs during power-pack installation wear out the tape before its time.

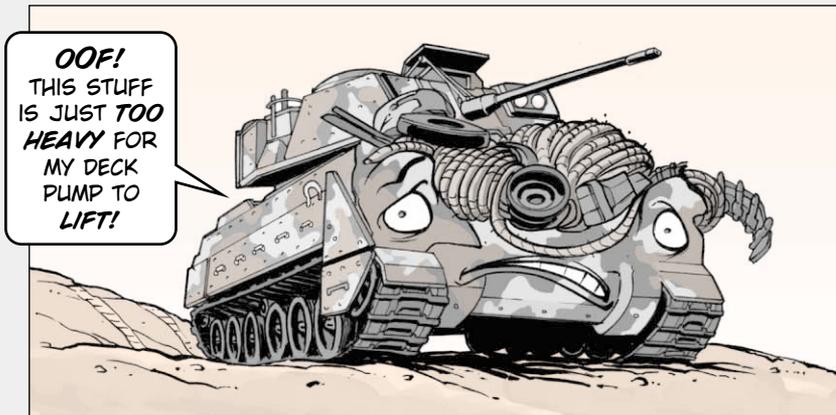
The PMCS tables in the -20-1-1 TMs say the vehicle is NMC if the heat shields are damaged, so most units simply replace them.

If the tape is all that's damaged, save your unit those repair bucks by replacing it instead of the heat shield. As long as the damaged edge of the tape is 12 inches long or less, just pull off the old tape and replace it with NSN 7510-01-176-3398.

Heat shields with more extensive damage should be replaced to avoid a fire hazard.



# All Decked Out



**Y**ou've got a lot of extra gear to carry on your Bradley, crewmen. Camo nets, backpacks, extra road-wheels, tarps, concertina wire—it all has to be stored somewhere.

Just make sure you don't lash it to

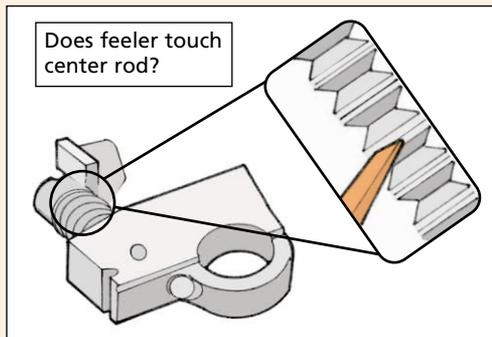
the engine deck. The hydraulic pump isn't designed to lift all that extra weight. It'll burn out.

Find somewhere else to store that gear. At the very least, remove it before raising the deck.

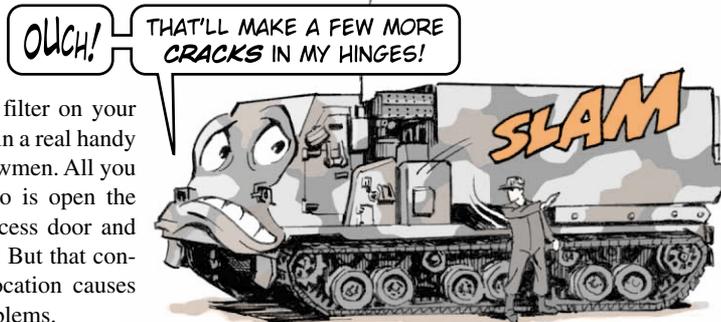
# M242 Sear Check

**S**ome Bradley repairmen are junking the sear for the M242 gun because the sear's compression washers turn.

But that's a waste. It's OK for sear washers to be a little loose. As long as you can't stick a .039-in feeler gauge between the washer bevels and touch the center rod, the sear's OK and you should not replace it.

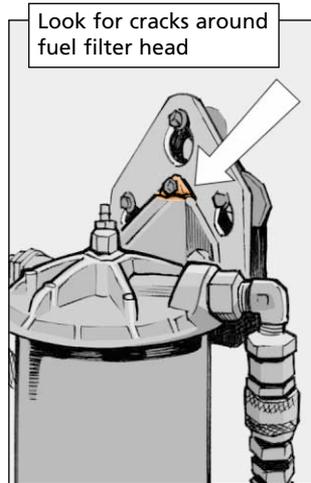


# WATCH FOR CRACKS, MAC!



**T**he fuel filter on your MLRS is in a real handy place, crewmen. All you have to do is open the engine access door and there it is. But that convenient location causes some problems.

For instance, constant vibration during operation can crack the fuel filter head around the mounting screws.



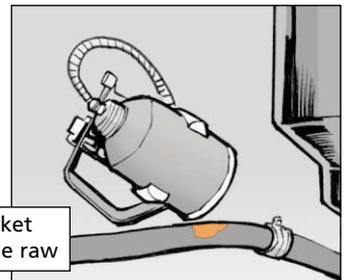
You can prevent some of that damage by keeping the screws tight. Also, don't make things worse by slamming the engine access door or leaning against the filter when draining it.

Check the door hinges for cracks, too. With the extra weight of the filter and hoses, vibration can also crack the hinges. If you spot any cracks on the hinges or at the fuel filter head, tell your mechanic.



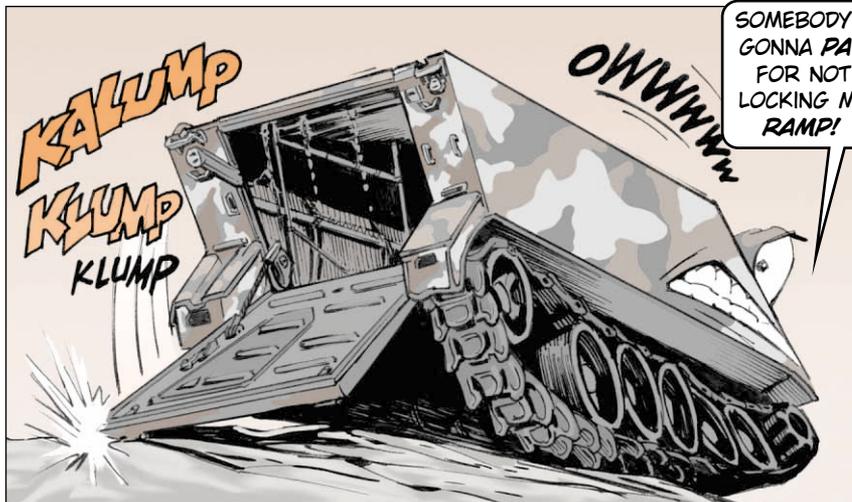
While you're in the area, eyeball the fuel line that runs along the bottom half of the access door. If it's frayed or showing wear spots, the line could be getting rubbed by the oil can bracket.

Too much rubbing results in a leak and that's a fire hazard. Let your mechanic know about damage to the fuel line right away.



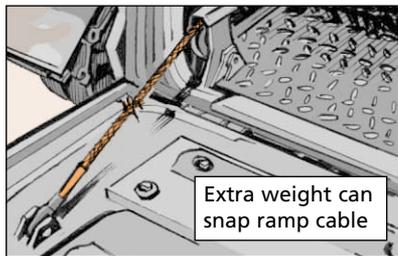
Oil can bracket rubs fuel line raw

# KEEP RAMP READY

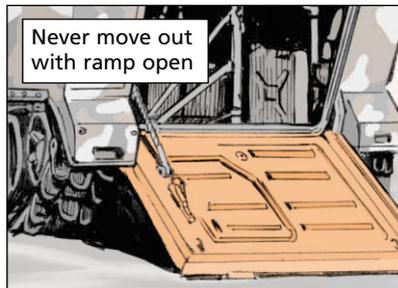


Crewmen, if you want the ramp on your M113-series carrier to work on the battlefield, take good care of it now.

\* Never store equipment on the ramp. It's not a storage rack for tent poles, concertina wire and camouflage nets. The ramp is heavy enough as it is. Extra weight will just break the ramp cable or damage the hydraulic pump.



\* Don't move the carrier while the ramp is down or not fully locked. That warps the ramp so it won't seal, breaks the locks and damages the hinges.



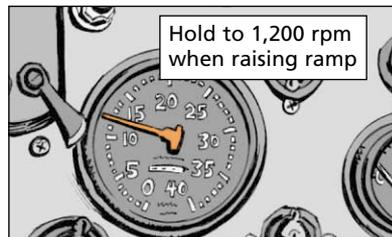
Moving with an open ramp can also break the ramp cable and damage the pump. So make sure the ramp is fully up and locked before you move out.

SOMEBODY'S GONNA PAY FOR NOT LOCKING MY RAMP!

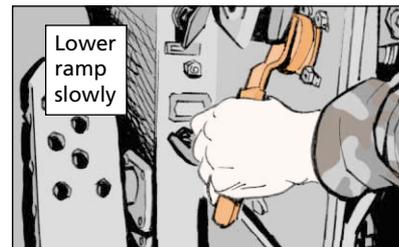
\* Lock the ramp door, too. An unlocked door will fly open suddenly when the ramp is lowered. That breaks the door's hinges and can ruin the ramp's hydraulics.



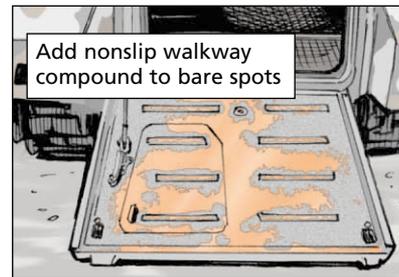
\* Don't race the engine to raise the ramp faster. It takes 15-20 seconds to raise the ramp at 1,200 rpm. It'll go up quicker at higher rpm—if the ramp pump survives, that is. Go slow and save the pump.



\* Never drop the ramp too hard or on uneven ground. That puts a strain on the hinges, pump and cable. Once again, slow and steady is the way to go.



\* Eyeball the ramp's nonslip coating. A worn surface makes for tricky footing, especially in wet weather.

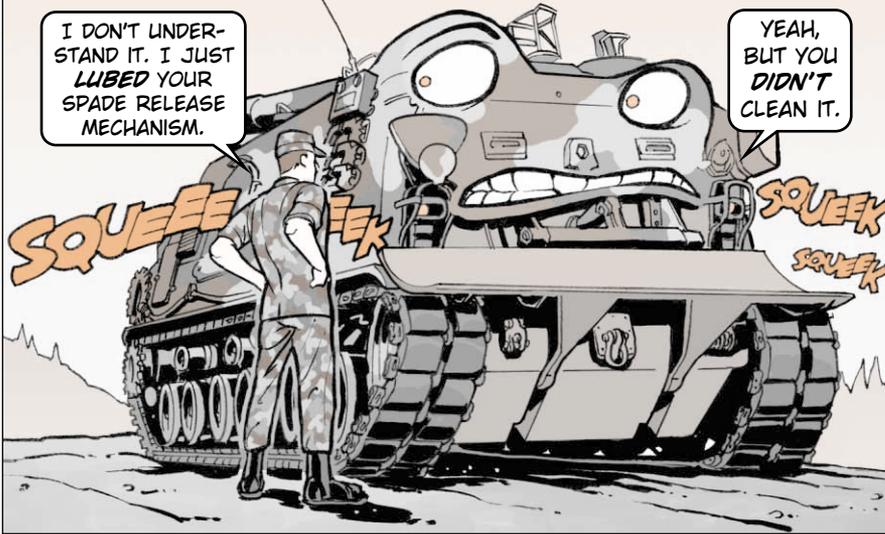


## Recoat a worn ramp like this:

1. Wash the surface thoroughly with soap and hot water. Use a nylon scrub brush to remove dirt, grease and loose paint. Rinse with hot water to further cut grease and oil.
2. Let the ramp dry completely.
3. Use a paint brush—such as NSN 8020-00-245-4516—to apply nonslip walkway compound to all the bare patches. NSN 8010-00-141-7838 gets a gallon of the olive drab compound.
4. Allow the compound to dry for 24 hours before stepping on it.



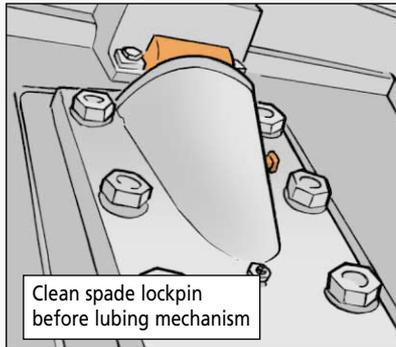
# Clean It Before You Lube It



Lubing the spade release mechanism on your M88A1 recovery vehicle won't do much good if you don't clean it first.

The spade lockpin gets covered with dirt, mud and sand. As the spade release is used, that gunk gets pulled inside the mechanism. Pretty soon, you have a spade that won't lock or release.

Clean and lube the mechanism like this:  
1. Wash off any dirt or mud with clean water and a nylon brush.



2. Wipe the spade lockpin dry with a clean cloth. If dirt still shows on the cloth, wash and dry the lockpin again.
3. Apply a light coat of GAA to the exposed part of the spade lockpin.
4. Pump GAA into the grease fitting on the right side of the pin housing until new grease flows from the relief valve. Wipe off the old grease.
5. Operate the spade release mechanism a few times. That ensures the entire spade lockpin is properly lubed.

If it's too late and the mechanism is already frozen, DS maintenance will fix the problem.

# REPLACE BAD EXHAUST PACKINGS

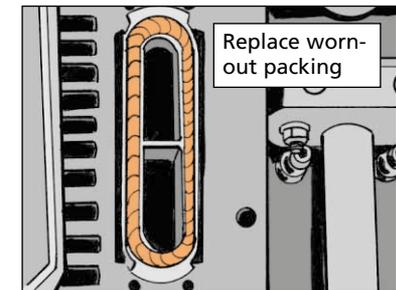


Does your howitzer or ammo carrier have exhaust leaks in the engine compartment?

If so, the culprit could be a worn-out exhaust deflector packing. It's supposed to plug up the space between the deflector and the end of the engine exhaust pipe.

Once the packing is worn enough, you'll be getting exhaust leaks in the engine compartment. That's a definite no-no.

Replace that packing when you start seeing leaks. A new packing comes



with NSN 5330-01-382-4272. Use the whole packing to fill the gap between the deflector and the hull mount.

If the seal support is bent so the deflector won't seat right, replace it. Use NSN 2990-00-894-0075 for a new support.

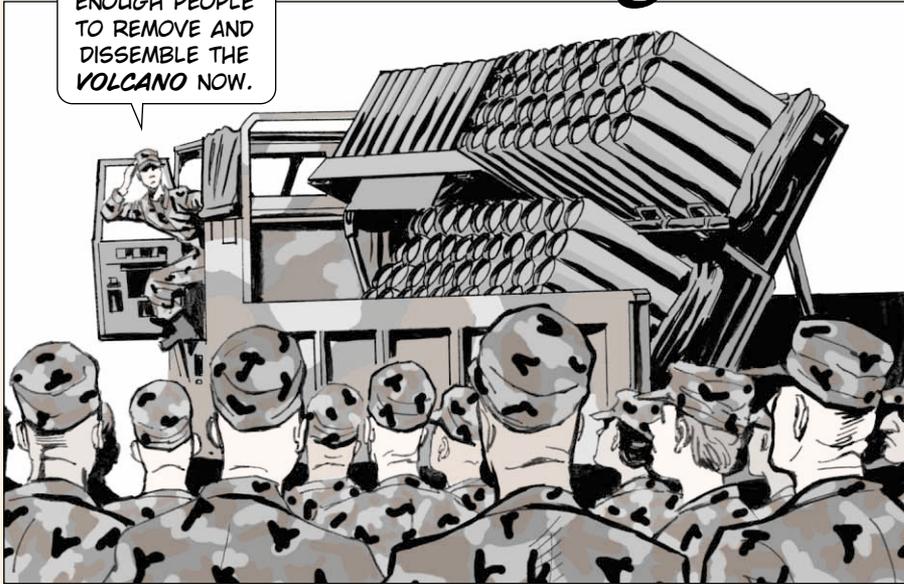
Make sure the cap screws that hold the deflector snug against the packing are not stripped or cross-threaded. Replace bad screws with NSN 5305-00-269-3238.



If you still can't get a good seal around the exhaust deflector, contact your support—now.

# Mining with

I THINK WE HAVE ENOUGH PEOPLE TO REMOVE AND DISSEMBLE THE VOLCANO NOW.



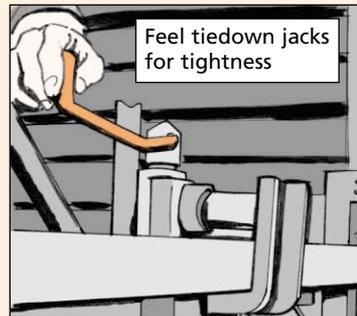
If you're mindful about PM with your Volcano, it won't mind sowing mines where you want it to.

## Assembly and Disassembly

TM 9-1095-208-10-1 says to use at least five people to install or remove the Volcano. That's **at least** five. The Volcano components are very heavy and very difficult to maneuver. One misstep can cause serious injury.

If more than five people are available, use them. Some engineer units make Volcano assembly and disassembly part of their PT so they have all the hands they need.

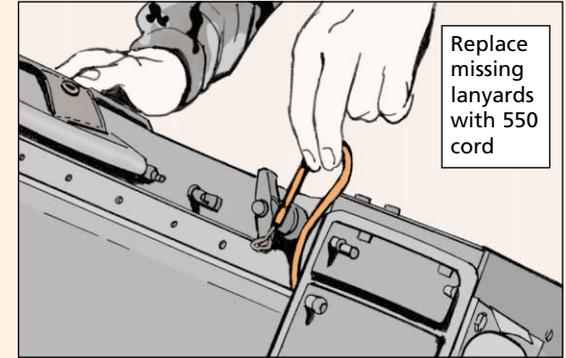
If tiedown jacks are used (5-ton trucks only), make sure they are tight. If a jack works loose, the Volcano shifts around during travel and shears the locking pins. In the field, check the jacks daily before operation. Tighten them if necessary.



# Volcanic PM

## PMCS

Locking pins should be attached to the Volcano by lanyards. If the lanyards have disappeared, temporarily substitute 550 cord or anything similar until you get another Volcano lanyard. That prevents the pins from disappearing and also the wrong pin from being used in the wrong hole.

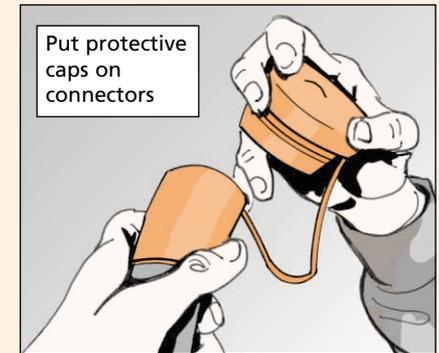


## Cables

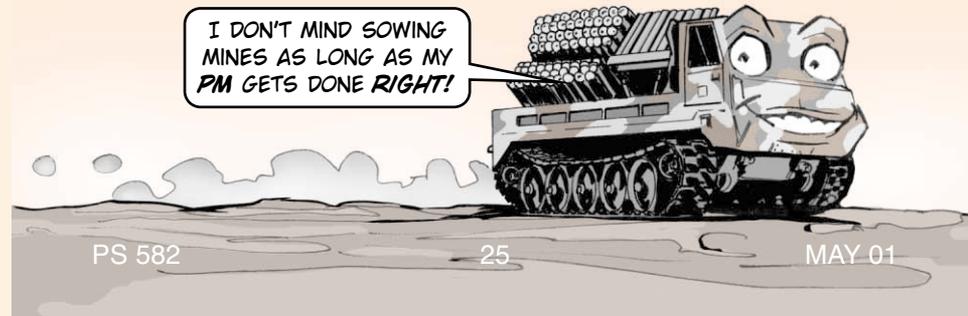
It's easier to connect the launcher rack cable if you first lean the rack a few inches forward, away from the tripod. That gives you room to maneuver the cable.

Don't force cable connectors. That bends pins. Check the connector for dirt or pebbles that could prevent a connection. Tap out or blow out obstructions with an air hose.

When cables are disconnected, mate their connectors with their protective caps to seal out dirt and moisture.



I DON'T MIND SOWING MINES AS LONG AS MY PM GETS DONE RIGHT!



SEE...

## Bolts Take Jolt

THERE'S A WHOLE LOT A' SHAKIN' GOIN' ON!

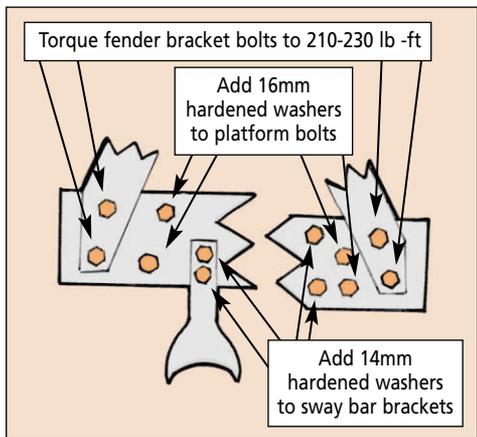


**M**echanics, bad vibes can put your excavators down.

Vibration loosens the bolts on the SEE's rear fender bracket, sway bar and platform. Loose bolts chew into the vehicle's frame. Then the vehicle's rear fenders and frame begin to fall apart.

Before that happens, make sure all bolts are torqued properly. The fender bracket bolts should be torqued to 220 lb-ft. Add 16mm hardened washers, NSN 5310-01-305-2539, to the platform bolts and torque the bolts to 220 lb-ft. Finally, add 14mm hardened washers to the sway bar bracket and torque the bolts to 150 lb-ft.

Order the 14mm washers on DD Form 1348-6 using CAGE code 64678 and PN 6819900440.

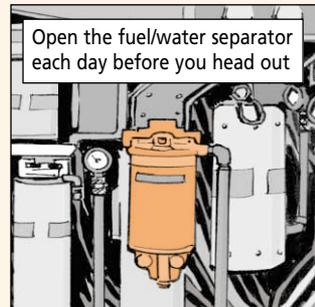


DEUCE...

## Keep Fuel Clean and Clear

**W**ater in your DEUCE's fuel will leave its engine running rough, or not running at all.

Water gets there when warm days and cool nights let condensation form in the fuel tank. You get rid of it by draining the fuel/water separator each day before you head out. The separator sits behind the oil filter compartment door.



If the fuel runs clear when you drain the separator, your DEUCE is OK for another day. If it doesn't run clear, close the valve and report it to your mechanic.

A strong line of defense against water contamination is the fuel filter. Make sure your mechanic replaces it twice a year per the TM.

Then, to limit condensation forming overnight, fill the fuel tank at the end of the day.

# The 100 Years War

FROM 1337 TO 1453 ENGLAND AND FRANCE FOUGHT A BITTER WAR. HOW IMPORTANT WAS MAINTENANCE OF EQUIPMENT? WE CAN ONLY GUESS... BUT...

...RESTING BETWEEN BATTLES, HARDENED VETERANS MUST HAVE TALKED ABOUT IT.



THIS WAR SEEMS T'BE GOIN' ON FOREVER!

AYE. SOMETIMES WE WIN...



... AN' SOMETIMES WE LOSE.

WE COULD MAYBE BEAT THE FRENCH ...ONCE AN' FOR ALL!

HOW?



WE CAN WIN THIS WAR.. AN' SOON... IF WE ARE MORE CAREFUL WITH OUR WEAPONS AND MATERIALS.

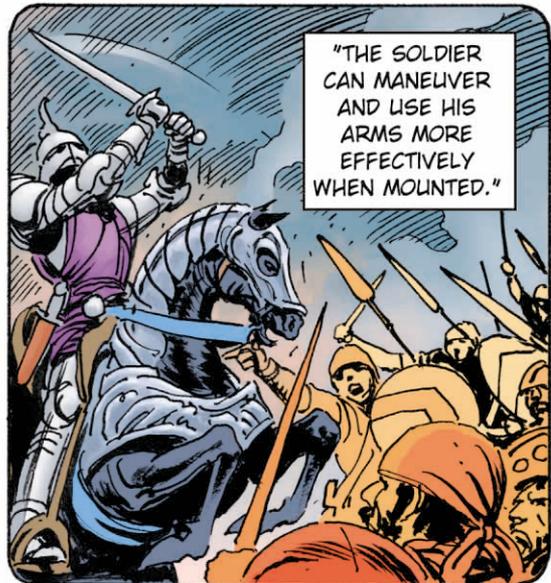


A MAN ON A **HORSE** MAKES A POWERFUL WEAPON. THE HORSE ADDS **STRENGTH AND SPEED.**

IT RAISES THE SOLDIER **OVER** HIS ENEMY.



THE **SPEAR** IS A SOLDIER'S COMPANION. 'TIS BOTH PROTECTION AND A WEAPON... AND IS TO BE KEPT ALWAYS NEAR AT HAND.



"THE SOLDIER CAN MANEUVER AND USE HIS ARMS MORE EFFECTIVELY WHEN MOUNTED."



"BUT THE ANIMAL MUST BE WELL-TREATED IF IT IS TO BE **DEPEND**ED UPON. FED AND BRUSHED DAILY."



"THE SPEAR IS AN **EXTENSION** OF THE SOLDIER'S ARM WHEN FACING THE ENEMY."



"IT WILL REPEL THE FORCE OF A CHARGING CAVALRY."



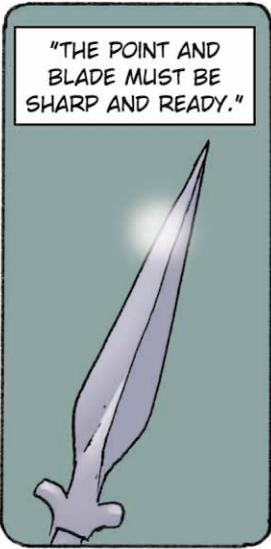
"IT MUST BE **SHOD** PROPERLY. A THROWN SHOE CAN CRIPPLE A HORSE... AND KILL THE RIDER."



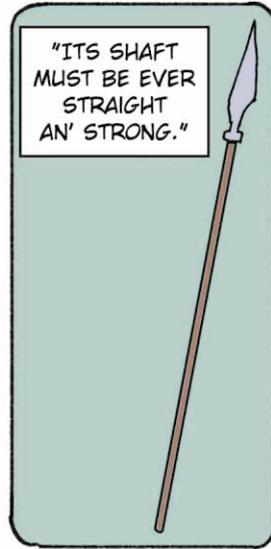
"THE HORSE'S **ARMOR** MUST BE KEPT CLEAN AND ADJUSTED."



"THE **SADDLE** MUST BE FIRM AND IN PLACE, STRAPS CHECKED AND SET."



"THE POINT AND BLADE MUST BE SHARP AND READY."



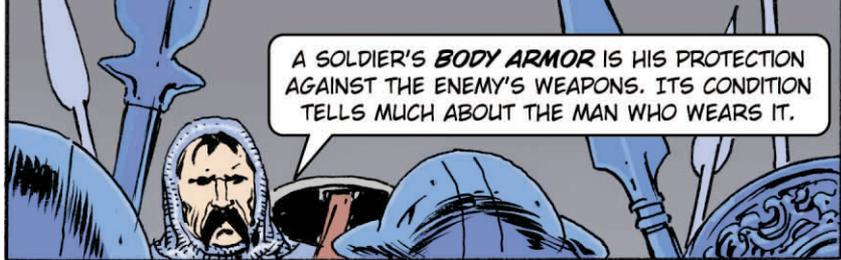
"ITS SHAFT MUST BE EVER STRAIGHT AN' STRONG."



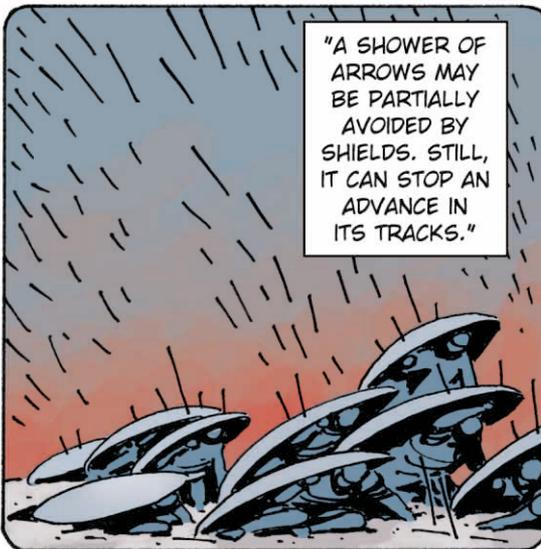
"FREE OF DUST OR MUD, THE SPEAR WILL SERVE WELL THROUGH MANY BATTLES."



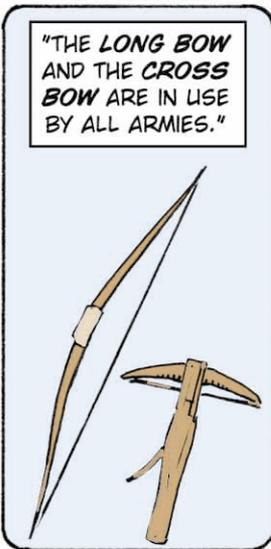
THE **BOW AND ARROW** CAN CAUSE HAVOC UPON THE ENEMY FROM A SAFE DISTANCE. TO BE EFFECTIVE, IT MUST BE MAINTAINED.



A SOLDIER'S **BODY ARMOR** IS HIS PROTECTION AGAINST THE ENEMY'S WEAPONS. ITS CONDITION TELLS MUCH ABOUT THE MAN WHO WEARS IT.

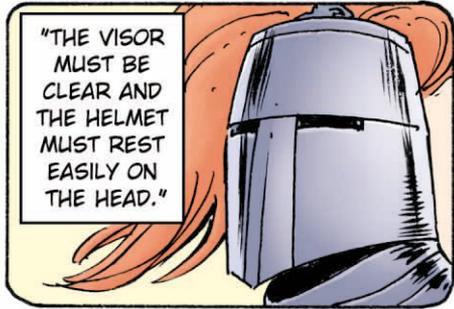


"A SHOWER OF ARROWS MAY BE PARTIALLY AVOIDED BY SHIELDS. STILL, IT CAN STOP AN ADVANCE IN ITS TRACKS."

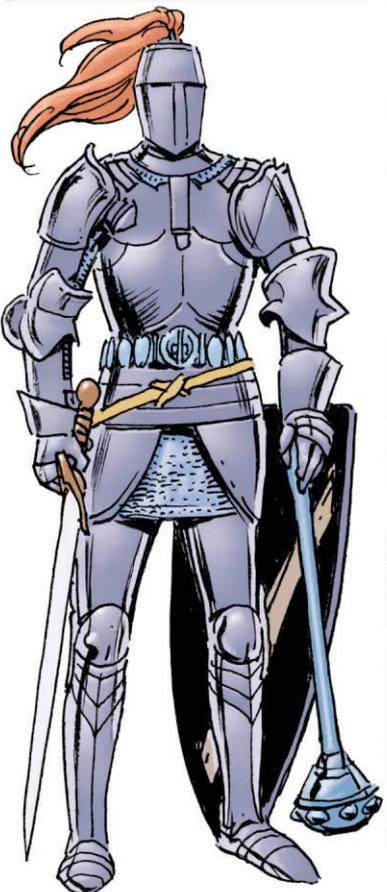


"THE **LONG BOW** AND THE **CROSS BOW** ARE IN USE BY ALL ARMIES."

"KEPT CLEAN AND POLISHED, THE METAL SHOWS PERSONAL PRIDE AND CHARACTER OF THE SOLDIER, RECOGNIZED BY ALL MEN IN ARMS."



"THE VISOR MUST BE CLEAR AND THE HELMET MUST REST EASILY ON THE HEAD."



"WELL OILED JOINTS ALLOW PROPER MOVEMENT."

"A TORN TIE, A MISALIGNED FEATHER OR A BLUNT POINT WILL NOT DO."

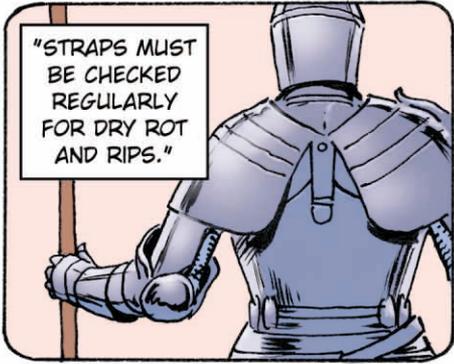


"A SMALL SPLIT IS THE FORERUNNER OF A BROKEN BOW..."

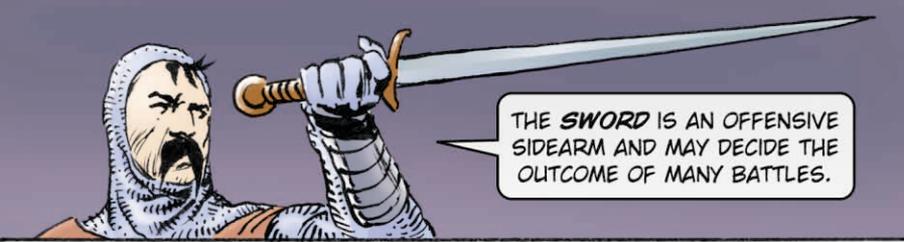


... REPAIR OR DISCARD IS THE RULE."

"THE CROSS BOW'S DRAWSTRINGS MUST BE REPLACED PERIODICALLY."



"STRAPS MUST BE CHECKED REGULARLY FOR DRY ROT AND RIPS."

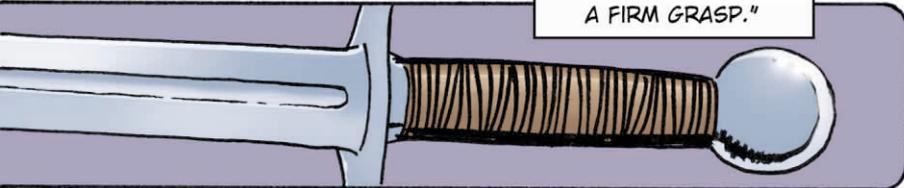


THE **SWORD** IS AN OFFENSIVE SIDEARM AND MAY DECIDE THE OUTCOME OF MANY BATTLES.

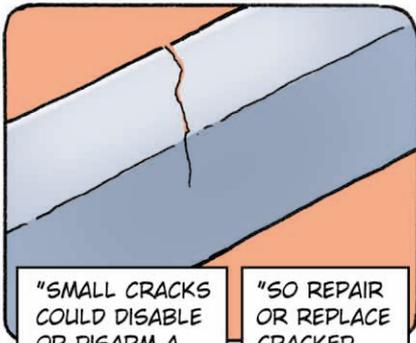


"OFTEN THE BATTLE IS REDUCED TO TWO MEN WIELDING SWORDS. 'TIS THEN THAT THE WEAPON IS **TESTED**, AS WELL AS THE **MAN**."

"A CLEAN HILT ALLOWS A FIRM GRASP."



"DAILY USE OF A HONING STONE WILL KEEP THE POINT SHARP AND THE BLADE KEEN."

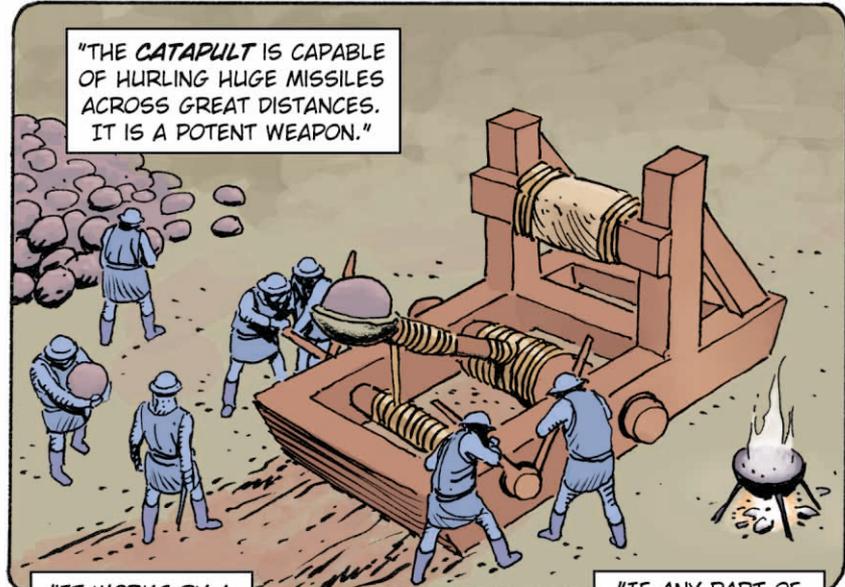


"SMALL CRACKS COULD DISABLE OR DISARM A SOLDIER."

"SO REPAIR OR REPLACE CRACKED BLADES."



EVEN LARGER ENGINES OF WAR MAY BE CRIPPLED IF PREVENTIVE MAINTENANCE IS NOT PRACTICED.



"THE **CATAPULT** IS CAPABLE OF HURLING HUGE MISSILES ACROSS GREAT DISTANCES. IT IS A POTENT WEAPON."

"IT WORKS BY A SERIES OF ROPES AND SPRINGS."

"GREAT PRESSURE IS EXERTED ON A WOODEN ARM."

"IF ANY PART OF THE MECHANISM FAILS THE ENTIRE MACHINE BECOMES USELESS."





BRAVE MEN MUST HAVE EQUIPMENT THAT THEY CAN DEPEND UPON.

AYE. THAT'S TRUE.

THIS WAR HAS GONE ON FOR MORE THAN A HUNDRED YEARS. BATTLES HAVE BEEN LOST AND MEN HAVE DIED BECAUSE OF EQUIPMENT FAILURES.

WE CAN TURN THE TIDE OF BATTLE IF WE TAKE BETTER CARE OF OUR ARMS.

WHAT SAY YOU, SOLDIER?



I AGREE MOST HEARTILY. AND, IN THE FUTURE, I WILL DO **EVERYTHING** TO MAKE SURE **PREVENTIVE MAINTENANCE** IS DONE!

CH-47D...

# Don't Just Eyeball It, Touch It



YOUR **FLIGHT CONTROL CLOSET** LOOKS GOOD TO ME!

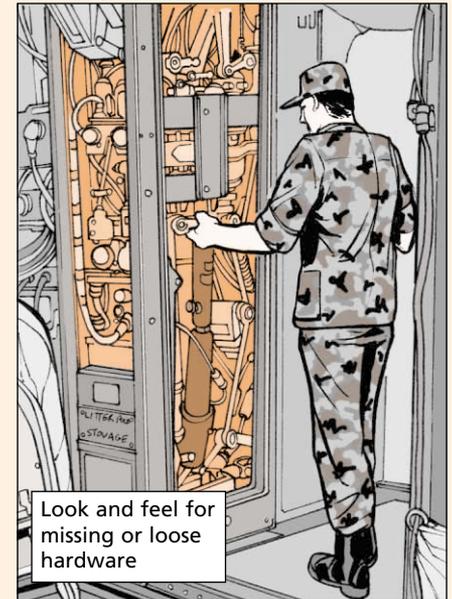
"LOOKING GOOD" ISN'T ENOUGH. YOU'VE GOT TO ROLL UP THOSE SLEEVES AND GET YOUR HANDS DIRTY.

Crew chiefs, you know the old saying, "Look, but don't touch." Well, that won't cut it when you pre-flight your Chinook's flight control closet.

Closet components control the aircraft's flight control functions and hydraulic systems. If you overlook a hydraulic leak or parts that are missing, it could affect your flight controls and hydraulic system.

So use your hands to feel for things like missing cotter pins, loose cannon plugs and fittings, loose bolts, plug pins that have backed out from aircraft vibration and loose hydraulic lines.

Missing these problems could mean a quick return to earth for you and your craft. Your best bet is to look and touch.

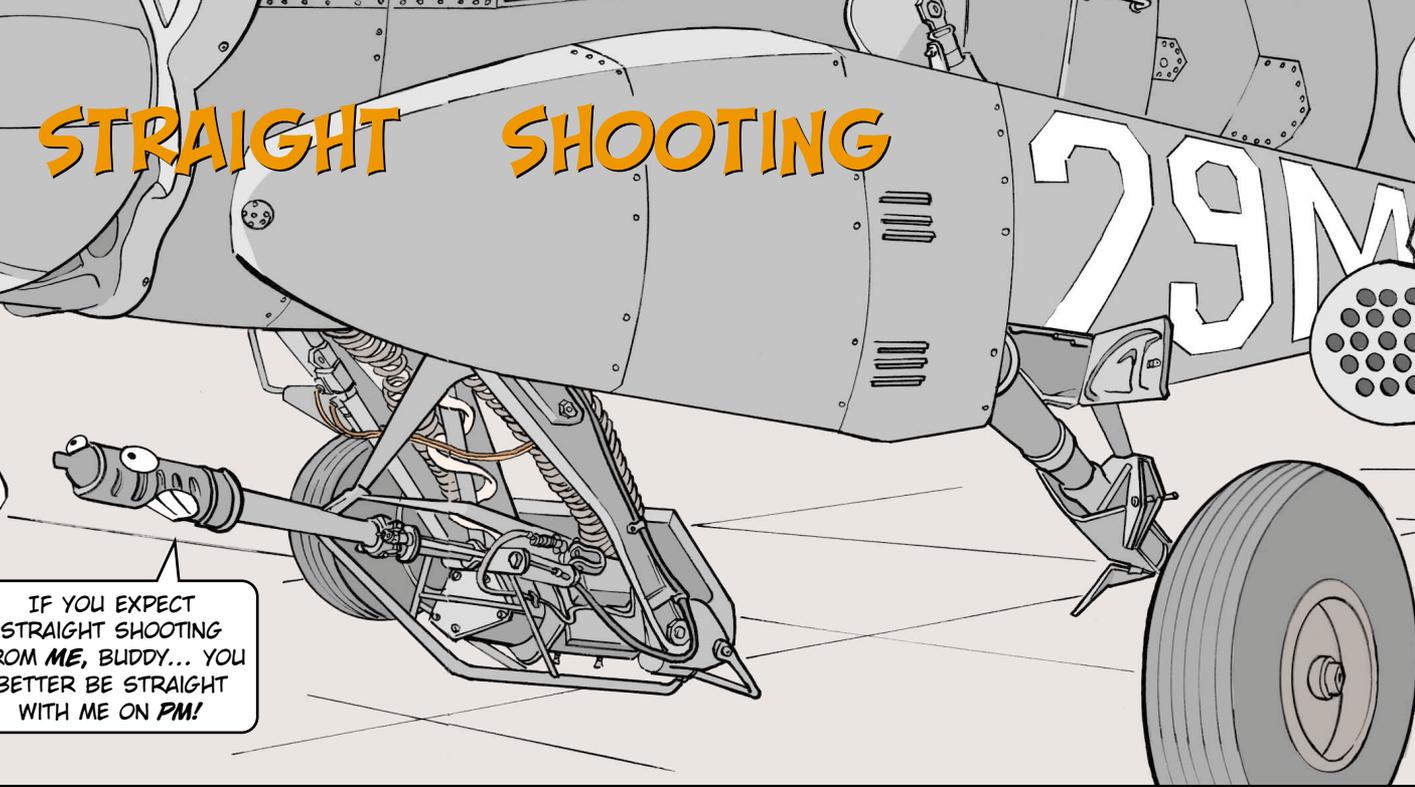


Look and feel for missing or loose hardware

# STRAIGHT SHOOTING



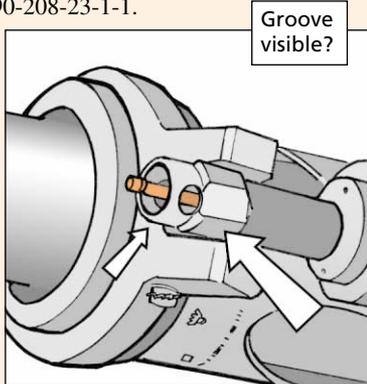
IF YOU EXPECT STRAIGHT SHOOTING FROM ME, BUDDY... YOU BETTER BE STRAIGHT WITH ME ON PM!



The AH-64's M230 gun won't be doing much straight shooting if you repairmen haven't been straight with its PMCS. So pay particular attention to these checks as you do the PMCS in Para 4-5-1 in TM 9-1090-208-23-1-1.

## Recoil Mechanisms

At around 72° F (+/- 10°) the indicator groove of the piston should be visible through the recoil's check hole. At higher temperatures, the groove may be to the edge of outside the piston rod. At lower temperatures, the end of the piston should be at least flush with the check hole. If not, the recoil is low on silicone lubricant, NSN 9150-01-056-7346, and the gun could be damaged during firing. Info on servicing the recoil is in Para 4-7-7 of TM 9-1090-208-23-1-1.

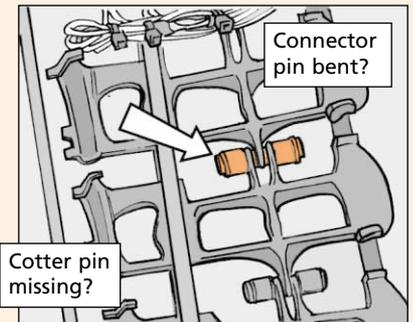


## Timing

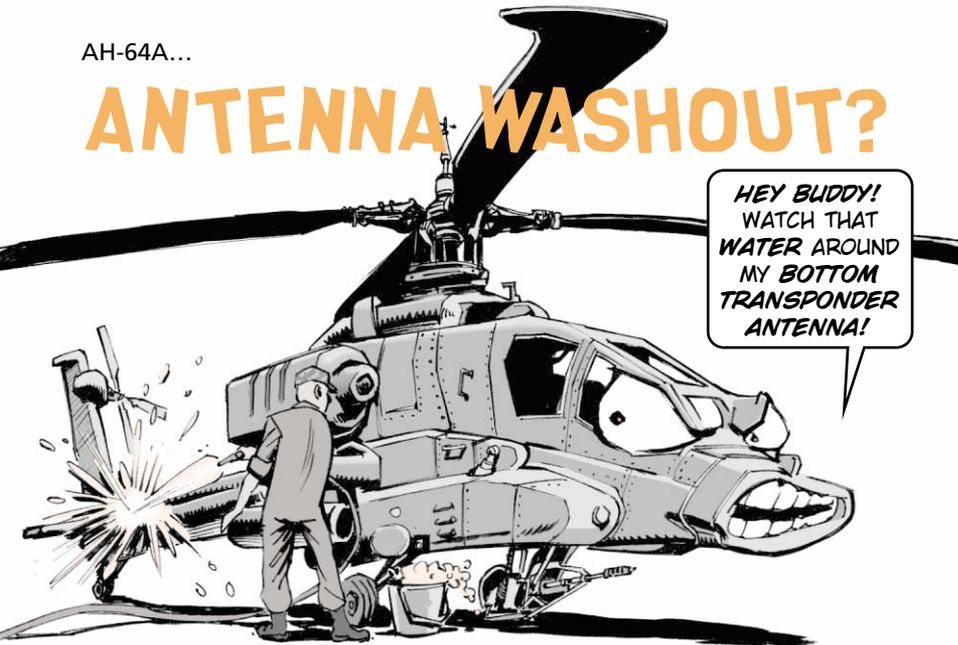
With the gun off the aircraft, position three dummy rounds in the rotor while turning the vertical drive shaft clockwise until all three cartridges are ejected from the gun. If the timing's correct, the rounds should cycle smoothly. If the gun jams, the timing needs to be checked. The timing procedure is in Para 4-7-9 of TM 9-1090-208-23-1-1.

## Ammo Handling Subsystem

As you cycle the rounds through the ammo handling system, check each link for a cotter pin and look at the connecting pin. If a pin is missing, the conveyor or belt could come apart during firing. Bent connecting pins cause rough operation during uploading, downloading and firing. See Para 4-7-142 in -23-1-1 for info on replacing the cotter pins.



# ANTENNA WASHOUT?

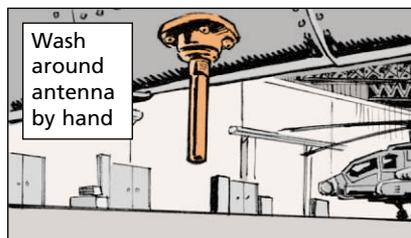
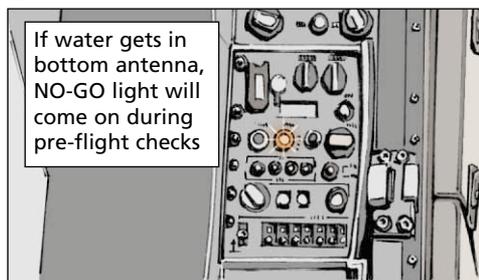


Good preventive maintenance includes giving your Apache a bath once in a while. But be careful. Too much of a good thing can short out the bottom transponder antenna.

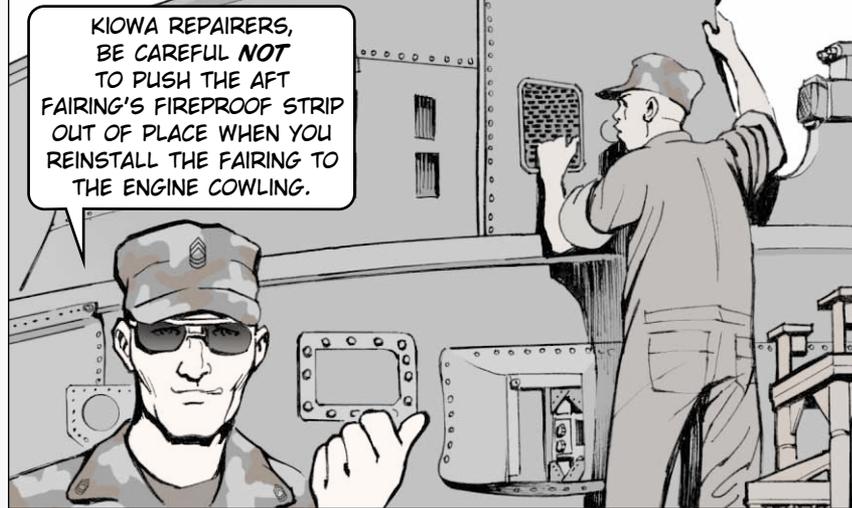
When water gets into the antenna, it shorts out internal electrical components and you'll get a NO-GO light on the transponder control panel during pre-flight checks. A NO-GO light could mean your aircraft isn't ready to identify itself to challenging aircraft and ground facilities.

If water gets into the antenna, your repairman will have to remove the antenna per Para 4-7-7 of TM 11-1520-238-23-1 and empty out the water.

Then you should do another maintenance operation check on the bottom antenna like it says in Para 14-13 of TM 11-1520-238-23-2.



# Use the Gap



If you push the fireproof strip out of place, it comes unbonded. Without protection, the metal airframe cowlings and the duct assembly can crack. That allows more heat into the engine area, resulting in an overheated engine and decreased mission capability.

So instead of just jamming the aft fairing in place and damaging the fireproof strip, CW4 Michael Pressley, 3-7th Cavalry, Ft Stewart, GA, came up with a safe and easy way to attach the fairing. He creates a 1/4-in gap between the engine pan and aft firewall fireproof strip. Here's how:



1. Unfasten the dzus fasteners on the aft end of the engine cowling.
2. Open the engine cowling doors.
3. Support the engine cowling doors with prop rods.
4. Lift the aft end of the engine cowling to create a 1/4-in gap between the engine pan and the aft firewall fireproof strip.
5. Place the aft fairing in position and slide it into the gap.
6. Fasten the dzus fasteners and you're ready for the next mission.

# Painting, Recapping, and Winching

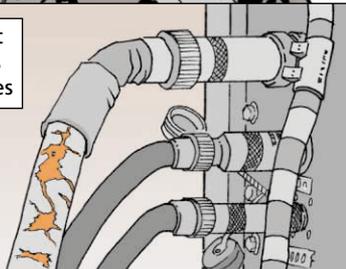
HERE ARE A FEW THINGS TO REMEMBER ABOUT YOUR PATRIOT WHEN IT COMES TO HAVING IT PAINTED OR REPLACING ITS TIRES.



## Painting

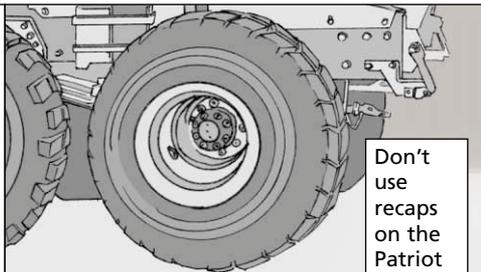
Before any Patriot components go to the paint booth, either remove their cables or tape them. Paint makes the cables less flexible and starts dry rot. A trip to the paint booth can end up costing you thousands in ruined cables.

Paint ruins cables



## Replacing tires

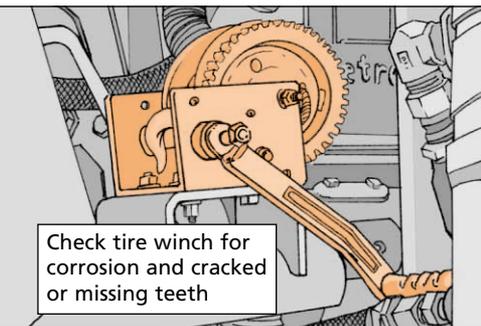
When it's time to replace Patriot tires, never try to save a few dollars by using recaps. Because of the weight and cost of the Patriot components, the Army wants only new tires as replacements on Patriot trucks and trailers.



Don't use recaps on the Patriot

## Winch PMCS

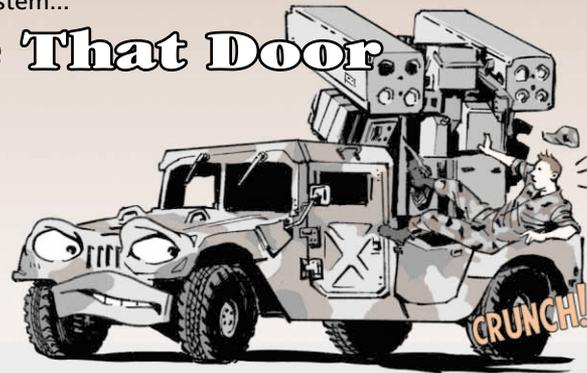
It gets little attention, but if the HEMTT tire davit winch fails, the crank can take off your head. Weekly, check the winch's gears for cracked or missing teeth and the winch for corrosion. If you spot problems, report them. Don't use the winch until it's fixed.



Check tire winch for corrosion and cracked or missing teeth

# Brace That Door

I TOLD YOU THAT YOU NEEDED TO GET THAT DOOR STRENGTHENED!



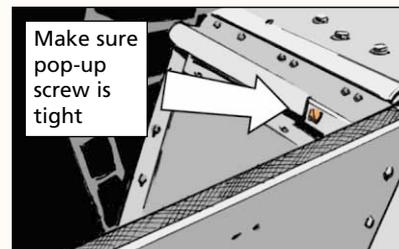
Dear Editor,

Avenger crews use the two half-doors on the HMWWV for steps up and down to the Avenger and to the HMWWV roof. But the doors weren't designed to withstand that kind of weight. They crack and bow and can even send a soldier tumbling.

But you really can't ask crews not to use the doors as a step because there's no other good way up and down.

So we strengthened the doors by getting our support to fabricate a T-bar 32x22 inches and to rivet it to the door. The T-bar braces the door and keeps it from buckling.

But the stronger door won't do much good unless crews make sure the door's pop-up screw is tight. If the screw loosens and pops out, the door swings out and anybody stepping on it falls down. So crews must include the screw as part of their before-operation checks.



Make sure pop-up screw is tight



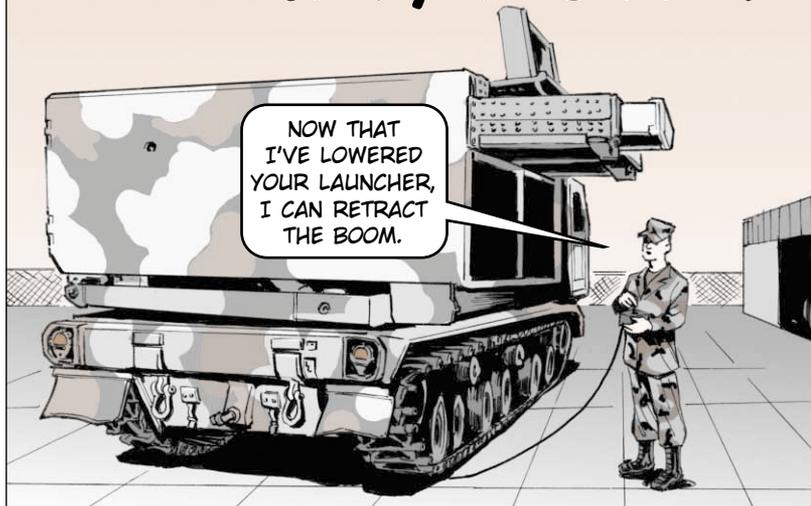
Have support rivet a T-bar to the door

SPC Zeke Ryan  
1/2 ACR  
Ft Polk, LA

From the desk of the Editor

You opened the door to a good solution for buckling doors. Thanks!

# HEY, DON'T

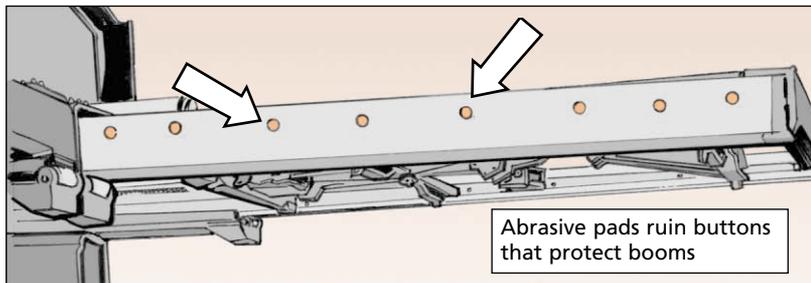


Sometimes crews unknowingly do things that seriously hurt their MLRS. Those actions fall into the "Hey, Don't Do That" category.

For instance:

**CLP and abrasive pads**—Some units try to dress up the MLRS with CLP and abrasive pads. Bad move! CLP on CARC paint makes it easier for enemy radar to detect you, plus it can cause the paint to flake off.

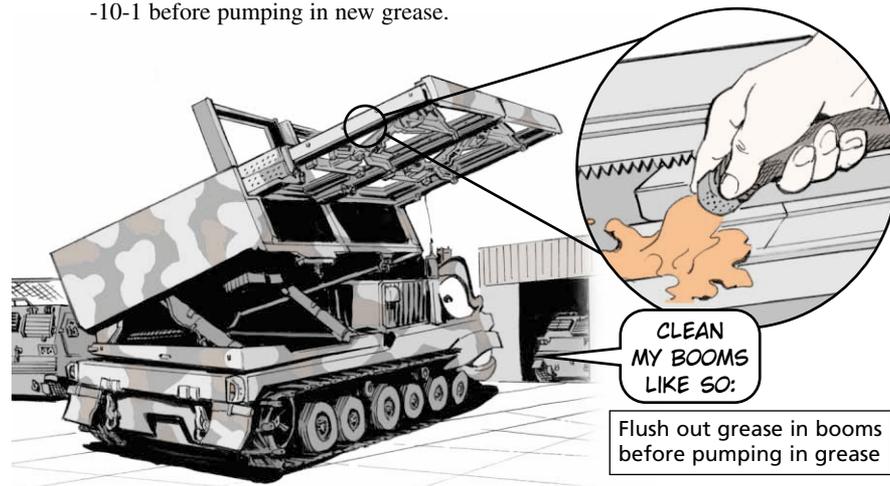
Abrasive pads take the protective coating from stuff like the boom rails and actuators. No coating means corrosion is on the way. Plus the pads can ruin the buttons that protect the booms against friction when they're moved. All the cleaning info you need is in Para 3-9 of TM 9-1425-646-10-1.



# DO THAT!

**Old grease**—If you don't remove the old grease from the booms before you pump in clean grease, you're not doing your MLRS any favors. The old grease has sand and dirt in it that turns grease into a gunky scouring agent. The grease grinds up gears and makes it hard for the boom's moving parts to move. The boom motor wears out quickly.

Flush and wipe out the old grease like it shows on Pages 3-35 through 3-38 in -10-1 before pumping in new grease.



**Retracting booms**—If you retract the booms while the launcher's elevated, the mechanism that activates the blast shield doors will be damaged from the strain of closing the doors from that angle.



## M249 Machine Gun...

I THINK I HAVE CARBON CONGESTION. WHOO, I FEEL AWFUL!

WHAT CAN I DO TO HELP?

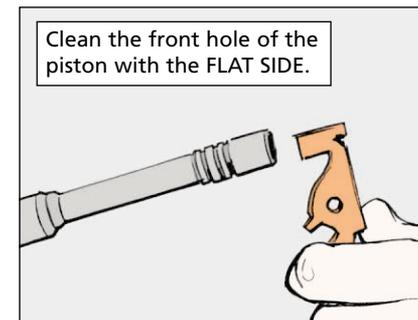
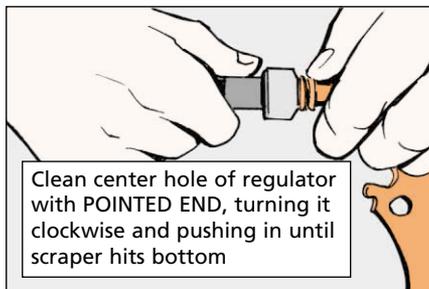
# SCRAPE IT OFF!



**F**iring lots of bullets produces lots of carbon in your M249 machine gun. That carbon coats moving parts and plugs the gas system. If you don't remove all the carbon, your M249 fires slower and slower...and then quits.

But you have the tool to make that carbon disappear: your scraper. Each scraper part is designed to scrape off carbon from different M249 parts. The sooner you use the scraper, the easier it is to remove carbon. Carbon hardens like enamel if it sits too long.

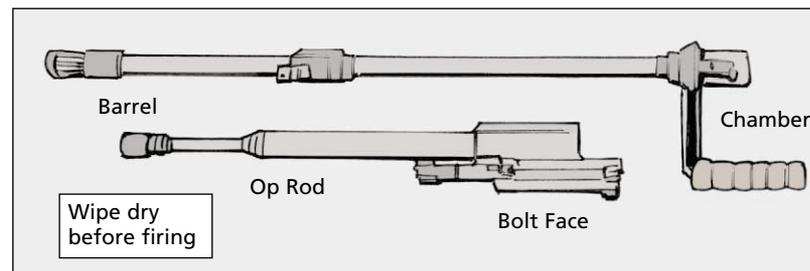
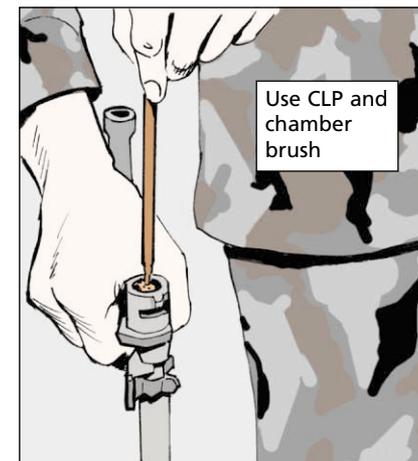
Use the scraper like this:



For the chamber, use the chamber brush and CLP. If your M249 has trouble extracting, a quick cleaning of the chamber usually fixes the problem.

CLP does a good job of cleaning off carbon, but it also does a good job of collecting carbon. So never use CLP—or any lube—on the barrel's gas regulator hole, the gas regulator, the gas cylinder, or the op rod's piston end. Clean carbon off those parts with the scraper only—no CLP.

It's OK to use CLP on the barrel, the chamber, the rest of the op rod, and the bolt face, but wipe those surfaces dry before firing.



If CLP and the scraper or brush can't knock out carbon, tell your armorer. He can soak off the carbon with dry cleaning solvent. Never, ever use abrasives like sandpaper on any metal parts of the M249. They remove the gun's protective finish.

# FASTER FILLING

**ARRGH!**  
THIS IS TAKING FOREVER!  
THERE MUST BE A FASTER WAY TO DO THIS!



Dear Editor,

It takes forever to fill the M13 decon's trainer with water. The fill hole in the container is small and it's a pain to keep pouring water through the funnel.

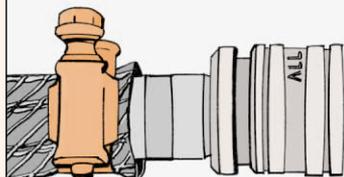
We make things easier here at the Chemical School by connecting an old M13 hose quick-disconnect to a garden hose. Use a 1-in clamp to hold the quick-disconnect in place. Then connect that end of the hose to the M13 quick connect plug and the other end to a faucet. Turn on the water and watch the trainer fill up.

We also tell students that when pumping, they should hold the rear of the pump with a rag or old glove. That will prevent their hand from being pinched or their butyl rubber glove from being torn.

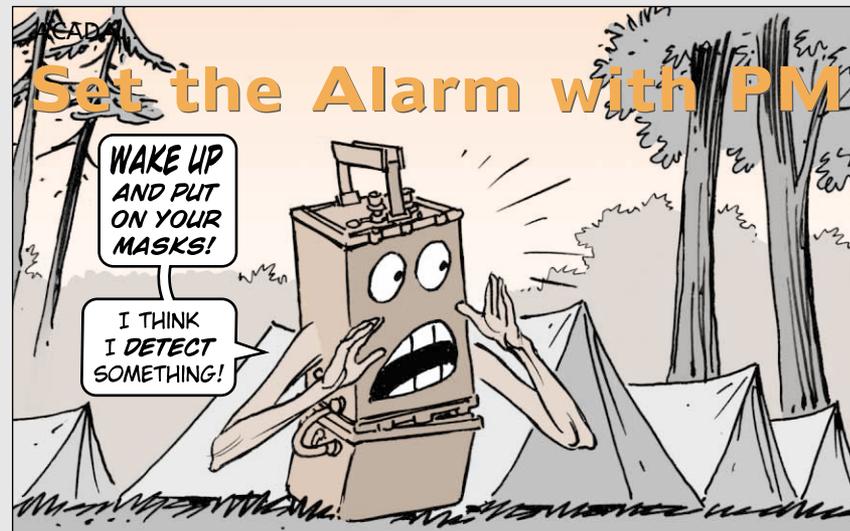


Put rag or glove under hand when pumping

Attach quick-disconnect to hose with clamp



Brad Perkins  
US Army Chemical School  
Ft Leonard Wood, MO



# Set the Alarm with PM

**WAKE UP AND PUT ON YOUR MASKS!**

I THINK I DETECT SOMETHING!

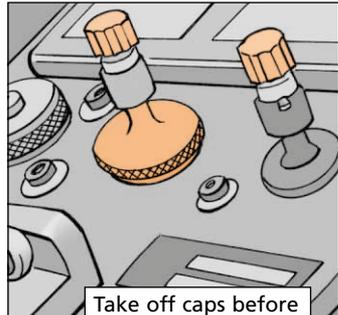
If you forget to set your M22 automatic chemical agent alarm, better known as ACADA, with PM, it can't alert you to chemical dangers.

**Remember to remove the inlet and exhaust caps before you turn on the ACADA.** If you forget, air can't get through the system, which means the ACADA won't sample outside air.

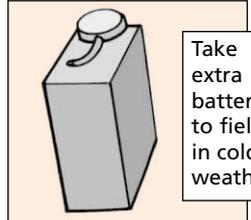
When you shut down, remember to put new caps on. Otherwise, the two ports will become contaminated. Order more with NSN 5340-01-454-6322.

The metal part of the inlet port becomes very hot during operations. Don't touch the metal with your bare hand.

**Take extra batteries in cold weather.** The operating time of the BA-5590/U battery drops from 12 hours at 76° F to 6 hours at 32° F. So you will need more backup batteries in cold weather. Your best bet in the cold is to operate the ACADA with the M28 power supply as much as possible.



Take off caps before turning on ACADA.



Take extra batteries to field in cold weather

# BE A RUST-BUSTER



I CAN GET AWAY IF HE DIDN'T READ HIS PS!

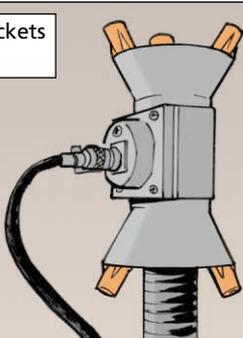


RUST-BUSTER! YOU'RE JUST IN TIME!

SCRAM, FELLAS! WE'RE BUSTED!

The OE-254 antenna has two places where rust and other types of corrosion can get a foothold—the feedcone sockets and the threads of the antenna sections. The six antenna feedcone sockets catch dirt and moisture that lead to corrosion. So keep them clean with isopropyl alcohol, NSN 6810-00-753-4993, and a swab.

Keep sockets clean



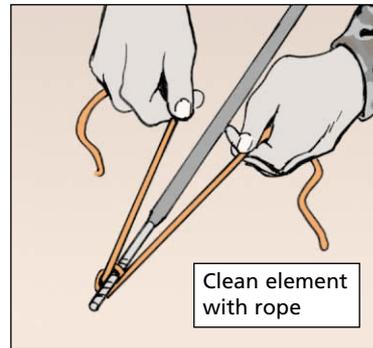
For stubborn corrosion, use a small arms bore brush, NSN 1005-00-903-1296, to scrape out the corrosion. For a better grip and more twisting force, attach cleaning rod handle, NSN 1005-01-113-0321, to the brush.

Just twist the bore brush down into the socket and turn it several times. The stiff fibers loosen corrosion and clean out the grooves.

Finish the job with isopropyl alcohol and a swab.

Keep the antenna elements free from corrosion with water-displacing compound, NSN 6850-00-142-9409 (twelve 24-oz aerosol cans) or NSN 6850-00-142-9389 (twelve 16-oz aerosol cans), and silicone, NSN 6850-00-880-7616.

But, first, clean the connecting area of each element with your antenna's guide rope. Loop the rope around the element. Pull back and forth from both ends of the rope. The friction created by the rope cleans the connecting area.



Clean element with rope

Never use a scouring pad to do this cleaning! Scouring pads wear down the metal and strip the element.



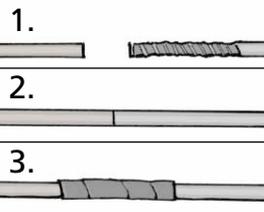
Don't use scouring pad

Once the contact areas are clean, spray them with water-displacing compound. Then give them a light coat of silicone compound.

Your element PM will be easier if the elements are attached only hand tight. Elements that are muscled together get damaged when they have to be muscled apart.

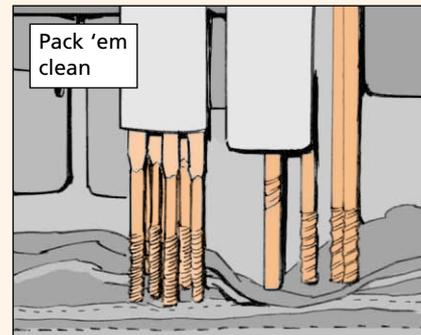
Wrap electrical tape, NSN 5970-00-419-4291, around each connection to keep moisture out and corrosion away.

Wrap connection with electrical tape



One final tip—before you pack up your antenna's mast sections, make sure they're clean. Too often antennas get packed away in a hurry with dirt and moisture.

Pack 'em clean



# Put Your RT

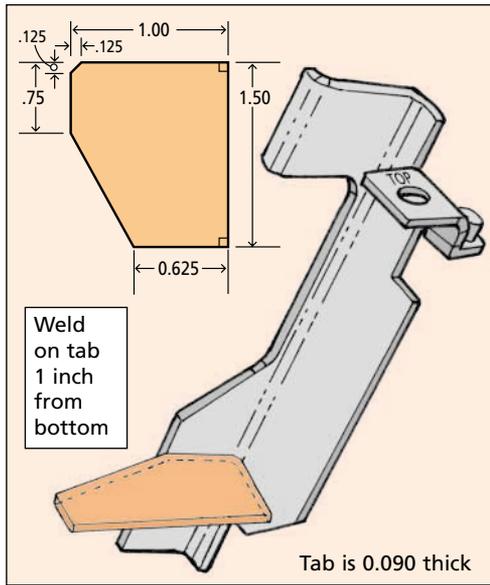


**K**eeping your new advanced SINGGARS improved program (ASIP) model, RT-1523E, locked in place is a real challenge.

The locking bar, NSN 5340-01-456-7985, must be installed just right. Even then, a determined thief can remove the RT without much trouble.

To keep the RT in place, a new locking bar, ordered with the same NSN, should be in the supply system later this year. In the meantime, you can modify the vertical piece of the current bar.

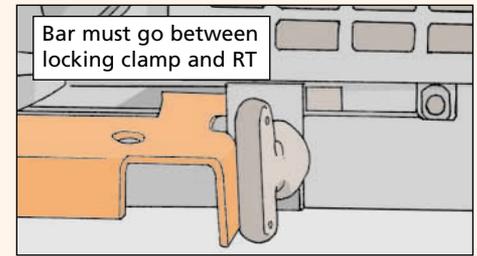
Here's how:



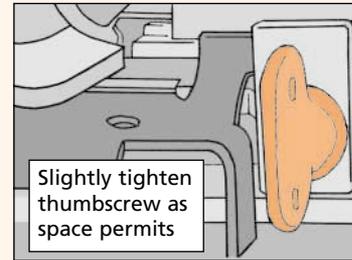
This modification, done by the unit, helps prevent the bar from being raised but you still have to attach the bar correctly to keep your RT secure, like so:

# Behind Bars

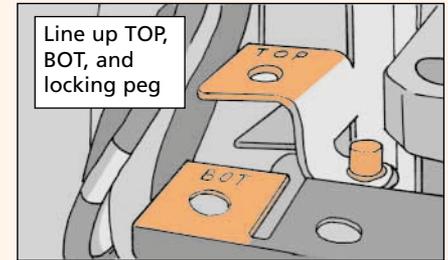
1. Work with the right side of the locking bar first. That's the side without the bottom (BOT) label. Make sure the bar rests between the locking clamp and the RT, not between the locking clamp and the thumbscrew. The locking clamp has a top lip that prevents the locking bar from sliding up.



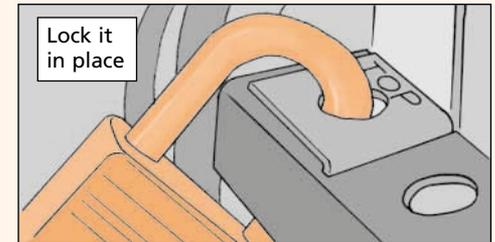
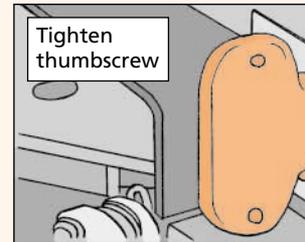
2. Now slightly tighten the thumbscrew to hold the locking clamp and the bar in place, but allow a little play so that the locking bar can still be moved.



3. Working with the other end of the locking bar, position the hole labeled BOT below the hole labeled TOP with the locking peg sliding into the hole next to the BOT hole.



4. Insert a padlock in the holes marked TOP and BOT and lock the bar down and the RT in place.



Many units secure their new radios in the motorpool at night. Until the new locking bar hits the supply system, that might not be a bad idea. Just remember to give the above instructions to the person putting the RT back in the vehicle.

# Are You Making These

A RECENT TOUR OF SOME MSE SHELTER SITES TURNED UP A NASTY HANDFUL OF EARTH-GROUNDING MISTAKES. CHECK 'EM OUT AND MAKE SURE YOU'RE NOT MAKING THEM, TOO.

WHAT HAPPENED TO LUCKY?

SLOPPY GROUNDING.



## 1. Not wearing safety goggles when driving ground rods.

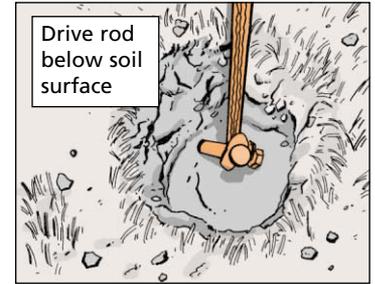
Safety goggles protect your eyes from flying metal chips. Don't think for a minute that a piece of metal won't chip and fly off while you're doing the hammering. Lucky Larson thought that and now he's called One-Eyed Willie.



# Grounding Mistakes?

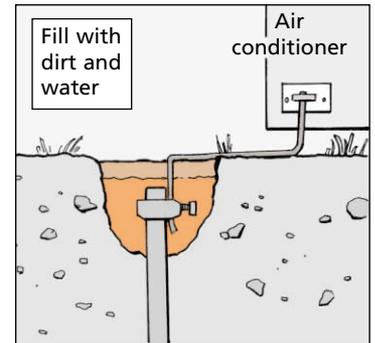
## 2. Not driving the 8-ft ground rod, NSN 5975-00-296-5324, beneath the soil surface.

Before you drive the rod into the ground, dig a hole about 18 inches square and 8 inches deep. Then drive the top of the rod to about 3 inches above the bottom of the hole. Keeping the top of the rod below the surface of the ground reduces dangerous voltages near the rod during a storm. And that also keeps you from tripping over it.



After you attach the ground strap to the rod, fill the hole with water and let it soak in. Then fill the hole with dirt. Add water as often as needed to keep the soil moist around the rod. A good constant source of water is your air-conditioning unit. Run a tube from the air-conditioner drain to the rod area to keep the soil wet.

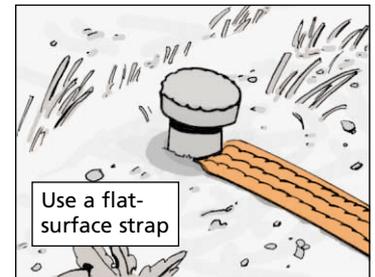
Just because the connection between the strap and the rod is out of sight doesn't mean it should be out of mind. Check it every day to make sure it stays connected and tight. People walking around the ground can unintentionally pull the strap loose. Unless you check it regularly, you won't know if you're still grounded.



If rocky or frozen ground stops you from driving a ground rod deep enough, consider other forms of grounding or multiple ground rods. See TC 11-6 or FM 5-424 to learn how.

## 3. Not using the right type of grounding strap.

The ground strap must be as large as possible—at least 6 AWG. A flat-surface strap is much better than a round one since there is more surface area and current passes over the surface and not through the strap. The strap should be copper or copper-clad aluminum. The best strap is made of braided copper. If steel or stainless steel must be used, it should be only temporary and inspected often for corrosion.



**4. Not paying attention to path impedance—resistance to current flow—when you lay out and attach the grounding strap.**

Keep the ground strap as straight and as short as possible. Make sure there are no loops, kinks, knots or sharp bends.

Run the strap under or around obstacles, not over them. If an obstacle is in the way, remove it, or pick another spot for your ground rod.

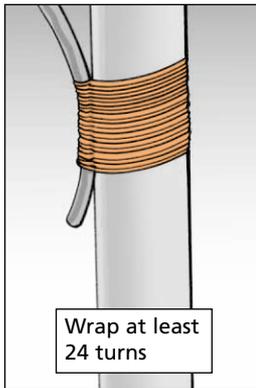
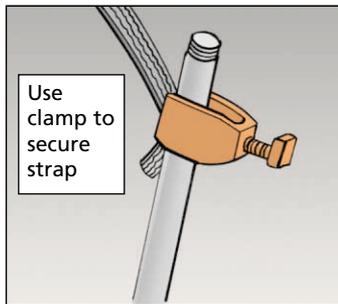
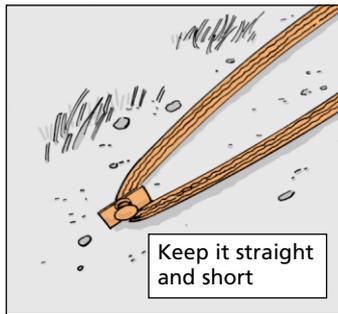
The key is to make sure nothing increases the ground strap's impedance and causes failures.

**5. Not attaching the grounding strap correctly to the ground rod.**

The generator set's three-section ground rod, NSN 5975-00-878-3791, comes with a clamp for the ground strap. The shelter's 8-ft ground rod has a thumbscrew to do the job. Too often, the clamp is lost and the thumbscrew is broken. When this is the case, the ground strap is often tied or loosely wrapped around the rod. This does not provide the good connection that's needed to conduct the current down the rod and into the earth.

So, check your ground rods. Order replacements for missing clamps with NSN 5975-01-034-8882. For missing thumbscrews, a nut, bolt and washer should do the job, but a replacement clamp can be ordered with NSN 5999-00-496-5834. The clamp for the three-section rod is too narrow to use on the 8-ft rod.

If you're missing a clamp or thumbscrew and no replacement is handy, tie the ground strap to the rod with at least 24 tightly wound turns of stripped telephone wire or other bare wire. Use this as a temporary fix until a clamp or screw can be found.



TAKE IT FROM ONE-EYED WILLIE, CAREFUL GROUNDING IS IMPORTANT!

# SUIT UP IN BUG ARMOR

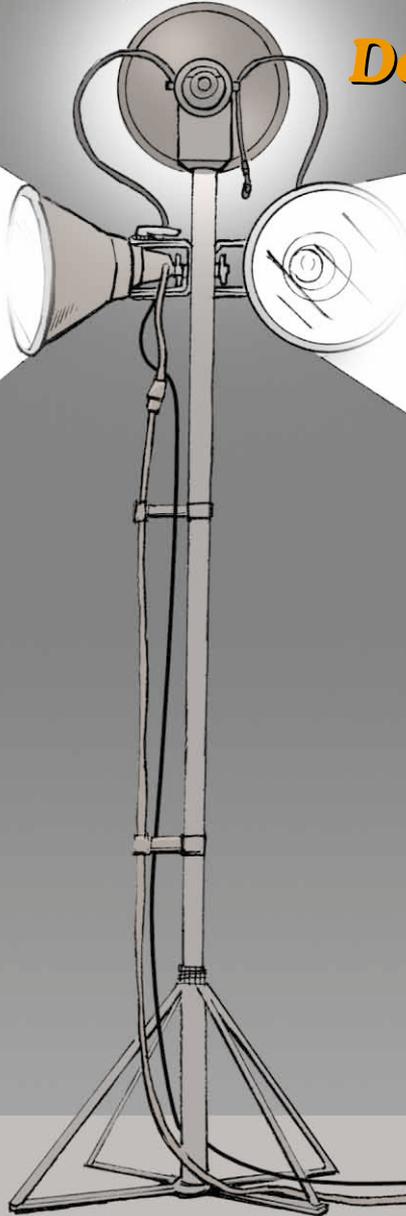


**Y**ou won't be in the game for long if you don't suit up in bug armor for complete protection. Use personal insect repellent, NSN 6840-01-284-3982, on your skin and clothing repellent, NSN 6840-01-345-0237, on your BDUs. The repellent for your skin protects you up to 10 hours. The stuff for your clothing will last the life of the uniform if you follow directions that come with the kit.

Both of these repellents contain the same ingredients used in the best commercial products on the market. When you're field training or deployed, exposure to disease-carrying insects is greater than what you'll face on a Sunday afternoon picnic. So protect yourself with both repellents.

Want more information on how to keep bugs away? See Technical Information Memorandum (TIM) No. 36 at: <http://www.afpmb.org>. Click on Contingency Information, then on Guidance.

# Don't Be Shocked!



**T**he mast-mounted electric floodlight set, NSN 6230-00-299-5642, is hazardous to your health because it does not come with an equipment grounding wire. Not good!

So Communications-Electronics Command (CECOM) came up with a fix and your power/generator maintainer can apply it.

For each telescoping mast he needs two 3-ft lengths and one 155-ft length of #8 AWG green grounding wire, NSN 6145-01-131-3818.

1. Disconnect the power cable from the generator set and fully retract the telescopic mast before starting.
2. With the floodlights mounted on the mast, install one 3-ft grounding wire between the No. 3 and No. 2 floodlights by connecting the wire to the floodlight mounting bracket bolts.
3. Next, install the other 3-ft grounding wire between the No. 2 and No. 1 floodlight.
4. Finally, connect the 155-ft grounding wire to the mounting bracket bolt of No. 1 floodlight. Run the grounding wire down the telescoping mast next to the power cable. Use tie wraps, NSN 5975-00-074-2072, to secure the grounding wire to the power cable.
5. Connect the other end of the grounding wire to the generator's ground lug.

# Add A Ground

Need more info? Contact CECOM's Tim Messer at DSN 992-2793, (732) 532-2793, or e-mail [timothy.messer@mail1.monmouth.army.mil](mailto:timothy.messer@mail1.monmouth.army.mil) or Franck Jasinski, DSN 992-8833, (732) 532-8833, or e-mail [franck.jasinski@mail1.monmouth.army.mil](mailto:franck.jasinski@mail1.monmouth.army.mil).

Mosquito Netting...

## PULL UP THE CARGO NET



**You** know that mosquito netting, NSN 7210-00-266-9736, will keep pesky mosquitoes away. But it will protect you from crawling critters too, if you remember to tuck yourself in.

Once you have the net installed over the frame poles, NSN 7210-00-267-5641, tuck it **under** your sleeping bag. If you don't tuck it, it's like lowering a cargo net to give the creepy crawlers a ladder to reach your tasty skin!



Supply...

# YOUR PARTS AND END ITEM PAL

CAN YOU TELL ME WHERE THIS PART GOES?



LET'S SEE IT.

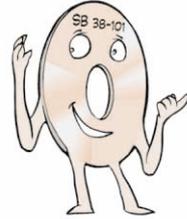
THE PART NUMBER ETCHED INTO THE PART CROSSES TO AN NSN IN THE AMDF, BUT WHERE DO YOU GO NEXT TO FIND OUT WHAT EQUIPMENT USES THE PART?

THE EQUIPMENT PARTS TM IS A GOOD PLACE, BUT THAT'LL TAKE TIME.

YOU'LL SAVE TIME IF YOU CHECK OUT THAT PART IN *ME*. I'M **SB 38-101**, SPARES AND REPAIR PARTS TO END ITEM APPLICATION (JUL 00).



YOU'LL SOON CALL ME YOUR PARTS AND END ITEM "PAL" SINCE MY CD-BASED PROGRAM DOES MORE IN *MINUTES* THAN WHAT WOULD OTHERWISE TAKE *HOURS*. WHEN YOU HAVE THE NSN, I CAN HELP IDENTIFY THE EQUIPMENT THAT USES IT.



JUST GO TO MY MAIN SCREEN, CLICK ON Reports, THEN END ITEM NIINs FOR SUPPORT ITEM NIIN QUERY. INPUT THE PART'S *NIIN* (LAST NINE NUMBERS OF THE NSN) AND WATCH YOUR PAL GET YOU A LIST OF END ITEMS THAT USE THE PART. ALL YOU HAVE TO DO NOW IS CHECK OUT THE LIST, SELECT ALL ASSIGNED UNIT EQUIPMENT ITEMS, AND GIVE THE LIST TO THE MECHANIC.

- \* **END ITEM EIC (END ITEM CODE)** MATCHES AN EIC TO ITS END ITEM NSN.
- \* **END ITEM LIN (LINE ITEM NUMBER)** GETS ALL THE NSNS ASSIGNED TO A LIN.
- \* **END ITEM MODEL NO.** SHOWS THE END ITEM NSN WHEN ALL YOU KNOW IS ITS MODEL NUMBER.
- \* **SUPPORT ITEM NIINs FOR END ITEM NIIN** GETS YOU A COMPLETE PARTS LIST FOR A GIVEN END ITEM.
- \* **CONTACT DATA** TELLS YOU WHO TO CONTACT, WITH YOUR QUESTIONS OR PROBLEMS, AT THE USAMC LOGISTICS SUPPORT ACTIVITY (LOGSA).
- \* **SB 38-101 HELP** HELPS YOU DEFINE QUERY TYPES AND CODES. IT ALSO LETS YOU CHECK OUT THE SB 38-101 USER'S MANUAL.

CHECK OUT THIS CHART FOR *OTHER WAYS* TO GET MY DATA!



I AM DISTRIBUTED THROUGH THE ARMY'S PINPOINT DISTRIBUTION SYSTEM. YOUR PUBS CLERK CAN ORDER ME ON-LINE AT: <http://www.usapa.army.mil>

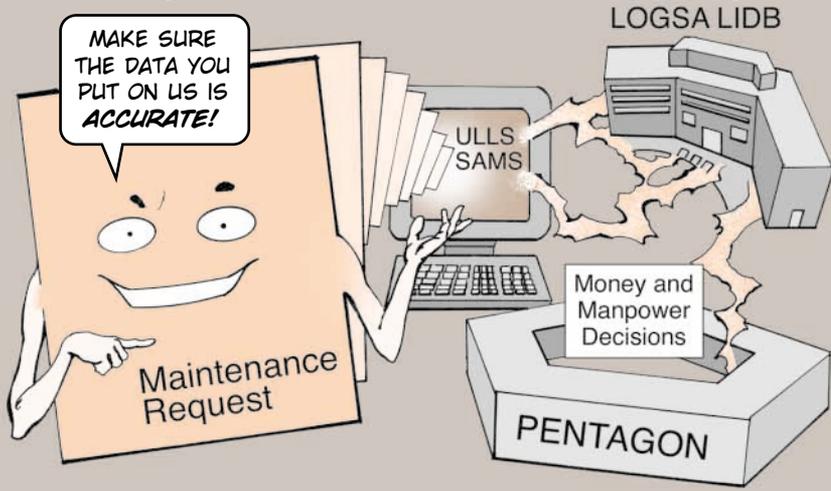
GET HELP ON MY DATA FROM *LOGSA* AT (256) 955-0838, DSN 645-0838, OR BY E-MAIL AT: [amxlsrra@logsa.army.mil](mailto:amxlsrra@logsa.army.mil)

## Need TOE Info?

If you are doing a manpower or equipment study for your unit and need base tables of organization and equipment (TOE) info, check out the US Army Force Management Support Agency (USAFMSA) web site at <http://www.usafmsardd.army.mil/toeheader>.

All base TOE documents are on line including cross-reference for an old to new equipment. Contact USAFMSA for help at (913)-684-8581, DSN 552-8581 or by e-mail: [davorenj@leav-rdd.army.mil](mailto:davorenj@leav-rdd.army.mil).

# Getting Maintenance Data Right!



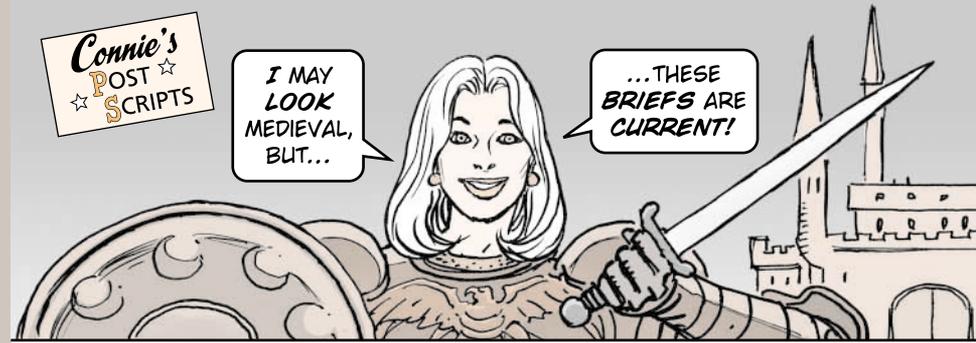
If you prepare and submit maintenance requests—DA Form 2407, DA Form 5990-E (ULLS) or PCN AHN-018 (SAMS)—then you must make sure the info is accurate. It goes into the logistics integrated data base (LIDB) at the USAMC Logistics Support Activity (LOGSA) where it's used by senior Army leaders to make decisions about your unit's funding and manpower.

So don't use "best guess" data and don't submit work orders with missing information just because you're in a hurry. If you do, you put your unit's authorized maintenance dollars and manpower at risk.

Instead, use the following checklist and avoid the risk:

- Complete as many fields as you can, including optional fields.
- Verify your unit identification code (UIC) and the UIC for your support.
- Double-check the weapon system NSN, LIN and EIC.
- Submit work order reports to direct support (DS/GS) on time—at least weekly.
- Make sure DS/GS parts usage data is right—quantities must be correct.
- Make sure DS/GS man-hours and MOS's are right for the work done.
- Make sure DS/GS uses correct status codes and times when posting.

LOGSA can help you with maintenance request reporting. Contact them at (256) 955-9668/9674, DSN 645-9668/9674, or by e-mail [wolf@logsa.army.mil](mailto:wolf@logsa.army.mil). You may also go to the LOGSA web site at <http://logsa.army.mil/wdserver.htm>.



## Transfer for M35A3

If you need a new transfer for an M35A3 truck, order the transfer for the M35A2, NSN 2520-00-089-8287. You must remove the yoke and dirt deflector from the old M35A3 transfer and reinstall them on the replacement. Eyeball Fig 95 in TM 9-2320-386-24P to identify the yoke and deflector. The M35A2 yoke won't work on the M35A3 and the dirt deflector is a new part on A3 models.

## Mask Outserts Protect Eyes

Outserts that protect soldiers' eyes from lasers and low-speed fragments are now available for the M40-series and M42-series masks. The M1 laser ballistic outserts, NSN 4240-01-434-1503, are part of the additional authorized list in TM 3-4240-346-10, so they must be ordered separately from the masks.

## MLRS Roadwheel Nuts

Use NSN 5310-00-982-6809 to order new roadwheel nuts for your MLRS. The nuts, NSN 5310-00-241-6664, that are listed as Item 5 in Fig 9 of TM 9-1450-646-24P are track pad nuts.

## M939A2 Alternator Kit

Need more amperage to operate your M939A2-series 5-ton truck and accessories? Then get the 100-amp alternator kit, NSN 2920-01-371-6064. The kit is only for A2-series vehicles and will be added to Fig 608 in TM 9-2320-272-24P.

## Kiowa Engine Flush Can

NSN 3740-00-641-4719 gets you the engine flush can for the OH-58D T703-AD-700-series engine. The NSN listed for Item 41 on Page B-13 of TM 55-2840-256-23 is wrong.

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

Would You Stake Your Life <sup>right now</sup> on the Condition of Your Equipment?