THE PREVENTIVE MAINTENANCE MONTHLY

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Redstone Arsenal, AL 35898-7466

Or E-mail to:

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Internet Address:

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By Order of the Secretary of the Army:

ERIC K. SHINSEKI
General, United States Army Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
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Issue 572

PS

July 2000

THE PREVENTIVE MAINTENANCE MONTHLY

TB 43-PS-572

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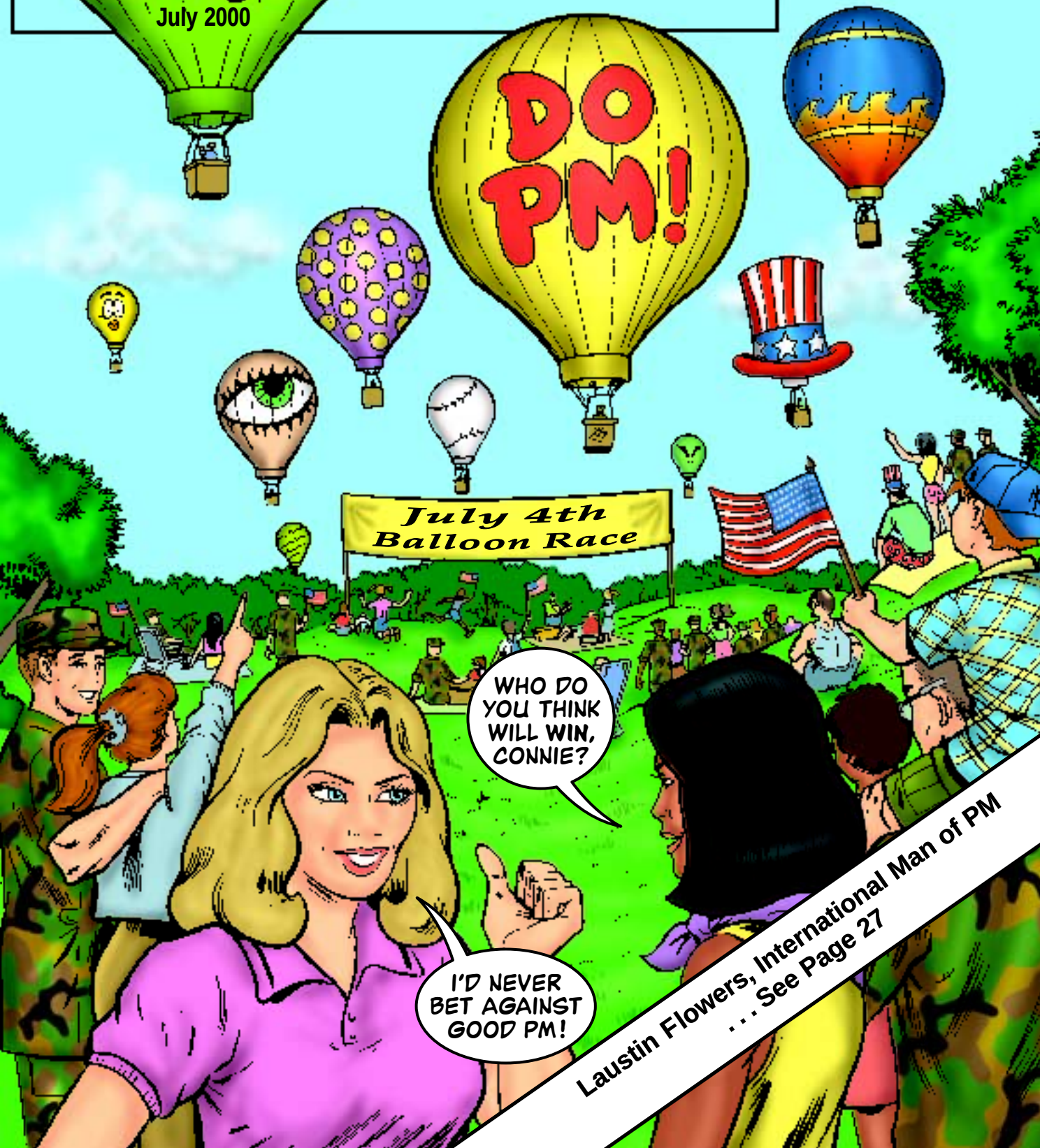
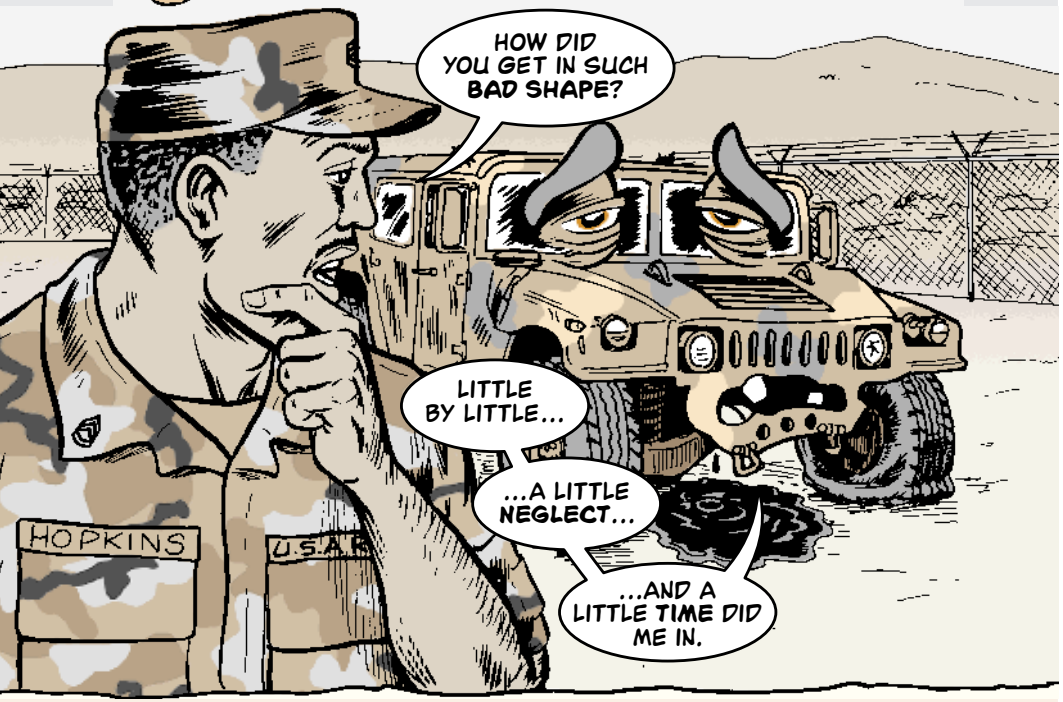


Laustin Flowers, International Man of PM
. . . See Page 27

NCOs . . .

Ignorance Is the Pits



What you don't know can't hurt you, right? Since when? The truth is, what you don't know is usually what really messes you up.

That goes big time for the condition of your unit's equipment. Not knowing **that** is one sure way to get hurt—maybe permanently.

But, since you can't inspect all of your unit's equipment yourself, you have to train your soldiers to be your eyes and ears. Make sure they're doing PMCS. Make sure they are on the lookout for potential problems and report the problems they find.

For instance, if they find and report a Class I or II leak, it can be fixed before it becomes a Class III leak.

Likewise, if they spot shiny areas around a bolt head or nut—a good sign that it's loose—and report it, it can be tightened before something breaks.

If they routinely eyeball trouble spots like wiring, hoses, belts and tires for wear, and report problems, you've got a chance to take action before major maintenance is needed.

What you **do** know can hurt you, too, but with a good reporting system at least you've got a fighting chance.

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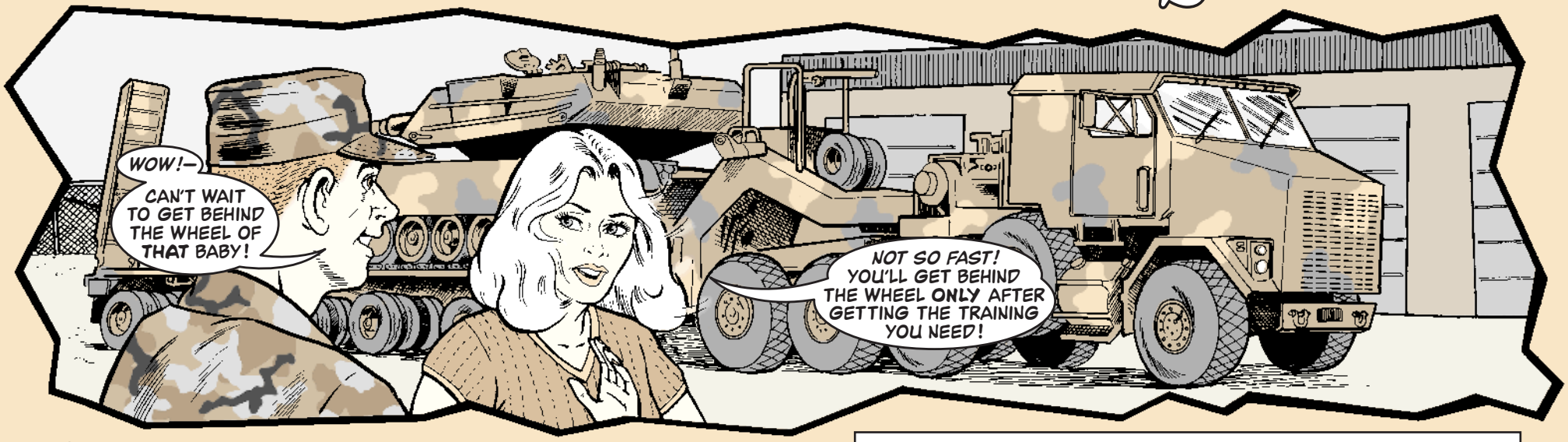
Put Driver's Training First



If you want well-trained truck drivers behind the wheel, you've got to put the best information between their ears.

Get that information for your unit in the form of training circulars (TC), television tapes (TVT) and CDs.

Here's what is available through your unit pubs clerk:

TC	Training Program
21-305	Wheeled Vehicle Accident Avoidance
21-305-1	Heavy Expanded Mobility Tactical Truck (HEMTT)
21-305-2	Night Vision Goggle Driving Operations
21-305-3	M939-series 5-ton Cargo Truck
21-305-4	High Mobility Multipurpose Wheeled Vehicle (HMMWV)
21-305-5	Equipment Transporters (Heavy, Medium and Light)
21-305-6	Tractor and Semitrailer (M915, M931 and M932)
21-305-7	Light Vehicles
21-305-8	Medium Vehicles
21-305-9	Heavy Equipment Transporter System
21-305-10	Palletized Loading System
21-305-11	Family of Medium Tactical Vehicles
21-305-100	Military Commercial Driver's License Driver's Manual

All these TCs are available on the Internet in the Army Doctrine and Training Digital Library (ADTDL) at **http://155.217.58.58**

Here are the TVTs distributed to Training and Audiovisual Support Centers (TASC), USAR commands, USAR training centers and state adjutants general.

TVT	PIN	Title
55-15	709184	Operation of the HMMWV
55-16	709233	Driving the M939A2-series Cargo Truck
55-17	709234	M931 PMCS (Part 1) and M931 Driving (Part 2)
55-18	709235	M915 PMCS (Part 1) and M915 Driving (Part 2)
55-19	709236	C-HET PMCS
55-20	709237	C-HET Coupling and Uncoupling
55-21	709238	C-HET Loading and Unloading the M1A1 Tank
55-22	709239	C-HET Driving
55-23	709710	HEMTT PMCS
55-24	709711	HEMTT Winch Operations
55-25	709712	HEMTT Crane Operations
55-26	709713	HEMTT Driving Techniques
55-27	709528	Driving a HMMWV Equipped with CTIS
55-36	710046	PLS Truck PMCS (Part 1), PLS Driving Techniques (Part 2) and PLS Crane Operations (Part 3)
55-37	710336	PLS Load Handling System (Part 4) and PLS Winch Operations (Part 5)
55-48	710750	HETS, PMCS for M1070 Tractor and M1000 Semitrailer
55-49	710751	HETS, Coupling/Uncoupling M1070 Tractor and M1000 Semitrailer
55-50	710752	HETS, Loading/Unloading M1070 Tractor and M1000 Semitrailer
55-54	710939	Family of Medium Tactical Vehicles (FMTV) Driving Techniques
55-55	710940	Family of Medium Tactical Vehicles (FMTV) PMCS
20-928	708983	Preparation and Use of the AN/PVS-5 Series Night Vision Goggle
20-929	708929	Preparation and Use of the AN/PVS-7B Night Vision Goggle

P.S. MORE

Here are the CDs that were distributed to select units, local TASC, USAR commands, USAR training centers and state adjutants general.

CD	PIN	Title
CDR 55-01	711259	Wheeled Vehicle Accident Avoidance
CD 55-15	None	M1083 5-ton Medium Tactical Vehicle (MTV)
CD 55-16	None	M977 HEMTT
CD 55-17	None	M1070/M1000 HETS
CD 55-18	None	M998 HMMWV
CD 55-19	None	M35A3C 2.5 Light Truck
CD 55-20	None	M915 14-ton Tractor and Semitrailer
CD 55-21	None	M939 5-ton Tactical Cargo Truck
CD 55-22	None	M813 5-ton Tactical Cargo Truck
CD 55-23	None	M1074 PLS

These TVTs and CDs can also be ordered over the Internet from the Defense Automated Visual Information System/Defense Instructional Technology Information System (DAVIS/DITIS). The web site is:

http://dodimagery.afis.osd.mil/

Once there, click on Search DAVIS/DITIS and follow the ordering info.

You can also order by:

E-mail: **vibuddy@hq.afis.osd.mil**

Fax: **DSN 795-6106, (717) 895-6106**

Mail: **Joint Visual Information Services Distribution Activity**
Warehouse 3/Bay 3
11 Hap Arnold Blvd
Tobyhanna, PA 18466-5102

Include your name, full military mailing address, the title and PIN of the film, format (VHS, for example) and the quantity of films you need. APO addresses must include a unit/box number, CMR box number or PSC box number.

If you have questions on driver training, drop a letter to:

Commandant, USATSCH
ATTN: ATSP-TDI-DX
705 Read St
Ft Eustis, VA 23604-5389

Or e-mail:

upchurchj@eustis.army.mil or
ritterj@eustis.army.mil

PS END

Wheeled Vehicles . . .

Accident Avoidance Training

The US Army Transportation School has developed an Internet course to help teach wheeled vehicle accident avoidance.

The 14-module course covers everything from doing vehicle inspections to coping with aggressive drivers.

Two versions are offered: a video version for students with Pentium CPUs and sound cards, and a text version for others.

Students have 30 days after enrollment to complete the on-line course. The school maintains a student completion roster and provides by-name confirmation to driver training offices.

The courseware is available on the school's website at:

http://www.transchool.eustis.army.mil/web-base.htm

HMMWV . . .

Up-armored Window Info

Information for ordering door and windshield glass for up-armored HMMWVs (M1097, M1114 and XM1109) is hard to find, so save this list:

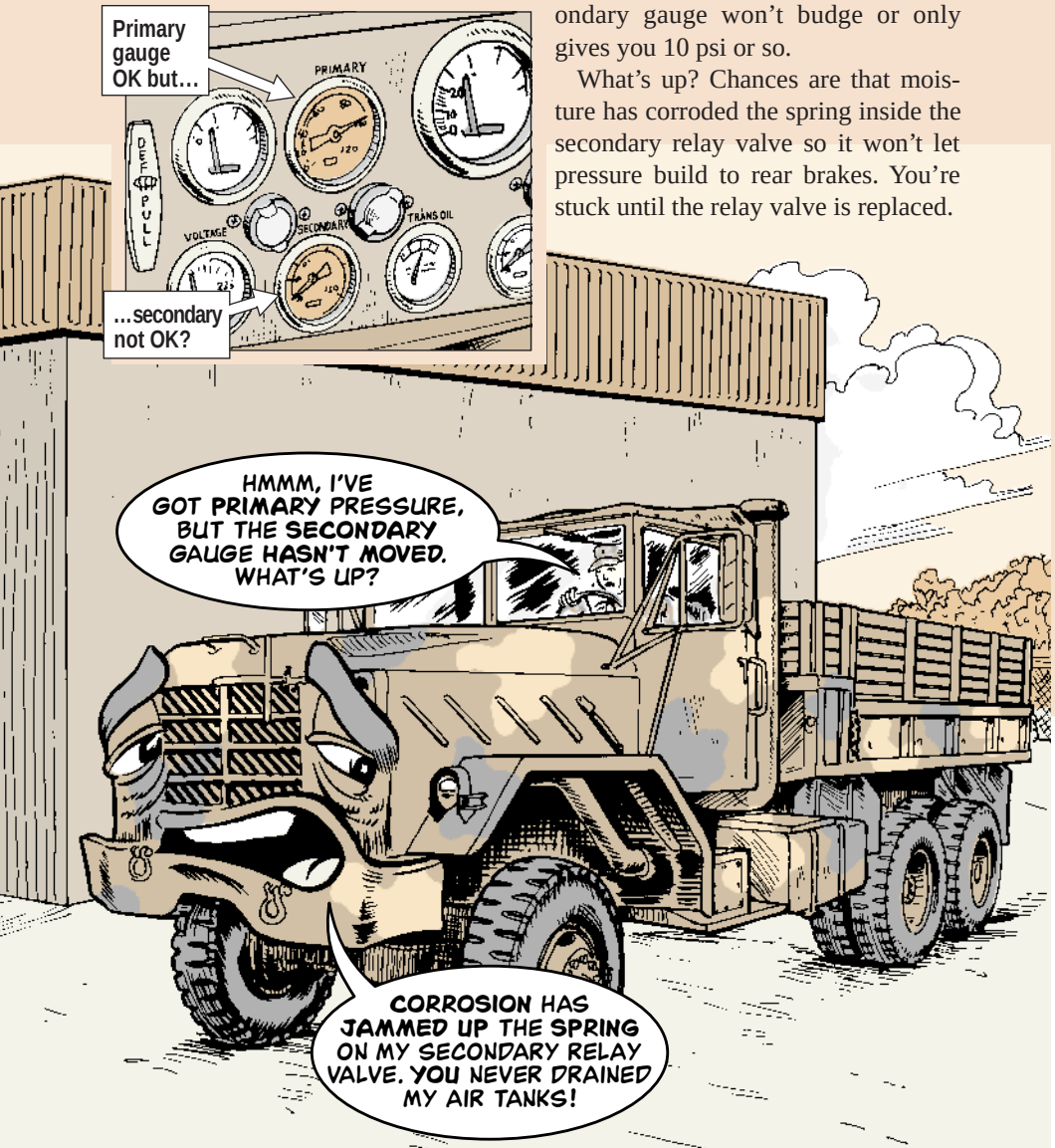
M1097 w/armor kit~	Door glass:	PN 4660605
	Windshield glass (*left side*):	PN 4660607-000
	Windshield glass (*right side*):	PN 4660606-000
	There are no NSNs for the glass on this truck. Order it by part number and CAGE code 6W728 on a DD Form 1348-6 from RIC S9C.	
M1114~	Door glass:	NSN 2510-01-435-9692
	Windshield assembly (*left*):	NSN 2510-01-435-9690
	Windshield assembly (*right*):	NSN 2510-01-435-9693
XM1109~	Door glass:	NSN 2510-01-419-2531
	Windshield assembly (*left*):	NSN 2510-01-418-6420
	Windshield assembly (*right*):	NSN 2510-01-418-6422

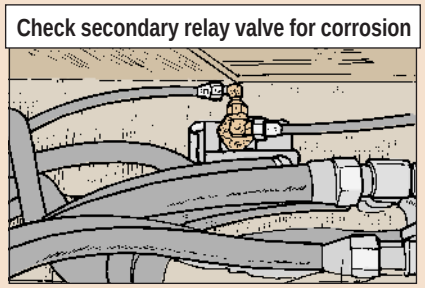
M939-Series Trucks . . .

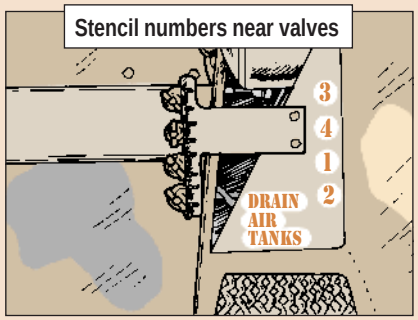
Drain Water from Air System

You go to your M939-series truck to prepare for a mission. You crank it up and wait for air pressure to build. The primary gauge maxes out, but the secondary gauge won't budge or only gives you 10 psi or so.

What's up? Chances are that moisture has corroded the spring inside the secondary relay valve so it won't let pressure build to rear brakes. You're stuck until the relay valve is replaced.







You can stop that show-stopper by draining the air tanks at the end of each day. Here's the right way to drain M939 air lines:

- Always drain all four tanks. There's more water in the wet tank for sure, but all tanks hold moisture.
- Drain tanks in the order called for on Page 2-67 of TM 9-2320-272-10 (Aug 96).

To make the draining order easy to remember, get your mechanic to stencil sequence numbers on the truck near the valves. Use CARC paint, NSN 8010-01-229-7540, and the 1-in stencils from the No. 1 Common shop set.

- Open each petcock, one at a time, until the air pressure is gone.
- Close all the petcocks after you've drained the tanks. Leaving them open doesn't get rid of water—it creates more. That's because cool nights and warm days build condensation inside the tanks. When you close the tanks just before you operate, the water is trapped inside, ready to clog air lines and jam relay valves.

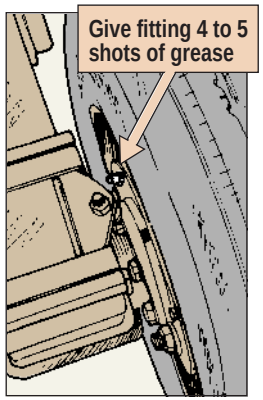
M172A1 Semitrailer . . .

Lube Brake Camshafts

Operators, grease fittings on the M172A1 lowbed semitrailer's brake camshaft rods get skipped at lube time because they're hard to find.

But without lube, the camshaft rods seize up. The rods have to slide and rotate inside their nylon bushings and bearings. If they can't, the brakes lock up. That can cause an accident.

Keep the brake camshaft rods lubed. The fittings are behind the inner tires of each axle.

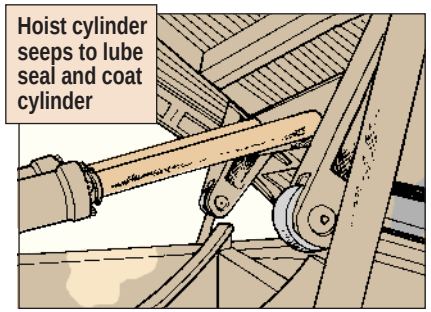


Dump Trucks . . .

Oil Seepage Protects Cylinders

Operators, your dump truck's hydraulic cylinders leak. Some leak just a dab, others a bit more. But don't call your mechanic because the cylinders are supposed to leak.

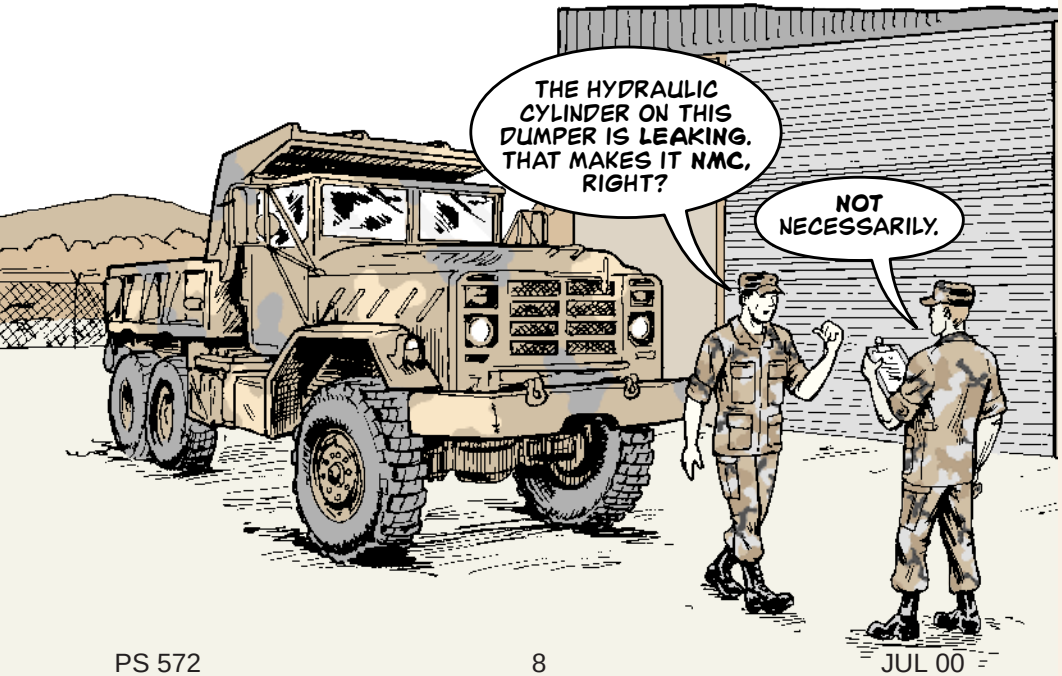
The single ram cylinders on all M929/M930 dump trucks seep just enough to keep the rod coated with oil and the seal wet. The oil protects the rod from the elements and corrosion.



Telescoping hydraulic cylinders—like the hoist cylinders on M917 and F5070 dump trucks—have seals at each segment of the cylinder. Each seal seeps a bit to lube the seal and coat the cylinder. The seepage adds up—as much as a quart a day. But this type of leakage does not make your truck NMC.

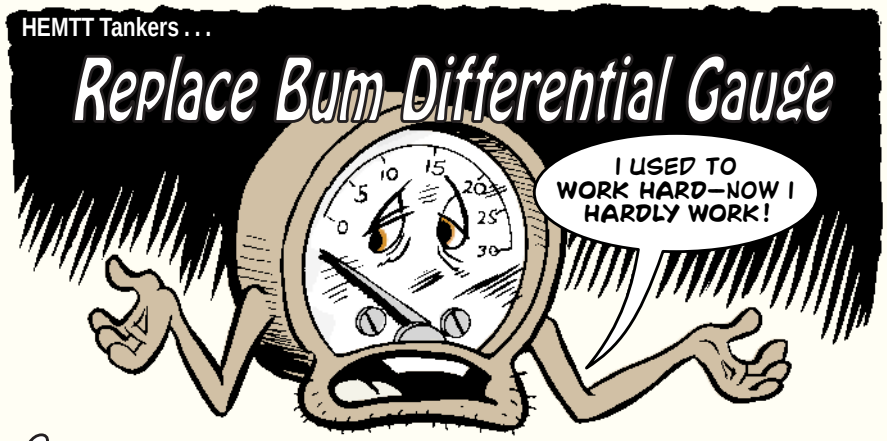
If the hoist cylinder will raise the empty dump body, your truck's OK.

But keep an eye on the fluid level. If it takes more than a quart a day to refill the reservoir, get your mechanic to look things over.



HEMTT Tankers . . .

Replace Bum Differential Gauge



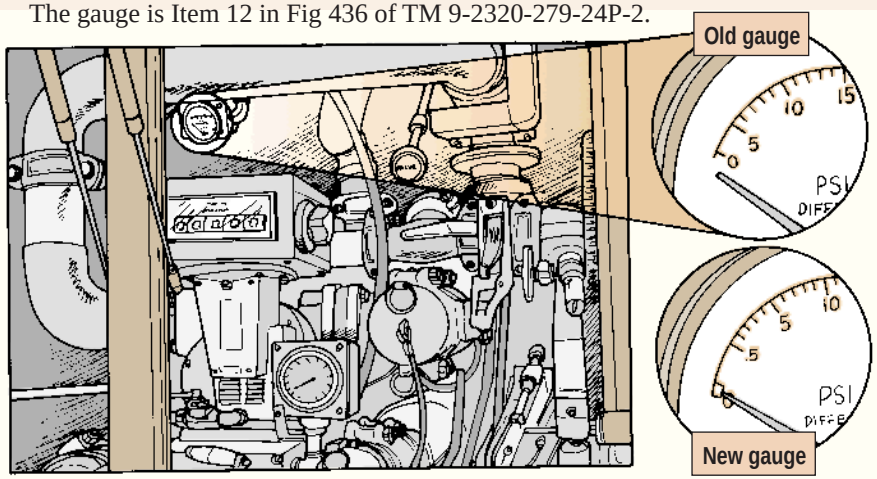
Got a differential fuel pressure gauge that reads zero or less when you're pumping fuel from an M978 HEMTT tanker? That gauge is bad and needs to be replaced!

Replace it with a new style of pressure gauge, NSN 6685-01-362-4272, that starts at .5 psi. It's more reliable than the old-style gauge that started at 5 psi. You can better keep up with the amount of dirt in the fuel filters.

As the filters get dirty, the pressure differential should slowly increase. That's normal. A differential of more than 15 psi indicates dirty filters that need to be replaced.

If an old gauge still works well, use it. But at the first sign of poor performance, have your mechanic replace it. A reading of less than 0 is one sign of poor performance (or a burst filter). Another is a sudden decrease or return to 0 pressure during operation.

The gauge is Item 12 in Fig 436 of TM 9-2320-279-24P-2.



Drain All 5 Air Tanks

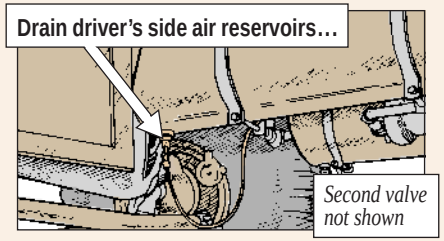
It's not enough that you drain the two driver's side air reservoirs and the two reservoirs on the passenger's side of your PLS tractor.

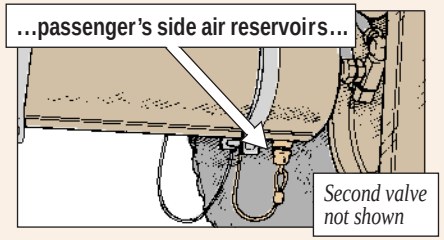
You've also got to drain the reservoir behind the access cover at the front end of the truck.

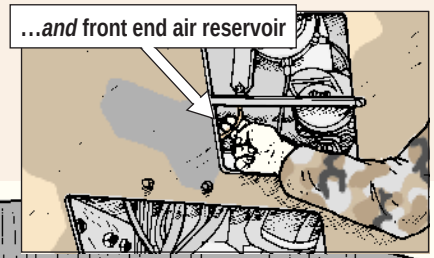
If you don't drain all five reservoirs as part of your after-operation PMCS, condensation lets corrosion get a foothold in your air brake system. That leads to brake failure.

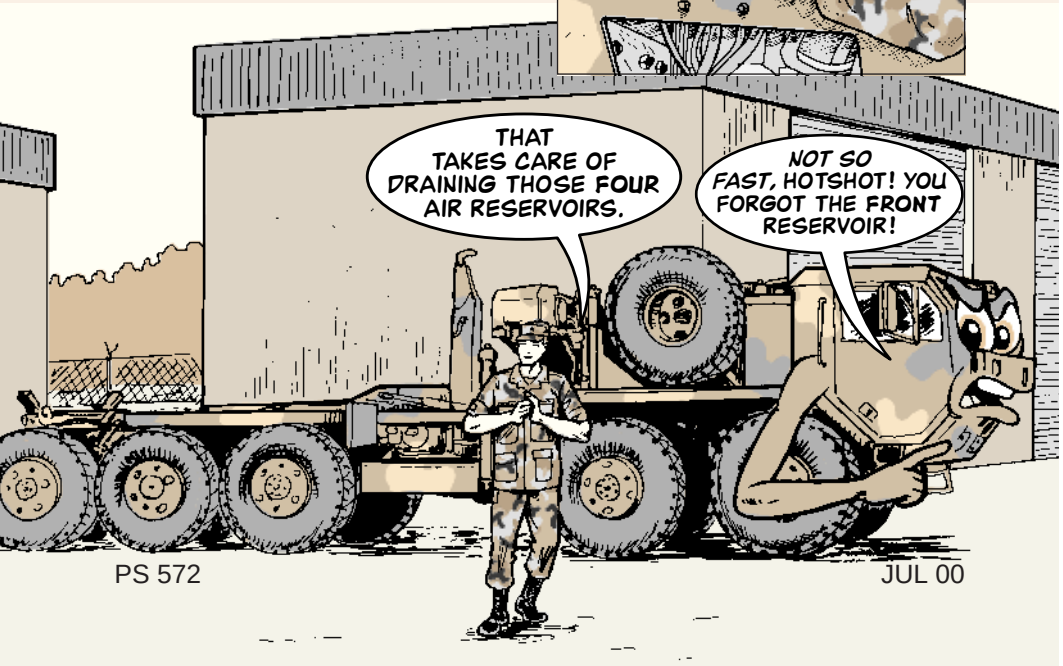
So, pull the drain cable on each reservoir until no more water runs out, then release it.

Watch what you pull on at the front reservoir, though. The horn's electrical wire runs right next to the drain cable. Pull on it and you could disconnect the horn.

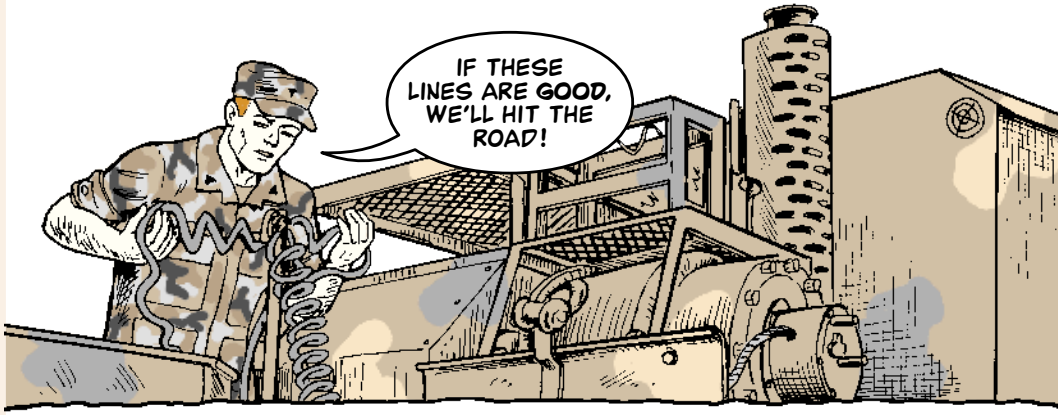








Gladhand Hoses May Be Bad



Some of the plastic hoses used for the M1070's service and emergency air lines aren't holding up to use and the elements. That makes for unsafe hauling of M1 tanks.

Take a look at both the service and emergency air hoses.

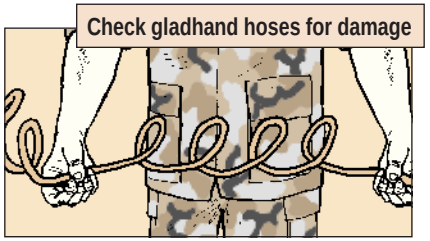
Check Hoses

Check the service and emergency hoses for cracks or kinks like so:

✋Grasp one end of the coiled section (with four or five coils between your hands) and stretch it 15 to 18 inches. Repeat the process at the other end of the hose.

✋Grasp an area in the center of the coiled section in each hand (with four or five coils between your hands) and stretch that coiled section 15 to 18 inches.

Repeat the entire process for the other hose.



Report These Problems

Let your mechanic know if you hear a cracking sound when the hose is stretched, or if you see cracks or breaks at any time.

If you find any damage, **do not drive** the HET until both air hoses are replaced with NSN 4720-01-106-9681. Then send an SF 368, Quality Deficiency Report, to TACOM.

Don't Give Seal a Raw Deal

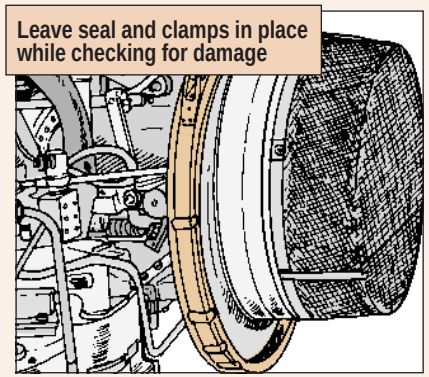
Mechanics, letting an M1-series tank operate with a loose or torn air induction system plenum seal is like signing its death warrant.

The turbine has to get air from somewhere, whether it's clean or dirty. And if the plenum seal is damaged or not installed correctly, you can bet a lot of the air's going to be dirty.

So make sure the engine gets clean air. Here's how:

Inspection

Remove the air intake cover and look at the seal for tears or other damage. Feel under the seal's lip, too. The surface should be flexible and springy, not soft or brittle.



Leave seal and clamps in place while checking for damage

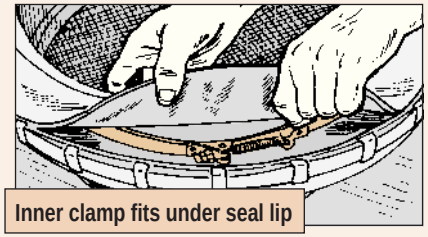
Next, examine the inner and outer hose band clamps. Look for looseness or stripped threads.

Any damage to the seal or clamps means you replace 'em. A new seal and outer clamp comes with NSN 5330-01-079-9954. NSN 4730-01-083-6059 gets a new inner clamp.

Installation

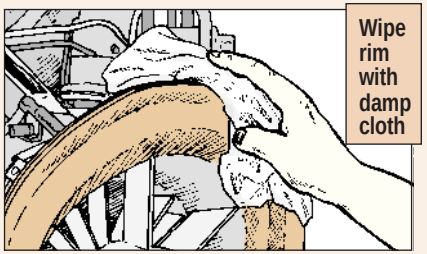
Here's what to do with the new seal and clamps:

1. Pull back the lip of the seal and install the inner clamp. Then put the outer clamp on the seal with the clamp screw positioned at the top.

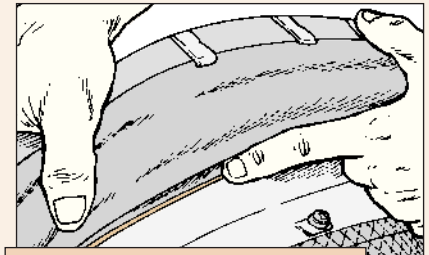


Inner clamp fits under seal lip

2. Wipe off the air intake rim, then slide on the seal, top side up. Wipe the plenum seal, too. Make sure the outer edge of the seal lines up with the yellow line all the way around the rim.



Wipe rim with damp cloth



Line up plenum seal with yellow line

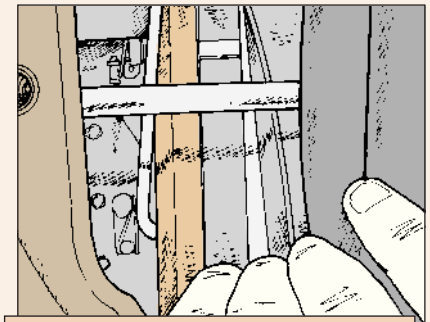
3. Pull back the lip and slide the inner clamp around so that the clamp screw is at 5 o'clock.

4. Torque both the inner and outer clamp nuts to 60–85 lb-in.

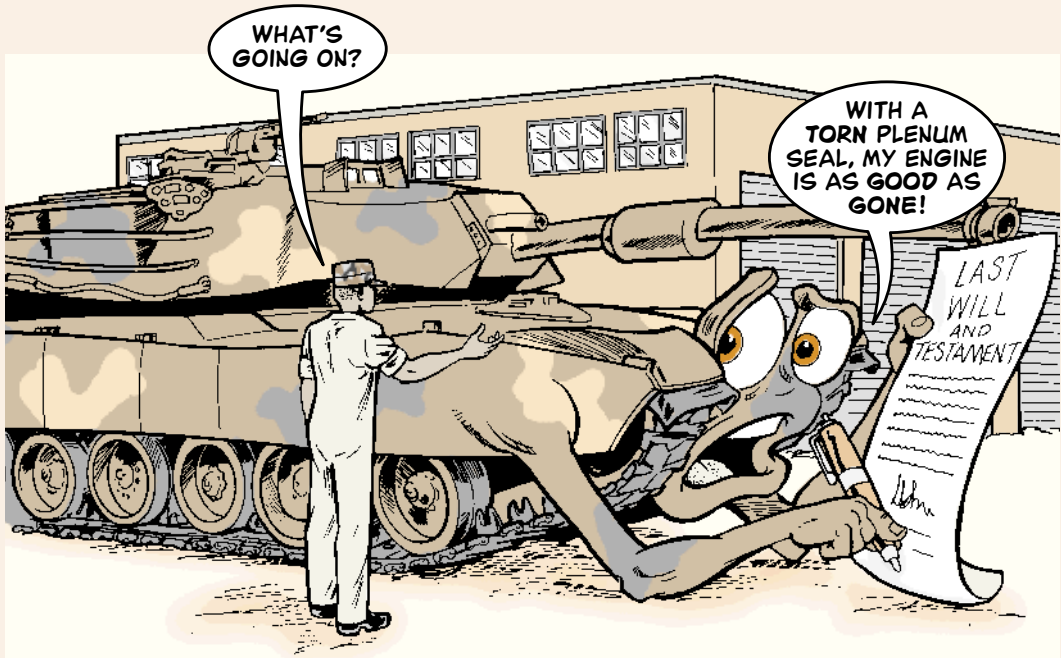
Last Step

After you've installed the plenum seal, don't try to reach around it to feel if the seal's in place. You won't be able to reach far enough and it's almost impossible to tell if the seal is pinched, anyway.

Instead, crawl under the tank and check the bottom of the seal through the hull access plate. With a flashlight in hand, it's easy to tell if the bottom of the seal is ready to go.



Check underside for seal pinches or gaps



Steps in the Right Direction

Checking the hydraulic reservoir level for your Bradley's power unit access door is a daily task, crewmen. If you don't do it right every time, you may not be able to open the engine compartment next time.

Follow these three steps to ensure the reservoir has the correct amount of fluid:

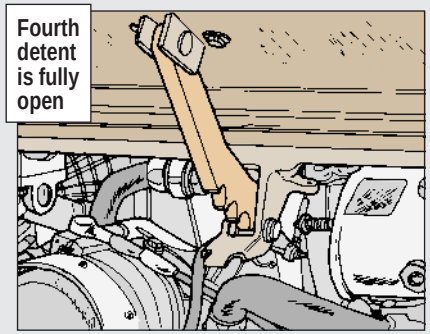
Step 1

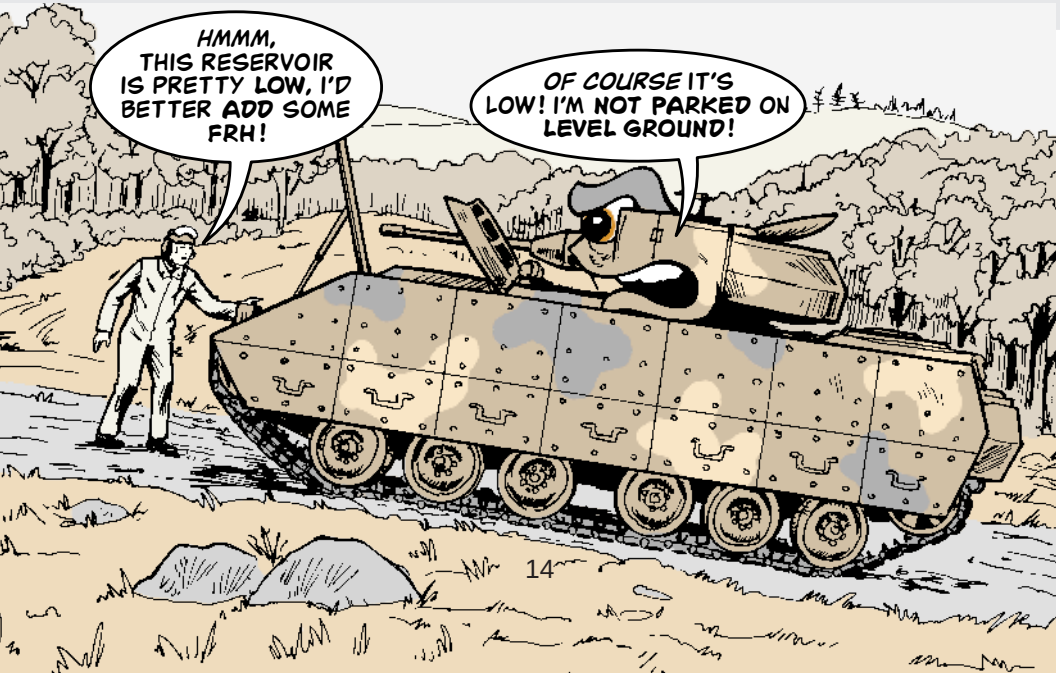
Park the vehicle on level ground. The reservoir sight glass won't give an accurate reading if your Bradley is parked at an angle.

Step 2

Open the access door **all the way** before checking the fluid level. When the door is only partially open, you'll get a high reading because the hydraulic cylinders aren't fully extended. Later, when you drain extra FRH from the reservoir to bring down the level, the system will become underpressurized. That lets air into the system and may keep the door from opening.

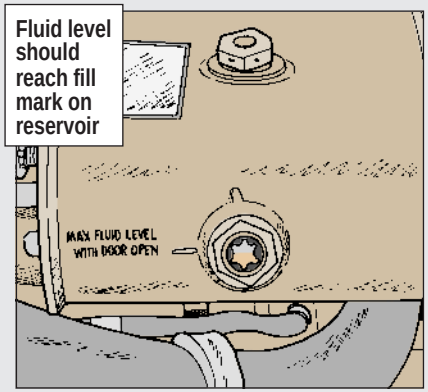
Open the access door to the fourth detent on the support link. That's fully open.





Step 3

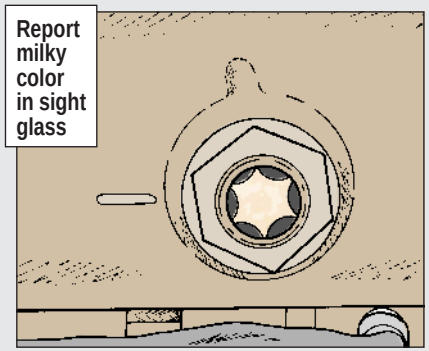
Eyeball the fluid level in the reservoir. The level in the sight glass should reach the full mark line inscribed on the reservoir.



If it doesn't, add FRH until it reaches the line. If the level passes the mark, drain some of the fluid. Use an AOAP vampire pump, NSN 4930-01-119-4030, to remove the excess fluid.

One More Thing

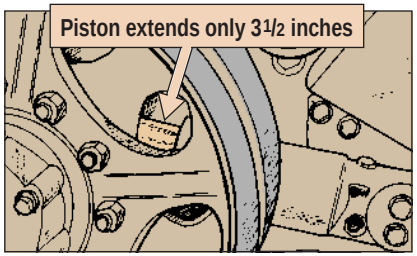
When checking the sight glass, pay special attention to the **color** of the fluid. Fluid that is milky in color is probably contaminated with water. Let your mechanic know right away. Contaminated fluid will ruin the seals.



Stop Pushing So Hard!

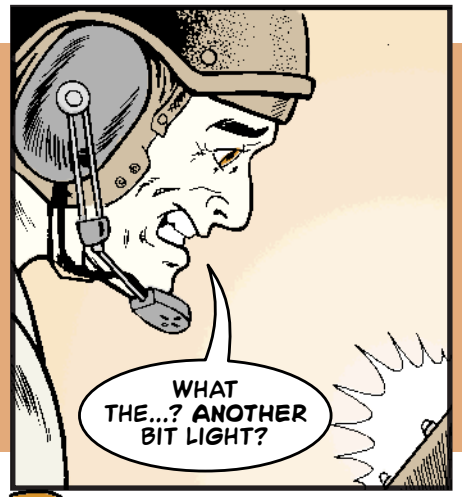
You can push some things only so far, crewmen. That includes the track adjuster piston on your M2/M3-series Bradley.

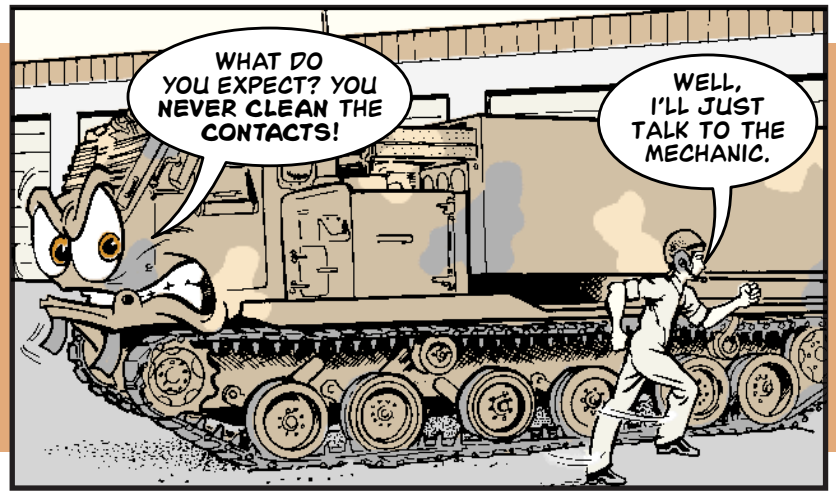
When tightening the track, the maximum extension for the piston is 3½ inches. If you try to tighten any more than that, excess grease is bled off through a small hole in the piston. You're just wasting grease because the track **won't** get any tighter.



If you see grease coming out of the bleed hole and the track is still too loose, bleed off the track adjuster to loosen the track and remove a shoe. Then try again.

A BIT of Advice

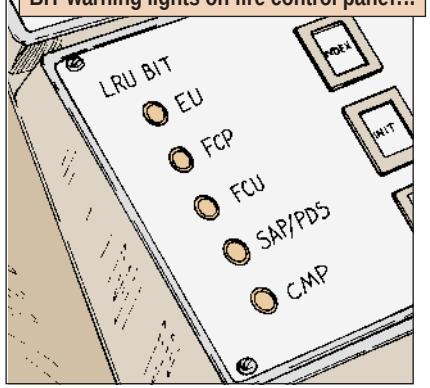




Drivers, are you getting lots of built-in-test (BIT) light warnings on the fire control panel of your MLRS? If so, chances are the problem is sand and dirt, not a malfunction.

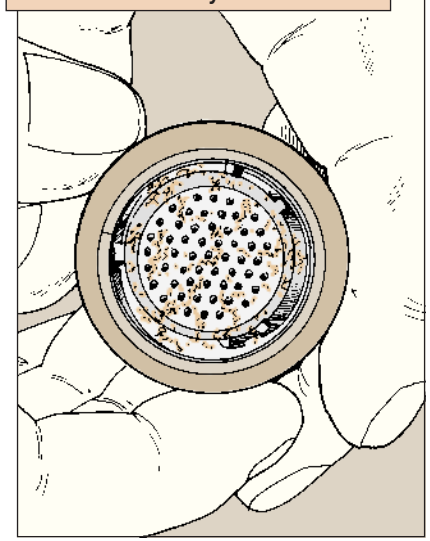
When enough dirt gets inside your vehicle's electrical connectors, the BIT lights signal a problem. Before you call in your mechanic to troubleshoot, try cleaning the connectors. Here's how:

BIT warning lights on fire control panel...



Unhook the connector indicated by the BIT light and use an air hose to blow out loose sand and dirt. Keep the air pressure to 30 psi or less, though, to protect the connector.

...could be caused by dirt in connector

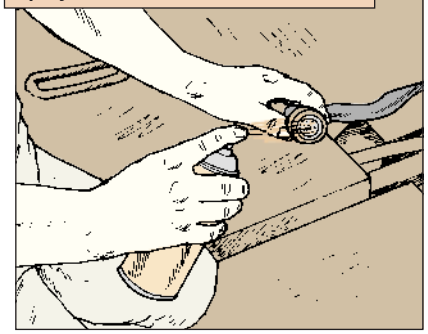


Then, spray the connector with cleaner, NSN 6850-01-453-5703. Order it on a DD Form 1348-6 and put "NSN not on AMDF" in the REMARKS block.

Spray it on and let it sit for a minute or two, then lightly scrub the connector with a foam swab. A box of 50 swabs comes with NSN 7045-01-154-1317.

If the BIT light still comes on after recycling the system, call in your mechanic.

Spray connector with contact cleaner



Know Where to Hang Your Helmet

MLRS drivers, where you hang your CVC helmet is important, especially during launcher reload and other times when the engine is running.

If you're in the habit of hanging your helmet on the steering yoke, ***stop!***

The weight of the helmet pulls the steering yoke to one side. That tells the transmission to turn the vehicle, wearing out the transmission disconnect clutches.

If the engine's running, put your helmet on the seat, on the floor, or better yet, keep it on your head. Just don't hang it on the steering yoke.

Ammo Handling . . .

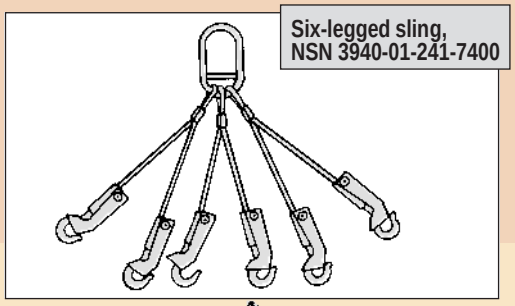
Move It Out!

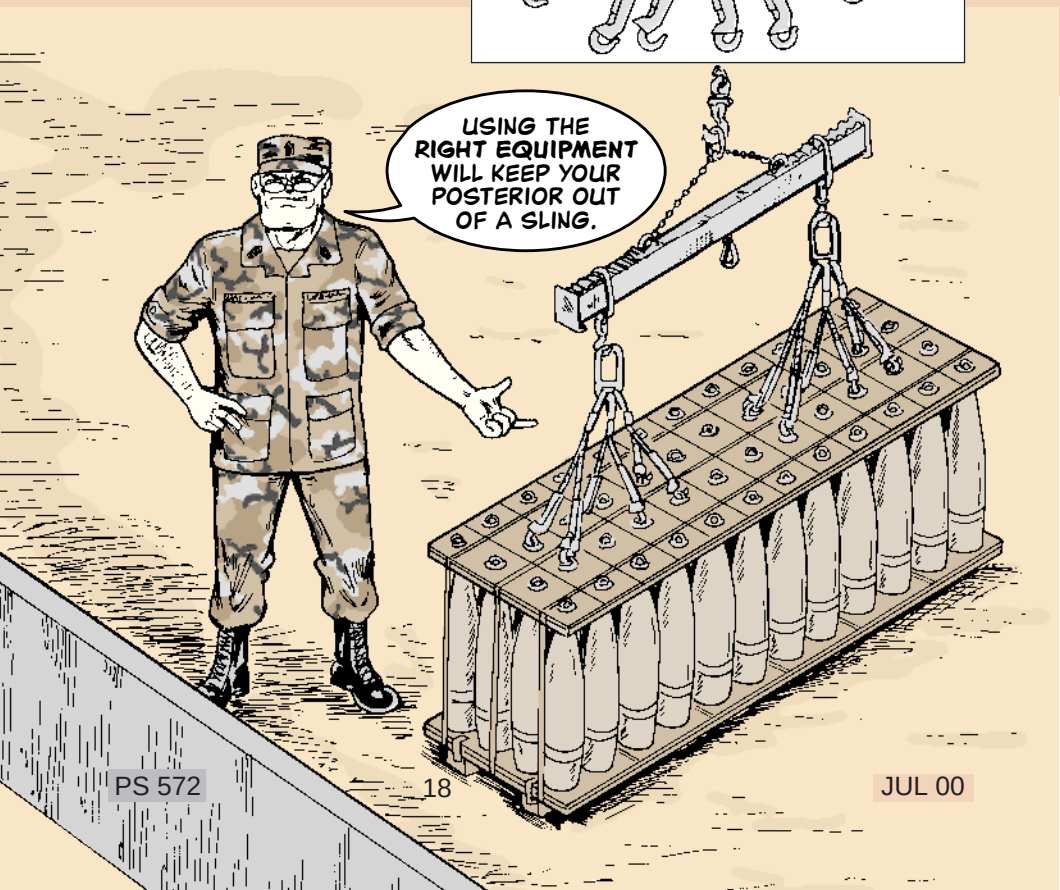
Need to move some palletized ammo? No problem—as long as you've got the right equipment on hand. You've got a choice of the six-legged sling, the single hoisting beam, or the double hoisting beam.

All three are authorized by TM 9-1300-251-20&P and can be used with any capable lifting equipment currently used by the Army including the M977 HEMTT, 7.5-ton rough terrain (RT) crane and 40-ton RT container crane.

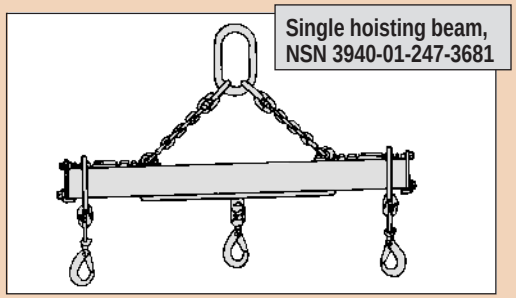
Here's how they're used:

■ Six-legged sling: Handles one to three pallets of 155mm projectiles and one or two pallets of 8-in projectiles. It's used with the HEMTT crane and 7.5-ton RT crane.

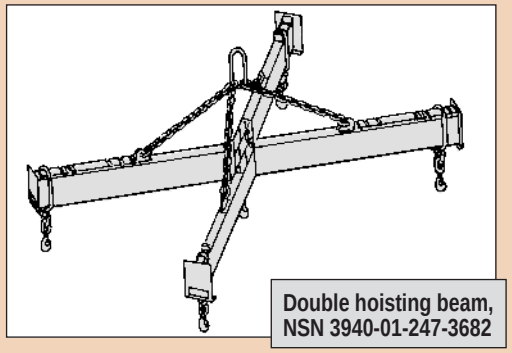

Six-legged sling, NSN 3940-01-241-7400



■ Single hoisting beam: Handles six pallets of 155mm and four pallets of 8-in projectiles. It requires two six-legged slings. Used with the 7.5-ton RT crane or larger lifting device.


Single hoisting beam, NSN 3940-01-247-3681

■ Double hoisting beam: Handles 12 pallets of 155mm and eight pallets of 8-in projectiles in a single lift. It also requires four 6-legged slings. Used with the 40-ton RT container crane. Can also be used as a single beam sling with the same capacity as the single beam.


Double hoisting beam, NSN 3940-01-247-3682

M109A4/A5 SP Howitzers, M992-Series Ammo Carriers . . .

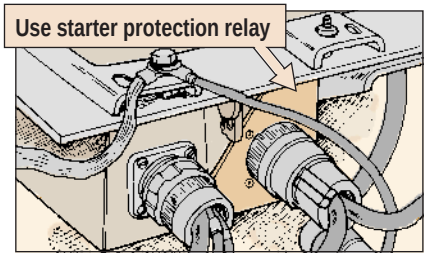
Stop Starter Shutdown

Mechanics, have drivers been writing up their M109A4/A5 howitzers and M992-series carriers because the starters keep locking up? The source of the problem may be the starter protection relay.

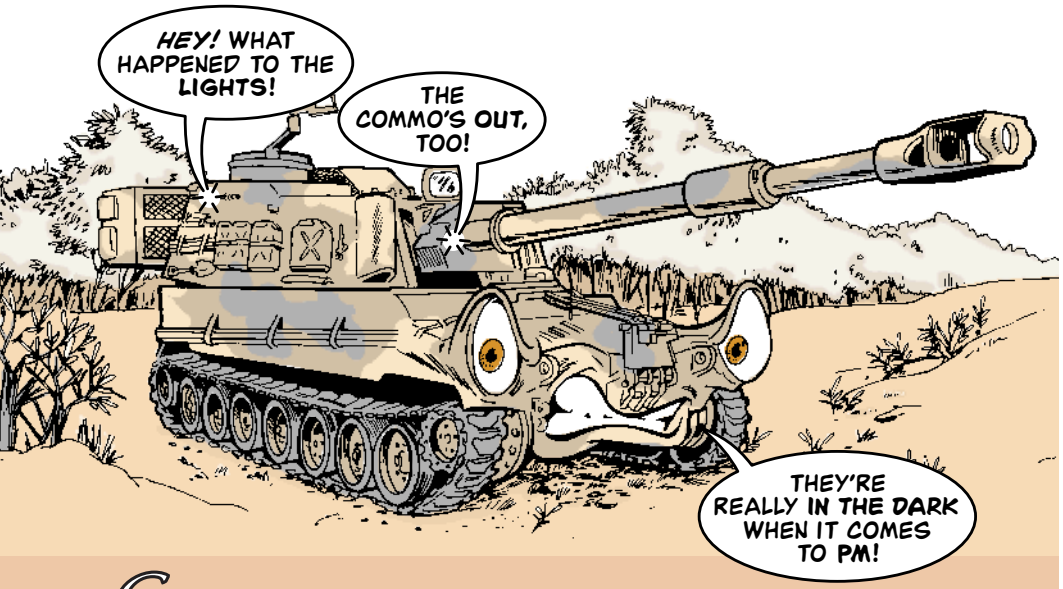
When the howitzers were converted from -A2s and -A3s, the starter relay was replaced with the same starter protection relay used in M992-series carriers. Problem is, that protection relay can short out during start-up, causing the starter to shut down prematurely. It may look like the starter has locked up when actually it's getting no power.

So before you troubleshoot or replace the starter, activate the combat override switch and engage the starter. If the engine cranks, the problem is the protection relay.

Get a new starter protection relay with NSN 5945-01-291-0734. That relay has been improved with a special internal filter that eliminates premature shutdown.



Snub the Rub!

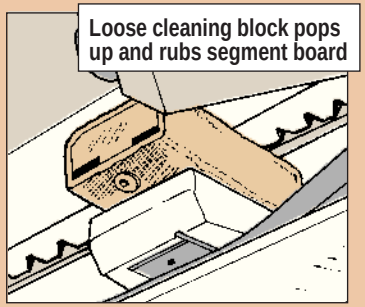


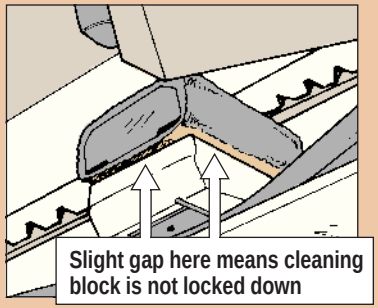
Crewmen, after you've cleaned the segment board on your Paladin, you're supposed to remove the green pad from the cleaning block. Just make **very** sure that you get the block locked back down on the cleaning mechanism afterward.

If it's not locked down properly, vibration makes the cleaning block pop up. In that position, the cleaning block rubs against the segment board until—***zap!***—the segment board shorts out. You're left without turret power or commo.

Ensure the cleaning block is locked down by eyeballing it. Look for a slight gap between the cleaning block and the cleaning mechanism. A gap means the cleaning block is not locked down. Try again.

No gap? The cleaning block is locked down and you're good to go.

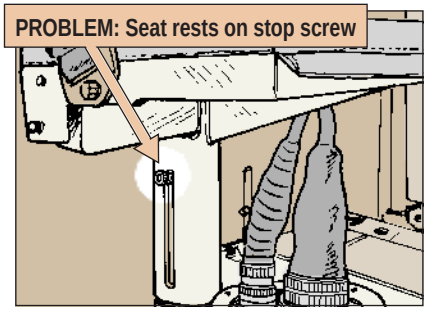




Take a Seat—Carefully

Mechanics, you'll find that gunners who happily lower the seat all the way in their ITV or FISTV aren't nearly as happy when the stop screw breaks.

The screw snaps off because the height adjustment slot is too short to allow the seat to rest against the lip of the support pipe. When the adjustment handle is in the unlocked position, the entire weight of the seat (and the gunner) presses down on the stop screw.



You can prevent broken screws by lengthening the height adjustment slot. Here's how:

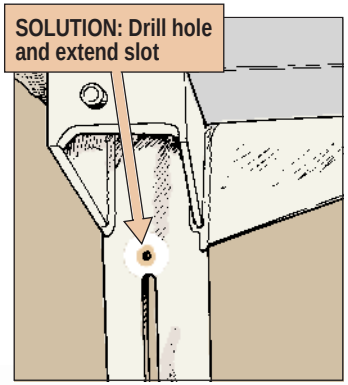
1. Remove the seat assembly from the support pipe.

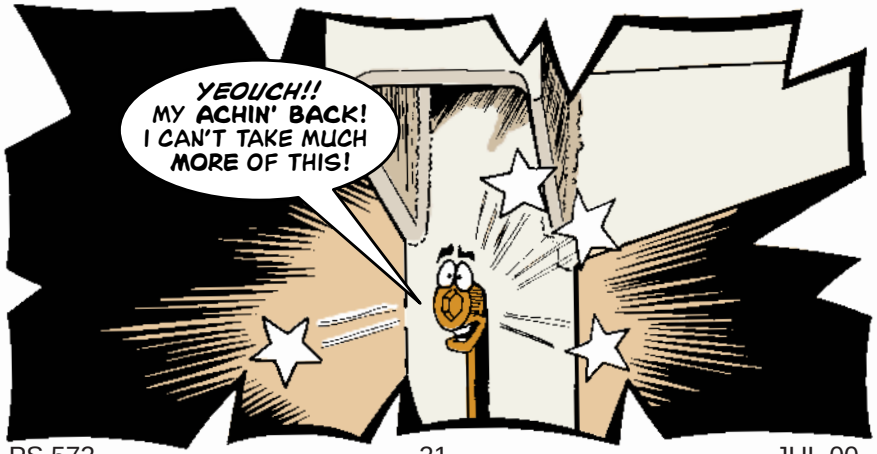
2. Measure 1/2 inch up from the top of the height adjustment slot and drill a 25/64-in hole.

3. Cut out the area between the slot and hole with a saber saw, NSN 5130-00-889-7745. Appendix A of CTA 50-970 is your authority for ordering the saw.

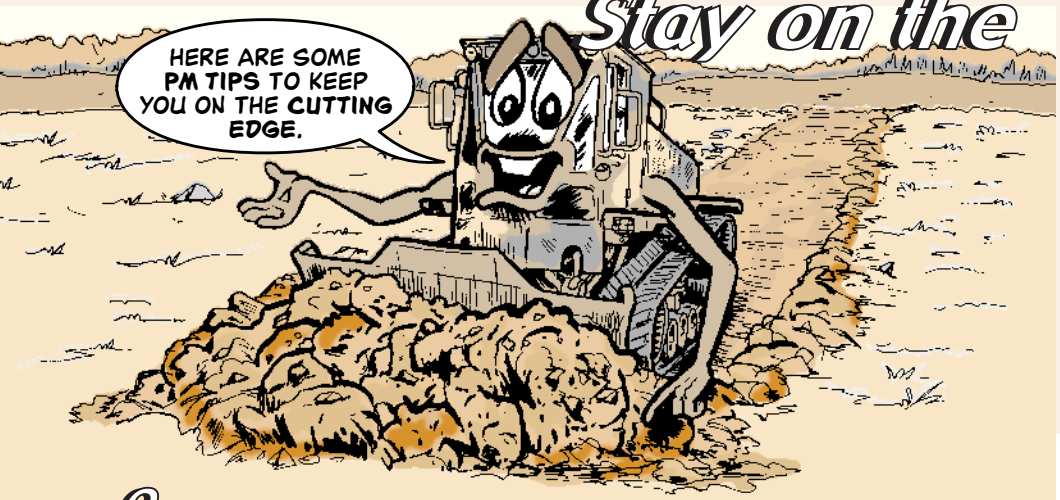
4. Smooth the rough edges of the slot with a metal file, NSN 5110-00-241-9152, from the No. 2 Common shop set.

5. Reinstall the seat assembly.





Stay on the Cutting Edge



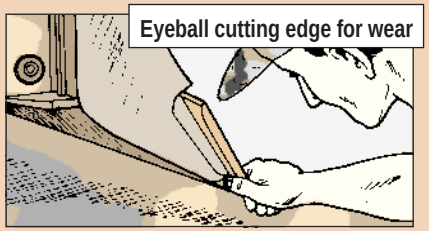
Operators, the DEUCE will move mountains of dirt for you if you pile on the PM.

Follow the words in TM 5-2430-200-10 and use these pointers—that others have learned the hard way—to keep your DEUCE on the job.

Eyeball the Cutting Edge

The earthmover blade's cutting edge protects the moldboard. If the cutting edge wears down too far, the moldboard is damaged and has to be replaced or sent to DS for repair.

Make sure the cutting edge is protecting the moldboard. To get a good look at the edge, raise the blade about 6 inches off the ground.

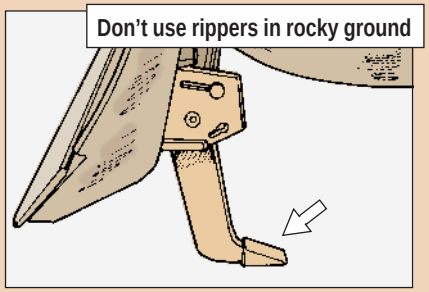

Eyeball cutting edge for wear

If the cutting edge is worn to less than 3/4 inch—about the diameter of a penny—report it. Your mechanic can reverse the edge or replace it if it can't be reversed.

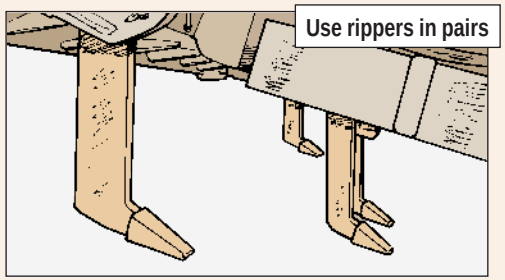
Don't Rip It Up

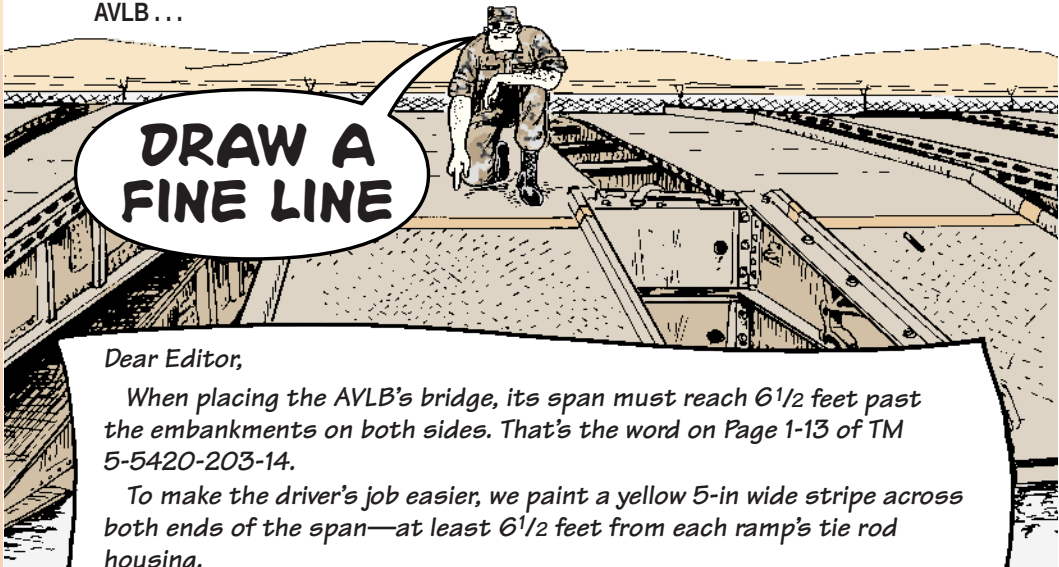
The earthmover's back rippers help break up clay and hard-packed soil. Here's a checklist that saves wear and tear on the vehicle and ripper shanks.

* Don't turn the DEUCE when the ripper shanks are in the ground. They'll twist and break off.
* Don't use the rippers in rocky ground. That'll just damage them.


Don't use rippers in rocky ground

* When the rippers are down, operate the vehicle in the EARTHMOVING mode with the transmission in FIRST SPEED REVERSE.
* Use all four rippers at one time, or use them in pairs so the DEUCE doesn't pull to one side. If just using one pair, for example, use the outside rippers together or the inside rippers together.


Use rippers in pairs



Dear Editor,

When placing the AVLB's bridge, its span must reach 6 1/2 feet past the embankments on both sides. That's the word on Page 1-13 of TM 5-5420-203-14.

To make the driver's job easier, we paint a yellow 5-in wide stripe across both ends of the span—at least 6 1/2 feet from each ramp's tie rod housing.

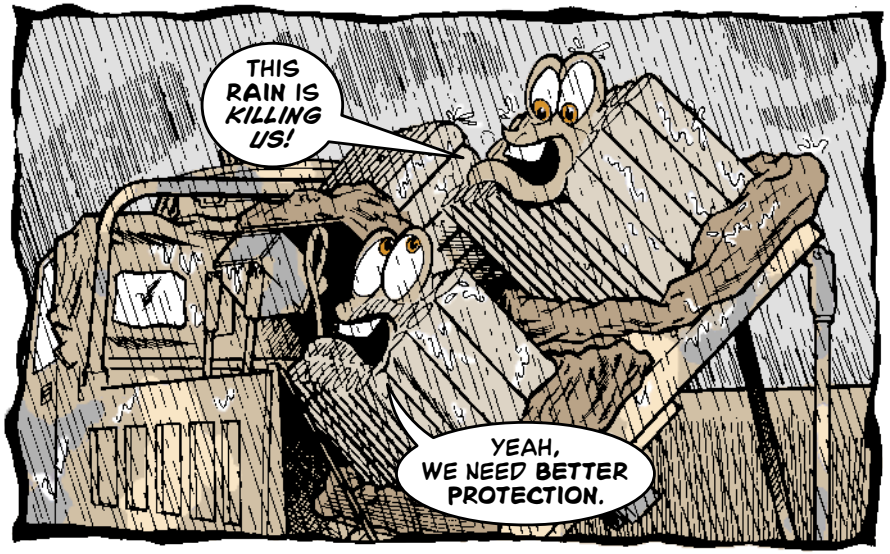
These yellow stripes are a quick visual reference for the driver as he positions the ramps on the banks of the bridging site.

SPC Brad Thoroughgood
70th Engr Bn
Ft Riley, KS

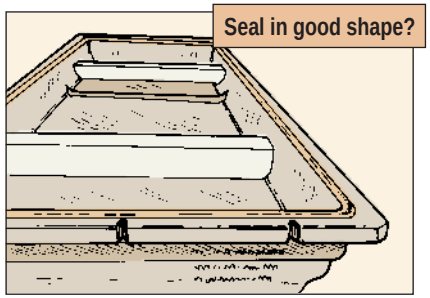
FROM THE DESK OF THE Editor

That suggestion sure bridges a safety gap. If you need a gallon of yellow CARC paint to mark your AVLB, use NSN 8010-01-235-8059.

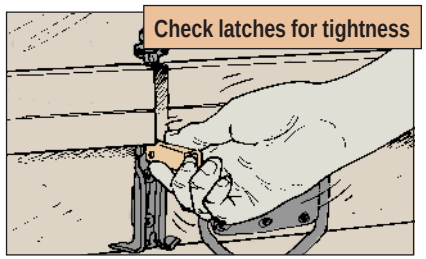
Sealed and Delivered

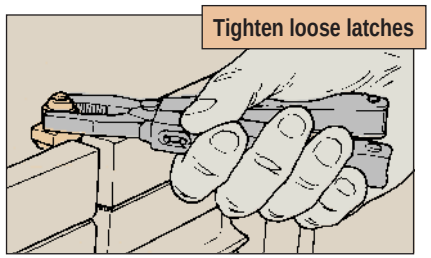


M139 Volcanos won't be delivering many mines if they sit for weeks in containers that have lost their waterproof seal or if they are covered with ragged covers. Water corrodes connectors and causes electrical problems that put out the Volcano's fire.

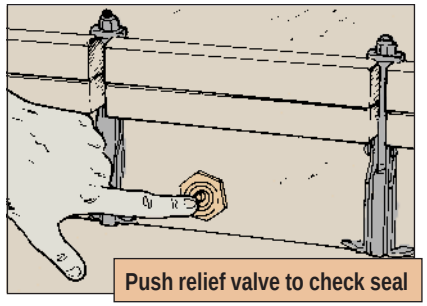

Seal in good shape?

If the Volcano is not going to be used for a while, disassemble it and store it in the storage cases. But first make sure the cases' seals are glued in place and in good condition. After you've shut the cases, check that each case's 35 latches are tightly latched. If a latch is loose, tighten its locking nut.


Check latches for tightness

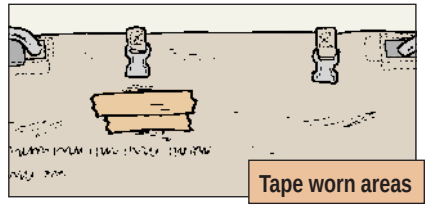

Tighten loose latches

After storing the cases, wait a couple of days and then push their relief valves. If the case seal is good, air will come out. No air means the seal needs to be checked out.


Push relief valve to check seal

Even if the cases seem to be doing their job, it's a good idea to open them after a heavy rain to be sure no water is inside.

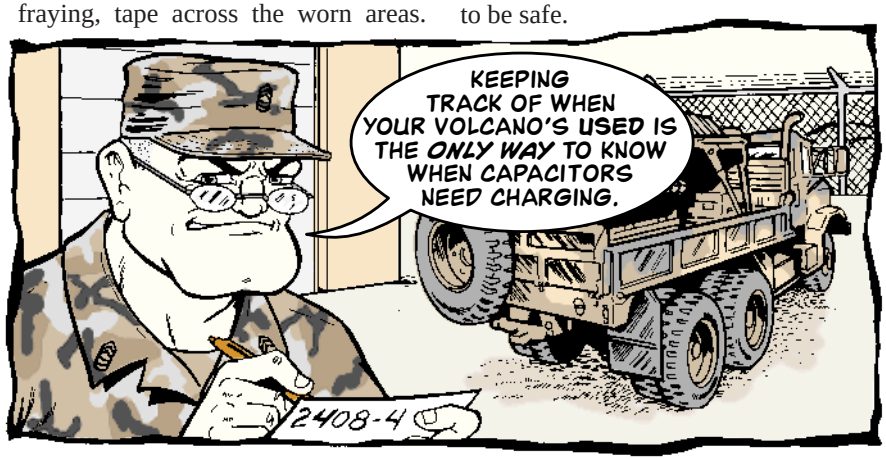
Also check out the protective covers for the launcher racks. The edges of the mine receptacles wear holes in the covers and that lets moisture inside to corrode the connectors. If the cover is fraying, tape across the worn areas. That way the rack wears on the tape, not the cover.


Tape worn areas

Your best bet, though, is to get a tarp that covers the entire truck bed or carrier. That will do a much better job of protecting the racks from moisture.

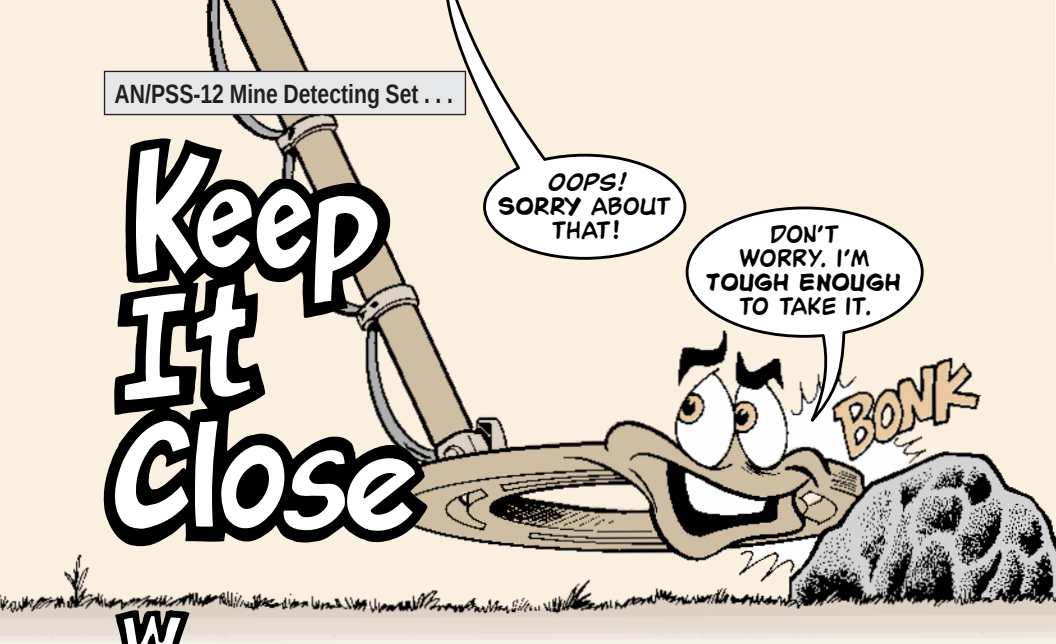
Remember, if the Volcano sits for more than a year without being used, its dispenser control unit and rack electrolytic capacitors develop permanent shorts. Support needs to charge the capacitors at least every 12 months.

Keep track of when the Volcano was last used or its capacitors were last charged on a DA Form 2408-4, Weapons Record Data card. If you ever lose track, get the capacitors charged just to be safe.



AN/PSS-12 Mine Detecting Set . . .

Keep It Close



When it comes to sweeping with your AN/PSS-12 mine detecting set, the closer to the ground the better.

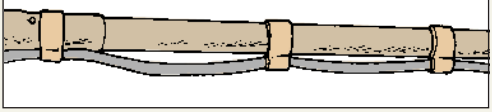
Pages 22–23 in PS 565 (Dec 99) and Pages 22–23 in PS 567 (Feb 00) told you to keep the search head 6 inches above ground on uneven ground. That's wrong. In fact, you want to keep the head as close to the ground as possible. The head should never be more than 2 inches from the ground. The farther away the head is from the ground, the more likely you are to miss a mine.

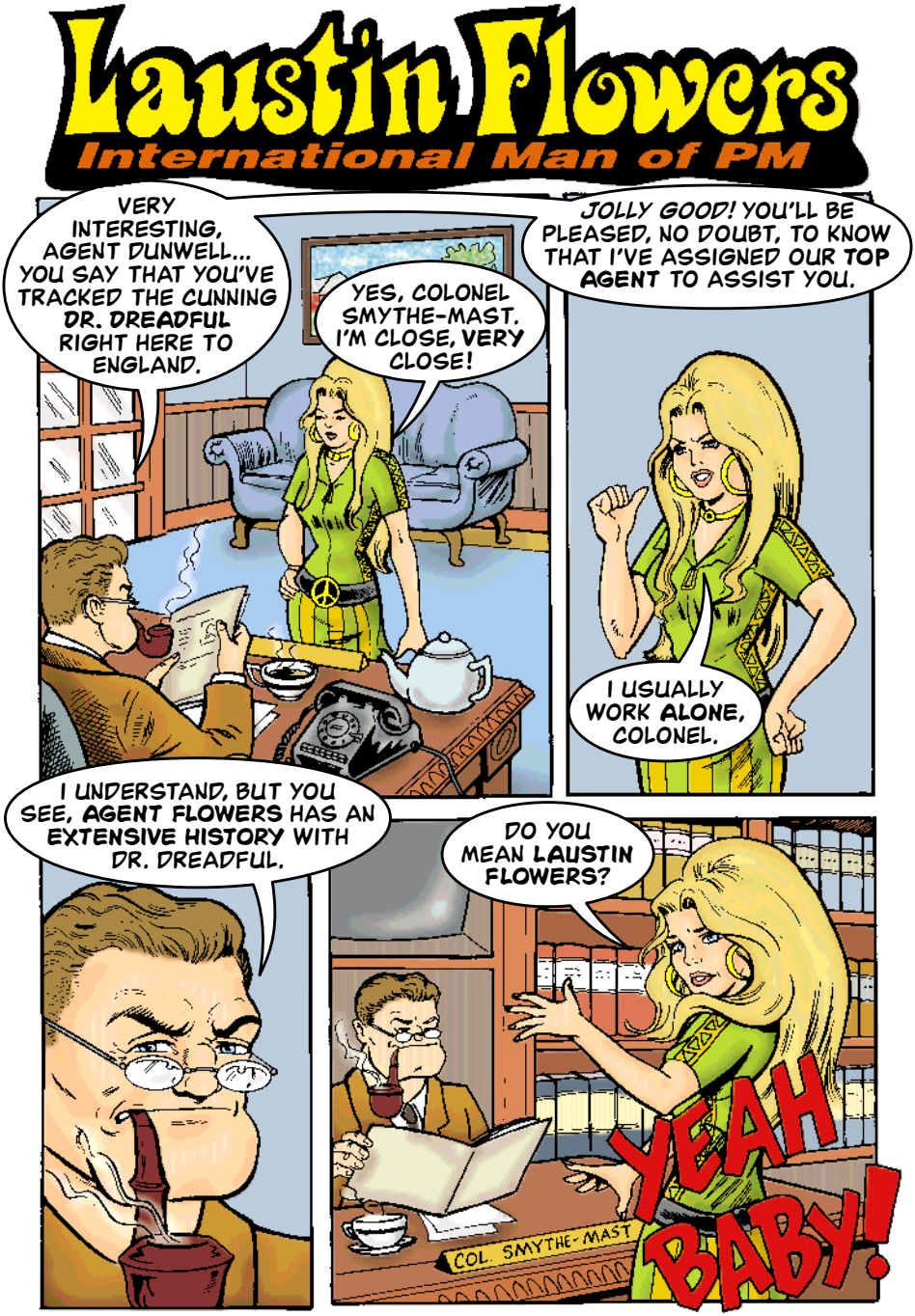
Keep head 2 inches or less above ground

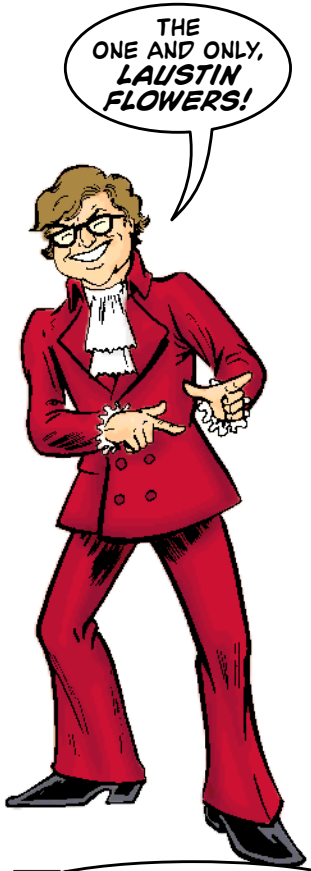
Sweep the search head slowly, about 1 foot per second, with the head parallel to the ground. Overlap each sweep by at least half the width of the head. Don't worry about hitting rocks with the head. It's rugged and can withstand bumps.

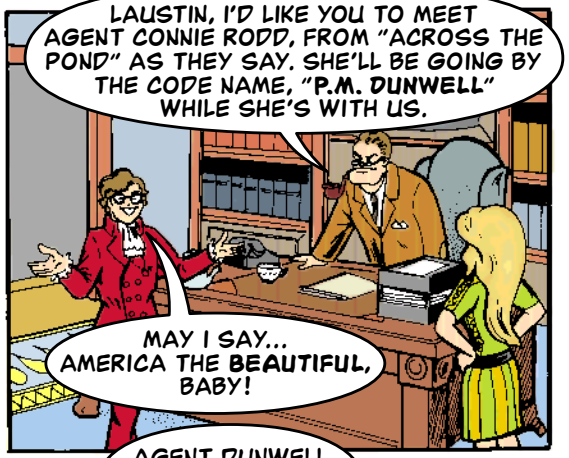
Use three to four clamps, NSN 5340-21-905-5919, to attach the search head cable loosely to the pole. The cable should not swing freely, but it shouldn't touch the pole, either. That could cause interference with the signal.

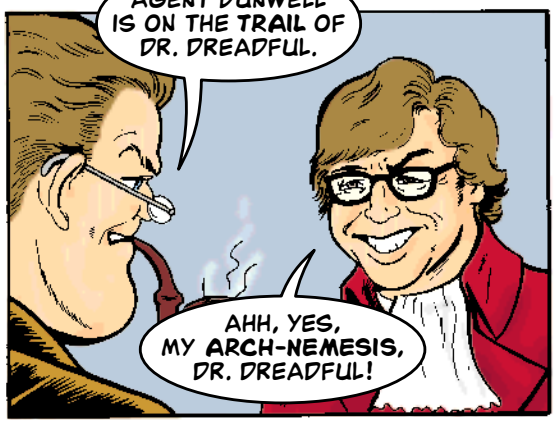
Use 3 or 4 clamps to secure cable

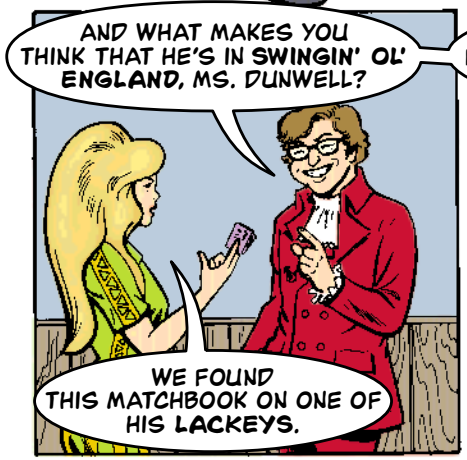



Laustin Flowers
International Man of PM
VERY INTERESTING, AGENT DUNWELL... YOU SAY THAT YOU'VE TRACKED THE CUNNING DR. DREADFUL RIGHT HERE TO ENGLAND.
YES, COLONEL SMYTHE-MAST. I'M CLOSE, VERY CLOSE!
JOLLY GOOD! YOU'LL BE PLEASED, NO DOUBT, TO KNOW THAT I'VE ASSIGNED OUR TOP AGENT TO ASSIST YOU.
I USUALLY WORK ALONE, COLONEL.
I UNDERSTAND, BUT YOU SEE, AGENT FLOWERS HAS AN EXTENSIVE HISTORY WITH DR. DREADFUL.
DO YOU MEAN LAUSTIN FLOWERS?
COL. SMYTHE-MAST
YEAH BABY!

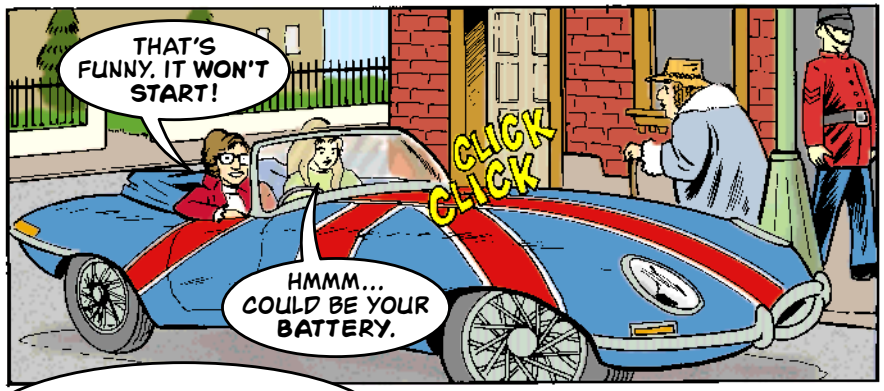

THE ONE AND ONLY, LAUSTIN FLOWERS!

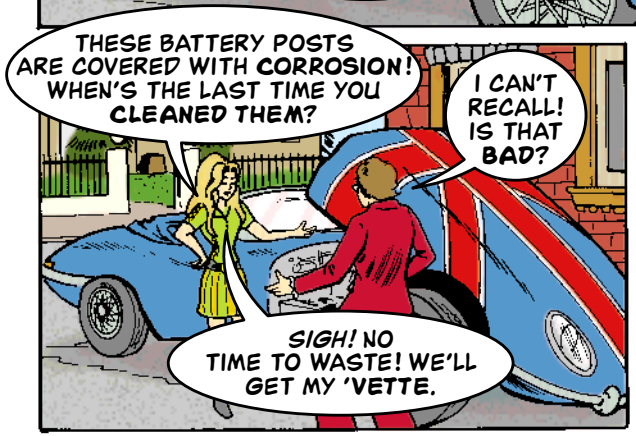

LAUSTIN, I'D LIKE YOU TO MEET AGENT CONNIE RODD, FROM "ACROSS THE POND" AS THEY SAY. SHE'LL BE GOING BY THE CODE NAME, "P.M. DUNWELL" WHILE SHE'S WITH US.
MAY I SAY... AMERICA THE BEAUTIFUL, BABY!


AGENT DUNWELL IS ON THE TRAIL OF DR. DREADFUL.
AHH, YES, MY ARCH-NEMESIS, DR. DREADFUL!

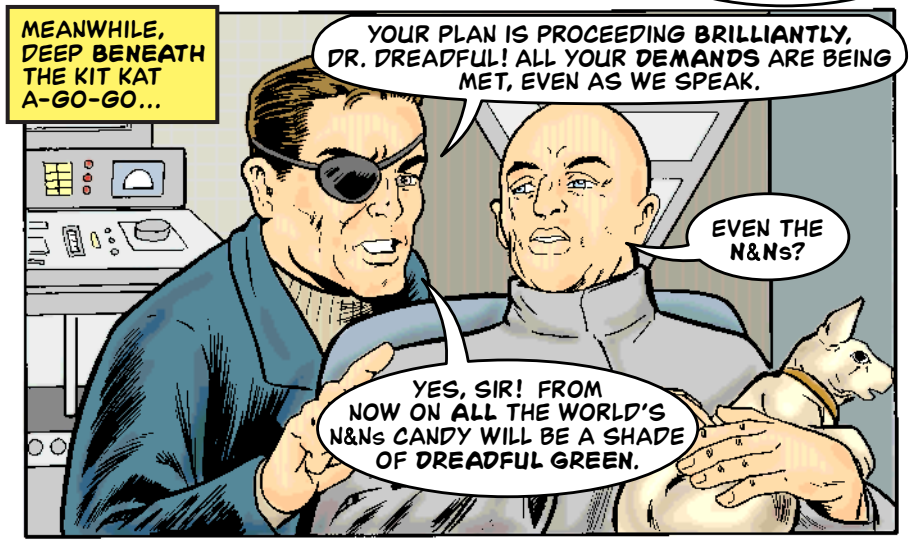

AND WHAT MAKES YOU THINK THAT HE'S IN SWINGIN' OL' ENGLAND, MS. DUNWELL?
WE FOUND THIS MATCHBOOK ON ONE OF HIS LACKEYS.

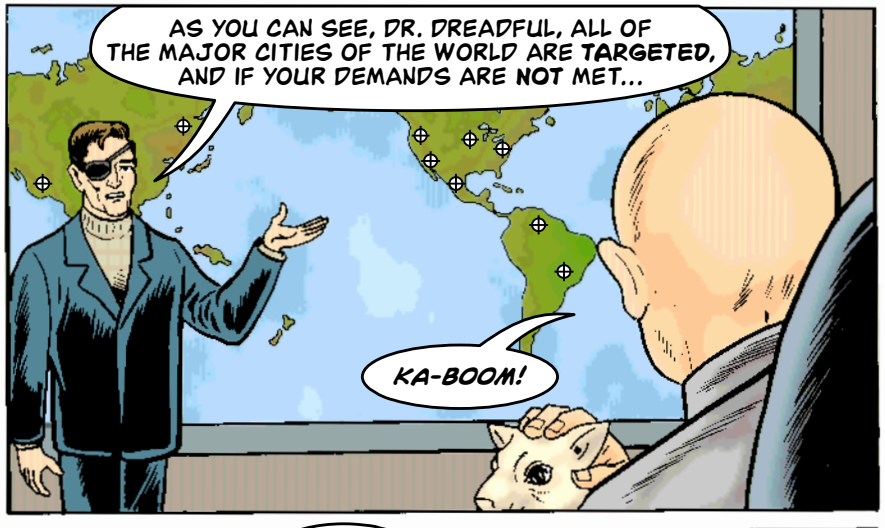
THAT CLUB'S NOT FAR FROM HERE. C'MON... WE'LL SWING OVER IN THE JAG!
KIT KAT A-GO-GO
1313 EVIL WAY
SWINGIN' OL' ENGLAND

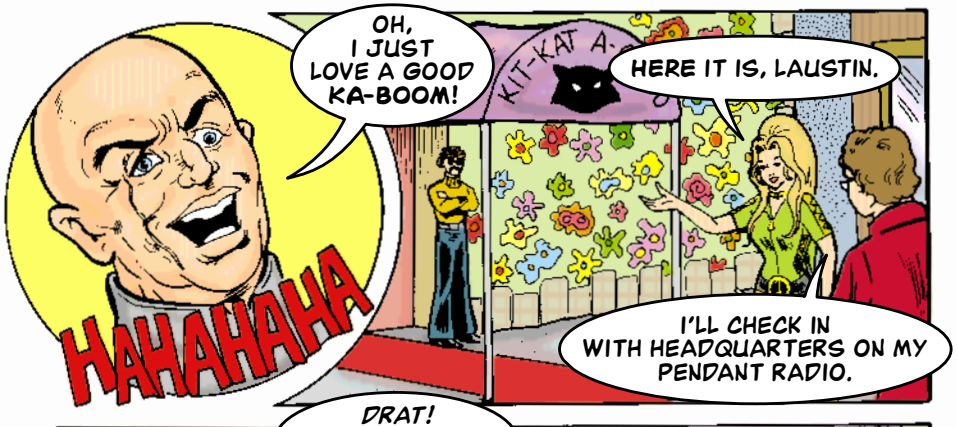

THAT'S FUNNY. IT WON'T START!
CLICK CLICK
HMMM... COULD BE YOUR BATTERY.

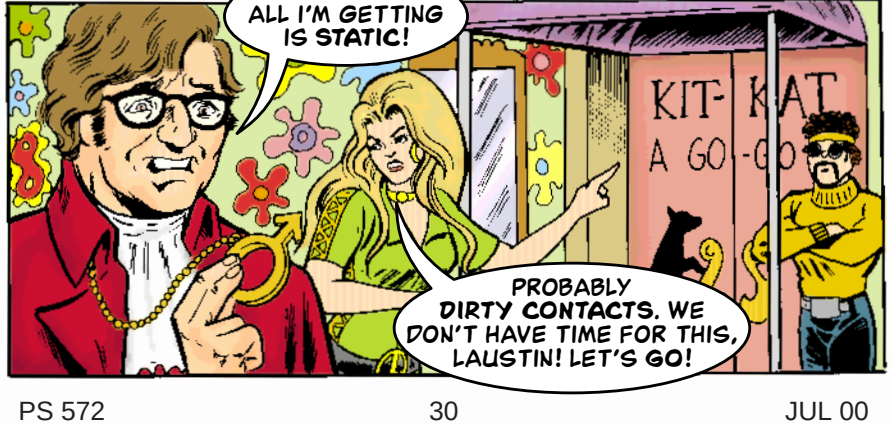

THESE BATTERY POSTS ARE COVERED WITH CORROSION! WHEN'S THE LAST TIME YOU CLEANED THEM?
I CAN'T RECALL! IS THAT BAD?
SIGH! NO TIME TO WASTE! WE'LL GET MY 'VETTE.

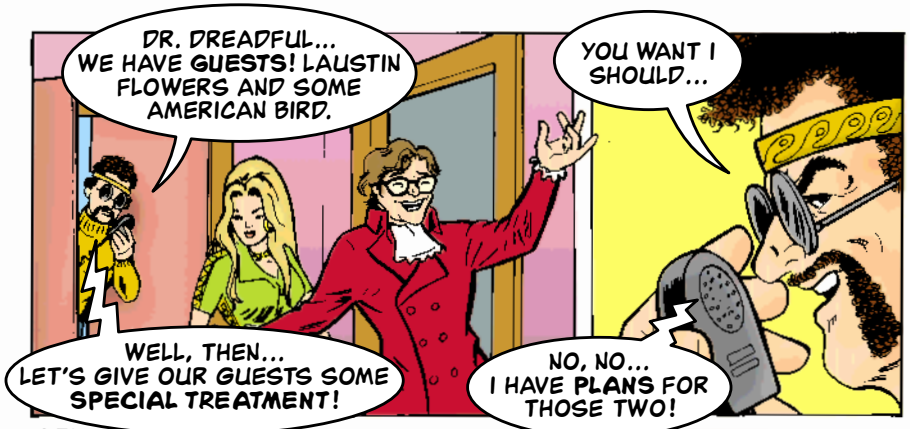
WHAT'S THE DEAL WITH THE VET, LUV... YOU GOT A SICK PUPPY?

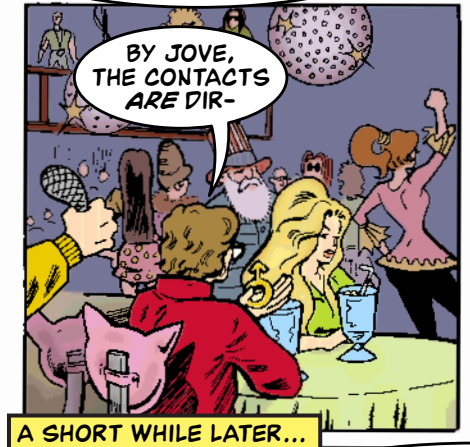

MEANWHILE, DEEP BENEATH THE KIT KAT A-GO-GO...
YOUR PLAN IS PROCEEDING BRILLIANTLY, DR. DREADFUL! ALL YOUR DEMANDS ARE BEING MET, EVEN AS WE SPEAK.
EVEN THE N&Ns?
YES, SIR! FROM NOW ON ALL THE WORLD'S N&Ns CANDY WILL BE A SHADE OF DREADFUL GREEN.


AS YOU CAN SEE, DR. DREADFUL, ALL OF THE MAJOR CITIES OF THE WORLD ARE TARGETED, AND IF YOUR DEMANDS ARE NOT MET...
KA-BOOM!

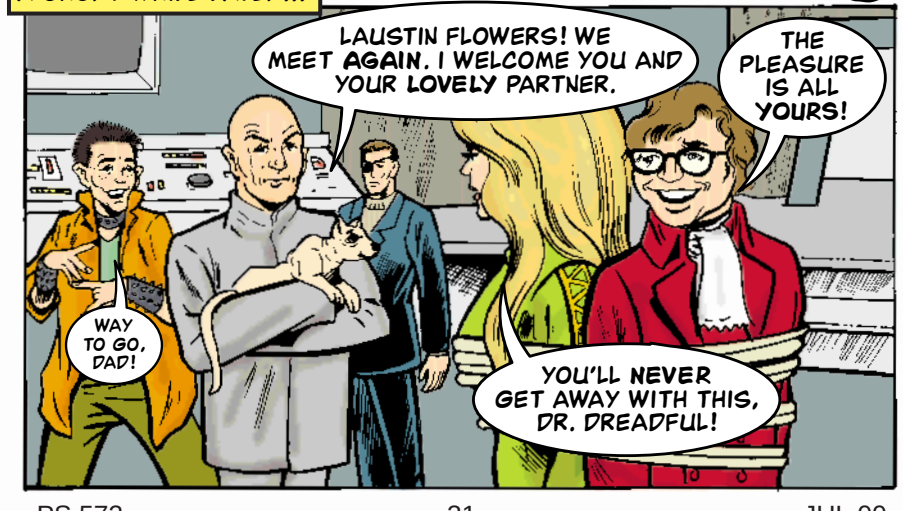

OH, I JUST LOVE A GOOD KA-BOOM!
HAHAHAHA
KIT-KAT A-
HERE IT IS, LAUSTIN.
I'LL CHECK IN WITH HEADQUARTERS ON MY PENDANT RADIO.


DRAT! ALL I'M GETTING IS STATIC!
KIT-KAT A GO-GO
PROBABLY DIRTY CONTACTS. WE DON'T HAVE TIME FOR THIS, LAUSTIN! LET'S GO!

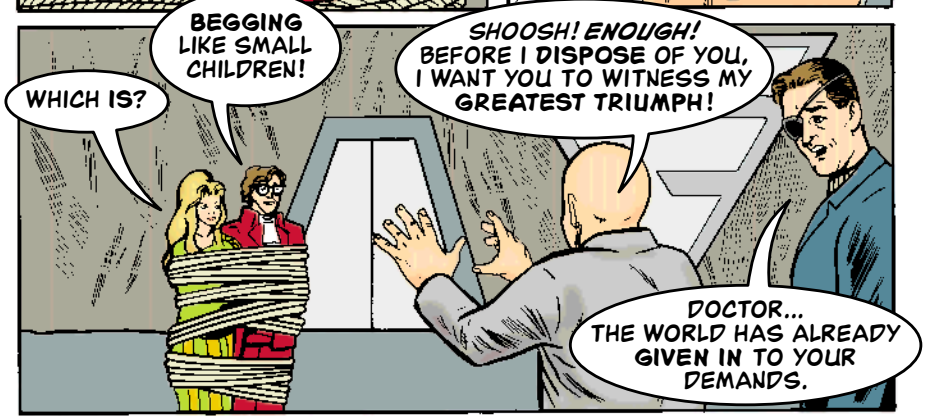

DR. DREADFUL... WE HAVE GUESTS! LAUSTIN FLOWERS AND SOME AMERICAN BIRD.
YOU WANT I SHOULD...
WELL, THEN... LET'S GIVE OUR GUESTS SOME SPECIAL TREATMENT!
NO, NO... I HAVE PLANS FOR THOSE TWO!

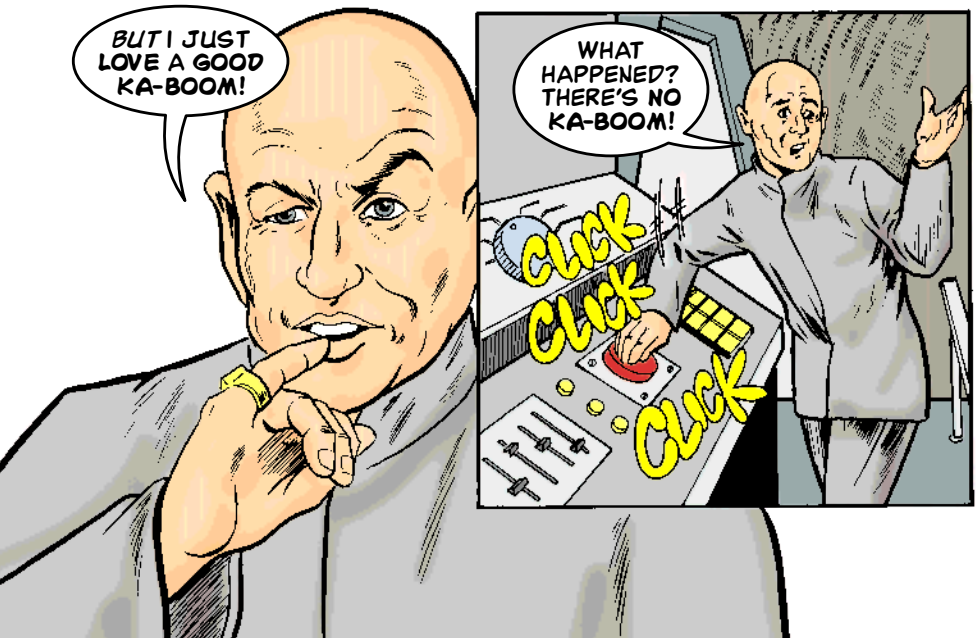

BY JOVE, THE CONTACTS ARE DIR-

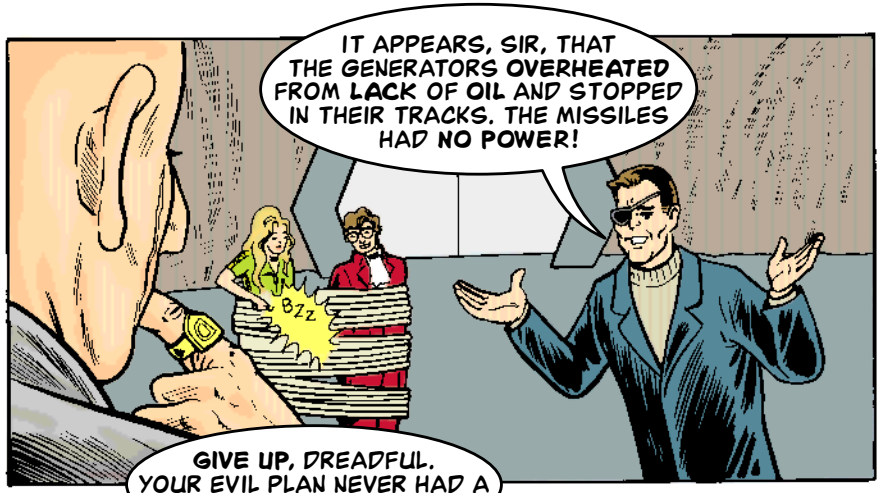
WHACK
DI-DIR... NIGHTY NIGHT!

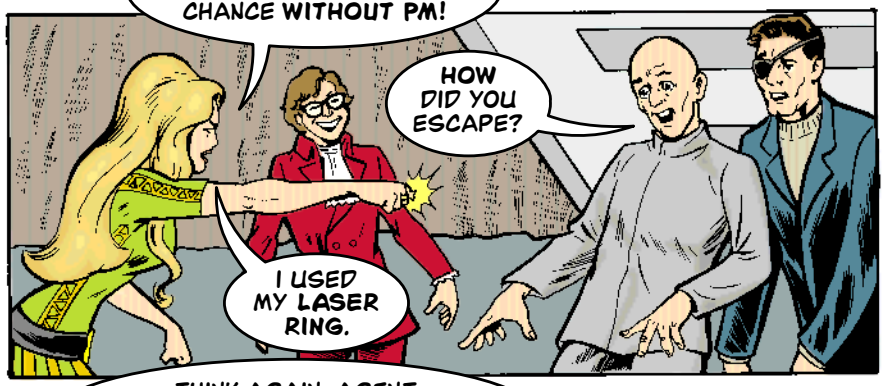

A SHORT WHILE LATER...
LAUSTIN FLOWERS! WE MEET AGAIN. I WELCOME YOU AND YOUR LOVELY PARTNER.
THE PLEASURE IS ALL YOURS!
WAY TO GO, DAD!
YOU'LL NEVER GET AWAY WITH THIS, DR. DREADFUL!

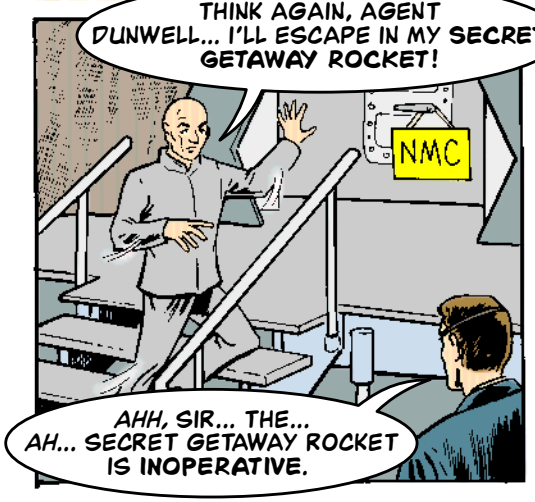
NOT TO WORRY, LOVE. THE MICRO SAW IN MY WRISTWATCH WILL...
WELL... ON TO PLAN B.
SPROING


WHICH IS?
BEGGING LIKE SMALL CHILDREN!
SHOOSH! ENOUGH! BEFORE I DISPOSE OF YOU, I WANT YOU TO WITNESS MY GREATEST TRIUMPH!
DOCTOR... THE WORLD HAS ALREADY GIVEN IN TO YOUR DEMANDS.

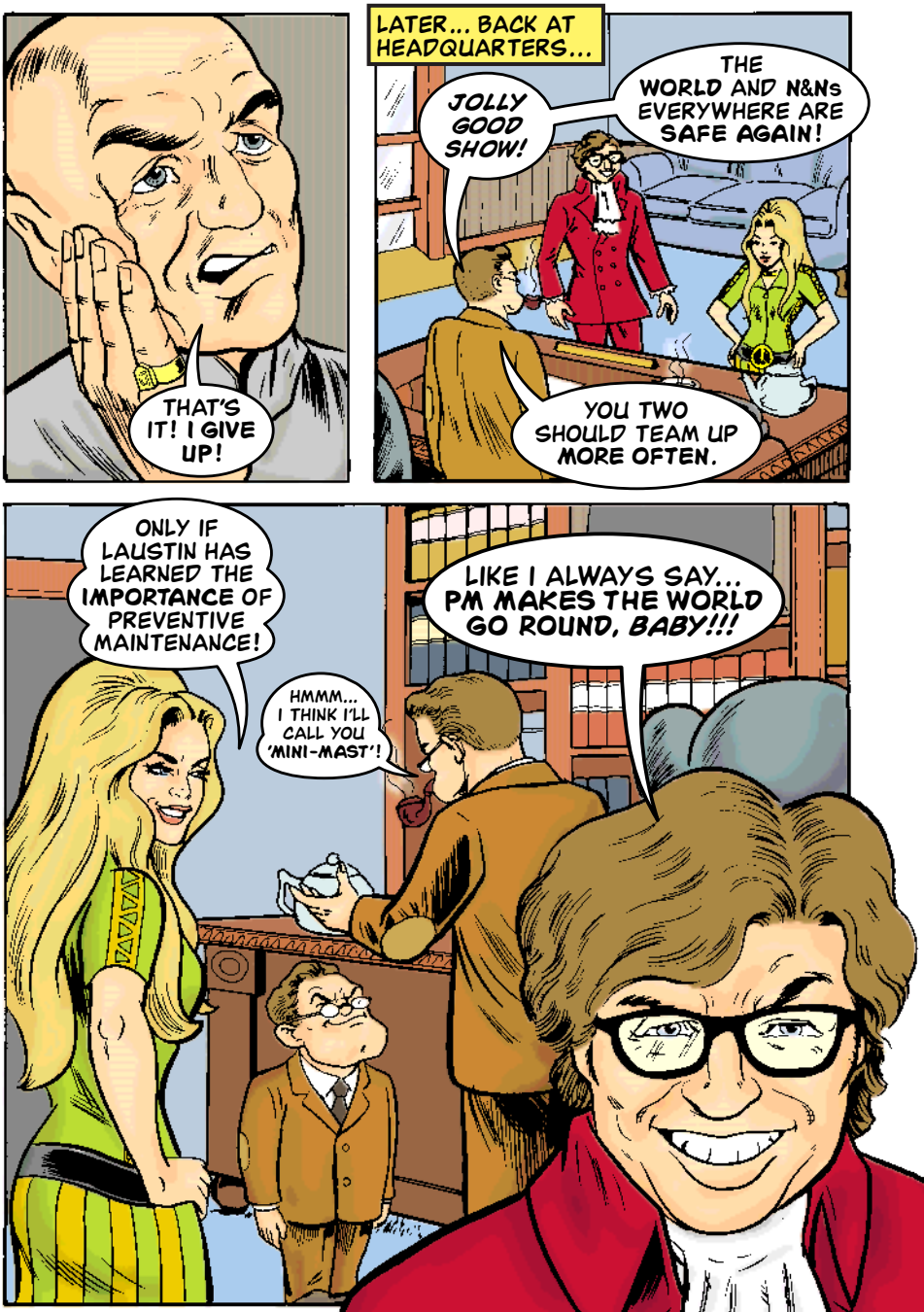

BUT I JUST LOVE A GOOD KA-BOOM!
WHAT HAPPENED? THERE'S NO KA-BOOM!
CLICK
CLICK
CLICK


IT APPEARS, SIR, THAT THE GENERATORS OVERHEATED FROM LACK OF OIL AND STOPPED IN THEIR TRACKS. THE MISSILES HAD NO POWER!
BZZ


GIVE UP, DREADFUL. YOUR EVIL PLAN NEVER HAD A CHANCE WITHOUT PM!
HOW DID YOU ESCAPE?
I USED MY LASER RING.


THINK AGAIN, AGENT DUNWELL... I'LL ESCAPE IN MY SECRET GETAWAY ROCKET!
NMC
AHH, SIR... THE... AH... SECRET GETAWAY ROCKET IS INOPERATIVE.

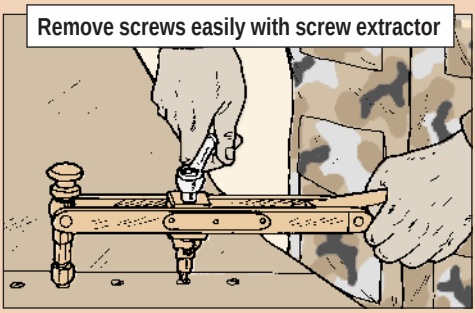
THE FUEL FILTER IS CLOGGED.


THAT'S IT! I GIVE UP!
LATER... BACK AT HEADQUARTERS...
JOLLY GOOD SHOW!
THE WORLD AND N&Ns EVERYWHERE ARE SAFE AGAIN!
YOU TWO SHOULD TEAM UP MORE OFTEN.
ONLY IF LAUSTIN HAS LEARNED THE IMPORTANCE OF PREVENTIVE MAINTENANCE!
HMMM... I THINK I'LL CALL YOU 'MINI-MAST'!
LIKE I ALWAYS SAY... PM MAKES THE WORLD GO ROUND, BABY!!!

Aircraft Blades . . .

Screw Removal Made Easy

Many a mechanic has busted his knuckles and lost his temper while trying to remove blade tip caps. You claim a painful victory after you bust your knuckles, strip screw threads, destroy screw driving heads or scratch and gouge the cap and blade.



Remove screws easily with screw extractor

Save your knuckles and blade tip cap screws by using a screw extractor. Extractor, NSN 5120-01-398-2869, removes screws from size 8-32 through 1/4 inch. Extractor, NSN 5120-01-398-2868, removes 1/4-in through 3/8-in screws.

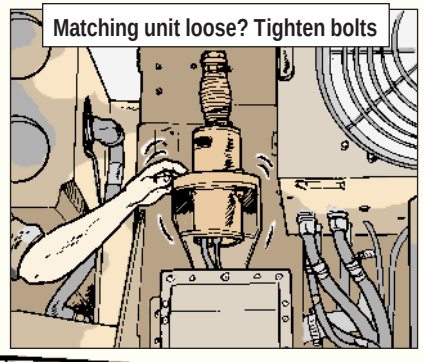
These extractors work on all aircraft panels and tip caps. Your commander must authorize their purchase since they are Class II items with a standard unit price that exceeds $100.

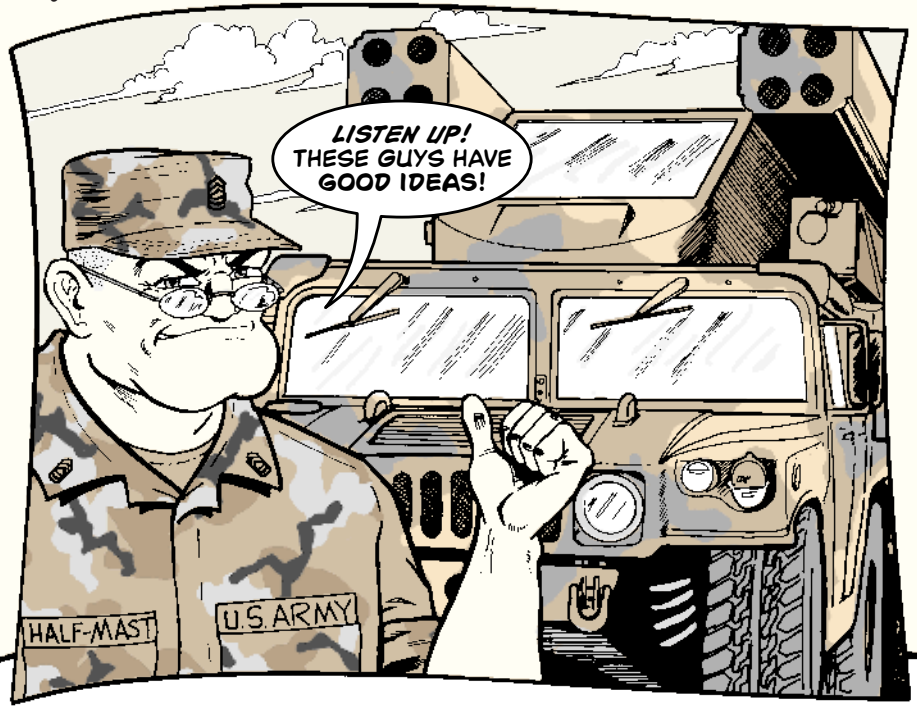
IFF, AMG, ECU/PPU and PM

Dear Editor,

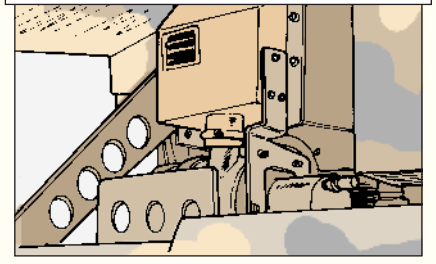
We have a few suggestions for Avenger crews and repairmen to make their lives—and firing—much easier:

- Pay attention to the identification friend or foe (IFF). Check the IFF interconnect box and cables before operations like it says in Item 27 of PMCS Table 2-1 in TM 9-1425-433-10 and test the IFF like it says in Para 2-36 of the -10. If the IFF doesn't work, it deadlines the whole missile system.
- Include the matching unit for the antenna mast guide (AMG) in before-operation PMCS. We've found the matching unit works loose and moves back and forth during travel, which weakens the antenna's connection and reduces the communication range. Just feel the matching unit for looseness. If necessary, tighten the three bolts holding it on.

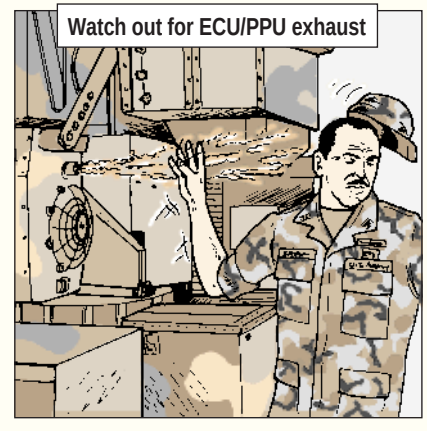

Matching unit loose? Tighten bolts



- After you power up the forward looking infrared receiver (FLIR), wait for its READY light to come on before switching from STBY to ON like it says in Step 3 of Para 2-36 of the -10. The FLIR must cool off before you use it, which usually takes 5–7 minutes. If you don't wait for the FLIR to cool, you'll get built-in-test (BIT) faults and have to spend time troubleshooting.
- Service the new environmental control unit/primary power unit (ECU/PPU) every 250 hours of operation. Change its oil and filters and make sure its W103 cable connector is torqued to 95–105 lb-in. The easiest way to track the 250 hours of ECU/PPU usage is by making it part of ULLS for your unit. Just add each Avenger to the equipment data file (AWCMX 001). Maintenance procedures for the ECU/PPU were added to TM 9-1440-433-24-1&2 in Change 7.
- Before your support uses a crane to remove the ECU/PPU, remove the Avenger's makeup air filter. There's little clearance for the ECU/PPU. If it's not lifted just right, it breaks off the filter's fan blower.


Remove air filter before removing ECU/PPU

- Be careful working around the Avenger when the ECU/PPU is running. Its hot exhaust shoots out to the side at eye level.


Watch out for ECU/PPU exhaust

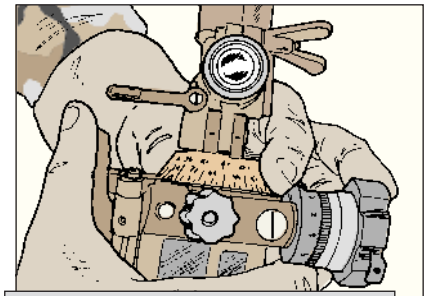
CW2 Corey Jeffries
CW2 John Saam
3/4th ADA
Ft Bragg, NC

SEAL OF Editor's APPROVAL

Sight Setting, Scale and Stuff

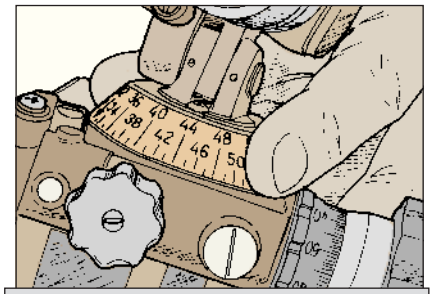
How loose is too loose when it comes to the coarse deflection (azimuth) scale of the M64A1 and M67 sights for the M224, M252, and M120/M121 mortars?

The before-operation checks for all these mortars say to check that the coarse deflection scale pops up into the secured position when you release it and stays at that locked setting and doesn't move freely. If the scale doesn't pop up or if it moves in the secured setting, the sight's not mission capable.



Does scale pop up when you release it?

Some mortarmen have been concerned that they can move the scale when it's in the secured position. But they shouldn't be. As long as there's slight resistance (3 lb-in) when you try to move the secured scale, it's good to go. Only if there's no resistance or if the scale moves during firing does the sight need to be turned in for repair. But if you have doubts about the scale, have support check it out.

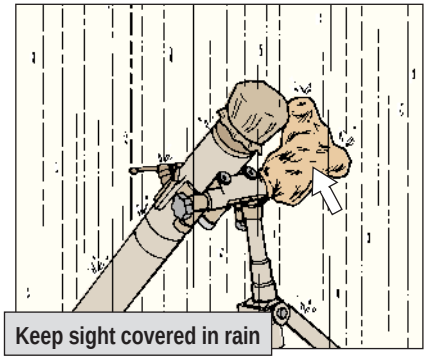


If scale moves without resistance, turn it in

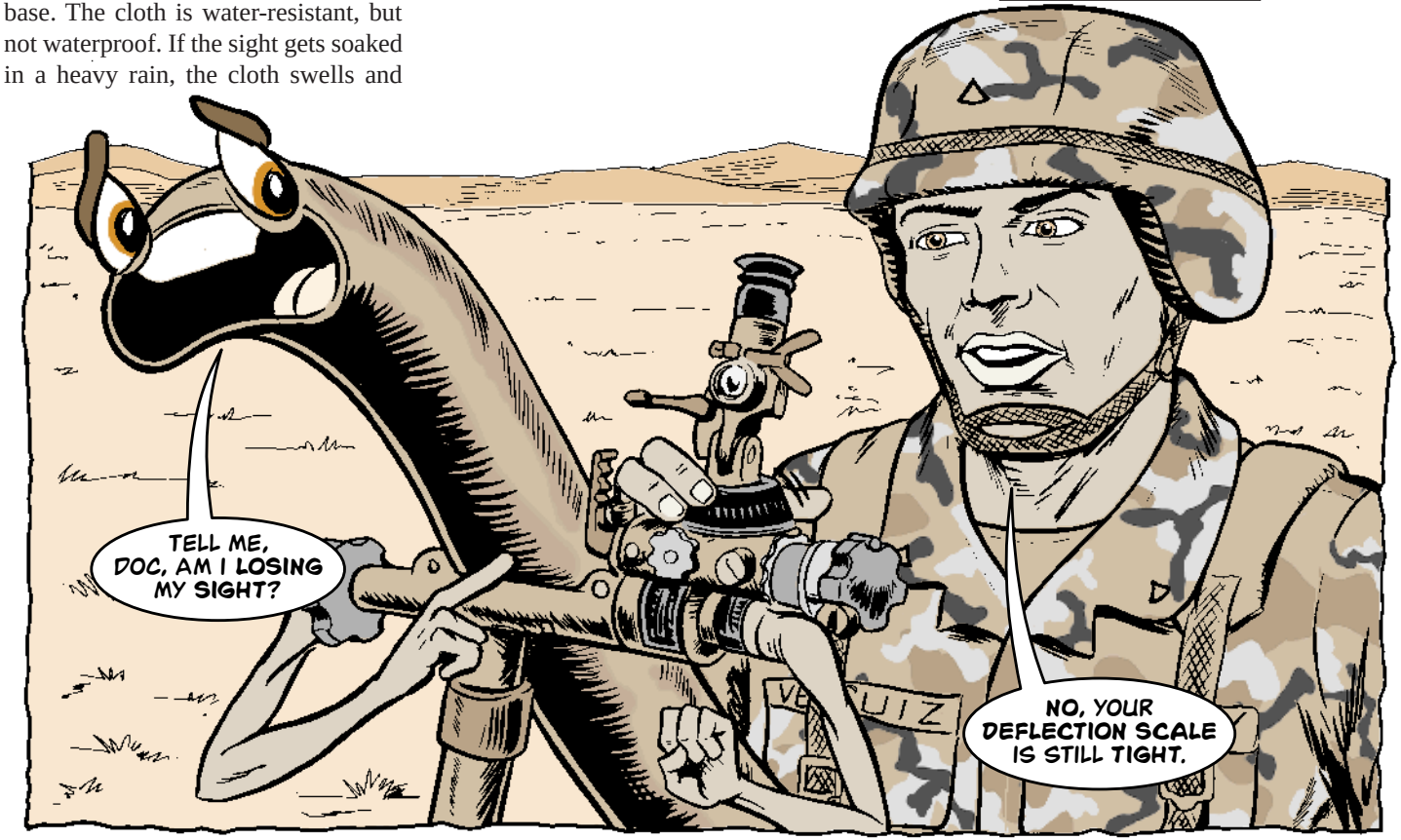
One thing you can do to keep the scale popping up is to keep the sight dry. The scale plungers have a cloth base. The cloth is water-resistant, but not waterproof. If the sight gets soaked in a heavy rain, the cloth swells and the plungers stick in their holes. Then the scale won't pop into or stay in the secured position.

Often, just letting the sight dry out completely will fix that, but drying can take a couple of days. Support sometimes has to replace the plungers.

Use the sight's cover as much as possible in the rain. Better yet, keep the sight in its carrying case when you're not shooting.



Keep sight covered in rain



Keep Back Plate Hook Hooking

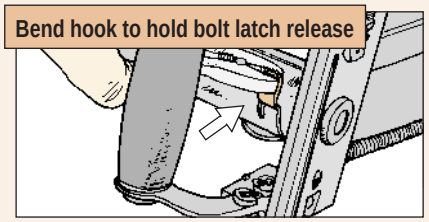
If the M2's backplate bolt latch release isn't completely doing its job, the bolt release lever won't stay down when the gun's fired in automatic mode. The bolt catch will continually hit the notches on top of the bolt and round out the notches. That can cause a runaway gun.

Armorers, you can stop that by making sure the metallic tube holds the latch release all the way down. If it doesn't do that, **slightly** bend the hook with pliers so that it does. If the hook still won't hold the latch release all the way down, the metallic tube, NSN 4710-00-726-5562, should be replaced by support.

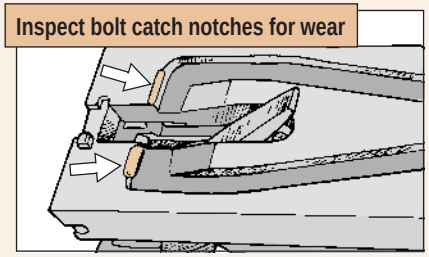
When the metallic tube is engaged, make sure there is no looseness in the bolt catch.

Also inspect the bolt catch notches for any signs of wear. If there are any, support needs to check out the bolt.

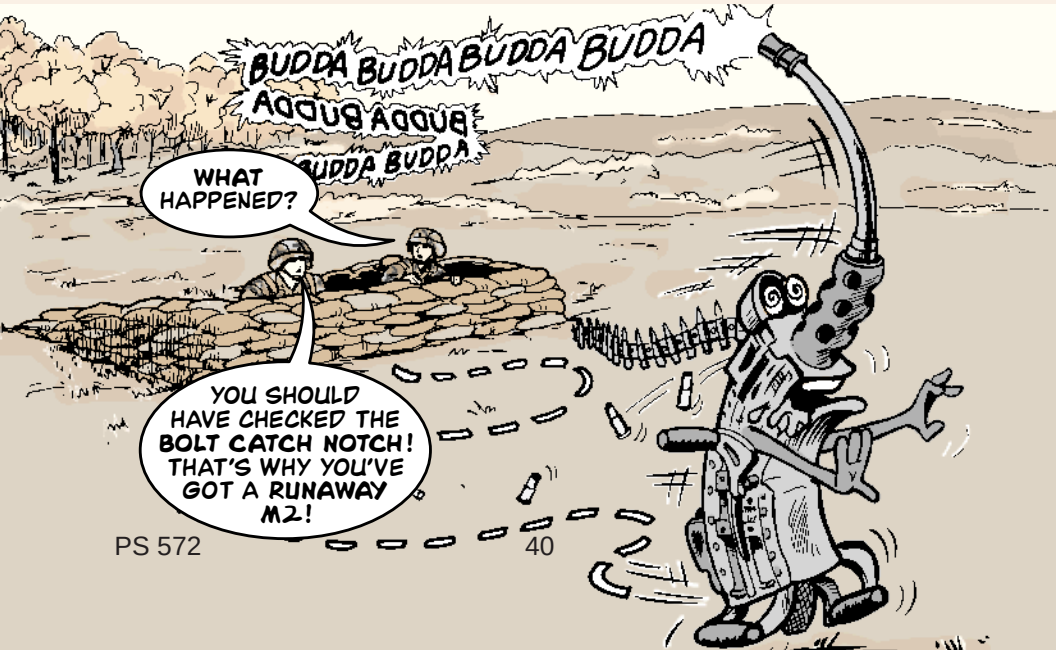
Bend hook to hold bolt latch release



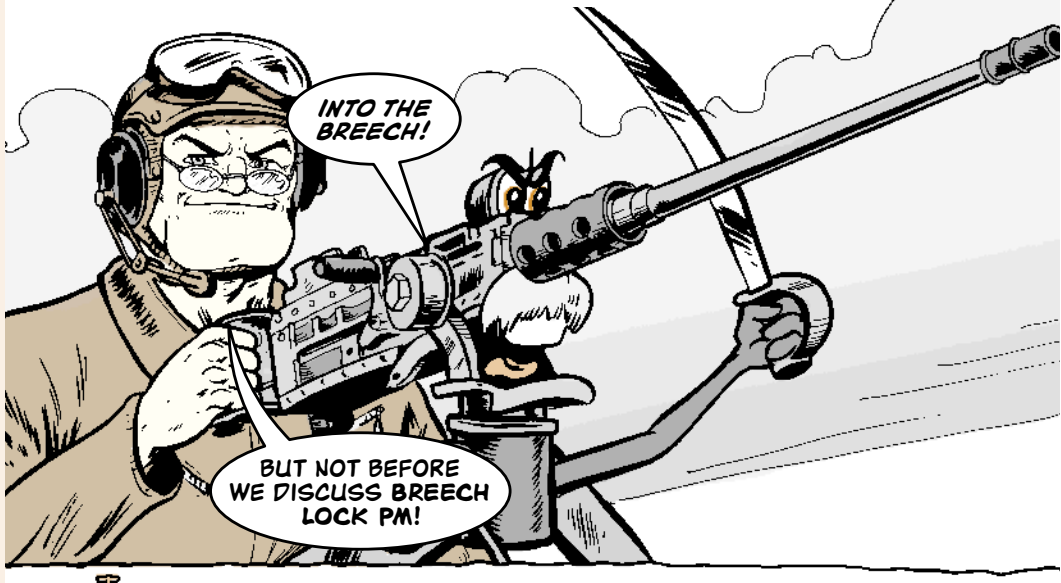
Inspect bolt catch notches for wear



Make sure your gunners know to push the bolt latch release all the way down for automatic firing. That saves wear and tear on the bolt catch notches.



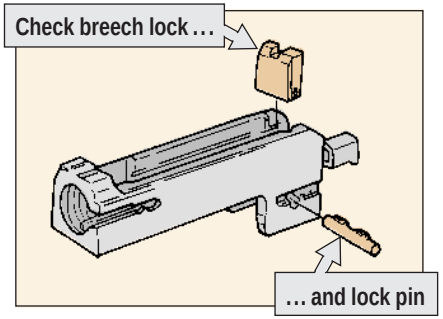
Into the Breech



If the M2 machine gun's breech lock is installed wrong or is in bad condition, the bolt will be destroyed during firing. An eyeball inspection and careful installation will keep your breech beyond the reach of trouble.

When you have your M2 disassembled for cleaning or to change the barrel, give the breech lock and lock pin a look. If you spot cracks, chipped areas, or heavy wear on the lock, that breech lock needs replacing, so tell your armorer. Also make sure the lock moves up and down easily in the guideways of the barrel extension. If it doesn't, tell your armorer.

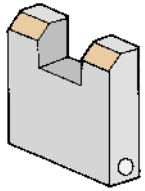
Check breech lock . . .



. . . and lock pin

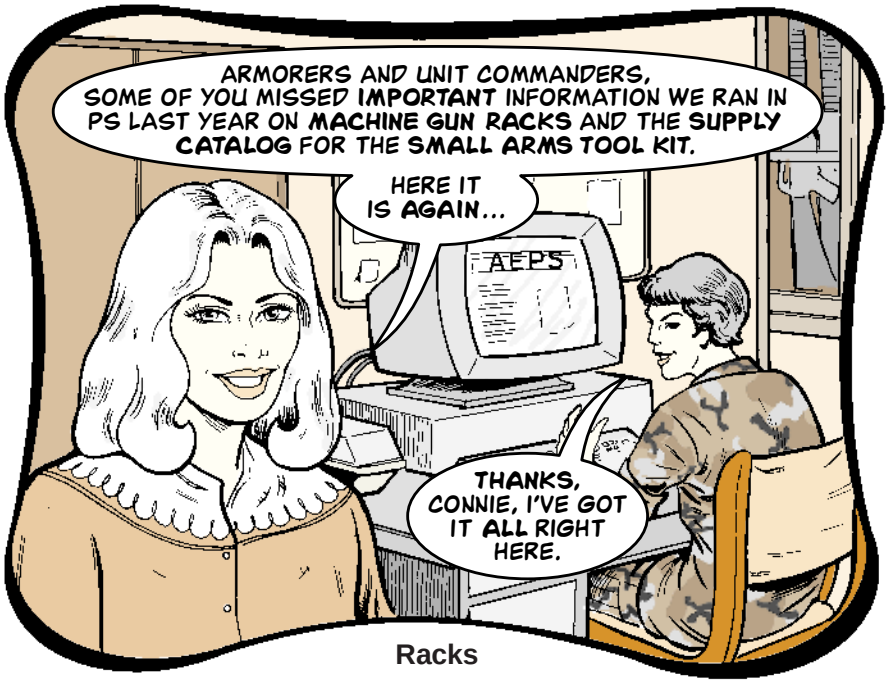
If the breech lock pin is cracked or its spring is broken or missing, your armorer needs to know.

No matter what shape the breech lock is in, it won't do your M2 any good if you install it wrong. Just remember that the beveled side should face forward toward the muzzle.



Beveled side faces toward muzzle

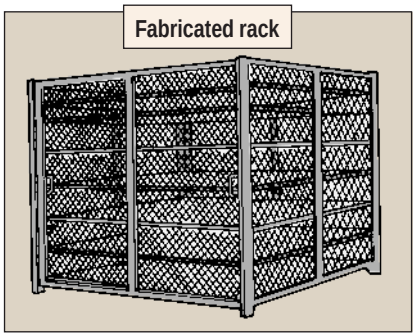
Gun Rack and Tool Kit Info



Racks

You don't need to write to TACOM-Rock Island to get plans for making a rack for your machine guns. The plans are on the Internet at the Army Electronics Product Support homepage at **http://aeps.ria.army.mil**. You must access the page from a military computer. If you don't have a password to access the page, you will have to apply for one.

After entering your password, click on *Commodity*, then *Individual and Crew-served Weapons*, then *Light machine Gun*, then *Modification Work Orders*, and finally, click on *Fabrication of Small Arms Rack*.


Fabricated rack

An all-purpose rack that holds the M2, MK 19, M240, M249, and M60 machine guns is also available with NSN 1095-01-454-6320. Order the M249's M13 rack with NSN 1095-01-197-7902, the M240 rack with NSN 1095-01-466-2065, and the MK 19's rack with NSN 1095-01-216-9295.

Small Arms Tool Kit

SC 5180-95-A07, which covers the small arms tool kit, NSN 5180-00-357-7770, was revised and included on EM 0074, the CD-ROM which includes most SCs.

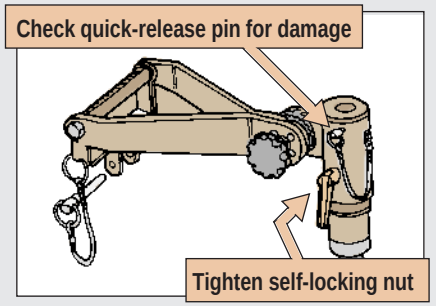
Your supply people should have a copy of EM 0074. They can print you a 30-page copy of the SC 5180-95-A07's hand receipt for inventorying the kit.

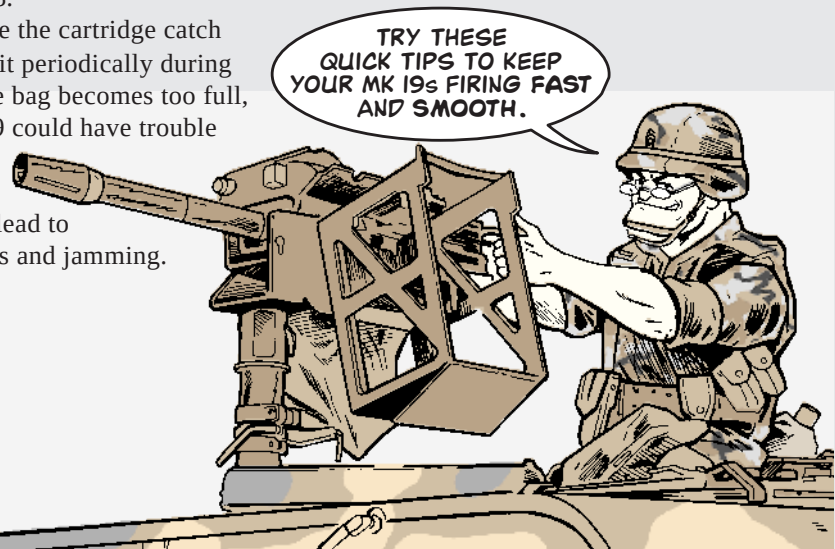
If your supply doesn't have it, your pubs people can order EM 0074 with IDN 212093 and PIN 075815.

MK 19 Machine Gun . . .

Pins, Nuts and Bags

- Armorers, tighten the self-locking nut that secures the mount cradle to the truck pintle. Units have reported that the nut doesn't always stay locked. If the nut works loose, so does the cradle.
- Gunners, eyeball the split end of the quick-release pin that locks in the mount to the universal pintle adapter. If the pin's end is bent or otherwise damaged, the pin can work out and the mount can work loose. So be sure to report a damaged pin. Your armorer can order a new pin with NSN 5315-01-447-2233.
- If you use the cartridge catch bag, empty it periodically during firing. If the bag becomes too full, your MK 19 could have trouble ejecting rounds. That could lead to stuck rounds and jamming.





Foxy PM

Your Fox won't be too foxy about detecting chemical threats if you forget these basic PM rules.

MM1

When you power up the MM1 spectrometer, wait for it to finish warming up and self-testing before you start operating. If you don't, any readings you get from the MM1 may be false. It takes at least 10 minutes for the MM1 to warm up.

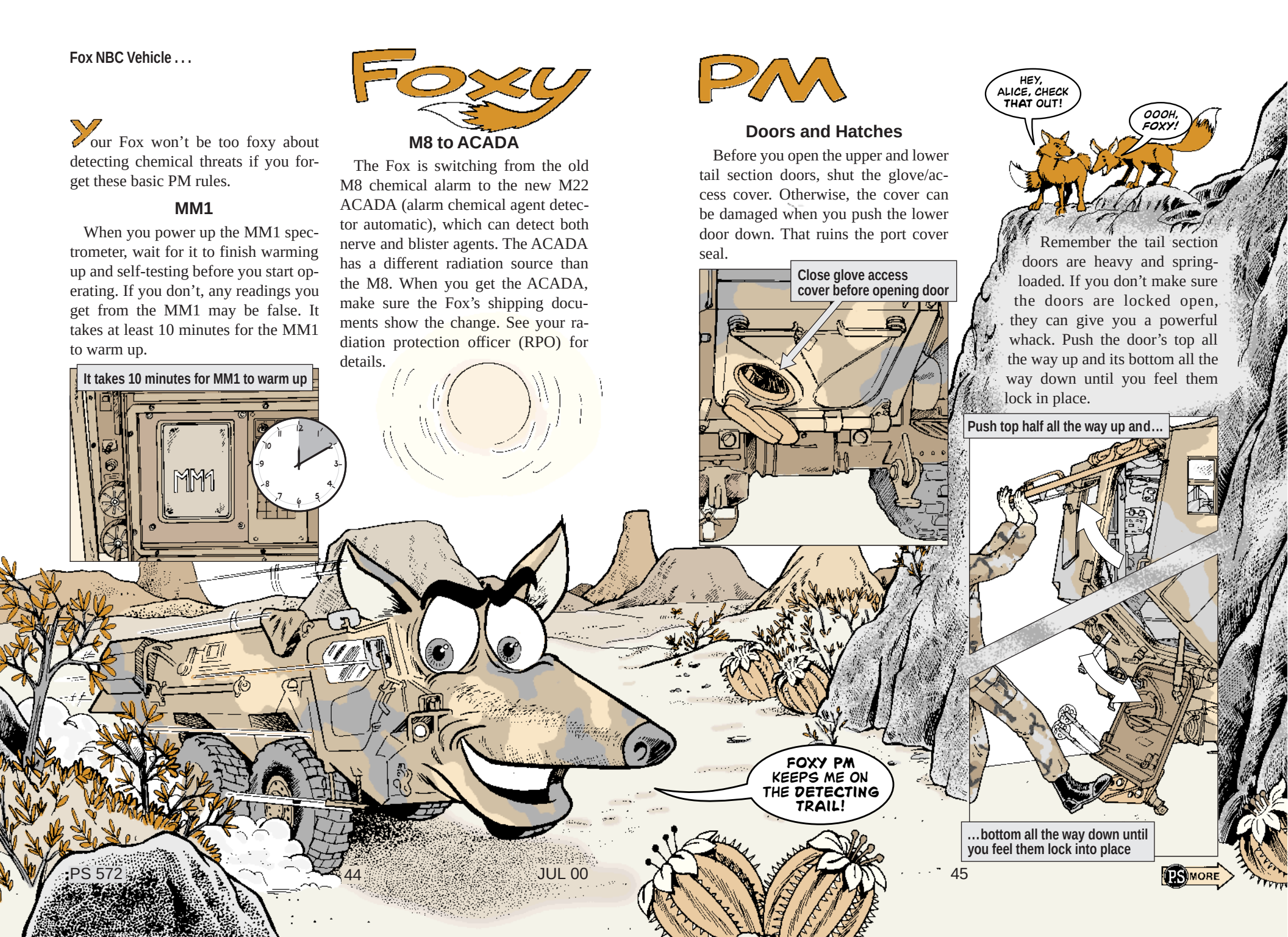
M8 to ACADA

The Fox is switching from the old M8 chemical alarm to the new M22 ACADA (alarm chemical agent detector automatic), which can detect both nerve and blister agents. The ACADA has a different radiation source than the M8. When you get the ACADA, make sure the Fox's shipping documents show the change. See your radiation protection officer (RPO) for details.

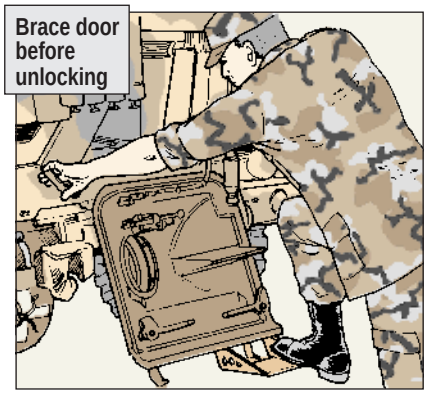
Doors and Hatches

Before you open the upper and lower tail section doors, shut the glove/access cover. Otherwise, the cover can be damaged when you push the lower door down. That ruins the port cover seal.

Remember the tail section doors are heavy and spring-loaded. If you don't make sure the doors are locked open, they can give you a powerful whack. Push the door's top all the way up and its bottom all the way down until you feel them lock in place.

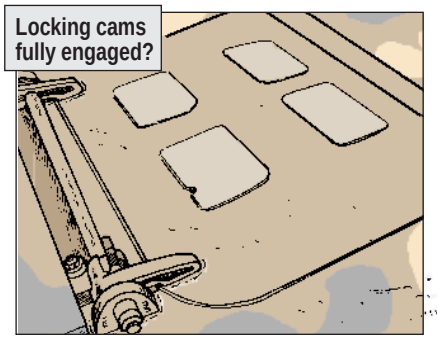


When closing the lower door, brace it with your foot before unlocking it. That keeps it from flying up.

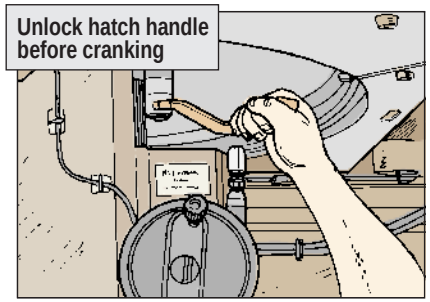

Brace door before unlocking

To lock the two top hatches, push the locking handles **all** the way to the closed position while pulling down on the latch. If you don't, the hatches aren't locked shut and they will leak.

When opening the top deck hatches, ensure the handles are fully opened and the locking cams are fully engaged. If the handles aren't in the fully opened position, you could damage the hatch and injure crew members.

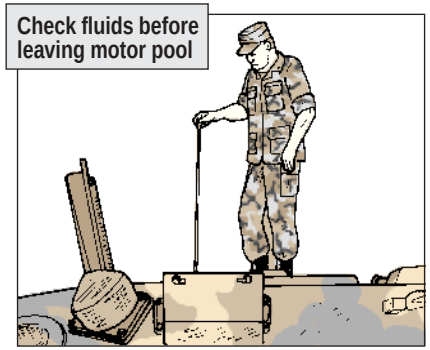

Locking cams fully engaged?

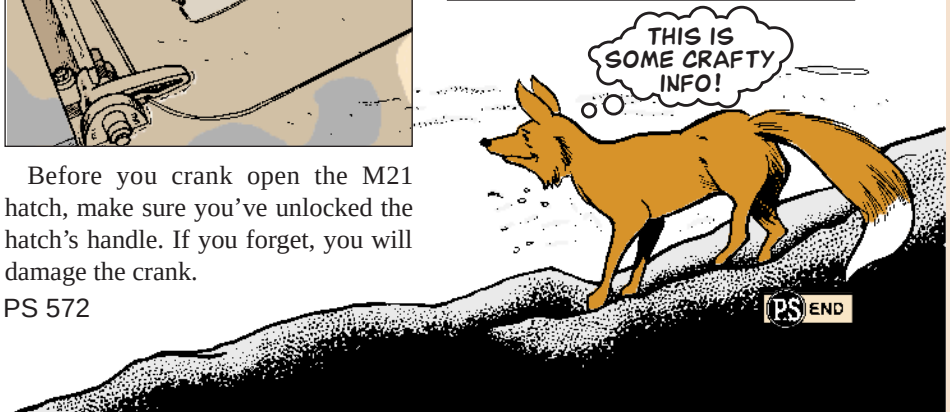
Before you crank open the M21 hatch, make sure you've unlocked the hatch's handle. If you forget, you will damage the crank.


Unlock hatch handle before cranking

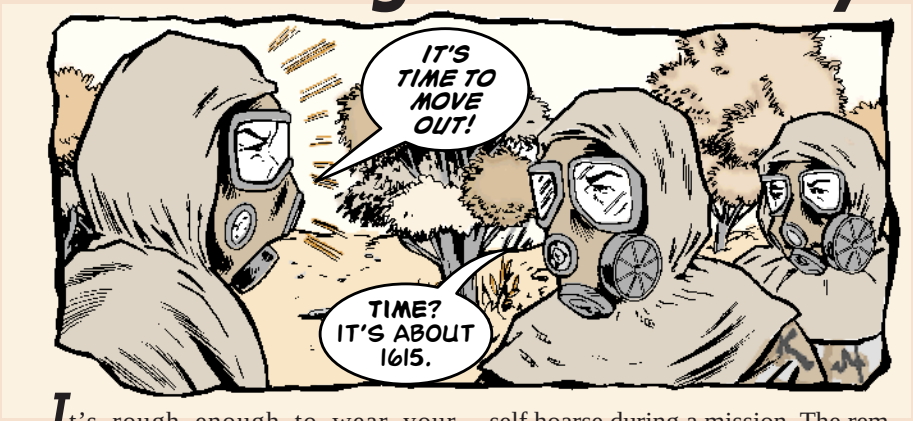
PMCS

Hydraulic and transmission fluid and radiator coolant checks are part of after-operation PMCS. But if your Fox has been sitting for weeks, fluids could have leaked. Check the ground underneath the drain valve for the engine and transfer case compartment for signs of lube or coolant leakage. Report any leakage to your mechanic so he can check it out, then check your fluid levels before you leave the motor pool.


Check fluids before leaving motor pool

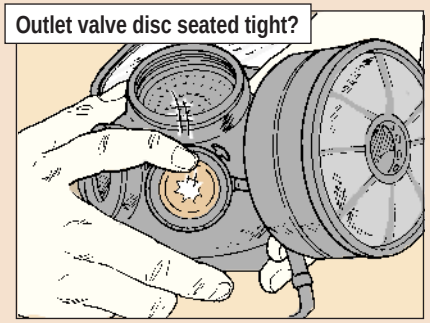


Breathing Comfortably



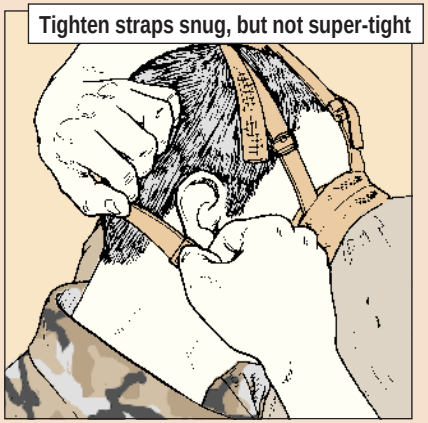
It's rough enough to wear your M40/M42 mask for long periods. You don't want to make it rougher than it has to be.

So pay attention to the outlet valve disc. Unless it's seated properly, you'll be breathing in and out of the outlet valve. You'll have no protection against real or simulated chemical agents. As part of your before-operation PMCS, make sure the disc is seated tight in the outlet valve.

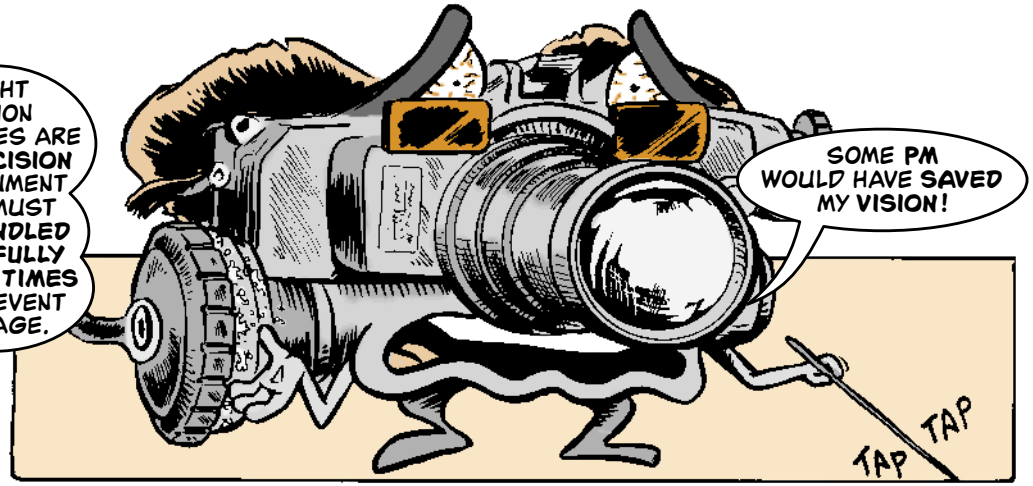

Outlet valve disc seated tight?

It's tough to make yourself heard with your mask on, so if you're a squad leader or higher, you can shout yourself hoarse during a mission. The remedy is the M7 amplifier, NSN 5996-01-381-9012. It greatly amplifies your voice and makes shouting unnecessary. The M7 is part of the AAL for the M40A1/M42A2 masks.

Your mask doesn't have to be skin-tight to protect you. In fact, if the straps are too tight, you'll develop a terrific headache. After you put on the mask, pull the harness cheek straps snug, but don't muscle them tight.

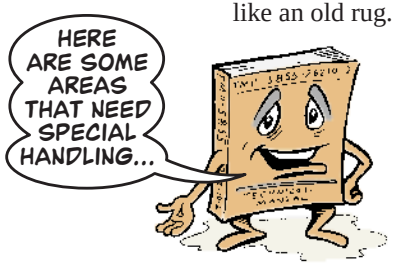

Tighten straps snug, but not super-tight

Night Vision Device Advice



That's the word in TM 11-5855-262-10-2, the operator's manual for the AN/PVS-7B night vision goggles.

It seems like pretty clear advice. But something is getting lost in the translation. Those -7's are taking a beating like an old rug.

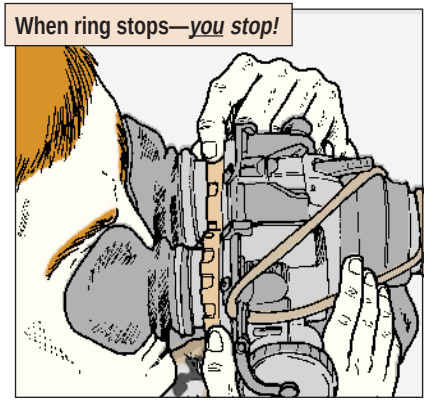


Diopter Ring

The diopter adjustment ring lets your eyes focus even if you normally wear glasses. That ring adjusts for the sharpest image possible in a range of +2 to –6 diopters.

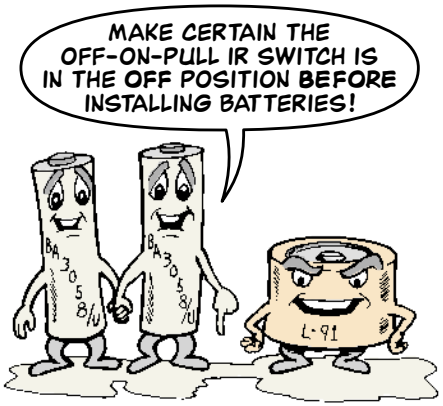
But some of you want more. You keep adjusting when there is no place to adjust to! It's not long until the ring cracks and breaks. So here is the rule: when the ring stops turning, stop turning it! It's not going to get any better than +2 to –6.

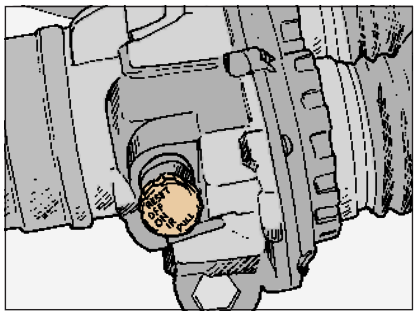
When ring stops—*you stop!*



Batteries

You can use only two types of batteries in the NVG. Two AAs will work (BA-3058/U, alkaline, NSN 6135-00-985-7845). Or one lithium, L-91, NSN 6135-01-333-6101, will work. Nothing else works, so don't try.

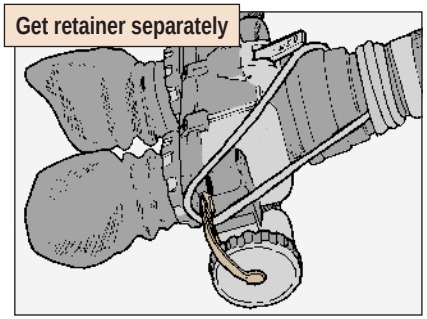




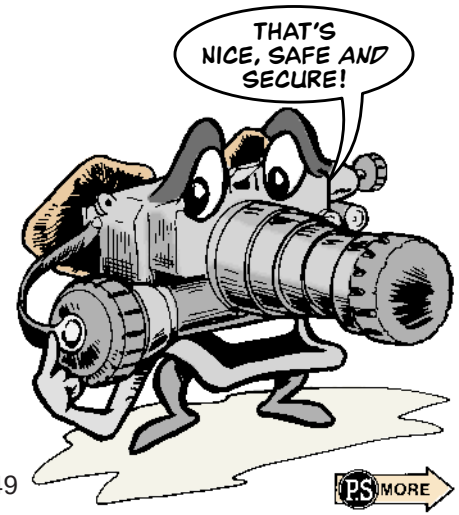
Remove the batteries before the goggles are stored. Batteries will leak in their compartments if stored in the goggles.

You no longer have to buy the battery cap assembly in order to replace the battery cap retainer. You can get the retainer separately with NSN 5935-01-448-6355.

Get retainer separately



You can also get just the cap with NSN 5855-01-246-8265 and just the packing for the cap with NSN 5330-00-729-4992.

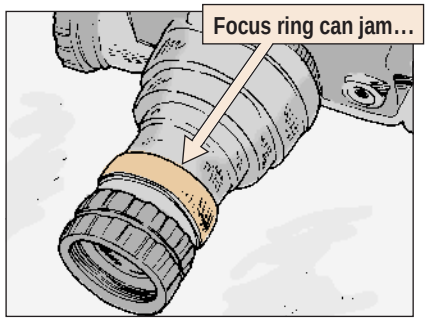


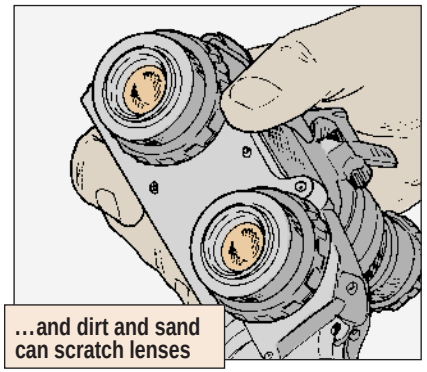
P.S. MORE

Cleaning

The goggles must be protected against dirt, dust, fingerprints and excessive moisture.

Dirt and sand can cause the carriage to stick, jam the focus rings and scratch the lens. Careful and prompt cleaning will save you heartache later.





Start by sliding the carriage forward as far as you can. Then brush the slide bars with lens brush, NSN 7920-00-205-0565.

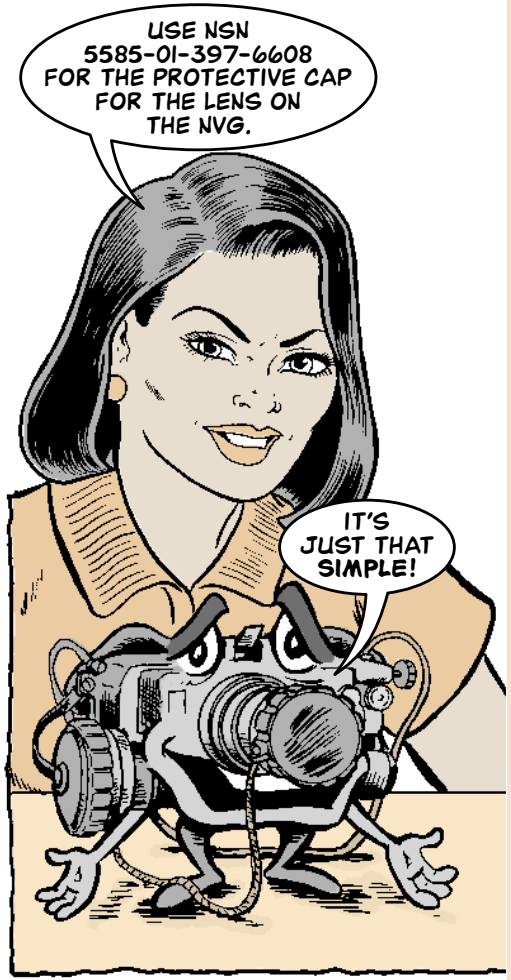
Turn the focus rings until the objective and eyepiece lens assemblies are completely extended. Using the brush, sweep the exposed plastic clean.

Brush dirt and dust off the lenses, then clean them with lens tissue, NSN 6640-00-459-4239, and distilled water.

If you're working in a dusty or sandy environment, attach the sacrificial window, NSN 5855-01-246-8271, to protect the objective lens from scratches or other damage.

Three Important NSNs

Use NSN 5855-01-441-0401 or 5855-01-421-7691 to get the universal mount that holds your night vision goggles on your Kevlar helmet.



END

How to Get ID Plates

Need an identification or name plate for your communications equipment or generator? Tell your support that SB-11-631, Identification Plates and Name Plates for Communications Equipment, has most of the ordering details.

RADIO SET, AN/PRC-112
PART NO. 01-P21261J001
NSN: 5820-01-279-5450

MFR: 94990 SER. NO. 19232 A
CONTRACT: DAAB07-90-C-H025
US

Your support will need some info from you about the plates you need. They'll need the:

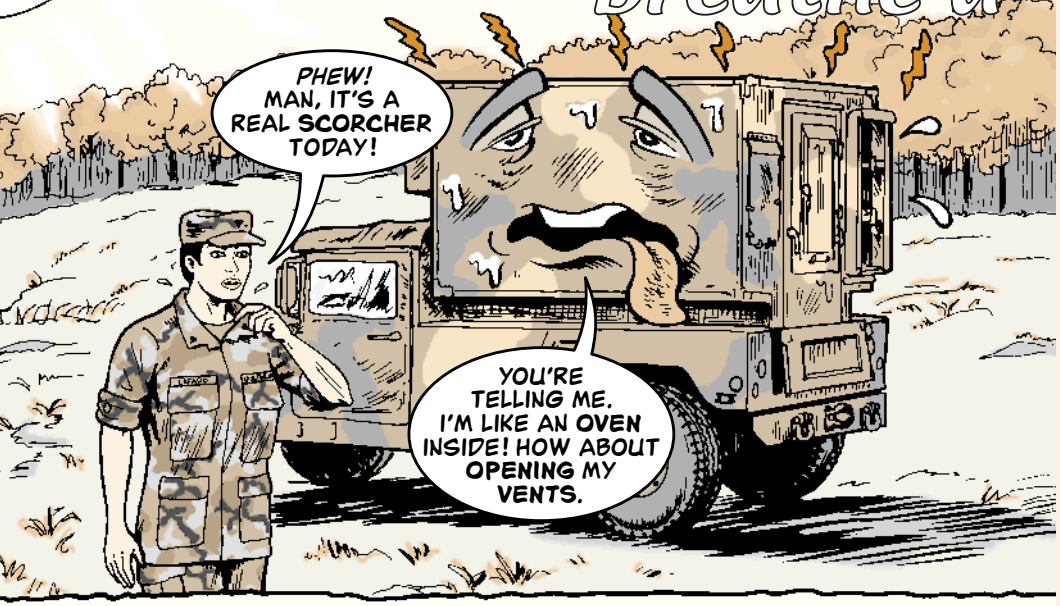
- Number of plates needed and their dimensions.
- Type of equipment or component by type number or nomenclature.
- Manufacturer name and location (if known).
- Contract procurement number.
- Equipment or component serial number and NSN.

They'll send that info and a fund cite on a DD Form 448 to:

Commander
US Army Communications-Electronics Command (CECOM)
ATTN: AMSEL-LC-LEO-P-MM-ER
Bldg 1202E, 2nd floor
Fort Monmouth, NJ 07703-5006

Annotate the form with "for fabrication" and your support's address and phone number. Once the plates arrive, your support will have to fill in any blank designations by hand or machine.

Breathe a Little Easier



"You're suffocating me!"

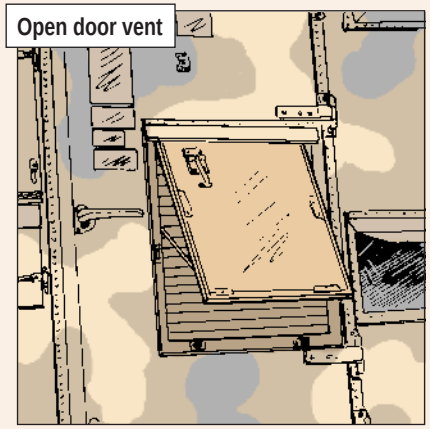
That's what your AN/TRC-190 line-of- sight (LOS) multichannel radio terminal and your AN/TRC-191 radio access unit (RAU) would tell you if they could talk.

The LOS radio terminal and the RAU need that cooling airflow inside the shelter to prevent temperatures from climbing and equipment from overheating.

Here's how to make sure your shelters breathe a little easier if you don't have air conditioning or if it's not up and running:

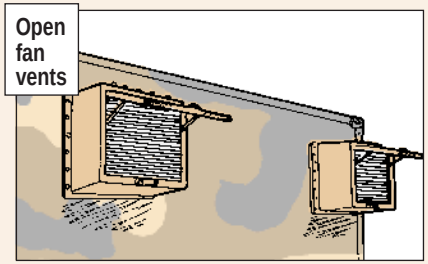
Door Vent

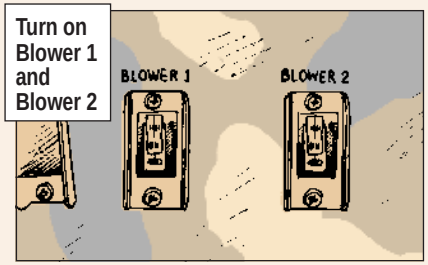
Hold down the heat by opening the vent cover in the shelter door to let in fresh air. Open the cover wider in the hot season.


Open door vent

Fan Vents

Likewise, open the fan vent covers at the front of the shelter. Set BLOWER 1 and BLOWER 2 circuit breakers to ON to get the ventilation fans working.


Open fan vents



Turn on Blower 1 and Blower 2

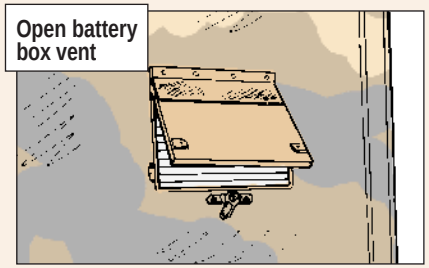
The fans not only draw warm air out of the shelter, they also help get rid of dust.

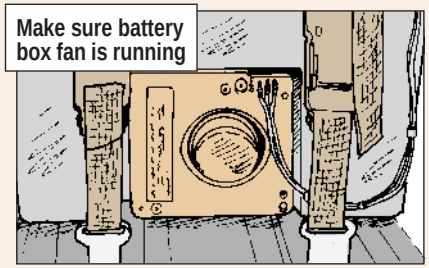
Never pile gear in front of the fans. That blocks the airflow.

Inspect the door and fan vent filters for dirt, bugs and debris. Clogged filters block airflow. Remove filters and rinse them in clean water. Let them air dry.

Battery Box Vent

Make sure you open the exhaust vent for the lead-acid battery box. Also make sure the battery box fan is running. If it's not, report it. The exhaust vent and the fan work together to draw fumes away from the batteries to the outside of the shelter. Trapped inside, those fumes need only a spark to ignite.


Open battery box vent

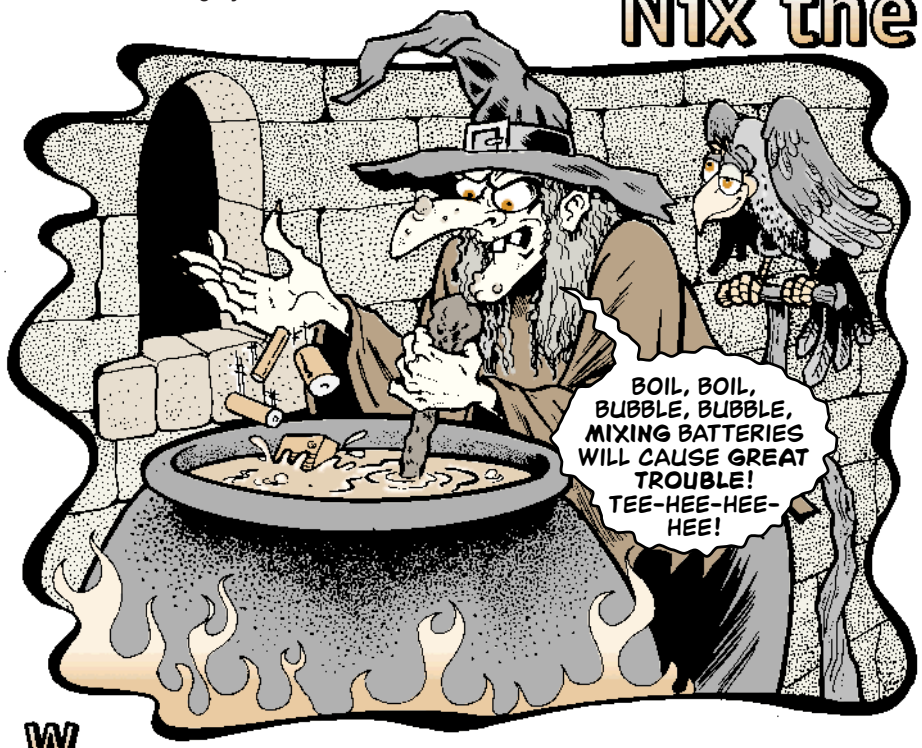

Make sure battery box fan is running

New ASIP SINCGARS Items

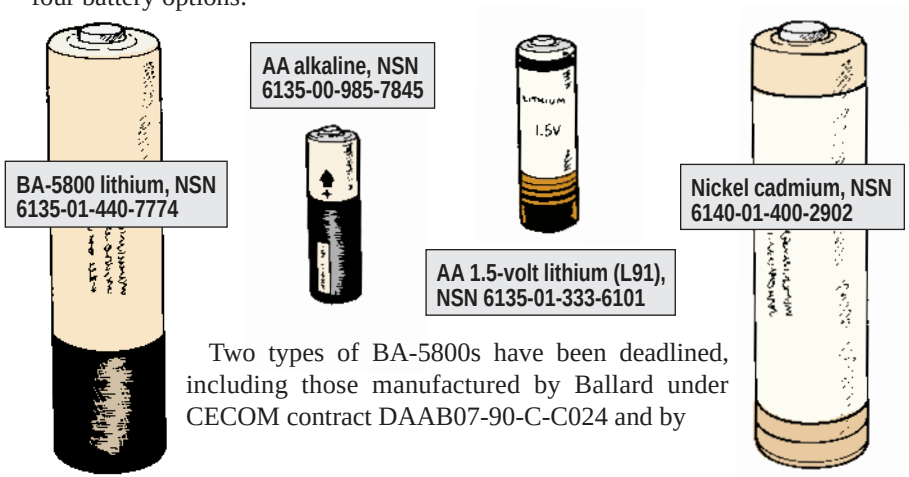
Don't carry your advanced system improvement program (ASIP) SINCGARS RT-1523 E(C)/U by its antenna. Instead, use the new carrying strap, NSN 5340-01-461-4741. Guide rails, NSN 5975-01-467-4678, ease installation of the RT into its case and stop rattles. Radio stand base, NSN 5340-01-463-9002, holds an RT-1523 E(C)/U upright.

Want one or all three items? CECOM is putting these additional authorized items into the new ASIP radio's parts manual, TM 11-5820-890-30P-3.

Nix the Battery Mix



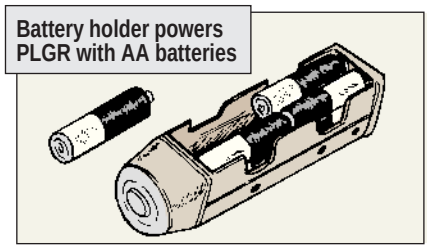
When it comes to powering your AN/PSN-11 precision lightweight global positioning system receiver (PLGR) for handheld operations, you have four battery options:



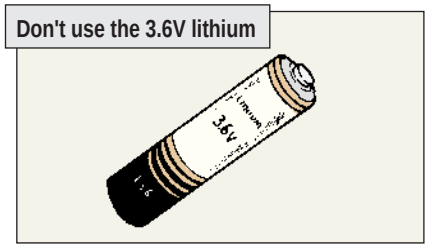
Two types of BA-5800s have been deadlined, including those manufactured by Ballard under CECOM contract DAAB07-90-C-C024 and by Crompton Eternacell under contract DAAB07-91-C-R104. See CECOM ground precautionary message (GPM) 99-002 and safety-of-use message (SOUM) 98-001 for details. Your CECOM LAR or safety office should have copies.

Some of you are taking a fifth option and it's one you really don't have. You're mixing AA alkaline and AA lithium batteries in the battery holder. Don't do that!

The battery holder, NSN 6160-01-385-4358, lets you power your PLGR with eight AA batteries. It's easy to mix together a few alkaline and a few lithium. But don't do it. Because the lithiums last longer than the alkaline, the mix could lead to leaking or ruptured batteries, possibly damaging the PLGR and causing injuries.


Battery holder powers PLGR with AA batteries

You should also never use the 3.6-volt AA lithium memory battery, NSN 6135-01-301-8776, in the AA battery holder. It's only for use in the memory battery compartment. If you try to use it to power the PLGR, you'll damage the set!



Don't use the 3.6V lithium

Check your PLGRs. If you're using AAs to power them, make sure they are **all** 1.5-volt lithium (L91) or **all** alkaline batteries and never a mix.

A Better Antifreeze

If your generator TM calls for ethylene-glycol antifreeze, MIL-A-46153 or MIL-A-11755, there is now an environmentally safer substitute you can use.

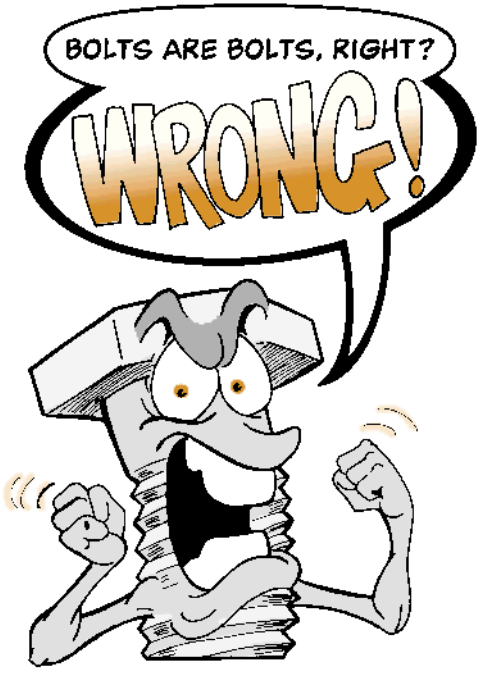
The new antifreeze is propylene-glycol, A-A-52624.

Order a 5-gal can with NSN 6850-01-441-3257 and a 55-gal drum with NSN 6850-01-383-3918.

Don't be confused by these NSNs: 6850-01-441-3234; 6850-01-441-3240; 6850-01-441-3248; 6850-01-441-3218; 6850-01-441-3221; and 6850-01-441-3223.

These NSNs are for ethylene-glycol versions and not the environmentally safer propylene-glycol. But **all** are covered under the same new standard, A-A-252624.

Size Up All Bolts



There are tough, strong bolts, light-duty bolts and all sorts of bolts in between. Make sure you're using the right one for the job at hand.

Next time you find an empty bolt hole, resist the temptation to fill it with the first right-size bolt you find.

Despite their simple appearance, bolts are really precision instruments. Their job is as critical as any other in the operation of a piece of equipment.

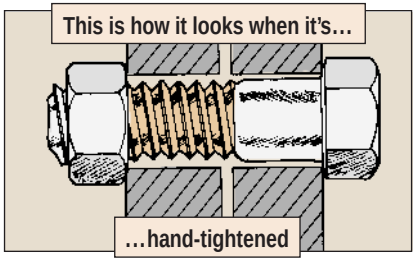
When you use a substitute, you put your equipment and your buddies in danger. That substitute bolt can snap at any time.

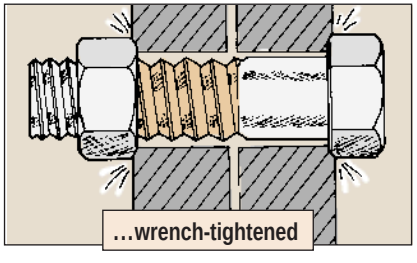
What's a Bolt?

In terms of mechanical advantage, a bolt is an inclined plane. With the added advantage of a lever—like a wrench—a bolt can generate tremendous pressure.

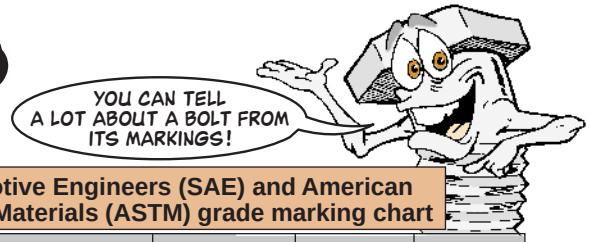
A bolt does its job by stretching, just like a spring or rubber band. Here's how:

The tension generated by the bolt when it's tightened keeps the nut on and the connection together. The same thing happens when you screw a machine bolt into matching threads.





The extra leverage you can get from a wrench is fantastic. By turning and turning, you can stretch a bolt completely out of shape, snap off the head, strip threads, crack the nut, destroy washers—not to mention damaging what the bolt holds together.



Society of Automotive Engineers (SAE) and American Society for Testing Materials (ASTM) grade marking chart

GRADE MARKING	SPECIFICATION	MATERIAL	BOLT & SCREW SIZE (in)	PROOF LOAD (psi)*	TENSILE STRENGTH (min. psi)
NO MARK	SAE-Grade 1	Low carbon steel	1/4 – 1 1/2	33,000	60,000
	ASTM-A 307		1/4 – 4	—	60,000
	SAE-Grade 2	Low carbon steel	1/4 – 3/4 over 3/4 – 1 1/2	55,000 33,000	74,000 60,000
	SAE-Grade 5	Medium carbon steel, quenched and tempered	1/4 – 1 over 1 – 1 1/2	85,000 74,000	120,000 105,000
	ASTM-A 449		1/4 – 1 over 1 – 1 1/2 over 1 1/2 – 3	85,000 74,000 55,000	120,000 105,000 90,000
	SAE-Grade 5.1	Medium carbon steel, quenched and tempered w/assembled lock washer	No. 6 – 3/8	85,000	120,000
	SAE-Grade 5.2	Low carbon Martensite steel, quenched and tempered	1/4 – 1	85,000	120,000
	ASTM-A325 Type 1	Medium carbon steel, quenched and tempered	1/2 – 1 1 1/8 – 1 1/2	85,000 74,000	120,000 105,000
	ASTM-A325 Type 2	Low carbon Martensite steel, quenched and tempered	1/2 – 1	85,000	120,000
	ASTM-A325 Type 3	Atmospheric corrosion resisting steel, quenched and tempered	1/2 – 1 1 1/8 – 1 1/2	85,000 74,000	120,000 105,000
	ASTM-A 354 Grade BB	Alloy steel, quenched and tempered	1/4 – 2 1/2 2 3/4 – 4	80,000 75,000	105,000 100,000
	ASTM-A 354 Grade BC	Alloy steel, quenched and tempered	1/4 – 2 1/2 2 3/4 – 4	105,000 95,000	125,000 115,000
	SAE-Grade 7	Medium carbon alloy steel, quenched and tempered, roll threaded after heat treatment	1/4 – 1 1/2	105,000	133,000
	SAE-Grade 8 ASTM-A 354 Grade BD	Medium carbon alloy steel, quenched and tempered Alloy steel, quenched and tempered	1/4 – 1 1/2	120,000	150,000
	SAE-Grade 8.2	Low carbon Martensite steel, quenched and tempered	1/4 – 1	120,000	150,000
	ASTM-A 490	Alloy steel, quenched and tempered	1/2 – 1 1/2	120,000	150,000 min 170,000 max

* *Proof Load is the measure of load that can be applied without causing permanent set.*

Bolts Torque to You

To get the best from any bolt, you've got to use the right torque. The torque called out in the TM isn't somebody's best guess, it's the value built into the bolt.

PS MORE

The right torque depends on what the bolt is made of and how it's made.

Typical Torque Values

DIAMETER/ THREADS PER INCH	TORQUE LB-FT NO DASHES (GRADE 2)	TORQUE LB-FT 3 DASHES (GRADE 5)	TORQUE LB-FT 6 DASHES (GRADE 8)
1/4-20	3—5	6—8	10—12
1/4-28	4—6	8—10	9—14
5/16-18	7—11	13—17	19—24
5/16-24	7—11	14—19	23—28
3/8-16	14—18	26—31	39—44
3/8-24	15—19	30—35	46—51
7/16-14	23—28	44—49	65—70
7/16-20	23—28	44—54	69—79
1/2-13	32—37	65—75	95—105
1/2-20	34—41	73—83	113—123
9/16-12	46—56	100—110	145—155
9/16-18	47—57	107—117	165—175
5/8-11	62—72	140—150	200—210
5/8-18	67—77	153—163	235—245
3/4-10	106—116	260—270	365—375
3/4-16	115—125	268—278	417—427
7/8-9	165—175	385—395	595—605
7/8-14	178—188	424—434	663—673
1-8	251—261	580—590	900—910
1-14	255—265	585—634	943—993
1 1/4-7	451—461	1070—1120	1767—1817
1 1/4-12	488—498	1211—1261	1963—2013
1 1/2-6	727—737	1899—1949	3111—3161
1 1/2-12	816—826	2144—2194	3506—3556

The first bolt of each diameter is Unified Coarse…

… the second is Unified Fine.

Use this chart only if your TM gives no torque values.

If you torque a bolt beyond its built-in limits (and it doesn't break), it stretches so far it can't snap back. You won't know it's sprung, so you keep on torquing.

Even if you get the torque reading you're looking for, it's wrong. The first bit of stress, and the bolt will snap or the nut will back off.

It's a sure bet what you've joined together will come apart sooner or later.

Wet or Dry Torque?

Some 90 percent of the torque you apply goes to overcome friction. Only 10 percent goes to tighten.

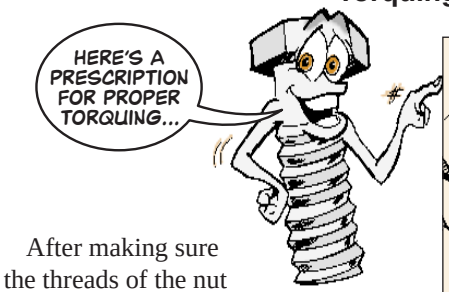
When you use a lube, you reduce friction. That means the same amount of torque will create more tightening force, probably too much.

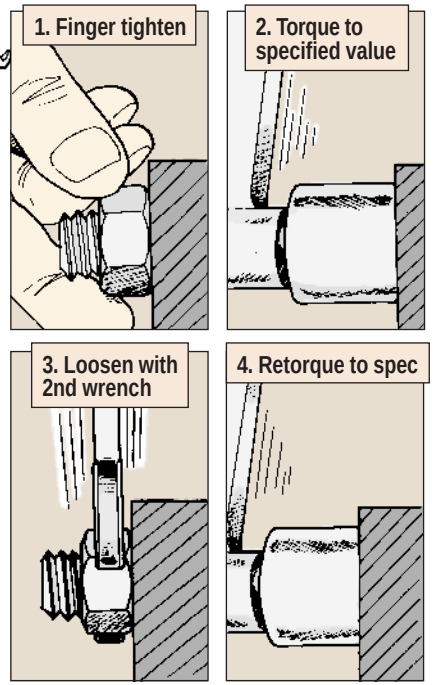
On the other hand, using a wet value on a dry bolt will not get the right amount

of clamping force.

If you use lube, make sure you use the wet torque value in your TM, not the dry one.

Torquing Tips





After making sure the threads of the nut and bolt are clean, do the following:

1. Run the nut up by hand until it begins to tighten.

2. Torque the nut to the specified value in one steady, continuous motion.

3. Loosen the fastener with another wrench. (Never use a torque wrench to loosen a fastener.) Loosening cleans the threads of burrs and dirt and lets the mating surfaces seat and align with each other.

4. Torque to specs.

Use the Right Washer

Always use the washer called for in your manuals, too. It must be able to stand up to the torque without thinning out. A soft washer will lose its shape under load, leaving the bolt loose enough to fail.

Once Is Enough

You won't get the same clamping force with the same amount of torque on a nut or bolt that's been used a number of times.

Increased friction because of deformed threads takes more and more of the torquing effort, meaning you get less and less holding force.

As an example, a new bolt might have a tension load of 13,250 pounds with 170 lb-ft of torque. The sixth time the nut is installed, the 170 lb-ft of torque produces only 7,500 pounds of load, a loss of 43.5 percent.

If your TM calls for new fasteners, use them. Otherwise, you're asking for trouble.

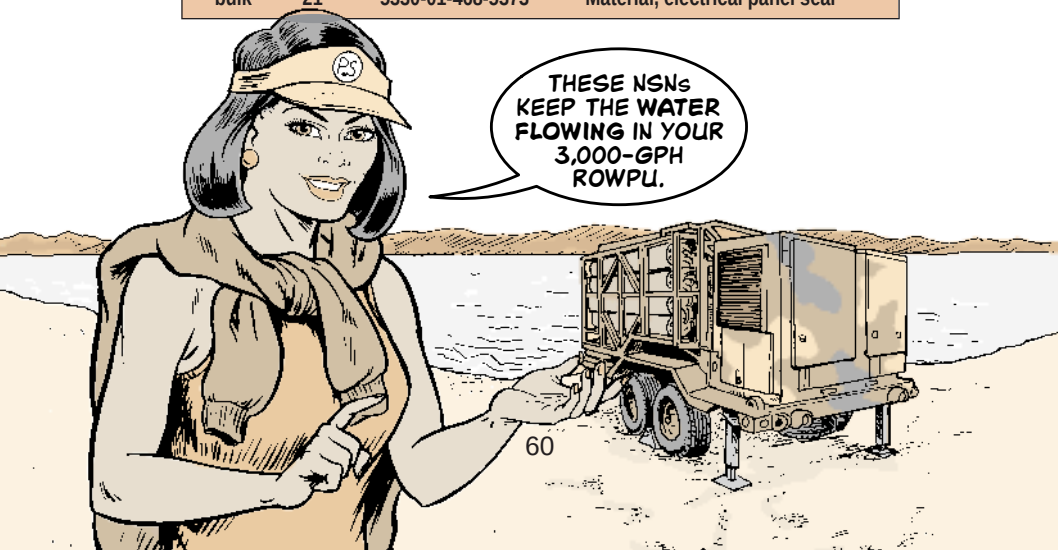
Reverse Osmosis Water Purification Unit . . .

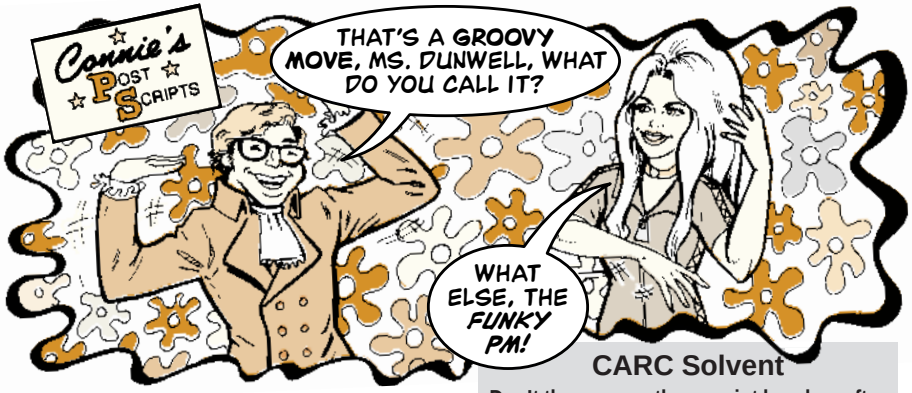
Repair Parts Update

Mechanics, some of the repair parts for the 3,000-GPH trailer-mounted ROWPU are hard to find. Either the old part is no longer available or the parts info in TM 10-4610-232-24P has changed.

Make a note of these changes to the TM until it can be updated.

Figure	Item	NSN	Name
41	3	5340-01-468-4943	Bracket, raw pump cannon plug
43	2	2540-01-468-5020	Latch, electrical panel door
67	96	5330-01-467-1605	Gasket, retainer in booster pump discharge assembly
69	13	4730-01-467-1526	Clamp, product water out
72	1	5340-01-468-4937	Clamp, basket retainer
80	4	4810-01-467-1589	Valve assembly, solenoid
81	4	4810-01-467-1591	Valve assembly, solenoid
83	17	5999-01-467-1685	Level switch
83	18	5999-01-467-1676	Level switch
83	19	5999-01-467-1683	Level switch
84	9	4730-01-467-1501	Clamp, multimedia tank
90	6	4810-01-467-1583	Valve assembly, solenoid
116	4	4730-01-468-5339	Elbow, waste out (Aqua Chemical models only)
bulk	21	5330-01-468-5373	Material, electrical panel seal





HEMTT Slobber Kit

It's no secret that HEMTT engines slobber. You can clean up that unburned fuel and oily mess by getting your support unit to install an airbox drain parts kit (slobber tube), NSN 2815-01-210-0374. It's the same kit used on the M911 HET. Forget the kit if your HEMTT is under warranty. The kit voids the warranty.

Battery for AN/PRC-90

The BA-1568 mercury battery, NSN 6135-01-838-0706, for your AN/PRC-90 radio is no longer available, even though the FED LOG AMDF says it is. Power your radio instead with a BA-5368 lithium battery, NSN 6135-01-455-7947.

Replace Ice Chest Gaskets

To get door seal gasket material for your 200-lb and 400-lb ice chests, order NSN 5330-01-395-3652 by the foot. That NSN replaces the one we gave you in PS 522, which contains asbestos and is NOT suitable for food service use. Replace the gasket by removing the screws on the fastening metal strip and then putting on the new material. Use no adhesive.

CARC Solvent

Don't throw away those paint brushes after spot painting with CARC. Get a gallon of urethane paint thinner with NSN 8010-00-181-8080 and clean those brushes for use next time. Just make sure you clean the brushes quickly, before the CARC has a chance to harden.

Camo Pattern for FMTV

Get the camouflage painting pattern for any FMTV model by writing to:

Commander
Belvoir Research, Development and Engineering Center
ATTN: STRBE-JDA
Ft Belvoir, VA 22060-5606

Provide the NSN, nomenclature, model number, standard study number (if known) and line item number (if known) for each model you want to paint. Drawings are also available on the FMTV website:
www.tacom.army.mil/gcss/pm_mtv/

MEL for Generators, Etc.

Looking for the maintenance expenditure limits (MEL) for your generators? Have your pubs clerk order TB 43-0002-32. In addition to generators, it also covers transformers, converters and illumination systems.

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

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