

PS**THE
PREVENTIVE
MAINTENANCE
MONTHLY****ISSUE 712 MARCH 2012**

TB 43-PS-712, The Preventive Maintenance Monthly, is an official publication of the Department of the Army, providing information for all Soldiers assigned to combat and combat support units and all Soldiers with unit maintenance and supply duties. All information published has been reviewed and approved by the agency responsible for the equipment, publication or policy discussed. Application of the information is optional with the user. Masculine pronouns may refer to both genders. The use of product or company names does not constitute endorsement of those products, services or companies by the U.S. Army. The use of non-DoD hyperlinks, along with their content, does not constitute endorsement by DoD or DA. Neither DoD nor DA exercises any editorial control over, and cannot vouch for, content on non-DoD websites.

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

Just write to:

MSG Half-Mast

PS, the Preventive Maintenance Monthly

USAMC LOGSA (AMXLS-GP)

5307 Sparkman Circle

Redstone Arsenal, AL 35898

Or email to:

logsa.psmag@conus.army.mil or

half.mast@us.army.mil

Internet address:

<https://www.logsa.army.mil/psmag/pshome.cfm>

By order of the Secretary of the Army:

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MONTHLY**

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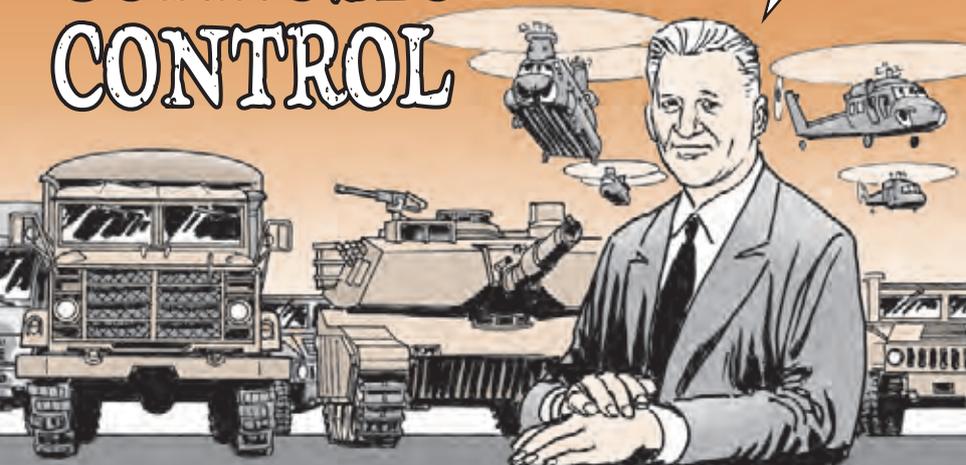
**CORROSION IS THE
SOLDIER'S CONSTANT
ENEMY! BUT...
IT IS A FOE YOU
CAN CONTROL!**

CORROSION

**CORROSION CONTROL
AND PREVENTION,
SPECIAL ISSUE**

CONFIDENT CORROSION CONTROL

CORROSION CONTROL AND PREVENTION IS A RESPONSIBILITY SHARED BY ALL SOLDIERS AND DA CIVILIANS.



The Army reinvigorated its efforts to control and prevent corrosion in its equipment just over two years ago. High operational tempos, environmental conditions, and inadequate shipment preparations have resulted in huge losses due to corrosion.

Corrosion control and prevention reduces equipment loss, major repairs and downtime, and increases the power and effectiveness of deployed forces.

Losses due to corrosion are largely due to lapses in preventive maintenance that could have found and treated corrosion before major damage occurred.

The key factor that will truly control and prevent corrosion is the singular Soldier or DA civilian who operates or maintains Army equipment.

This issue of PS Magazine is dedicated to renewing our efforts to improve readiness and decrease the costs of corrosion. I ask you to join with me in this task.

Wimpy D. Pybus
Deputy Assistant Secretary of the Army,
Acquisition Policy and Logistics
Corrosion Control and Prevention Executive

Click here for a copy of this article to save or email.

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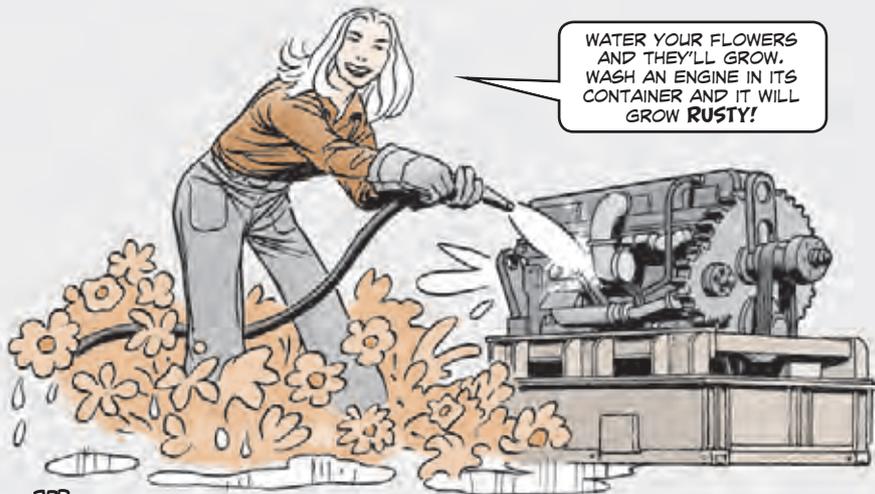
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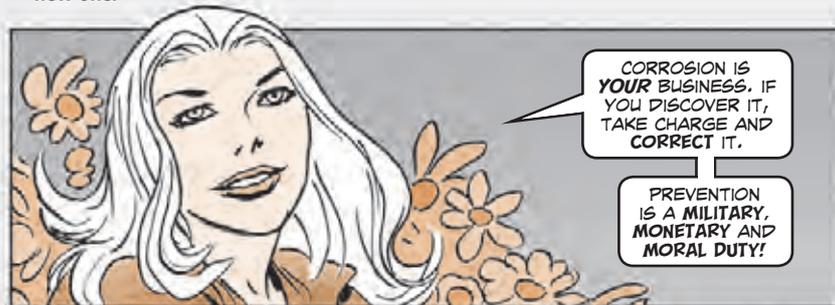
CONTAINERS: FRIEND OR FOE?



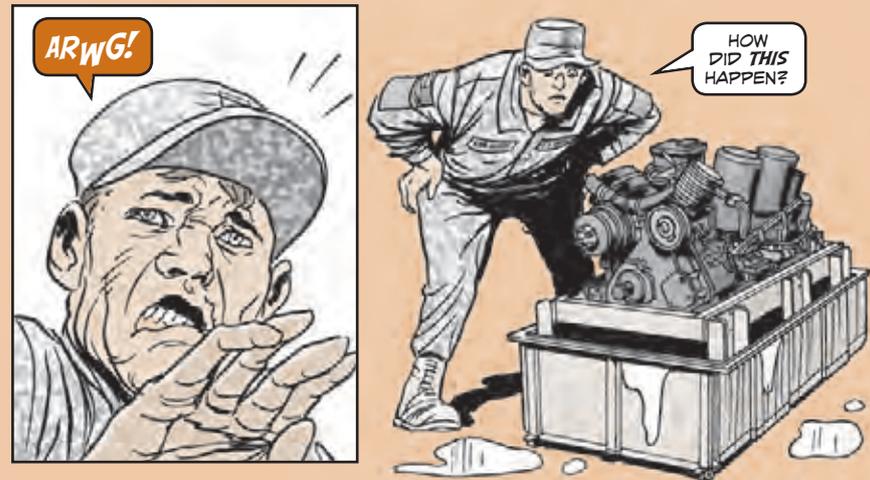
Whether you're deploying or redeploying, the elements of corrosion will make your containers cages of corruption if you give them room.

Containers are meant to protect your equipment wherever you're shipping it. Here's what you can do to control corrosion during those long-distance treks:

- Don't power spray equipment while it's in its shipping container! Moisture that is trapped in a container designed to keep it out will make a rust heap out of your equipment.
- Shipping container gaskets need PM, too! If they are broken, corroded or just worn out, they can't do their job. Replace or repair them. Inspect them every time you inspect the container or its contents.
- Check the humidity sensors on the containers! Is humidity controlled or running amok?
- Learn what corrosion looks like! Check out Pages 27-34 in this book. Find corrosion, remove it, coat and lube the equipment per the TM and fix the container or get a new one.



DON'T CUT ITS LIFE SHORT!



PRIVATE, YOU'RE FACED WITH ONE OF THE UGLIEST REMINDERS THAT PREVENTIVE MAINTENANCE HAS FAILED.

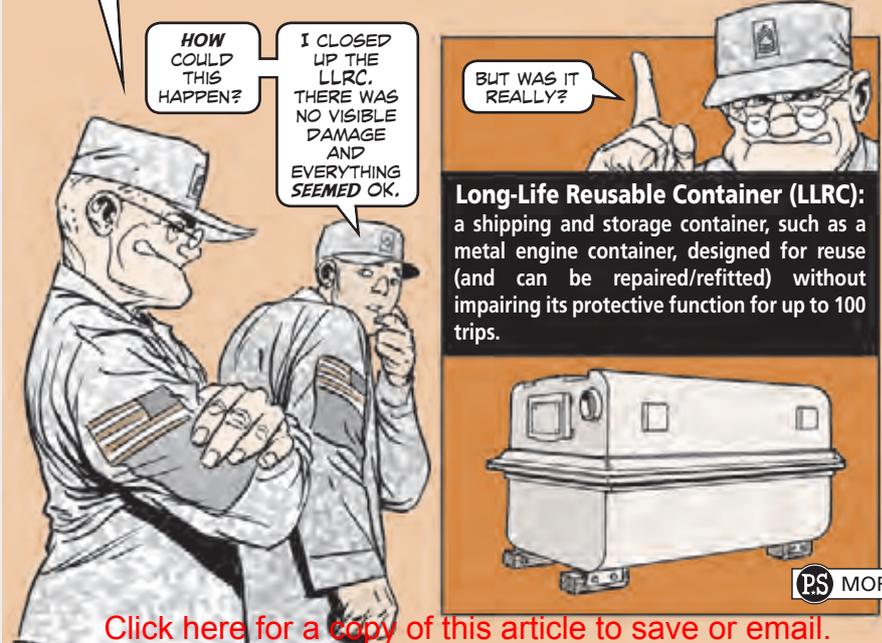
INSIDE THE LONG-LIFE REUSABLE CONTAINER (LLRC) YOU'VE JUST OPENED SITS THE ENGINE YOU SHIPPED IN GOOD CONDITION.

EXCEPT NOW IT'S FULL OF RUST AND CORROSION AND SITS IN A LARGE PUDDLE OF WATER.

HOW COULD THIS HAPPEN?

I CLOSED UP THE LLRC. THERE WAS NO VISIBLE DAMAGE AND EVERYTHING SEEMED OK.

BUT WAS IT REALLY?



Long-Life Reusable Container (LLRC): a shipping and storage container, such as a metal engine container, designed for reuse (and can be repaired/refitted) without impairing its protective function for up to 100 trips.

WHAT SHOULD HAVE HAPPENED?

DINGS AND DENTS ON FLANGES FIXED. OLD GASKET REPLACED. ALL SECURING BOLTS SHOULD HAVE BEEN USED.



Small Things Matter

The proper method of preservation per MIL-STD 2073-1, *Standard Practice for Military Packaging*, was followed and even the correct LLRC was available. The LLRC still had its original gasket and most of its bolts. Although there were a few dings and dents around the flanges, it seemed OK to use.

Just before the top was about to be put on, you tossed in some desiccant. One landed on the engine, but so what, you thought. The humidity indicator was blue, so it did not need to be replaced, then.

Unfortunately, so many engines were shipping back out, your LLRC sat in the yard for more than 60 days without being checked. The humidity indicator card started out blue, but gradually changed to lavender and then to pink, finally becoming all white. Is it any wonder that the engine ended up in condition code F? What should have happened?

The same care used to ship an asset to the joint operations area needs to be applied for redeployments.

First, those dings and dents on the flanges might have prevented a good seal. They should have been repaired. And the old gasket should have been replaced. Think comparative cost: a new gasket versus a new engine.

The top and bottom of the LLRC need to be secured by **all of its bolts**. The four corner drill may work well in basketball, but it didn't seal your LLRC!

What about the Desiccant?

If the LLRC is equipped with a desiccant port, the desiccant should be placed in the basket located inside of the port, never on the asset.

Consult the special packaging instructions for details on how much desiccant to use. If you're unable to determine how much is needed, contact LOGSA PSCC for assistance at:

logsapsc.sr.tyad@us.army.mil



WHEN SHIPMENTS ARE DELAYED, DESICCANT CAN BECOME SATURATED.

CHECK CONTAINERS FOR INCREASING HUMIDITY. IF IT RISES ABOVE 50 PERCENT HUMIDITY, ACTION IS NEEDED.

Take a look at the humidity indicator card. If it is not blue, change out the desiccant and check the card.

Sitting outside for 60 days, exposed to the elements, is a long time. During extended storage, the humidity indicator should be checked at least every 30 days.

Desiccant:
A substance that induces or sustains a state of dryness (desiccation) in its local vicinity in a moderately well-sealed container.

Pre-packaged desiccant is most commonly used to remove excessive humidity that would normally degrade or even destroy products sensitive to moisture.

Humidity indicator card:
A humidity indicator card has a moisture-sensitive chemical that will change color when the indicated relative humidity is exceeded. It is an inexpensive way to quantify relative humidity levels inside sealed packaging. They are available in many configurations and used in many applications, especially military and semiconductor.

Increase Inspections

Increased inspection of containers awaiting shipment is important because most metals suffer little or no corrosion while desiccant keeps the relative humidity below 50 percent. Once the humidity indicator starts to change color, it is time to replace the desiccant within the desiccant port. If the humidity indicator goes back to blue, the engine inside should be OK. But, the LLRC will need to be further monitored.

If the humidity indicator does not go back to blue, it may be necessary to open up the LLRC to inspect the engine, check for other problems, and to replace the gasket and desiccant.

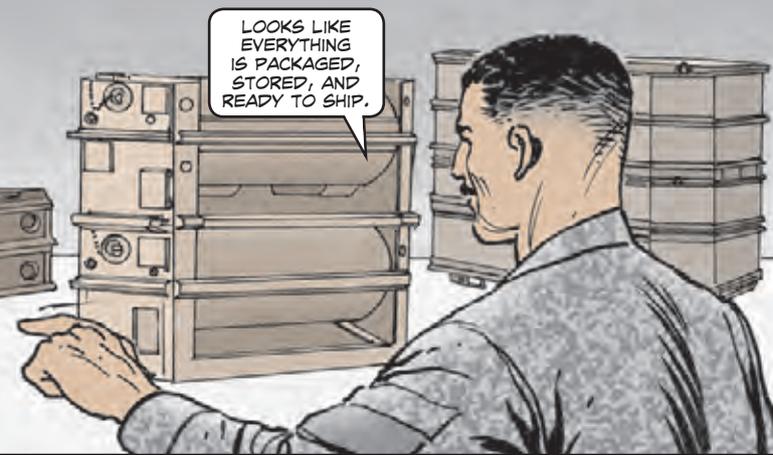


REMEMBER THAT RUSTY ENGINE? ALL OF ITS PROBLEMS **COULD** HAVE BEEN PREVENTED, MONEY AND EFFORT SAVED, AND READINESS RATES IMPROVED...

...BUT **ONLY** IF ALL OF THE NECESSARY STEPS FOR **PREVENTING** ENGINE CORROSION HAD BEEN FOLLOWED.

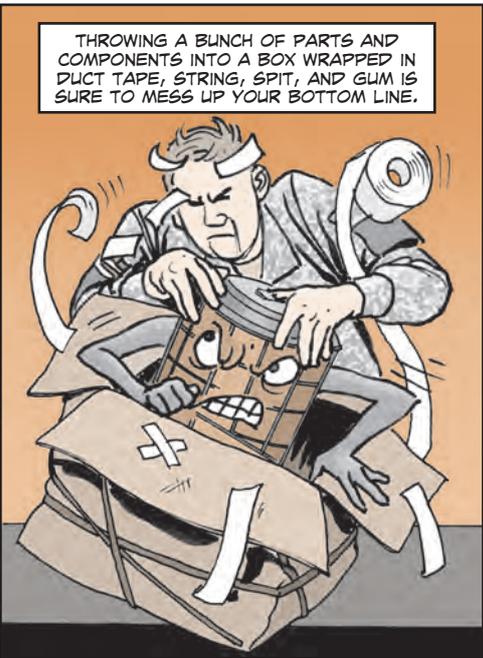
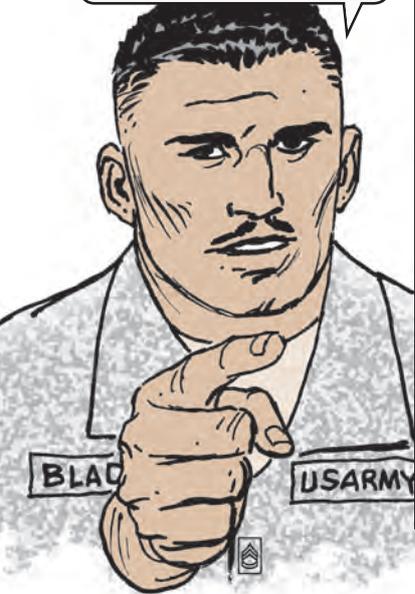
Pack Right, Ship

Right, Store Right



MECHANICS, PACKAGING AND SHIPPING COMPONENTS IN THE RIGHT CONTAINERS AND IN THE RIGHT FASHION WHEN YOU SEND THEM IN FOR REPAIR MEANS FASTER TURN AROUND.

THROWING A BUNCH OF PARTS AND COMPONENTS INTO A BOX WRAPPED IN DUCT TAPE, STRING, SPIT, AND GUM IS SURE TO MESS UP YOUR BOTTOM LINE.



SHABBY PACKAGING FOR SHIPPING AND STORING, OR STORING WITHOUT THE CORRECT PAPERWORK MEANS YOUR COMPONENTS ARE FLYING ON A WING AND A PRAYER ON THEIR WAY TO ASB OR THE DEPOT SHOP.



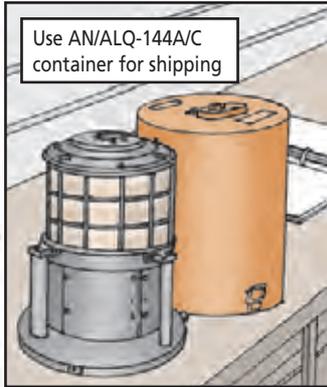
IF COMPONENTS AREN'T PACKAGED LIKE THE INSTRUCTIONS SAY IN FED LOG AND EACH AIRCRAFT MAINTENANCE AND SHIPPING TM, DAMAGE AND DETERIORATION DURING SHIPMENT OR STORAGE WILL DRIVE UP REPAIR COSTS.



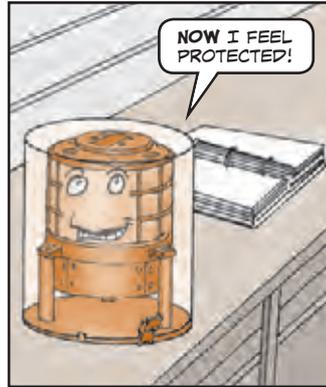
FOR EXAMPLE...

...if you ship the ALQ-144A/C countermeasure set, use the correct shipping container, NSN 5865-01-250-2422. There's also an old container, NSN 5865-01-037-1325. The difference between them is the shape, but both serve the same purpose. Just make sure they're clean, free of corrosion and can seal out condensation and moisture.

Use AN/ALQ-144A/C container for shipping



NOW I FEEL PROTECTED!



If you just need to store the countermeasure set upper transmitter, use NSN 5865-01-109-1801.

SOME CONTAINERS HAVE ADDITIONAL PACKAGING INSTRUCTIONS, SO FOLLOW 'EM.

THE **BEST** MAINTENANCE PRACTICE IS TO SHIP COMPONENTS IN THE **SAME** CONTAINERS OR BOXES THE REPLACEMENT PARTS CAME IN.



Always think about weather conditions when you ship a component. Consider how long it will sit outside and whether it will be transported or stored in a salty, rainy, cold, dusty or sandy environment. That determines the type and amount of desiccant, preservative, cushioning material, and how much other protection you need to use.

TO MAKE SURE PACKAGING IS DONE RIGHT, HERE ARE A FEW MORE RESOURCES TO USE...



- FM 38-700, *Packaging of Material for Preservation* (Dec 99)
- FM 38-701, *Packaging of Material for Packing* (Dec 99)

Before shipping any components, include all the historical data. That means using DA Form 2410 and DA Form 2408-5. If the paperwork is left out, your unit won't get turn-in credit, and the component could be returned. Upon receipt of disposition instructions from the managing inventory control point, ship material with the completed DD Form 1577-series condition tag, and the correct number of copies of the DD Form 1348-1A. For additional packaging and preservation information, check out GEN-11-AMAM-03 on the web:

<https://www.us.army.mil/suite/page/219232>

USE THIS SHORT LIST TO ORDER SHIPPING MATERIALS FOR SMALL PARTS AND COMPONENTS FOR REPAIR.



ALL THE MEASUREMENTS ARE IN INCHES.

NSN	Item
8105-00-224-8485	Envelope, packing list
8105-00-290-0342	Sack, shipping, padded envelope
8105-00-756-2710	Envelope, packing list
8115-00-050-5237	Box, shipping, 12x12x18
8115-00-101-7638	Box, shipping, 9x6x3
8115-00-134-3655	Box, shipping, 12x12x14
8115-00-134-3656	Box, shipping, 14x14x14
8115-00-179-0578	Box, shipping, 10x16x8
8115-00-192-1604	Box, shipping, 8x8x12
8115-00-192-1605	Box, shipping, 10x10x12
8115-00-516-0251	Box, shipping, 20x14x9
8115-00-550-3558	Box, shipping, 24x14x14
8115-00-787-2142	Box, shipping, 6x5x2 ¹ / ₂
8115-00-787-2147	Box, shipping, 6x5x3 ¹ / ₂
8115-00-787-2148	Box, shipping, 12x8x3 ¹ / ₂
8115-01-015-1313	Box, shipping, 26x9x9
8115-01-019-4084	Box, shipping, 18x12x3 ¹ / ₂
8115-01-057-1244	Box, shipping, 10x10x3 ¹ / ₂
8115-01-057-1245	Box, shipping, 16x16x3 ¹ / ₂
8135-00-300-4905	Cushioning material, foam
8135-00-926-8990	Cushioning material, bubble
8135-00-926-8991	Cushioning material, bubble

If there's any doubt about packaging, shipping or storing aircraft parts, contact the AMCOM Packaging Branch, DSN 746-2526 or (256) 876-2526.

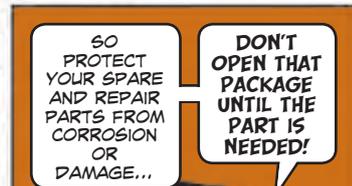
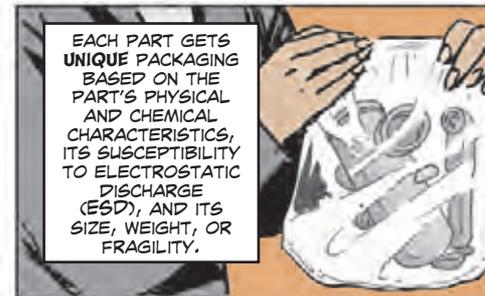
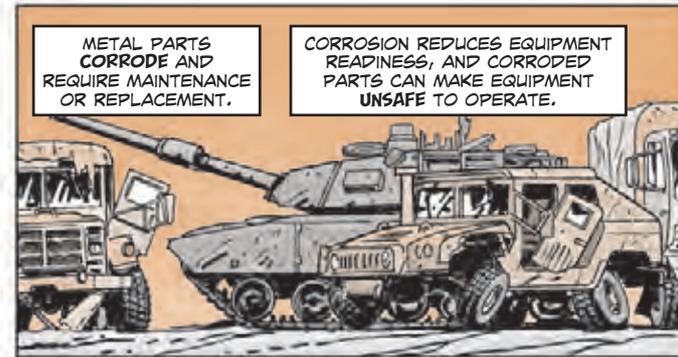
For additional information on packaging, shipping and storing, contact LOGSA's PSCC, DSN 795-7105 or (570) 615-7105 or email:

toby.pt@us.army.mil

DON'T Open That Package!



PS FAST FACT!
CORROSION STARTS AS SOON AS METAL IS EXPOSED TO AIR—THINK OXYGEN AND WATER (IN EITHER ITS LIQUID OR VAPOR FORMS).



- MILITARY PACKAGING TAKES MANY FORMS:
- A long-life reusable container housing your HMMWV engine
 - ESD protective barrier bags and fast packs on circuit card assemblies
 - Fiberboard boxes
 - Wood boxes and crates
- AND PARTS CAN BE FURTHER PROTECTED BY:
- Preservatives and corrosion inhibitors
 - Desiccant and humidity indicators



All Aircraft...

“HMMM... WHERE'S THE GOOD SOAP!”

WHAT ARE YOU

“AHH, I'LL JUST USE THIS STUFF WE GOT AT THE PX.”

“Y'KNOW, THAT'S A LOT OF SUDS...”

CLEANING WITH?

“HOW DO I FIND OUT WHAT'S OK?”

“CHECK OUT THE AMRDEC CORROSION SECTION ON AKO.”

“BUT, FIRST, GET THOSE SLIPS OFF THAT BIRD!”

“WHOA! YOU CAN'T USE JUST ANY OLD CLEANER ON YOUR HELICOPTER! IT'S GOTTA BE APPROVED!”

IT'S NOT A GOOD IDEA TO USE HIGH-PRESSURE WATER TO BLAST GRIME AWAY FROM YOUR BIRD'S EXTERIOR.

NEITHER IS IT GOOD TO USE UNAUTHORIZED CLEANERS.

When cleaning your aircraft, never use industrial cleaners, detergents and degreasers (including Simple Green®) that the Army hasn't tested and approved.

Some unapproved cleaners have a “citrus” compound called “D-Limonene.” These commercial cleaners did not pass Army performance tests and should not be used. These cleaners cause corrosion when runoff is trapped in nooks and crannies and that reduces strength in steel, makes alloys brittle, degrades canopy transparencies, and damages painted surfaces and cadmium plating.

If you've used unapproved cleaners on your bird, lots of fresh water and an approved Army cleaning agent will get the stuff off.

Check your airframe TMs for approved cleaners. Follow up cleaning with a corrosion inspection and treatment. Apply approved corrosion preventive compound like it says in your -23 TMs and the info in TM 1-1500-344-23, *Cleaning and Corrosion Control*.

Make sure that every cleaning product used on your bird is approved by the Army and is listed in your TMs. Then check MIL-PRF-85570 and MIL-PRF-87937 and order the approved cleaners you need.

IF YOU NEED CORROSION INFORMATION, CHECK OUT THIS LINK!

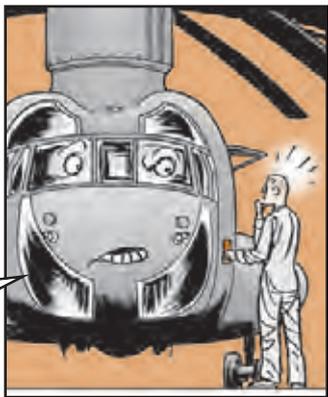
FOR MORE INFORMATION, CHECK OUT AR 750-59, ARMY CORROSION PREVENTION CONTROL PROGRAM.

<http://www.us.army.mil/suite/page/219232>

General Aircraft...

CORROSION CONTROL

DID YOU KNOW THAT APPLYING THE PROPER WATER-DISPLACING CORROSION PREVENTIVE COMPOUND (CPC) INSIDE AND OUTSIDE OF CANNON PLUGS AND RECEPTACLES IS OK?



MANY SOLDIERS ARE NOT AWARE OF THIS, ESPECIALLY IN THE AVIATION WORLD.

Using CPC in this manner extends the life of the plugs and pushes out moisture from inside the connector. It is true that some types of CPCs interfere with current and signals from aircraft black boxes, but that happens only if you use the wrong CPC inside connectors.

When electronic systems have problems or don't work, the quick fix is to reseat (disconnect and reconnect) the cannon plug to clean off the corrosion from the pins. After that, the plugs usually have good connectivity until the corrosion returns. Using electronic grade CPC, MIL-PRF-81309, Type III, NSN 8030-00-546-8637, helps keep the corrosion from returning. Because of their temporary nature, CPCs must be regularly removed and replaced. Consult TM 1-1500-344-23-2, Table 8-1, for CPC time limitations. Make sure you don't use excessive amounts of CPC. If you do, tilt the connector and let the excess drain out, then wipe off the connector with a clean, dry cloth.

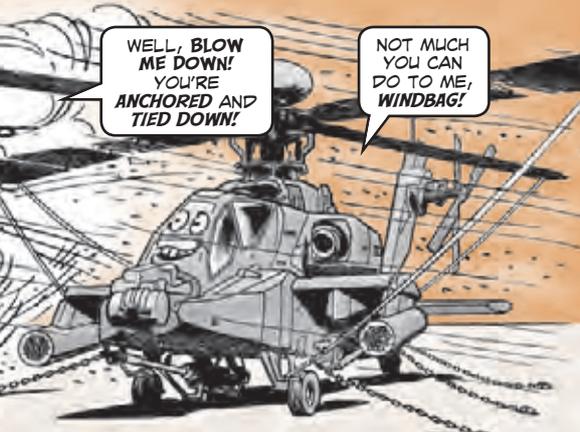
For questions concerning usage and application of CPCs, contact the AMCOM Corrosion Program Office hotline at DSN 897-0209, (256) 313-0209.

All Aircraft...

WELL, BLOW ME DOWN!
YOU'RE ANCHORED AND TIED DOWN!

NOT MUCH YOU CAN DO TO ME, WINDBAG!

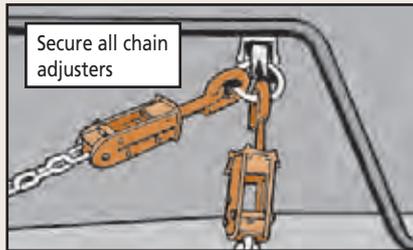
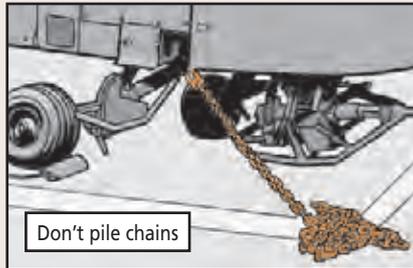
CHAIN GANG CHATTER



Crews, your aircraft tie-down chains, NSN 1670-00-516-8405, need as much PM as your bird if you're going to keep your birds anchored.

If you treat chains like a pile of junk, that's what they'll become. And if a heavy windstorm blows up like it did at Ft Hood in 1989, your bird could be tossed like a chef salad if there are weak links in the chain.

When you're not using the chains, don't pile them up. Instead, stretch them out to prevent dirt buildup and to let them dry quicker. Chains left in piles rust faster, especially in rainy weather as water and dirt easily collect in the chain pile. Then you'll have all the right ingredients for corrosion. Check and clean corrosion from chains like the tie-down TM says.



Frequently rotating the tie-down chains you're using extends their life and use. Make sure the chain adjuster lock mechanisms operate properly. Chains that don't fit properly or are not adjusted right will not provide the right resistance to strong winds. When you're not using the adjusters, store them in a safe place to prevent damage from vehicles.

For all tie-down and mooring information, eyeball your bird's -23 TM and TM 1-1500-250-23, Aviation Unit and Aviation Intermediate Maintenance for General Tie-Down and Mooring On All Series Army Model AH-64, UH-60, CH-47, UH-1, AH-1 and OH-58 Helicopters. If there are conflicts between your aircraft's pub and the tie-down manual, the tie-down TM takes precedence. Always use polyester rope. NSN 4020-01-318-5428 gets 3/8-in rope, while NSN 4020-01-028-3843 gets 1/2-in rope.

[Click here for a copy of this article to save or email.](#)

AH-64A/D Aircraft...

SURRP!
THIS WET WEATHER IS GIVING MY RECOIL REAL MOISTURE PROBLEMS.

I'M LOSING MY SPRING.



Keeping the M230 Recoiling

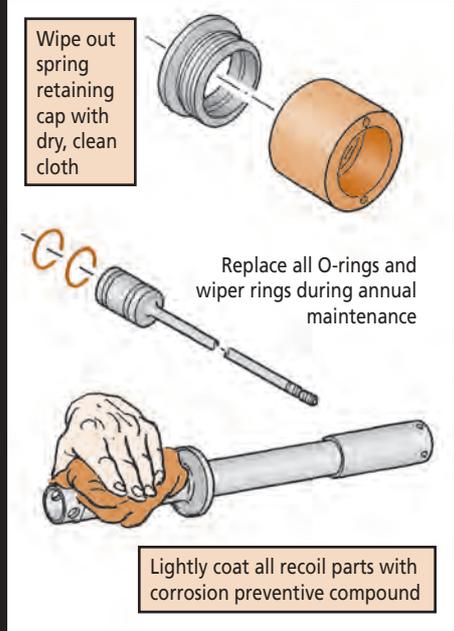
Water is shortening the life of M230 machine gun recoil mechanisms. Water gets in the recoil after the AH-64A/D is flown in wet weather and causes serious corrosion. But a bit of PM can dry up moisture problems for the recoil.

After flying through the rain, check inside the spring retaining cap for standing water. If you find any, mop it up with a clean cloth and then blow dry inside the cap with an air hose set to 30 psi. This will keep water from seeping inside the piston rod housing.

When ASB does the annual maintenance on the M230, they should replace all the O-rings and wiper rings. Over time, both rings become brittle or cracked and let water leak inside the recoil.

Before reassembling the recoil, they should lightly coat the recoil spring, piston rod, sleeve spacer, spring washers, the interior of the spring retaining cap, and the interior of the piston rod housing with corrosion preventive compound, NSN 8030-00-938-1947.

This will keep the recoil in the recoil assembly.



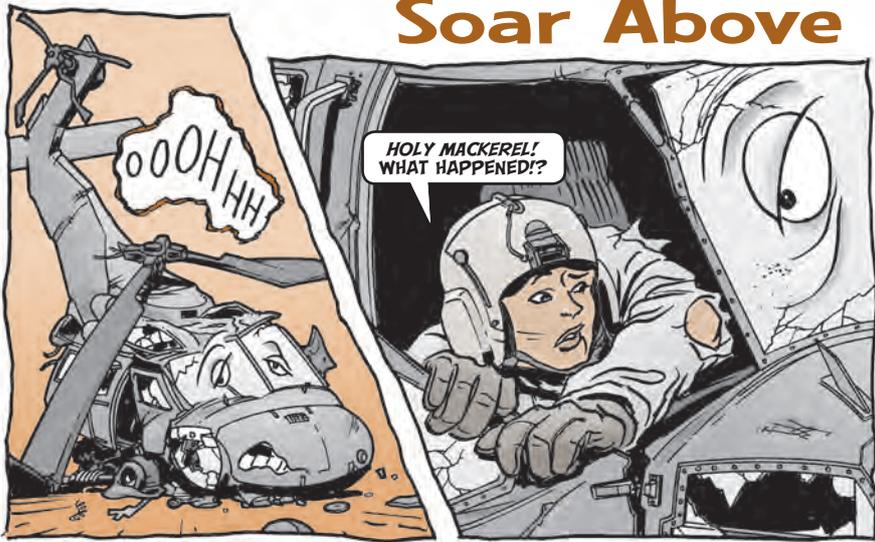
Wipe out spring retaining cap with dry, clean cloth

Replace all O-rings and wiper rings during annual maintenance

Lightly coat all recoil parts with corrosion preventive compound

[Click here for a copy of this article to save or email.](#)

Soar Above



AIRCREWS CAN DO A LOT TO AVOID CORROSION'S WORST EFFECTS...

...AND AMCOM CAN HELP YOUR CREWS BEAT CORROSION.

Army aircrews wage a continuous battle against an enemy that constantly attacks their aircraft at the molecular level.

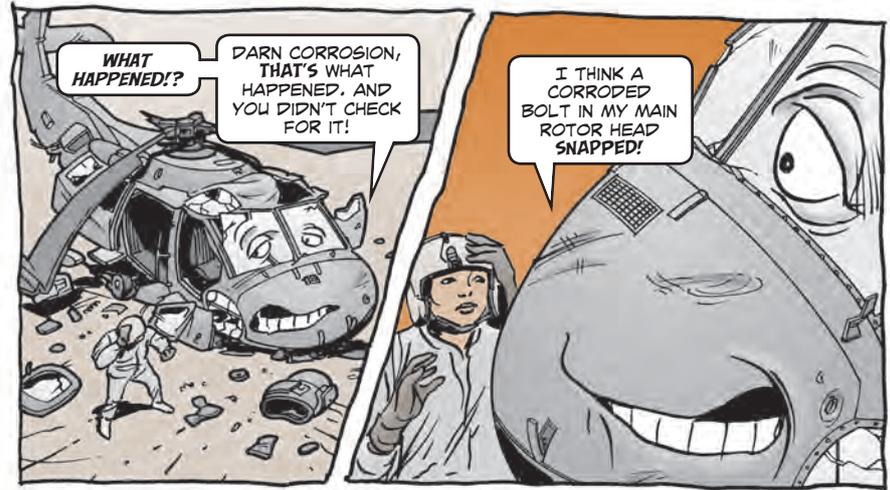
The enemy is corrosion. And it's doing enough damage to cost the Army billions of dollars every year.

Untreated corrosion expands and weakens its target. Its effects become increasingly difficult and expensive to fix. Fortunately, corrosion damage is largely preventable. The best news is that aircrews can do a lot to find and knock out corrosion before it does real damage.

The AMCOM Corrosion Control Program Office (CCPO) at Redstone Arsenal provides training and technical assistance to help identify and combat different types of corrosion.



Corrosion with PM

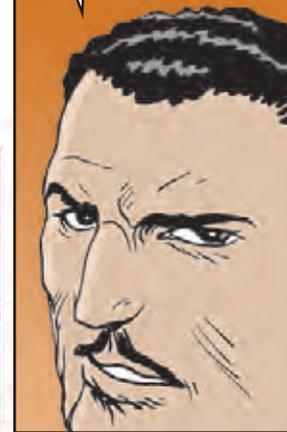


The CCPO can provide a team of inspectors and analysts to visit any aviation site at no cost to the unit. Their classroom and hands-on prevention and control instruction satisfies the annual refresher training required by TM 1-1500-328-23, *Aeronautical Equipment Maintenance Management Policies and Procedures*.

Teams help Soldiers learn how to determine the root cause of corrosion. They also introduce the latest products and techniques for cleaning, sealing, and preserving bare metal.

Find corrosion early and you can fix it quickly and cheaply. Help stop the massive waste of money spent each year on failed corroded components.

ONLY CONSTANT ATTENTION AND AN ALL-HANDS EFFORT CAN SIGNIFICANTLY REDUCE THE WASTE OF EFFORT, TIME, MONEY AND PARTS LOST TO UNCHECKED CORROSION.



COVERS ADD AVIATION PROTECTION!



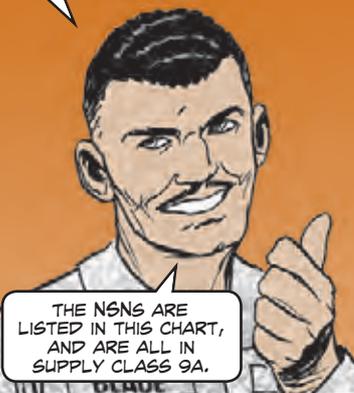
THESE NEW COVERS PROVIDE HIGH VAPOR TRANSFER RATES AND SHIELD AIRCRAFT FROM CORROSION.

AMCOM's Corrosion Prevention and Control Program has been conducting a demonstration/validation project for a lightweight, breathable protective cover for aircraft and Patriot components.

The covers are an advanced commercial-off-the-shelf (COTS) textile that has high vapor transfer rates and shielding properties that provide environmental and corrosion protection.

The covers were tested in SWA on aircraft windscreens and provided protection against sandblasting, pitting and crazing.

THE CH-47 AIRCRAFT COVER PROTECTION KIT HAS BEEN ASSIGNED NATIONAL STOCK NUMBERS AND CAN BE ORDERED THROUGH THE SUPPLY SYSTEM.



THE NSNs ARE LISTED IN THIS CHART, AND ARE ALL IN SUPPLY CLASS 9A.

NSN 1730-01-	Part #	Item Name
593-9707	CH-47-202	Cover, aircraft ground
593-9690	CH-47-063	Cover, fwd rotor hub
593-9716	CH-47-068	Cover, aircraft ground
593-9723	CH-47-064	Cover, aft rotor hub
593-9684	CH-47-067	Cover, set
593-9711	CH-47-075	Cover, aircraft ground
593-9702	CH-47-076	Cover, aircraft ground
593-9729	CH-47-073	Cover, aircraft ground
594-2207	CH-47-074	M130, flare cover, rh
593-9515	CH-47-150	Cover, aircraft ground
593-9662	CH-47-127	Cover, console set
593-9697	CH-47-124	Cover, aircraft ground
593-9736	CH-47-128	Cover, aircraft ground
593-9359	CH-47-060	Cover, aircraft engine
593-9488	CH-47-059	Cover, aircraft engine

Validation projects continue for the UH-60M Blackhawk, the OH-58 Kiowa Warrior, Patriot missile canisters, Patriot Tactical Control Stations, and 25-kW generators.

All Aircraft... Painting and Marking TM Change Coming



Bad or outdated information in a TM can be as dangerous in aviation shops as on a battlefield. So for the 13th time since 1986, the AMCOM Corrosion Program Office is revising TM 55-1500-345-23, *Painting and Marking of Army Aircraft*.

Like other technologies, coatings are changing and improving at a rapid pace.

Paints and primers on aircraft provide protection. Flaking and cracking paint can be as harmful to your aircraft as flaking and cracking skin is to you. The new TM will help you get maximum protection from the elements and harmful substances.

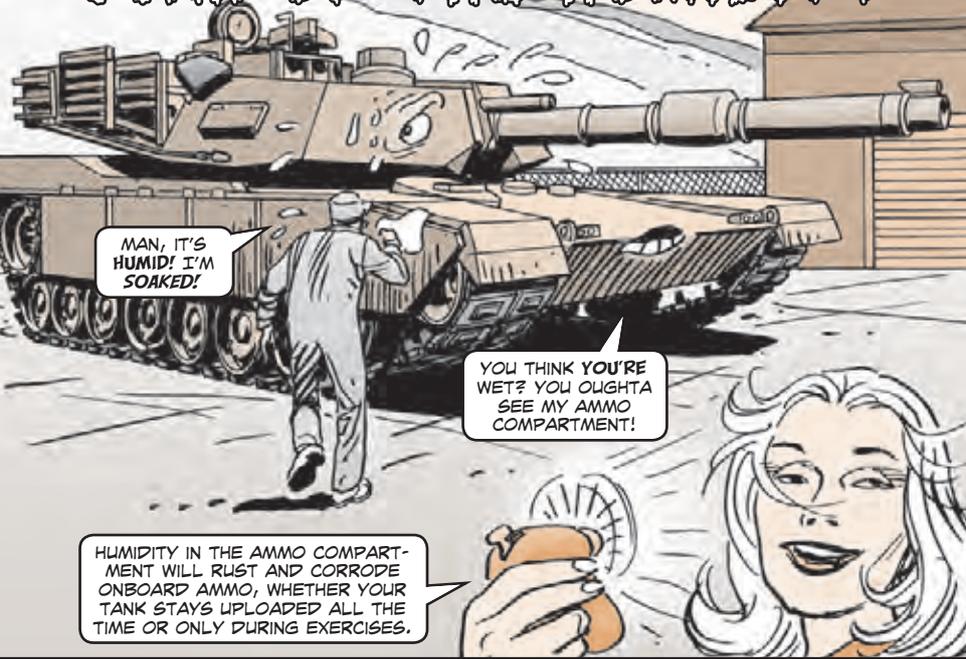
The new TM will eliminate silica-based CARC paint in favor of the new polymeric bead CARC and Type II (low infrared reflectance) primers. The TM will discuss visual and physical criteria for coatings, including damage and corrosion limits and topcoat thickness parameters.

Modernized cleaning and surface preparation techniques will improve paint adhesion and durability.

WATCH PS MAGAZINE FOR WORD ON WHEN THE TM WILL BE RELEASED.



SOAK UP THE HUMIDITY



MAN, IT'S HUMID! I'M SOAKED!

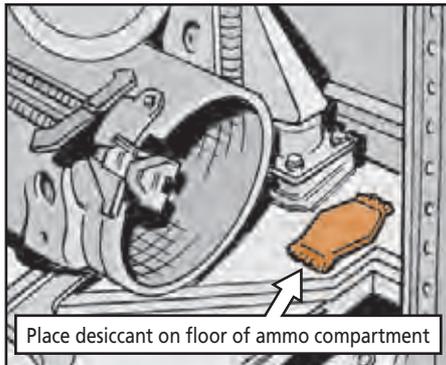
YOU THINK YOU'RE WET? YOU OUGHTA SEE MY AMMO COMPARTMENT!

HUMIDITY IN THE AMMO COMPARTMENT WILL RUST AND CORRODE ONBOARD AMMO, WHETHER YOUR TANK STAYS UNLOADED ALL THE TIME OR ONLY DURING EXERCISES.

Sure, you can slow the damage by occasionally wiping away any condensation in the ammo compartment. But to really put the brakes to corrosion, you've got to stop moisture.

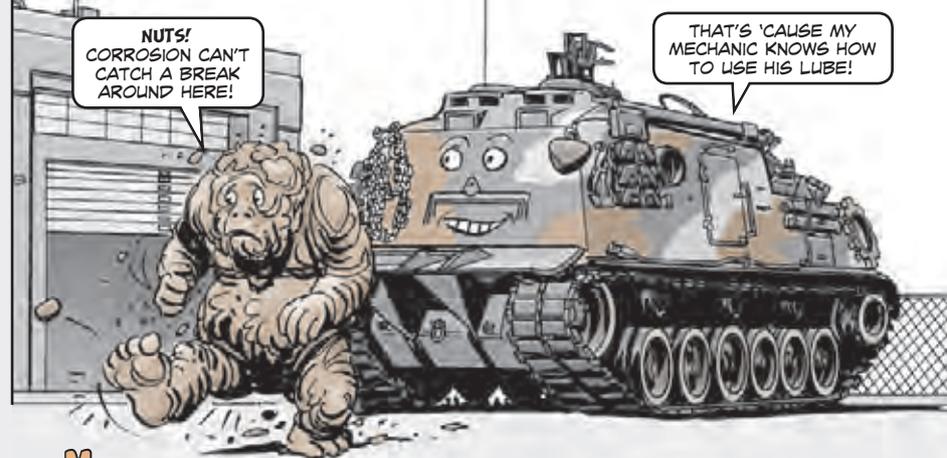
A few bags of desiccant will do the trick. Just open each ammo door and put a bag or two on the floor between the ammo tubes and the compartment wall. NSN 6850-00-264-6571 gets a drum of 300 bags of desiccant.

When it's time to pull PMCS on the hull ammo compartment, check the desiccant bags. If they're moist to the touch or if the compartment walls are wet again, it's time for new desiccant.



Place desiccant on floor of ammo compartment

A LITTLE LUBE'LL DO IT



NUTS! CORROSION CAN'T CATCH A BREAK AROUND HERE!

THAT'S 'CAUSE MY MECHANIC KNOWS HOW TO USE HIS LUBE!

Mechanics, a little battery acid in the wrong place will damage more than the batteries. You have to worry about what's **under** the batteries, too.

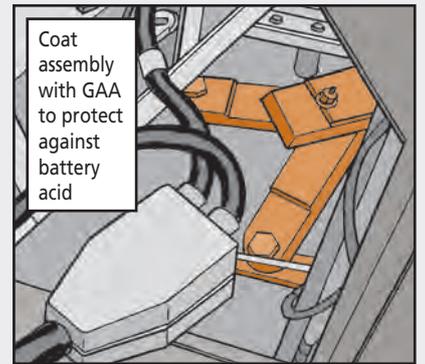
In the case of your M88A1 recovery vehicle, that's the steering linkage bell crank assembly.

The assembly is to the side and below the battery box, so any battery leakage usually ends up on it, too. If it's not lubed regularly, the resulting corrosion makes the rods brittle. Eventually, they break.

So, before you lube the steering linkage bell crank assembly quarterly with GAA, carefully wipe off any corrosion you find with a rag. If the corrosion is heavy, use a solution of water and baking soda. Wear rubber gloves and safety glasses to protect your hands and eyes.

Next, put a light coat of GAA on the outside of the assembly, then use your grease gun to lube normally. The GAA helps protect the assembly from battery corrosion until it's time to lube again.

AND CHECK THE BATTERY BOX AND ITS CONTENTS FOR CORROSION PROBLEMS, TOO.

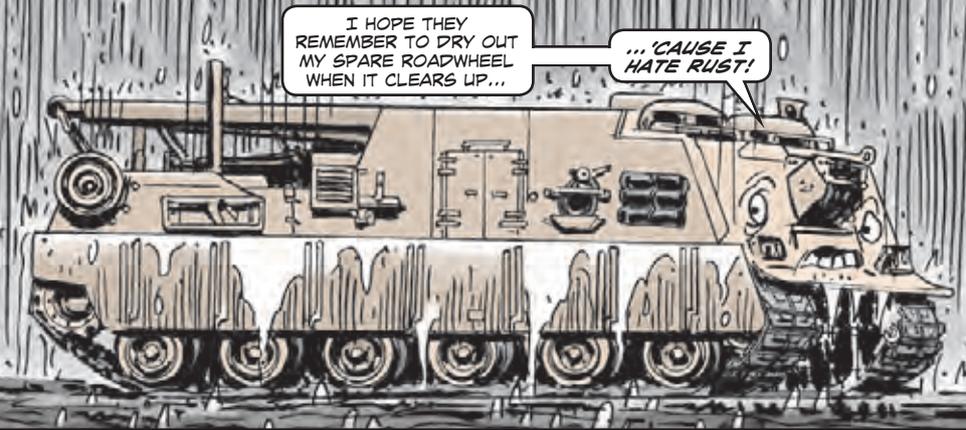


Coat assembly with GAA to protect against battery acid

RUSTY ROADWHEEL IS RUINED

I HOPE THEY REMEMBER TO DRY OUT MY SPARE ROADWHEEL WHEN IT CLEARS UP...

... 'CAUSE I HATE RUST!



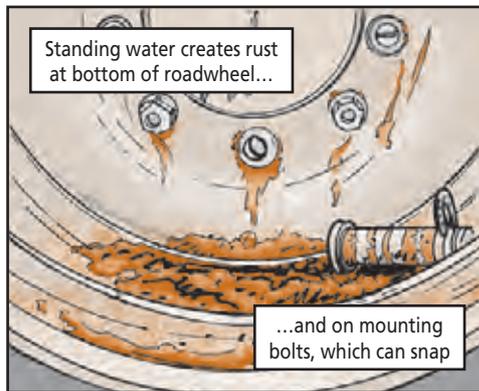
The spare roadwheel hanging on the side of your M88-series recovery vehicle will turn into a rusty ornament if you don't keep it dry, mechanics.

When bolted to the side of the vehicle, the roadwheel sits at an angle. That allows rain and wash water to pool in the bottom of the roadwheel. The water sits there until it evaporates.

When this happens over and over, rust is the result. Not only does the bottom of the roadwheel develop severe rust, but the lug nuts can actually rust in place on the mounting bolts. Those rusted bolts often snap when you try to remove the nuts.

You can prevent the damage, but it'll take a little work on your part. First, use a little antiseize compound on the lug nuts and bolts when mounting the spare roadwheel. That prevents rust and makes the nuts easier to remove later. Get a 4-oz tube of antiseize compound with NSN 8030-00-059-2761.

Second, after washing your vehicle, and after any rainfall, take a few rags and soak up the pool of water in the bottom of the roadwheel. That will keep the roadwheel ready when you need it.



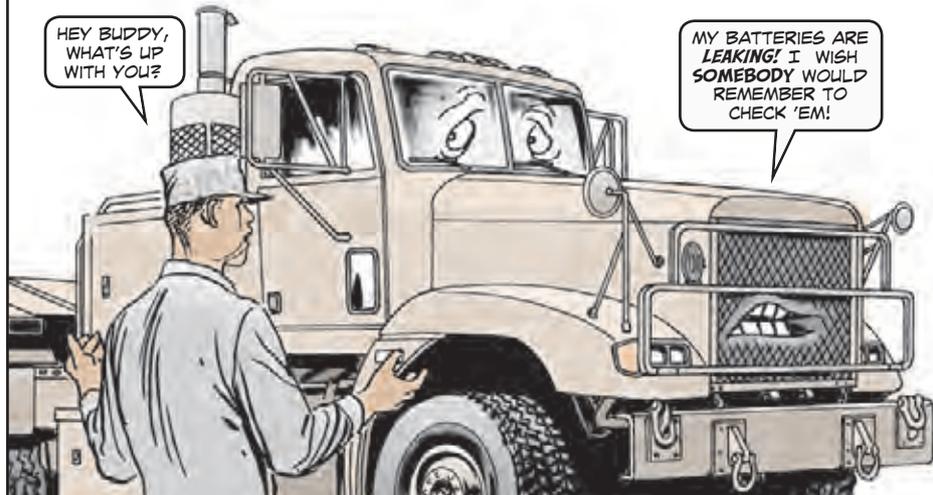
Standing water creates rust at bottom of roadwheel...

...and on mounting bolts, which can snap

BATTERY SPACER PLATE'S FATE

HEY BUDDY, WHAT'S UP WITH YOU?

MY BATTERIES ARE LEAKING! I WISH SOMEBODY WOULD REMEMBER TO CHECK 'EM!



Dear Half-Mast,
While servicing M920 tractor trucks, I've noticed a recurring problem. The wooden spacer plate, NSN 5365-01-079-6540, that goes under the batteries often rots and needs replacing. That part costs almost \$50. It sure would be nice to have this plate last longer in bad weather and battery leakage. Do you have a tip that can help us?
SGT B.L.R.

Dear Sergeant B.L.R.,
Certainly. You still have to use the spacer plate, but here's a tip that should help you out. Use battery box liner, NSN 6160-01-389-1966. The battery box liner should absorb and neutralize battery acid and prevent corrosion to the box. You'll have to cut enough liner to cover the entire bottom of your truck's battery box. Then replace it whenever you need to.
Half-Mast



COVER ALL THE SPACE YOU WANT TO PROTECT WITH THIS LINER!

TANK vs BRIDGE: PLASTIC



WOODEN BRIDGES ARE FOUND EVERYWHERE AND SOLDIERS USE THEM TO TRANSPORT TROOPS AND EQUIPMENT.

BUT THEY DON'T LAST FOREVER!

Hot, humid environments increase wood rot and invite insect attacks. And the heavy loads bridges endure take a toll. Chemical treatment of wood reduces rot and insect damage, but those chemicals are toxic to people and the environment. And not all treatments are equal. In some parts of the world, locally treated wood is only slightly better than untreated wood. (That is, if you can even find local wood!)

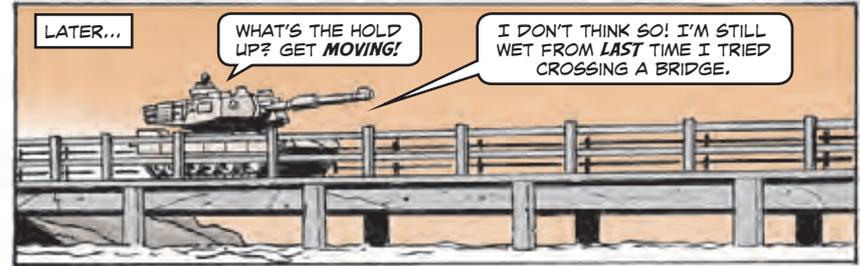
For critical bridges and other load-bearing wooden structures, there is an innovative solution in high-capacity thermoplastic material and design.

Two bridges were built recently at Ft Bragg (and a third is under construction). The bridges are holding up to repeated heavy vehicle crossings.



YES, RECYCLED MILK JUGS AND CAR BUMPERS CAN NOW CARRY AN M1 TANK!

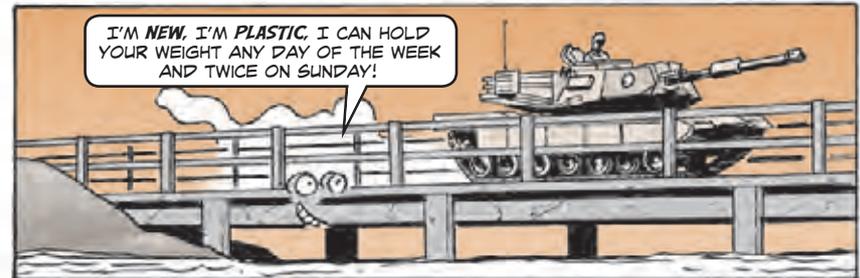
LUMBER SAVES THE DAY!



LATER...

WHAT'S THE HOLD UP? GET MOVING!

I DON'T THINK SO! I'M STILL WET FROM LAST TIME I TRIED CROSSING A BRIDGE.

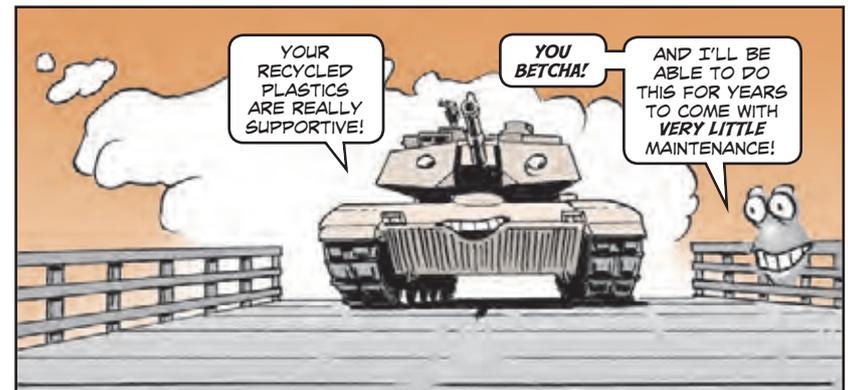


I'M NEW, I'M PLASTIC, I CAN HOLD YOUR WEIGHT ANY DAY OF THE WEEK AND TWICE ON SUNDAY!

Like familiar plastic lumber you might have seen on playgrounds or in parks, the new bridge material is resistant to moisture, rot, and insects. And it stands up to very heavy loads without sagging or bouncing like a trampoline. The best news is the new material costs less than treated wood for initial construction and annual maintenance needs are low. It also costs less to ship and improves the Army's carbon footprint.

The new material and design can be used for all sorts of outdoor, load-bearing structures. For more information on the use of this new degradation-resistant thermoplastic lumber, contact Mr. Richard Lampo at:

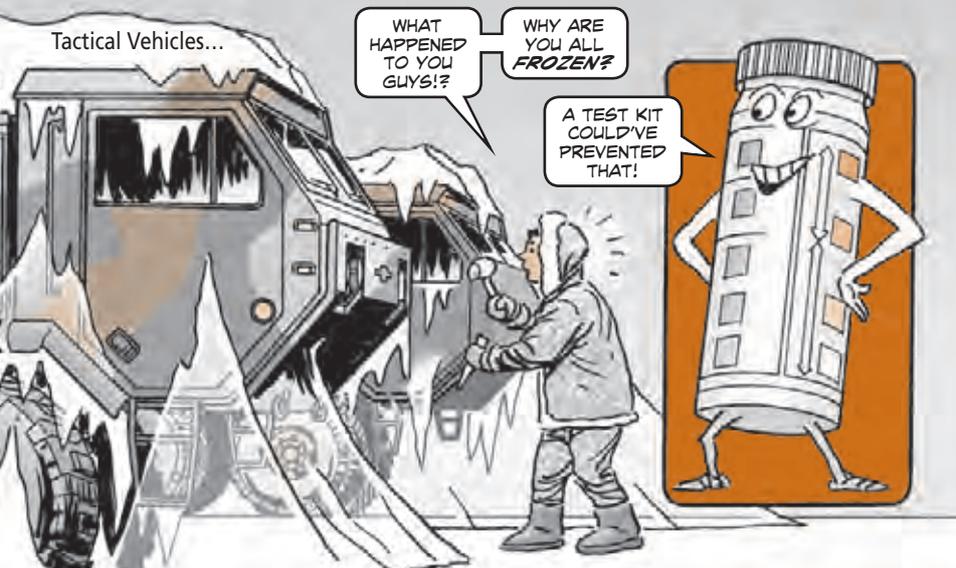
richard.g.lampo@us.army.mil



YOUR RECYCLED PLASTICS ARE REALLY SUPPORTIVE!

YOU BETCHA!

AND I'LL BE ABLE TO DO THIS FOR YEARS TO COME WITH VERY LITTLE MAINTENANCE!



ANTIFREEZE TESTS

Is your vehicle's cooling system ready to perform in all types of weather? If you're not sure, test it. This should happen at least during scheduled maintenance and climatic change services.

The combination antifreeze and battery tester, NSN 6630-00-105-1418, tests for freeze protection down to -50°F. Use this only for 50/50 blend antifreeze.

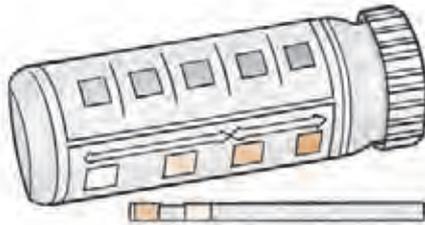
Antifreeze test kit, NSN 6630-01-011-5039, tests for freeze protection down to -60°F. The test strips in this kit can be used for both the 50/50 and 60/40 antifreeze blends.

Use commercial test strips to test the nitrite (corrosion protection) level of antifreeze. The ideal nitrite concentration for 50/50 antifreeze/water solution is between 1,200 and 1,400 ppm.

For more info on testing antifreeze, eyeball TB 750-651, *Use of Antifreeze Multi-Engine Type Cleaning Compounds and Test Kit in Engine Cooling Systems*. You can find it on LOGSA's ETM website:

<https://www.logsa.army.mil/etms/index.cfm>

Use a CIDA-A-51461C Type II antifreeze test kit for freeze protection



AVLB...

RUSTY PIPE = NASTY FUMES



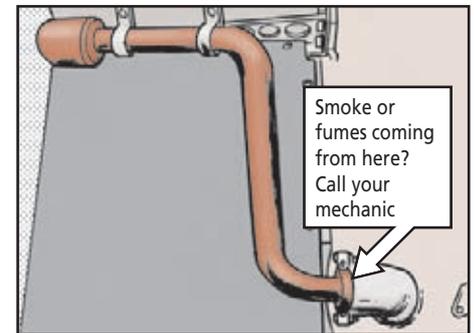
Water from rain, the wash rack and condensation gets inside the exhaust pipe. That creates rust that eats away at the pipe. Eventually, the pipe develops leaks and crumbles away.

A bad exhaust pipe may not vent the heater's fumes, including carbon monoxide. That's bad news for anyone inside the vehicle.

Take a look at the exhaust pipe from the outside the next time the heater's running. If you see smoke or fumes coming from anywhere other than the end of the exhaust pipe, there's a good chance not all exhaust is being properly vented. Call in your mechanic.

The best way to prevent this damage is to keep water out of the exhaust pipe whenever possible. If you're going to the wash rack, cover the pipe with a plastic bag before you start washing. If the vehicle's going to sit in the motor pool for a while, seal the exhaust pipe with a plastic cap or cover it with a tarp to keep out rain. Just remember to remove them before operation.

Taking a few precautions to keep out moisture will let your AVLB—and you—breathe easier.



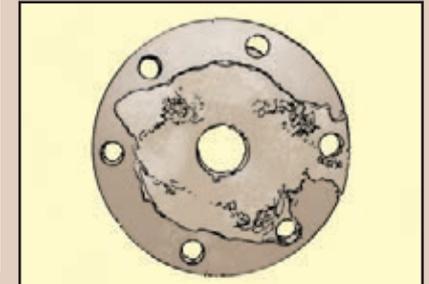
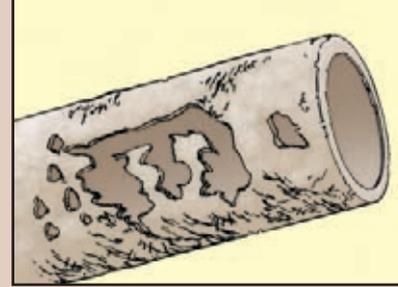
CUTTING CORRUSSION



9 Types of Corrosion

UNIFORM (or general attack):

Affects a large area of exposed metal surface, like rust on steel or tarnish on silver. It gradually reduces the thickness of the metal until it fails.

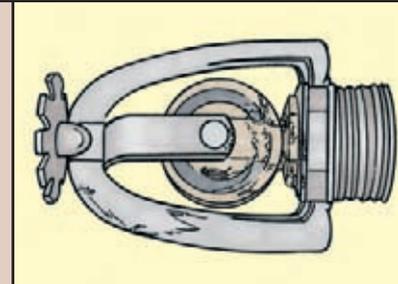


CREVICE:

Occurs in crevices created by rubber seals, gaskets, bolt heads, lap joints, dirt or other surface deposits. It will develop anywhere moisture or other corrosive agents are trapped and unable to drain or evaporate.

SELECTIVE LEACHING:

One element, usually the anodic element of an alloy, corrodes away, leaving the cathodic element. This can create holes in metal.



INTERGRANULAR:

Metal deterioration caused by corrosion of the bonds between or across the grain boundaries of a metal. The metal will appear to be peeling off in sheets, flaking, or being pushed apart by layers. A particular type of intergranular corrosion is exfoliation.

PITTING:

This can result from conditions similar to those for crevice corrosion. Pits can develop on various materials due to their composition. Rifle bores are big victims of pitting.

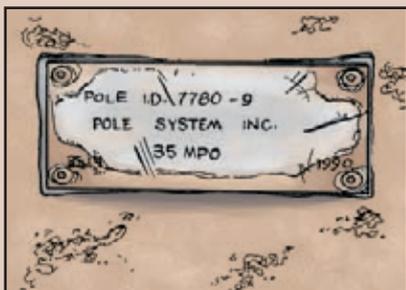
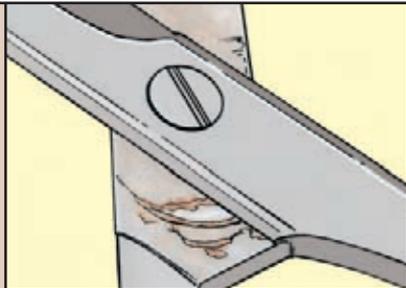


EROSION:

Results when a moving fluid (or gas) flows across a metal, particularly when solid particles are present in the fluid. Corrosion actually occurs on the surface of the metal, but the moving fluid washes away the corrosion and exposes a new metal surface, which also corrodes.

FRETTING:

Occurs between two pieces of weight-bearing metal in contact with each other. It's usually identified by a black powder corrosion product or pits on the surface.



GALVANIC:

Occurs when two different kinds of metal come in contact with each other, like steel bolts on aluminum, for example. This is a common problem on aircraft because of their mix of metals.

STRESS:

Term used to describe corrosion cracking and corrosion fatigue.



Reach for Rust Inhibitor

RAIN, SALT, WIND AND SAND ARE SOME OF THE CAUSES OF CORROSION.



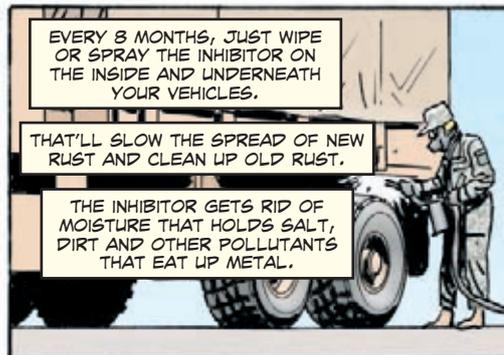
BUT YOU CAN CURB THEIR EFFECTS AND LOWER REPAIR COSTS BY USING **RUST INHIBITOR**, ALSO KNOWN AS CORROSION PREVENTIVE COMPOUND.



EVERY 8 MONTHS, JUST WIPE OR SPRAY THE INHIBITOR ON THE INSIDE AND UNDERNEATH YOUR VEHICLES.

THAT'LL SLOW THE SPREAD OF NEW RUST AND CLEAN UP OLD RUST.

THE INHIBITOR GETS RID OF MOISTURE THAT HOLDS SALT, DIRT AND OTHER POLLUTANTS THAT EAT UP METAL.



IT ALSO LUBES MOVING PARTS AND PENETRATES EXISTING RUST.



RUST INHIBITOR IS PETROLEUM-BASED AND CONTAINS NO HAZARDOUS MATERIAL.

BUT THE HEADSHEP STILL RECOMMENDS THAT YOU WEAR A RESPIRATOR, GOGGLES AND GLOVES WHEN APPLYING IT BECAUSE OF POSSIBLE IRRITATION TO YOUR RESPIRATORY TRACT OR SKIN.

ORDER THE AMOUNT OF INHIBITOR YOU NEED...

Quantity	NSN 8030-01-414-
16-oz bottles (12)	7423
5-gal container	8947

AS A RULE OF THUMB, IT TAKES ABOUT 2 GALLONS TO TREAT A HMMWV...

...AND UP TO 3 GALLONS FOR A 2 1/2-TON OR 5-TON TRUCK.

AND RUST INHIBITOR WON'T HARM PAINTED SURFACES, PLASTICS, RUBBER, GLASS OR WIRING, BUT IT'LL MAKE THEM SHINE FOR A WEEK OR TWO.

AS YOU CAN SEE, THAT **RUINS** YOUR CAMOUFLAGE, SO KEEP IT OFF THE PAINT ON THE OUTSIDE OF YOUR EQUIPMENT.

Counteract Corrosion

HERE ARE A FEW OTHER THINGS YOU CAN DO TO CUT BACK ON YOUR EQUIPMENT'S CORROSION...

- Paint or lube unprotected surfaces. Unprotected surfaces can corrode.
- Keep your equipment clean.
- Lube like the lube orders prescribe to prevent rust and premature replacement of pins and assemblies.

CLEAN YOUR WEAPON'S BARREL AFTER FIRING.

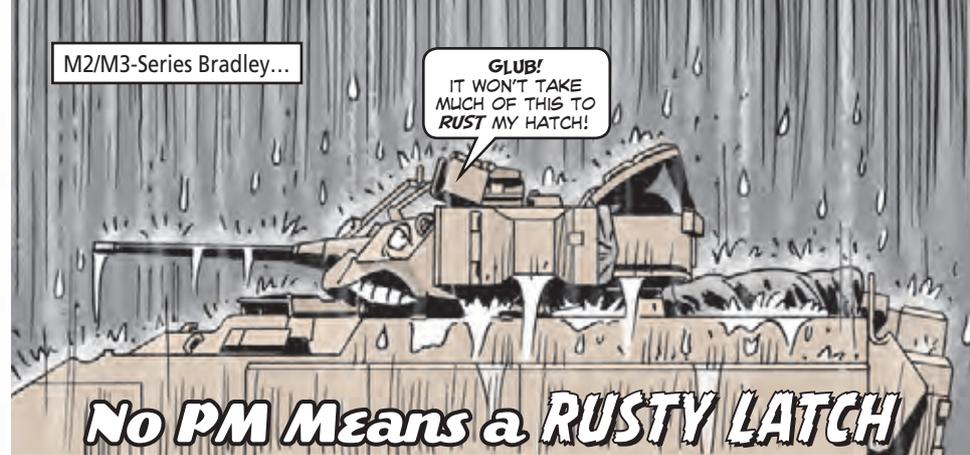
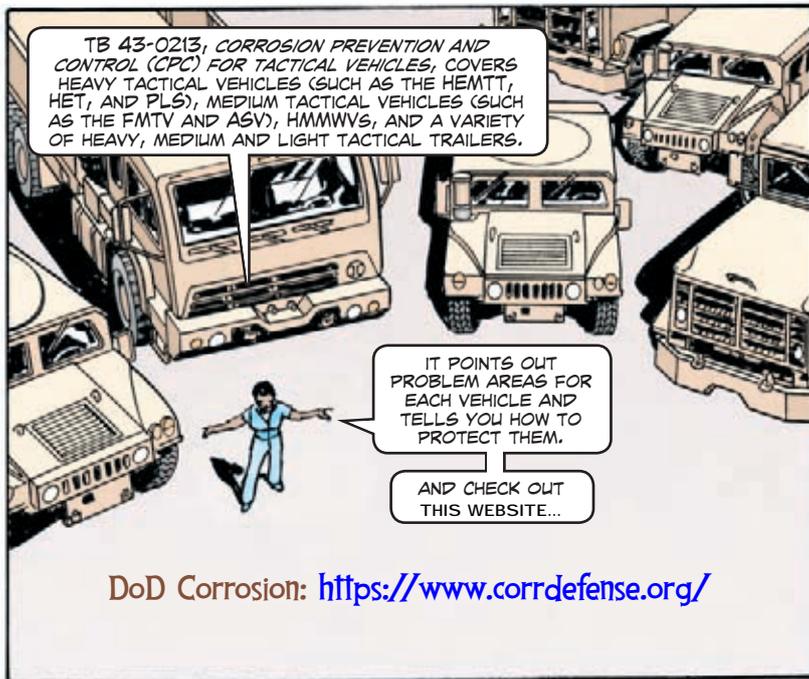
KEEP DRAIN HOLES UNCLOGGED. THAT WAY, WATER HAS LESS OF A CHANCE TO COLLECT AND CAUSE RUST.

A CORROSION FIGHTER MUST ACTIVELY SEEK OUT THOSE AREAS WHERE WATER CAN BE TRAPPED AND GET RID OF IT!

COATINGS SUCH AS PAINT, GREASE, PRESERVATIVES, OIL, ETC., PROVIDE THE BEST LINES OF DEFENSE AGAINST CORROSION.

AN UNPROTECTED SURFACE NEEDS TO BE REPAINTED OR RECOATED ASAP!

Helpful Pubs



Take some metal, add a little water and what do you get? You guessed it—rust! And you can expect the same answer when it comes to the commander's hatch on your Bradley.

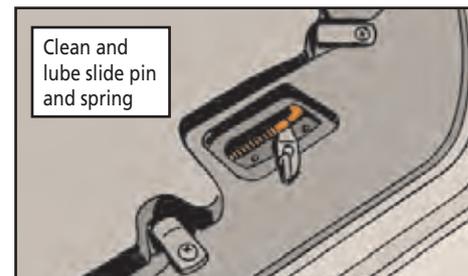
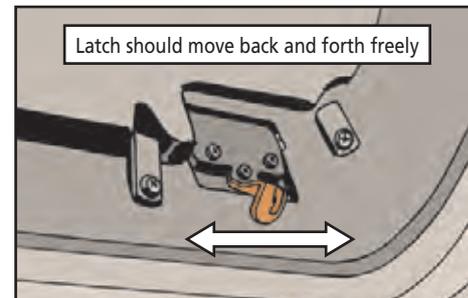
When the hatch is left open, rain and condensation pool around the hatch cover latch. The water seeps inside the latch and rusts the slide pin and spring. Then the latch won't move, so you can't move the hatch to the pop-up position.

Keep the latch moving with a shot of aerosol dry-film lubricant, NSN 9150-01-260-2534, about every 120 days. Move the latch back and forth a few times to work in the lubricant.

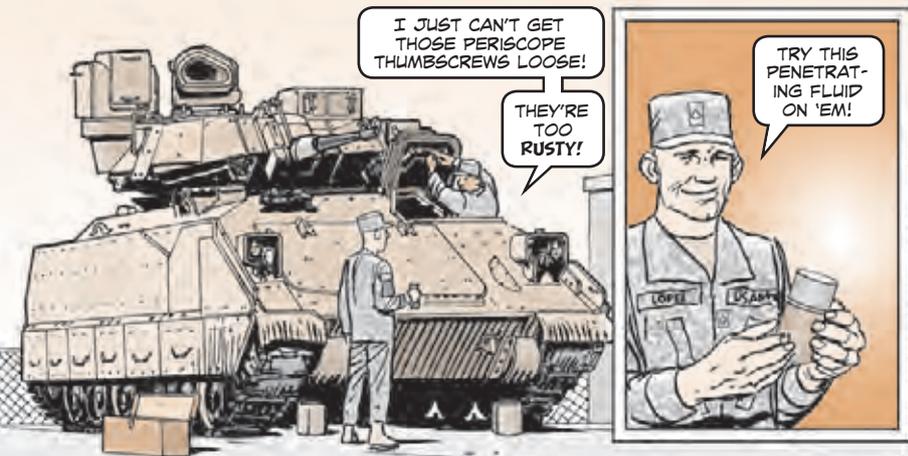
If the latch is hard to move or won't budge at all, get your mechanic to remove the latch cover and clean and lube the area around the slide and spring with dry-film lubricant.

The hinges and hatch release pin also get exposed to the elements. Without lube, you'll hear a lot of creaking and groaning when you try to open and lock the hatch—if it'll move at all.

Put a few drops of OE/HDO on the hinges and release pin quarterly. Then exercise the hatch a few times to work in the oil.



RUST REMOVAL MADE EASY

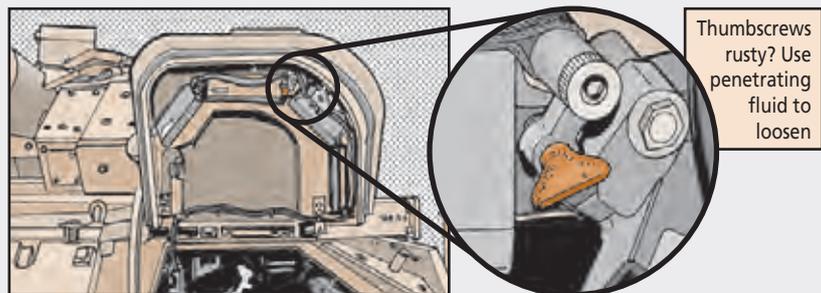


A little rust on the driver's hatch periscope thumbscrews can end up being a nightmare. Those thumbscrews are supposed to make removing the periscope to install the night sight an easy task. But if they get rusty enough from rainwater and condensation, they won't move. Even worse, if you use a wrench to try to unscrew 'em, they snap off.

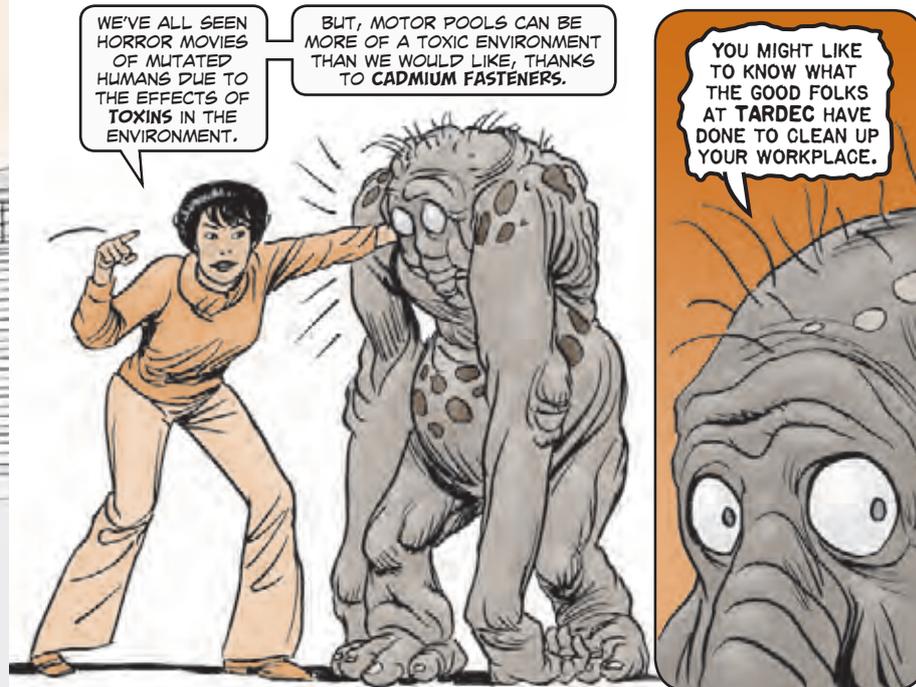
Then your mechanic has to drill them out before new thumbscrews can be installed. And the whole thing starts over again.

If you've got stuck thumbscrews, try spraying them with some penetrating fluid before trying to loosen them. NSN 6850-00-973-9091 brings a case of 12, 10-oz spray cans.

Once you've got the rusty thumbscrews out, get replacements with NSN 5305-01-106-7961.



TOXINS AS A FORM OF CORROSION



Removal of cadmium fasteners from the Stryker, or any vehicle, may require sanding or grinding. Most of the toxic cadmium falls as small pieces that can be easily cleaned up, but some cadmium becomes dust.

Cadmium dust on skin, clothing and work surfaces can be removed by washing—but inhaled cadmium dust is hazardous to your health!

The risk is great enough to require protective clothing and respirators when removing cadmium fasteners. Consult your local industrial hygienist or safety professional for recommendations.

Some corrosion control experts at TACOM's Research, Development and Engineering Center (TARDEC) wondered if non-toxic fasteners wouldn't be better.

At point-of-purchase, cadmium fasteners are cheaper but non-cadmium fasteners offer significantly lower life-cycle costs when you factor in clean-up and hazardous material disposal costs.

Soldiers can reduce cadmium exposure by applying the good word found on Pages 38 and 39.

One of the best ways to prevent corrosion is to root out the conditions that lead to it. In this case, TARDEC eliminates the toxic/corrosive effects of cadmium to the health of Soldiers and saves the Army money.

Cadmium is a silver-white metal element that's commonly used as a protective coating, a hardener, a battery component and a paint pigment. That means it's all over any motor pool.



CADMIUM IS COVERING THE ENTIRE MOTOR POOL!

IS THERE NOTHING TO BE DONE?!

Unfortunately, cadmium is also a known carcinogen and can cause lung and kidney damage. That's why Soldiers should do everything possible not to expose themselves to it. Normally, grinding and sanding produce particle sizes that will not be airborne. However, don't use compressed air to clean work benches, parts and areas because cadmium dust can produce an inhalation hazard. Keep the hazard limited to a skin and ingestion hazard. Maintain a clean work environment and wash frequently.

You are most at risk to cadmium exposure while grinding, sanding or welding metal parts, particularly bearings and axles. The fine cadmium particles get into the air where you can unknowingly inhale them, especially if compressed air is used to clean or dry parts. This can also spread cadmium particles to adjoining areas like break rooms and offices.



HERE ARE SOME WAYS TO PROTECT YOURSELF AND YOUR FELLOW REPAIRMEN WHEN GRINDING, SANDING OR WELDING...



Wear a respirator and protective clothing, such as coveralls, as determined by a qualified industrial hygienist.

- Welding, sanding and grinding should be done in areas that can be washed to remove cadmium waste. These processes are best done outside the shop to reduce inhalation hazards. People not involved should stay away from these processes

- Use exhaust ventilation to capture cadmium dust at its source. Ensure the work environment is periodically evaluated by industrial hygienists or safety professionals to provide adequate and appropriate protection.



- Wash your hands and face as soon as possible after doing any repairs that might produce cadmium dust.

- Never shake or blow dust that might contain cadmium off clothing. That just puts the cadmium in the air where it can be inhaled.



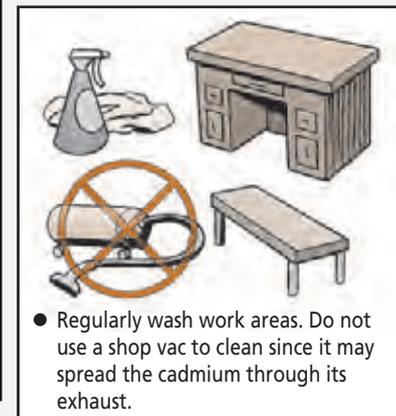
- Keep your home free of possible cadmium contamination by leaving work clothing in designated work locker areas.



- Do not smoke, eat or drink in work area.



- Don't wash contaminated clothing with non-contaminated clothing.

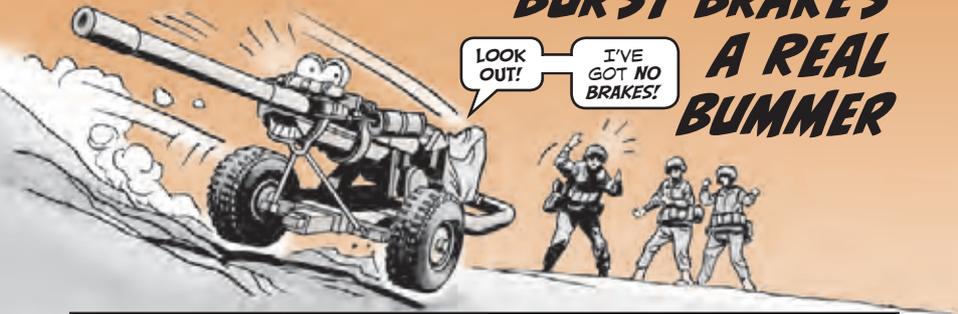


- Regularly wash work areas. Do not use a shop vac to clean since it may spread the cadmium through its exhaust.

Follow local environmental laws and Army regulations to dispose of gloves, clothing, rags, respirator cartridges and waste water.



BURST BRAKES A REAL BUMMER



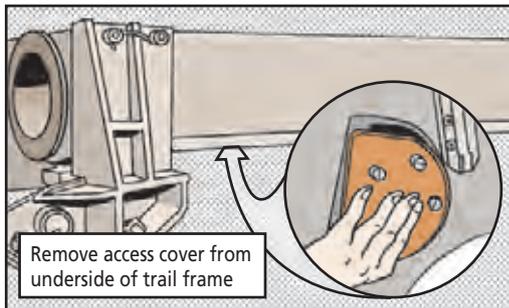
Dear Editor,

While performing scheduled services, we've noticed that the M119A2's brake hose, NSN 4720-01-344-6034, is badly rusted about 80 percent of the time. Those rusty hoses can easily burst during brake tests and normal operation.

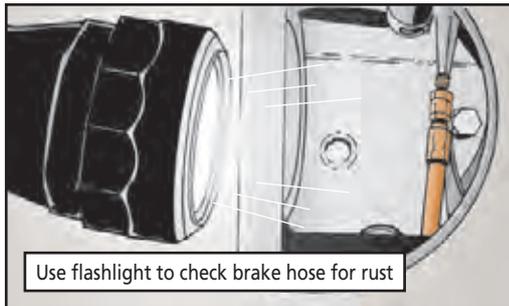
We recommend that operators keep a close eye on this brake hose and that it also be checked during every service. It's also a good idea to make sure the drain plugs, NSN 5365-01-488-7429, and access cover gasket, NSN 9320-01-343-1778, are in good condition.

The brake hose is easy to reach. Just open the right-hand (curbside) access cover, PN 12591232, on the underside of the trail frame. Then use a flashlight to look at the brake hose inside the frame chamber. If it's rusty, get the brake hose replaced right away.

Wilfried Heitzer
Jochen Rankel
Michael Schwabe
Peter Kohler
Gerhard Scherm
Hans-Juergen Pimer
Maintenance Activity Vilseck, Germany



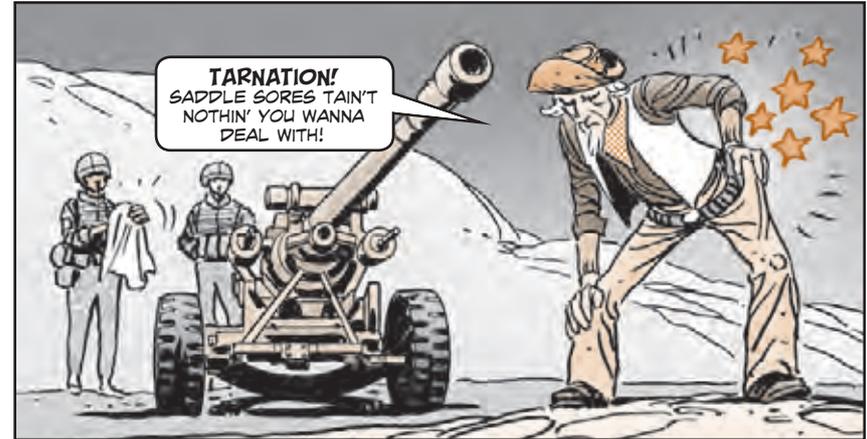
Remove access cover from underside of trail frame



Use flashlight to check brake hose for rust

Editor's note: An excellent suggestion, gentlemen. The procedure for replacing the brake hose is in WP 0045 00 of TM 9-1015-252-34 (Aug 06, w/Ch 1, Feb 08).

CLEANING FIRST PREVENTS SADDLE SORES



Daily lubing of the saddle bearing surfaces on your M119A2 howitzer is wasted effort if you don't clean them properly first, operators.

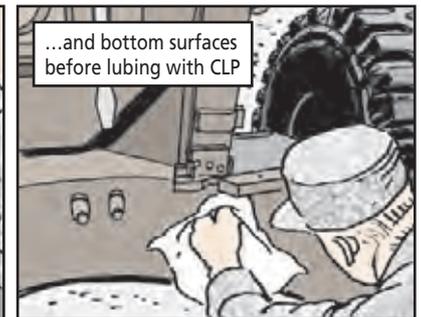
It's easy to remember to clean the bottom surfaces. They face up, so they're in plain sight. It's the top surfaces—the ones that face down—that are usually forgotten.

Dirt, sand and oil collect there, too. If you don't clean them off, the combination acts like sandpaper. Soon, those smooth metal surfaces are scratched, pitted and covered with corrosion. That leads to damaged saddle pads which will make your howitzer NMC.

Use a clean cloth to wipe off all of the surfaces. You'll have to get down on your hands and knees to make sure the top surfaces are clean.



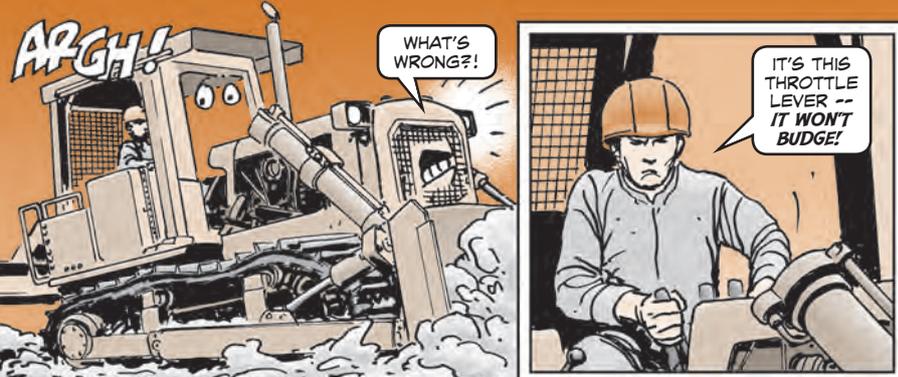
Clean top surfaces...



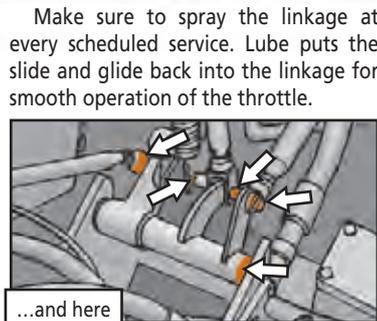
...and bottom surfaces before lubing with CLP

When the gunk is gone, cover all the surfaces—top and bottom—with a light coat of CLP, NSN 9150-01-054-6453.

STUCK LEVER LINKAGE REMINDER



To prevent these problems, wipe off the throttle linkage with a brush or clean rag. Then spray pivot points and connections with a shot of lubricating spray, NSN 9150-00-458-0075. Move the throttle lever back and forth a few times to work it in.

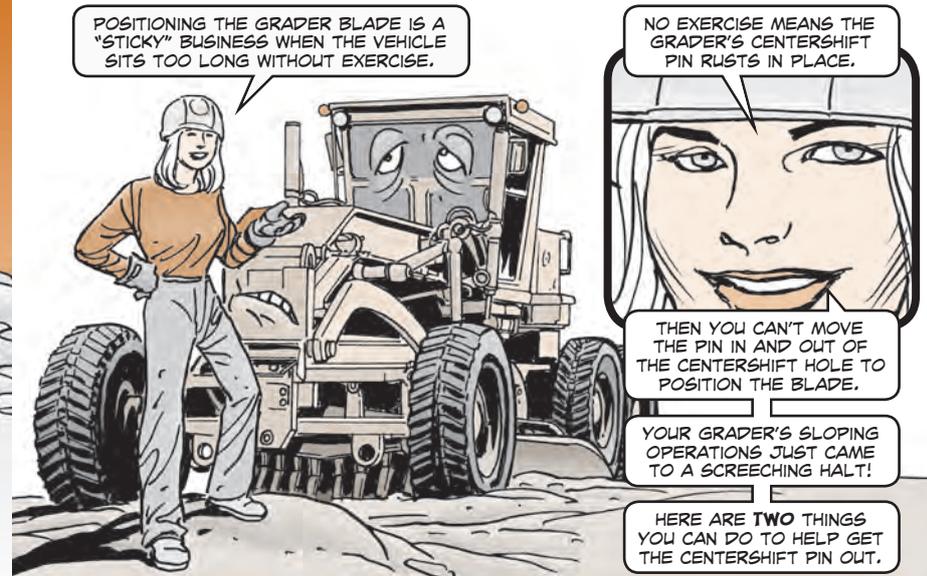


Make sure to spray the linkage at every scheduled service. Lube puts the slide and glide back into the linkage for smooth operation of the throttle.

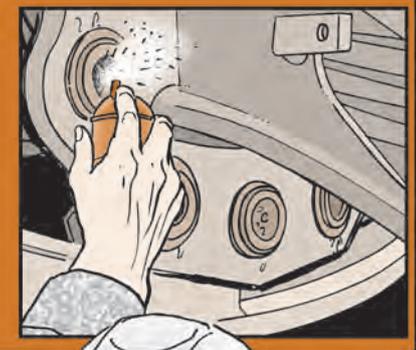
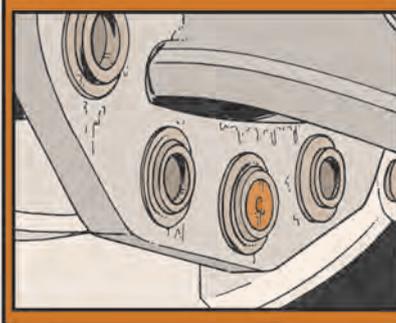
Paint Shop Reminder
 Before your dozer heads off to the paint shop, tape over the throttle linkage where it connects into the mounting bracket. That way the linkage won't get stuck "in place." Just make sure the tape is removed when the dozer comes back from the paint shop.

[Click here for a copy of this article to save or email.](#)

LUBE HELPS "STICKY" PIN



- First, exercise the grader by pulling the center shift pin out of the hole at least once a month. That way rust won't "freeze" the pin in place.
- Second, spray the hole and pin with corrosion preventive compound. NSN 8030-00-938-1947 gets a 16-oz can.



BY THE WAY, WP 0039 AND WP 0041 OF TM 5-3805-261-10 HAVE THE LOWDOWN ON THE CENTERSHIFT PIN.

[Click here for a copy of this article to save or email.](#)

Protect Hydraulic Cylinders

WELL, HELLO DOLLIES! ARE YOU READY TO TAKE THOSE CONTAINERS TO THE FIELD?

I'M READY AND RARIN' TO GO!

I'M A BIT RUSTY. I NEED SOME HELP HERE!

YOU CAN HELP YOUR DOLLIES BY USING THE FOLLOWING TIPS.



Dear Editor,

I have a good idea to pass on to troops in the field. It'll protect the M1022A1 dolly set's hydraulic cylinders and save the Army money.

Nowhere in TM 9-2330-390-14&P, the TM for the M1022A1 dolly set, are instructions found about protecting the lift cylinders and the positioning cylinders—its hydraulic cylinders—from weather damage. The operator's PMCS only tells you to clean and lube. The organizational PMCS says only how to lube. We need some way to prevent the push rod in the cylinder that's exposed to the weather from pitting, which leads to cylinder replacement.

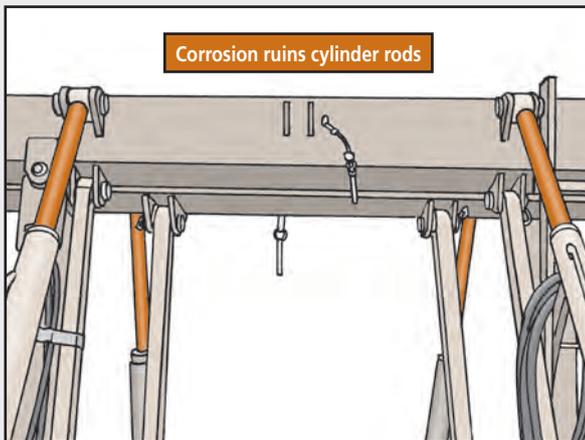
Hydraulic cylinders aren't cheap. A new lift cylinder assembly costs about \$2,273 and a new positional cylinder assembly costs about \$1,562.

I suggest that units get tube-type pipe insulation from a local hardware store and put it around the exposed push rod on the cylinder. This should cut down on cylinder replacement and save money.

Richard Hart
Production Supervisor
FLRC Hood

Editor's note:

Thanks for that useful tip, Mr. Hart. Readers, remember that corrosion is no friend to your dolly set. It ruins cylinder rods. In fact, it can pit the rods so badly that seals can't prevent fluid leaks. Once the leaks go to Class III, your dolly set becomes NMC.



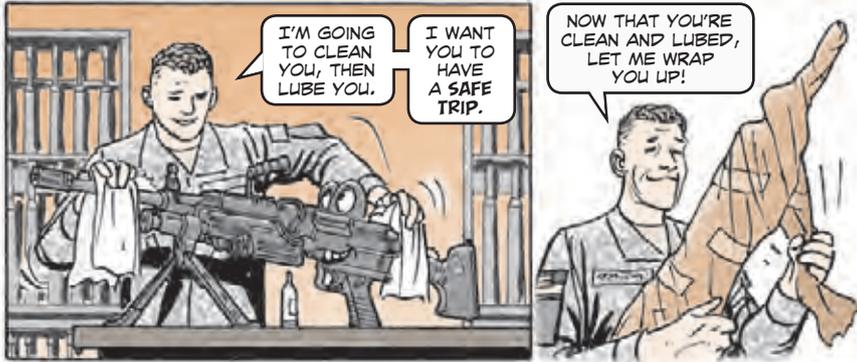
Another way to protect hydraulic cylinders and stop corrosion before pitting starts is by exercising the cylinders weekly. That spreads a thin coat of hydraulic oil on the cylinder rods. But if you can't exercise the equipment, put a thin coat of GAA on the rods.

And if your dolly set is going to sit unused for more than a month, you can also coat the cylinder rods with GAA and wrap them with waterproof paper. Then use moisture-resistant sealing tape, NSN 7510-00-852-8180, to hold the paper in place.

By the way, TACOM LCMC told us there is a \$364 protective bellows assembly, NSN 5340-01-573-1239, PN 8D00411-1, made from special weather and sun-resistant material.

NSN 5340-01-573-1239
brings protective bellows

Safe Shipping For your Weapons



All the care you give your rifle, machine gun, or pistol in the field can go to waste if you don't show the same care when you ship it to or from SWA.

If you just toss your weapon in a box for shipment, moisture can let corrosion turn it into an expensive piece of junk by the time it arrives at its destination. And that has happened too many times in the last several years. Too many weapons have been ruined because PM was forgotten when it came time to ship them.

But your weapon can have a safe journey if you just remember these rules:

- **Clean 'em.** Completely clean your weapons like their -10 TMs say to. **But no steam cleaning!** That surely leads to corrosion because it also cleans out all lubricant.
- **Lube 'em.** That means CLP for all weapons except the MK19. For it, use corrosion preventive compound (MIL-PRF-16173 grade 3), NSN 8030-00-244-1293, cut 50 percent with mineral oil; or use general purpose lubricating oil (MIL-PRF-3150), NSN 9150-00-231-2356; or general purpose lubricating oil (MIL-PRF-32033), NSN 9150-00-231-9062, if it's used with vapor corrosion inhibitor (VCI). All three lubes can also be used for all weapons if necessary.
- **Wrap 'em.** Wrap weapons in VCI barrier and secure the barrier with tape. NSN 8135-00-664-0015 brings a 3 x 600 foot roll of VCI.
- **Do not use bubblewrap.** Some bubblewrap contains a chloride that when mixed with moisture forms an acid that causes corrosion. There's no way to tell which is which, so avoid **all** of them!

Some units have reported problems getting these VCI materials through the supply system. Flex-Pac and MRN Enterprise are other sources for VCI bags and will ship them within 24 hours.

Contact Flex-Pac at (309) 794-9544. Contact MRN Enterprise at: 412-221-9111 or order at their website: <http://www.mrnexterprises.com>

STAMP OUT BARREL MARKING



Dear Half-Mast,

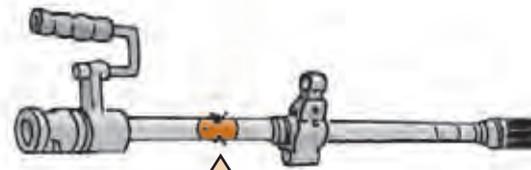
I know PS has talked about how important it is to ID both barrels for the M2, M249, and M240 machine guns. That way you know you're using a barrel headspaced for that specific weapon. You recommended using a dog tag to put the ID number on. I know you can get the dog tags with NSN 8465-00-242-4804. How do you stamp the numbers on them?

SPC A.B.

Dear Specialist A.B.,

Your direct support has metal stamping die sets that are part of the All Direct Support Shop. If they don't have the stamping sets, you can order one for 1/8-in numbers with NSN 5110-00-289-0002. Then use safety wire to fasten the dog tag to the barrel. Make sure the wire ends don't stick out where they can poke someone. You can also paint the number on the barrel.

What you **don't** want to do is engrave the number on the barrel. That ruins the barrel's finish, which leads to corrosion and a ruined barrel.



Use safety wire to attach dog tag to barrel

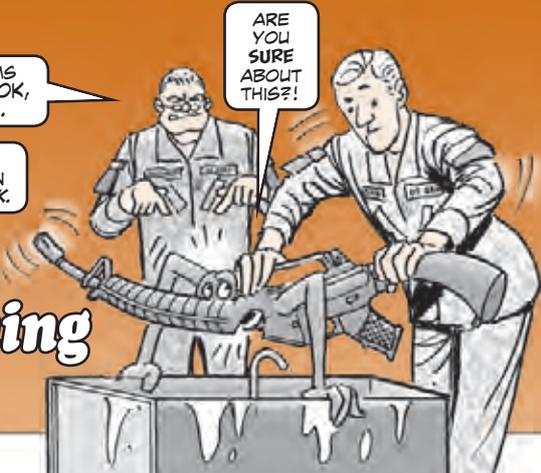
Half-Mast

CLEANING SMALL ARMS IN CLEANING TANKS IS OK, IF DONE CORRECTLY.

BUT IMPROPER USE OF CLEANING TANKS CAN TURN A GOOD WEAPON INTO JUNK.

ARE YOU SURE ABOUT THIS?!

Cleaning with Cleaning Tanks



The Army doesn't recommend a specific cleaning tank. But you should **never** use an ultrasonic cleaning system. They can completely remove a weapon's protective coating, which leaves the weapon defenseless against corrosion.

You should also **never** use a water-based cleaning fluid. That leads to corrosion.

Use only the cleaning materials listed in the back of the weapons' -23&P TMs. These cleaners have been tested and approved by the Army. MIL-PRF-680 Type II dry cleaning solvent, NSN 6850-01-474-2317, is authorized by the Army.

Do not clean several weapons at once in a cleaning tank. It's too easy to mix up bolts and receivers, which would ruin headspacing.



KEEP THAT STUFF OUTTA ME!

IT MAKES WEAPONS RUST!

Applying SFL

If you need to degrease a weapon in order to touch it up with solid film lubricant (SFL), use MIL-PRF-680 Type II dry cleaning solvent. It's not enough to let the weapon's parts soak in the solvent. You also need to scrub the parts with the solvent and a non-metallic brush to clean out all dirt and grease.



Degreasing requires a little muscle

THIS IS THE PROPER PROCEDURE FOR APPLYING SFL...

- Thoroughly clean and degrease the weapon.
- Thoroughly dry the weapon.



- Apply an even coating of SFL to the areas that need touchup.



Apply even coating

- Allow the SFL to fully cure for 24 hours before returning the weapon to service.

See the weapon's -23&P for the limits on how much of the weapon can be touched up with SFL.

NSN 9150-01-260-2534 brings a 16-oz aerosol can of SFL. You can also get a 1-qt can with NSN 9150-01-360-1908 and a 1-gal can with NSN 9150-00-142-9361. These are non-aerosol and must be applied with a brush, which will produce a more even application than spraying on SFL. Whichever kind of SFL you use, carefully follow the instructions on the can for best results.

IF YOU HAVE ANY QUESTIONS ABOUT CLEANING TANKS OR SFL, CONTACT TACOM'S EUGENE MEADE AT DSN 786-1277; (586) 282-1277; OR EMAIL: eugene.v.meade2.civ@mail.mil



Small Arms...



DRY UP MOISTURE THREAT!

Moisture is the silent enemy of your rifles, pistols and machine guns. While you think your weapon is safely tucked away in the arms room or in a transport ship or plane, moisture can feed the corrosion that eats away at the weapon's metal. When you get ready for action again, you may find that the barrel or bolt has been ruined.

But there are several ways you can dry up the moisture threat.

Prepare for travel. If your weapon is traveling from SWA back to your home base, it may be going from extreme heat and low humidity to either a plane where the temperature will be cold or to a ship that will go through lots of salty sea air. And, if the weapon's final destination is someplace like Ft Polk or Stewart, it will face very high humidity there.

To protect your weapon against all the moisture produced by temperature changes and humidity, you at least need to clean and thoroughly lube it like the -10 TM prescribes. The best protection for travel, though, is to also use vapor corrosion inhibitor wrap, NSN 8135-00-664-0015.

PS had an article in PS 660 (Nov 07) on the best ways to prepare weapons for shipment. Access it at:

<https://www.logsa.army.mil/psmag/archives/PS2007/660/660-18-20.pdf>

If you don't prepare your weapon for overseas travel, count on its being ruined by corrosion by the time it arrives. Some posts report receiving weapons back from SWA with absolutely no lube and thus defenseless against moisture.



Fight humidity in the arms room. Places like Stewart or Polk are very humid and many other Army posts have to deal with some humidity. The very best way to fight humidity is with a dehumidifier that has a 15-pint capacity.

But for larger arms rooms or very humid environments, you probably need a dehumidifier that has a 30- to 60-pint capacity. Most large home supply outlets have a large selection of dehumidifiers.

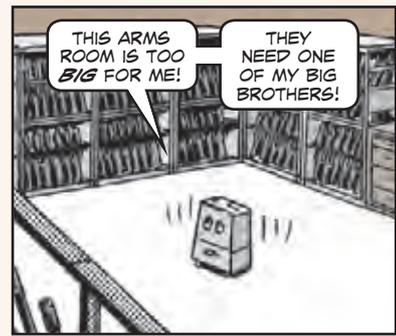
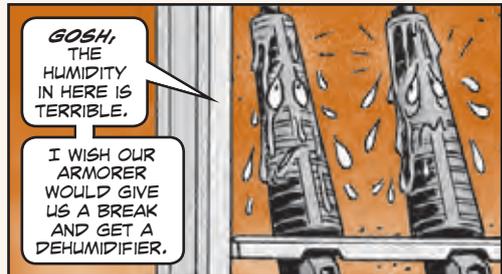
Dehumidifiers lose their effectiveness above 95°F, so arms rooms should be kept below that temperature if possible. Always position a dehumidifier on the floor, since that's where moisture settles. Air circulation fights humidity, so running a fan in the arms room is a good idea, too.

A dehumidifier won't do much good if you don't empty it. In very humid environments, you may need to do that every day. And if you're going to be gone for several days, you need to make sure someone else empties it.

Prepare for storage. Armorer should not accept any weapon for storage in the arms room that hasn't been cleaned and lubed.

Don't leave barrel caps on rifles. They trap moisture in the barrel.

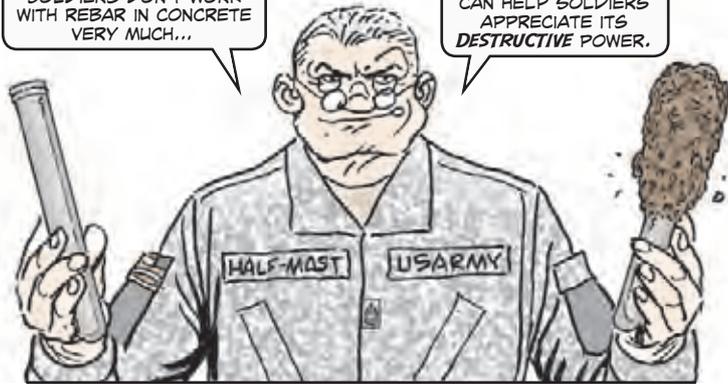
Weapon TMs say you can store weapons for up to 90 days without cleaning or lubing them. But you still need to check all the weapons in arms room for signs of corrosion at least monthly, especially in humid areas. If you wait three months to check, it could be too late.



PROTECTING REBAR IN CONCRETE

THIS IS A NORMAL PIECE OF REBAR. ALTHOUGH SOLDIERS DON'T WORK WITH REBAR IN CONCRETE VERY MUCH...

...UNDERSTANDING REBAR CORROSION CAN HELP SOLDIERS APPRECIATE ITS DESTRUCTIVE POWER.



Many Army concrete structures use reinforcing steel rods (rebar). But rebar can corrode, especially if water penetrates the concrete.

Corrosion both weakens and expands rebar within the concrete. Eventually the concrete fractures, weakening the structure.

There is new hope for protecting rebar from corrosion. The penetrating corrosion inhibiting system (PCIS) is an inhibitor spray applied to concrete surfaces. It penetrates into concrete, protecting rebar from corrosion.



How well does it work? In Okinawa, Japan, two bridges and a warehouse had significant rebar corrosion. After some patching of broken concrete, PCIS was applied.

Tests showed a reduction of corrosion rates from 61.4 to 14 microns/year, and water penetration was reduced from 0.14 to 0.015 ml/sec.

What will a similar investment of lubrication and appropriate rust inhibitors do to prevent corrosion on your equipment?

Overcoating Process for Steel Structures

Just how committed is the Army to preserving maintenance dollars?

A new process designed to reduce corrosion on Army structures like aircraft hangars has some interest for field-level Soldiers.

In the past, as steel structures developed rust, the process was to remove the rust, paints and coatings down to the bare metal. Sand blasting produced hazardous waste. Wet methods helped keep waste from getting into the environment but the residue still had to be treated as hazardous, resulting in high disposal costs.

RUSTY METAL STRUCTURES ARE AN EYESORE! THEY ARE ALSO COSTLY TO REPAIR OR REPLACE.

READ ON TO FIND OUT WHAT THE ARMY IS DOING TO REDUCE COSTS AND INCREASE DURABILITY.

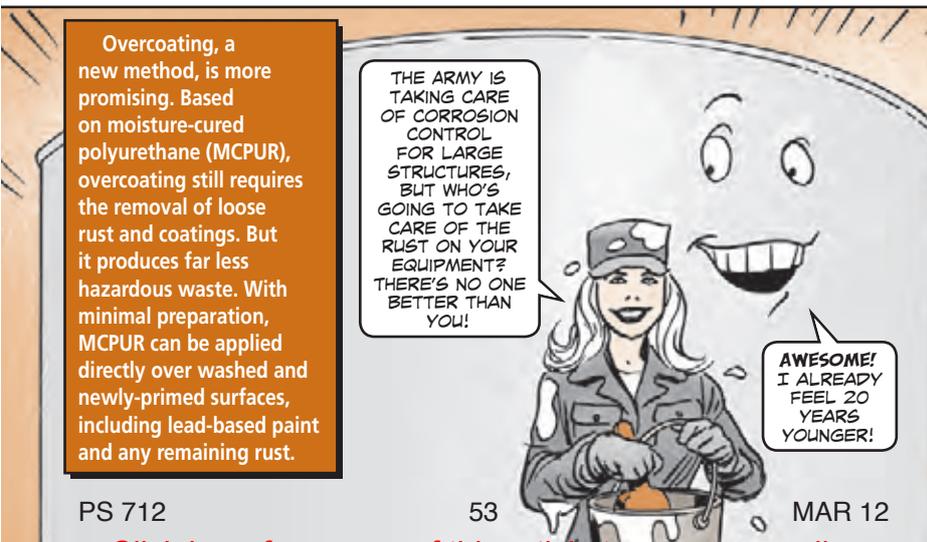
WOULD YOU LOOK AT THIS? MY NEW OVERCOAT WILL SAVE MY SKIN AND KEEP ME FROM FEELING MY TRUE AGE!



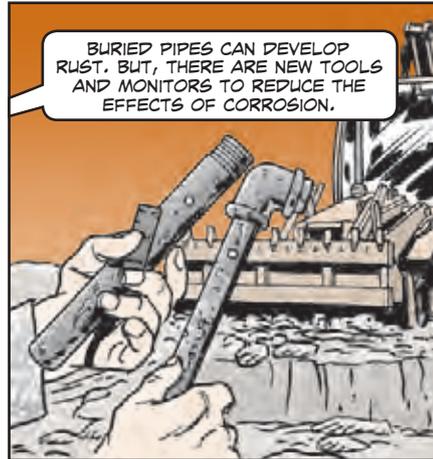
Overcoating, a new method, is more promising. Based on moisture-cured polyurethane (MCPUR), overcoating still requires the removal of loose rust and coatings. But it produces far less hazardous waste. With minimal preparation, MCPUR can be applied directly over washed and newly-primed surfaces, including lead-based paint and any remaining rust.

THE ARMY IS TAKING CARE OF CORROSION CONTROL FOR LARGE STRUCTURES, BUT WHO'S GOING TO TAKE CARE OF THE RUST ON YOUR EQUIPMENT? THERE'S NO ONE BETTER THAN YOU!

AWESOME! I ALREADY FEEL 20 YEARS YOUNGER!



HIGH TECH UTILITY PROTECTION



Soldiers live because of corrosion control and prevention in the utilities they use every day.

There's an old saying, "What you can't see can still hurt you!" This is true of underground utilities such as gas and water. Their pipes and valves need corrosion control because their metal parts are subject to corrosion. Corrosion can lead to leaks and breaks, and in the case of gas lines, explosions.

The Army is applying some new options to fight utility corrosion.

Cathodic protection (CP) runs an electric current between a ceramic anode and the utility to be protected. The utility is kept at a negative potential, and the anode is kept at a positive potential. Newer "deep well" ceramic anode CP systems have recently been installed at two installations to protect water reservoirs and pipelines, as well as fire suppression, steam and natural gas lines.

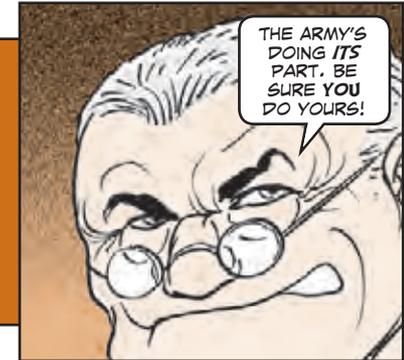
But monitoring these systems was hard because they are laid underground and there are a lot of them.

Maintenance workers now use a new wireless system to check the working condition of the utility lines. Workers can drive past CP test stations where remote monitoring units (RMUs) gather data. The data can be analyzed and used to keep the utility lines in good condition. Some Army installations already have 100 such test stations that can reduce monitoring time from three months to three days!



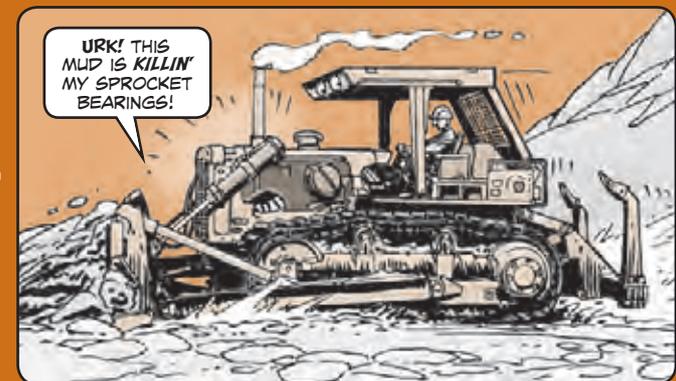
Maintenance personnel can use a laptop PC or a PDA unit to automatically interrogate and record CP protection levels during a "drive-by" of each monitoring station.

What's that mean for Soldiers? Life on Army installations is safer as better prevention keeps utility systems working. And better corrosion prevention provides considerable time savings for maintenance personnel.



D7G Tractor...

LUBE SPROCKET BEARINGS



Operating in dirt and mud is murder on the dozer's sprocket bearings.

That's because water and dirt get past the seals and into the bearings, causing abrasion and corrosion that eat at the bearing's polished surfaces. Worn bearings knock the dozer's track out of alignment—causing excessive wear and tear on the vehicle's undercarriage components.

To head off problems, lube the bearings every time you finish a day's run in mud or water. Pump in grease until new lube comes out around the diagonal bearing cap assembly, which is behind the drive sprocket.

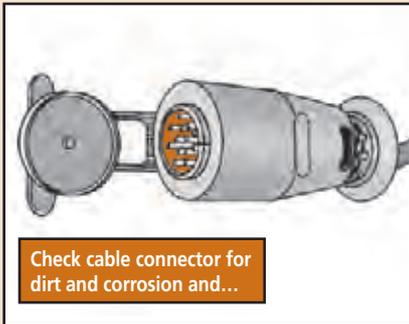


CABLE CARE CAUTION

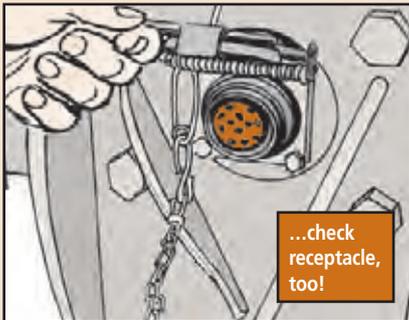
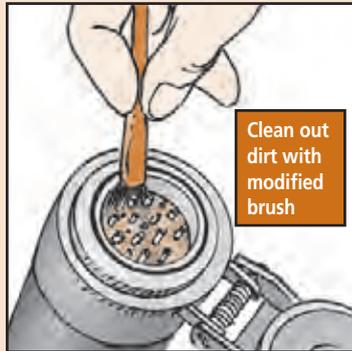


Before Connecting

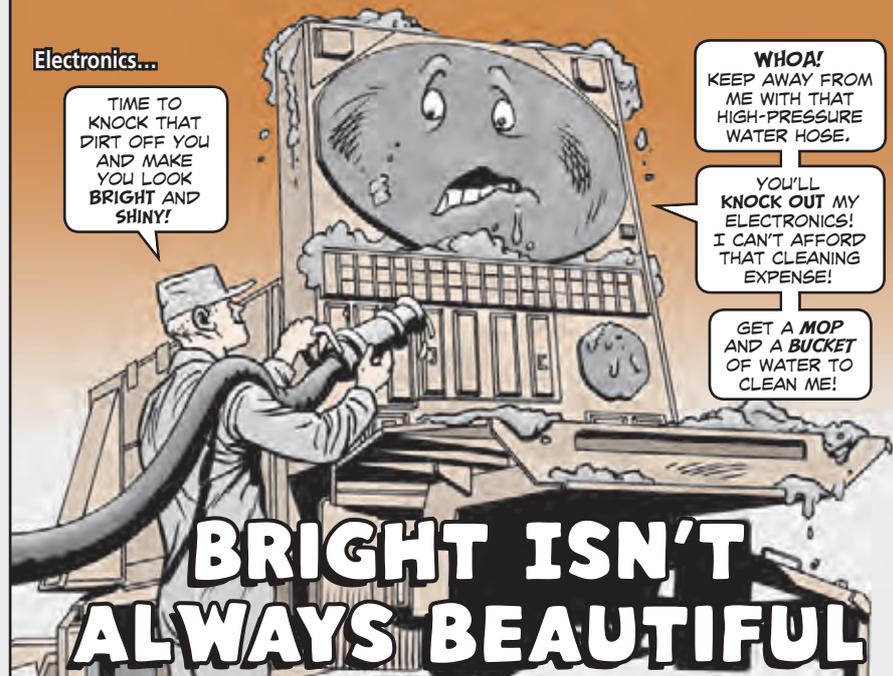
Before installing cables, take a close look at the connectors and receptacles for dirt and corrosion. Loose dirt can usually be blown out with the help of an air hose.



Stubborn dirt can be a little tougher. Try clipping off all but about 1/2 inch of the bristles on an acid swabbing brush, NSN 7920-00-514-2417. The shorter bristles make them stiff enough to brush dirt out of the connector and around the outside of the receptacle.



To remove corrosion, try spraying a light coat of corrosion preventive compound, NSN 8030-00-546-8637, and scrubbing with that short-bristled acid swabbing brush. The compound also displaces water, which should help prevent further corrosion down the road.



Soldiers and their commanders often want their equipment to look bright and shiny for inspections. To achieve that goal, they often employ high-pressure water or steam or take the equipment through wash racks.

That's usually not a bright idea. The cost of a bright, shiny appearance can be many thousands of dollars of ruined electronics equipment.

Most electrical components—like a SINGARS radio or the MLRS's electronics unit—are built to be **water-resistant**. That means they can survive rain and humidity as long as their gaskets are in good shape. But these gaskets are definitely not designed to seal out high-pressure water. The water pushes past their seals and soon shorts and corrosion start doing their worst. An item like the Patriot's data link terminal module can cost many, many dollars to replace.

So is that bright, shiny appearance worth it? No. And when your commander gets the bill, he definitely won't think it's worth it.

As a general rule, don't use high-pressure water above wheel or track level on wheeled vehicles, tanks and trailers that have electronic gear. Check with the equipment's -10 TM to see if it's OK to run a truck or tracked vehicle through the wash rack. Sometimes it is OK, as long as you cover electronic components first. Never use any hose inside a vehicle or van.



IF CLEANING NEEDS TO BE DONE, USE A BUCKET OF SOAPY WATER AND A BRUSH OR MOP. NOW THAT'S A BRIGHT IDEA!

AMMUNITION FOR THE COMMO FIGHT

KEEPING YOUR COMMO EQUIPMENT DOING ITS COMMUNICATION JOB CAN BE A BATTLE.

THE ENEMIES IN THE FIGHT ARE THE ELEMENTS IN THE AIR AND THE ENVIRONMENT ON THE GROUND.

HERE ARE A FEW WEAPONS THAT SHOULD BE IN YOUR ARSENAL...



Water-Displacing Compound

WATER-DISPLACING COMPOUND IS A MULTI-PURPOSE LUBRICANT, PENETRANT AND CORROSION INHIBITOR.

I DRIVE OUT MOISTURE AND I LEAVE A THIN, LONG-LASTING FILM.

CONSIDER IT A MUST BETWEEN ANTENNA SECTIONS.

Silicone Compound

NSN 6850-00-880-7616 BRINGS AN 8-OZ TUBE OF SILICONE COMPOUND WITH CORROSION INHIBITOR.

SILICONE SEALS OPEN AREAS AND PREVENTS WATER AND DIRT INTRUSION.



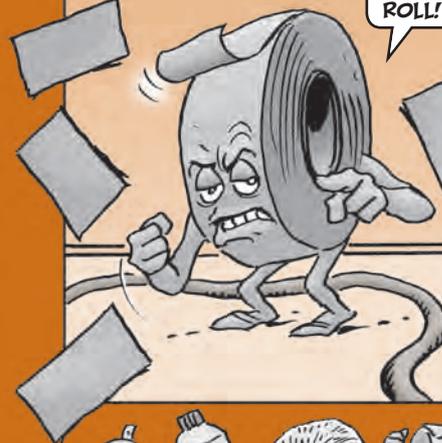
NSN 6850-00-142-9389 BRINGS A BOX OF TWELVE 16-OZ CANS.

Electrical Tape

ELECTRICAL TAPE HAS A HUNDRED USES IN YOUR COMMO SHOP.

ORDER IT WITH NSN 5970-00-419-4291.

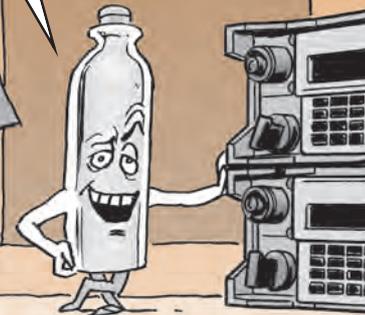
LET'S ROLL!



Isopropyl Alcohol

KEEPING EQUIPMENT CLEAN IS A MAJOR JOB AND SOME CLEANERS CAN DO MORE HARM THAN GOOD.

ISOPROPYL ALCOHOL, NSN 6810-00-753-4993, DOES A GOOD CLEANING JOB AND DOES NOT HARM YOUR EQUIPMENT.



IF YOU GENTLY CLEAN YOUR EQUIPMENT, KEEP MOISTURE AND DIRT OUT OF CONNECTIONS AND CONNECTORS, AND USE INHIBITORS TO FIGHT CORROSION, YOU'LL WIN THE COMMO WAR.



Sentinel Reception Needs Isopropyl



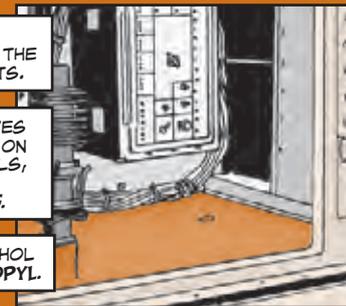
IF YOUR SENTINEL IS GOING TO WARN YOU ABOUT THE ENEMY, IT NEEDS TO BE VERY RECEPTIVE.

IF YOU'RE RECEPTIVE TO THIS PM, COUNT ON GOOD SENTINEL RADAR RECEPTION.

DO NOT USE RUBBING ALCOHOL TO CLEAN INSIDE THE SENTINEL'S COMPARTMENTS.

RUBBING ALCOHOL REMOVES THE PROTECTIVE COATING ON THE COMPARTMENTS' WALLS, WHICH CAN LEAD TO CORROSION AND ARCING.

IF YOU NEED TO USE ALCOHOL FOR CLEANING, USE ISOPROPYL.



FIGHTING CABLE CORROSION

THIS MLRS NEEDS ME!

LET ME AT THOSE CORRODED CABLES!!!



Thousands of electrical cables are used on Army equipment, ranging from the most basic radio systems to complex missile systems and aircraft. All of these cables can be knocked out by corrosion in their connectors. And once the cables are gone, so is the equipment they're powering. That's why you need to do everything possible to fight cable corrosion.

Corrosion takes many different forms, depending on what the cable connector is made of. Corrosion on aluminum can be white, gray or black and look like a paste when wet or a hard film or crumbly deposit when dry. On steel, corrosion is red, brown or black and looks crusty. On copper, it's green or blue and looks like paste when wet. Pitting is also a form of corrosion.

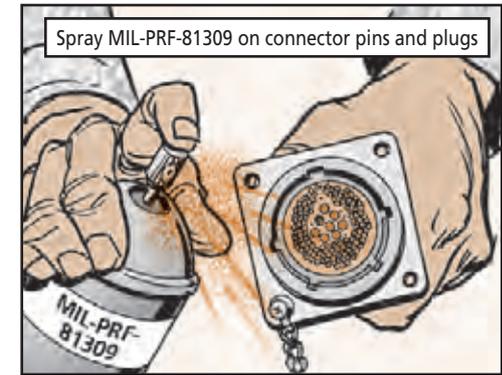
The best way to combat cable corrosion is to apply corrosion preventive compounds (CPCs) to both the inside and outside of connectors on a regular basis.

Corrosion POCs

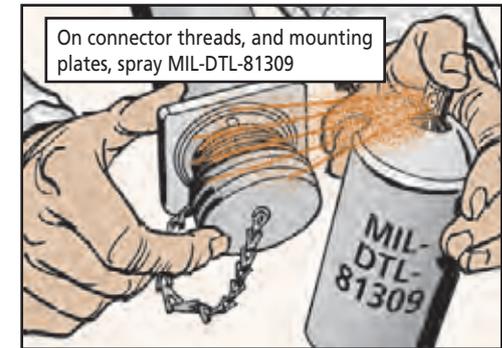
If you have corrosion questions, contact AMCOM's corrosion program office's Robert Herron at DSN 746-5061, (256) 876-5061, or email:

robert.a.herron@us.army.mil or steven.f.carr@us.army.mil

On the inside of connectors, spray a light coat of MIL-PRF-81309 Type III CPC, NSN 8030-00-546-8637, on the pins and plugs. Do this in a well-ventilated area. That's a light coat! Don't soak the connectors. MIL-PRF-81309 Type III is the only authorized CPC for connector pins and plugs.



On connector shells and mounting plates, apply a light film of MIL-DTL-81309 Type II CPC, NSN 8030-00-938-1947. Again, just a light coat. This CPC is also good for lubing moving parts like hinges. Other sizes of this CPC are available on FED LOG.



Then, during your weekly PMCS, check for corrosion on connector mating surfaces, threads, shells and mounting plates. Treat them again with CPCs if necessary. Be sure to remove the old CPC residue and clean the connector surfaces before applying a new coat.

Other CPCs

MIL-DTL-85054 Type I, NSN 8030-01-347-0980, is good for protecting non-moving metal parts, such as skin seams, fastener heads where paint has cracked, access panel edges, and areas with damaged paint.

Use MIL-L-23398 (solid film lube), NSN 9150-01-260-2534, or MIL-PRF-81309 Type II, NSN 8030-00-938-1947, on sliding components like hinges, turnbuckles, latches, and flap tracks. Solid film lube is also good for protecting areas where paint or protective finish has worn off.

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

Would You Stake Your Life ^{right now} on the Condition of Your Equipment?