Issue 371

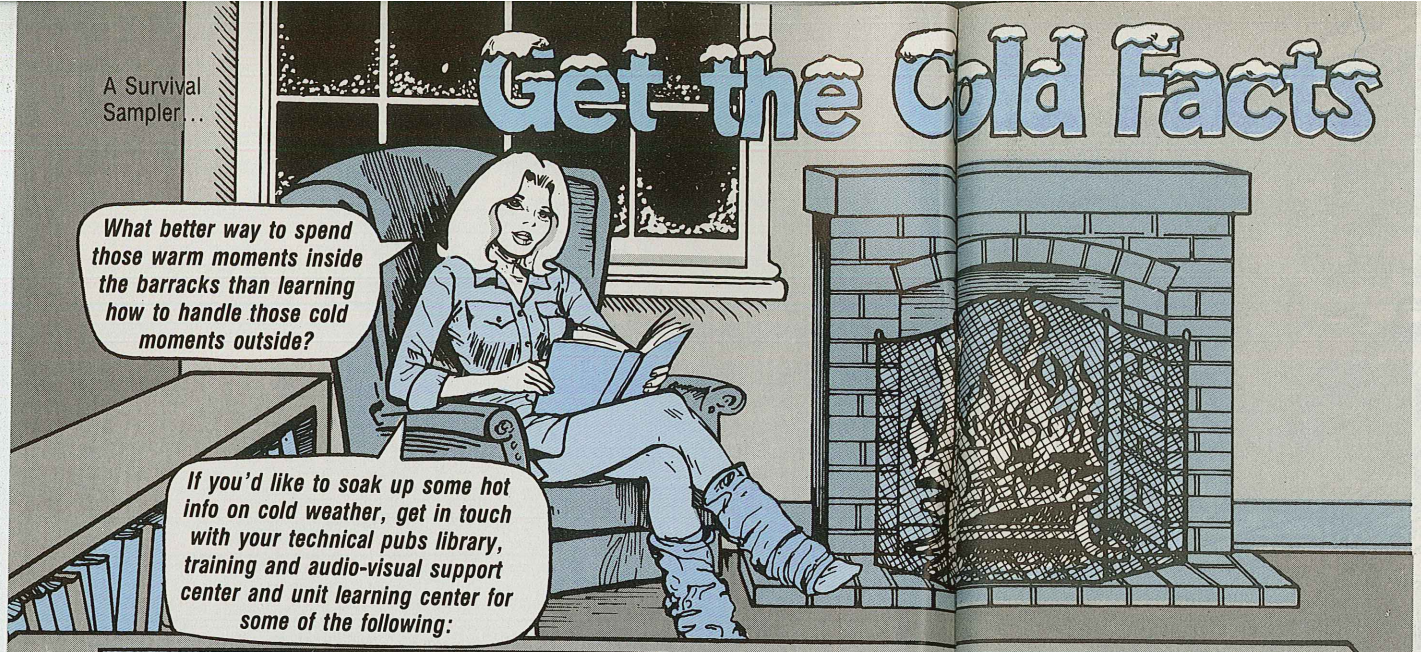
PS

October 1983

THE PREVENTIVE MAINTENANCE MONTHLY

A Survival Sampler...

Get the Cold Facts



Publications

TM 9-247	Materials and Chemicals Used for Cleaning, Preserving, Abrading and Cementing Ordnance Materiel
TM 9-6140-200-14	Lead-Acid Batteries
TM 750-254	Cooling Systems: Tactical Vehicles
TB Med 81	Cold Injury Publications
TB Med 269	Carbon Monoxide: Symptoms, Etiology, Treatment and Prevention of Overexposure
TB 750-651	Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems
TC 11-6	Grounding Techniques
TC 21-3	Individual Operations and Survival in Cold Weather Areas
SB 9-16	Personnel Heaters and Winterization Kit Policy
SB 11-6	Primary Battery Supply Data (cold weather substitutes for dry cells)
SB 38-100	Preservation, Packaging, Packing, Marking
FM 1-202	Environmental Flight
FM 9-207	Operation and Maintenance of Ordnance Materiel in Cold Weather
FM 31-70	Basic Cold Weather Manual
FM 31-71	Northern Operations
DA Cir 40-81-3	Prevention of Cold Injury
DA Pam 360-843	Commanders Call—Cold Injuries Films

Films, Tapes

TF 7-1550	Combat In Deep Snow and Extreme Cold
TF 8-3977	Personal Hygiene in a Cold Climate
TF 8-4879	Prevention of Cold Injury
TVT 8-63	Emergency Care for Cold Injuries
TF 9-3109	Cold Weather Starting—Tanks
TF 9-3957	Vehicle Operation Under Weather Extremes-Part I-Cold Weather
TF 10-2843	250,000-BTU Duct-Type Heater
TF 10-4780	How to Use Cold Weather Clothing
DDCP 20-286	Winter Storm Survival
TF 20-6040	Drowning—The Cold Facts
TF 20-6222	Cold Weather Training... The Safe Way
TF 21-3183	Maintenance of Vehicles in Northern Latitudes
TF 21-3279	Introduction to Northern Operations—Part I
TF 21-3341	Introduction to Northern Operations—Part III
TF 21-3398	Cold Weather Uniform

TEC Lessons

043-441-7830-F	Chaparral Cold Weather Checks
300-081-4127-F	Treating Frostbite
431-093-7414-A	Extreme Cold Operations (MOS 27B)
911-441-0035-F	Cold Weather Hazards
911-441-0042-F	Personal Hygiene: Care of Feet

PS THE PREVENTIVE MAINTENANCE MONTHLY

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

ISSUE NO. 371 **OCTOBER 1983**

GROUND MOBILITY

Winter PM	2	Lube Order	15
Lead-Acid Batteries	6,10	Engine Starting Fluid	15
Battery Charge	9	Seatbelts	17
Slave Cable	11	Water Trailers	17
Exhaust Pipe	11,16	Diesel Fuel	18
Diesel Engines	12	Fuel Freeze-ups	19
Fuel Saver Tip	13	Cooling Systems	20
Personnel Heater	13	Tire Chains	24
Engine Starter	14	Cold-Weather Driving	29

AIR MOBILITY

Aircraft Covers	37	Aviation Messages	65

COMMUNICATIONS

AN/GRC-106	40	Antenna Tips	44
Grounding Equipment	43	Cold Battery Care	46

FIREPOWER

Rockets, Missiles & Mortars	48	CLP	51
		Lens Care	52
Small Arms PM	50	M109-Series Howitzers	53

TROOP SUPPORT

Pubs, Maint Advisories		BDU Repairs	59
SMART! Messages	28	Boot Laces	59
Clothing CAre	54	M12A1 Decon	59
Cold-Weather Hood	55	Heaters	60
Cold Metal Burn	55	Steam Cleaner	61
Sleeping Bag PM	56	Heater PM	62
Cold-Weather Boot	57	Cold-Weather Posters	63
Tent Tips	58	Small Generators	64

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

MSG Half-Mast
PS Magazine
Lexington, KY
40511

Use of funds for printing of this publication has been approved by Headquarters, Department of the Army, 10 September 1982 in accordance with AR 310-1.
DISTRIBUTION: In accordance with requirements submitted on DA Form 12-5. **Private subscriptions:** Order from US Govt Printing Office, Supt of Documents, Washington, DC 20402. $24 per year to US and APO; $30. to foreign address.
PS Magazine ISSN 0475-2953 is published monthly by the Department of the Army, Washington, DC. Second Class Postage is paid at the Lexington, KY post office and at additional mailing offices.
Postmaster: Send address changes to Cdr. US Army Pubs Ctr. 2800 Eastern Blvd, Baltimore, MD 21220.

The Iceman Cometh!

It's nearing that time when Old Man Winter will grace us with his presence. Just because you haven't sent him an engraved invitation, don't get the idea that you'll be excluded from his frosty visit. Cold weather isn't RSVP!

When Old Man Winter knocks at your door, it'll be rough trying to get special lubes, antifreeze or winter covers. So check your TM's and LO's for winter servicing. Find any special winter items listed? Make sure you've got them now while stocks are plentiful.

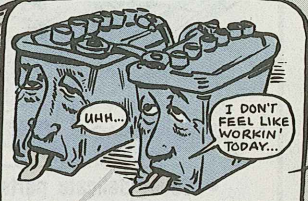
Winter Glitches

Linkages stiffen and slow equipment response.

Rubber and plastic parts get stiff and brittle. What was bendable quickly becomes breakable.

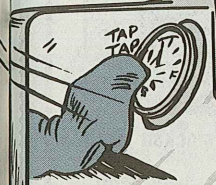
Lubes get thick and hard to use.

Paint becomes brittle and cracks easily.



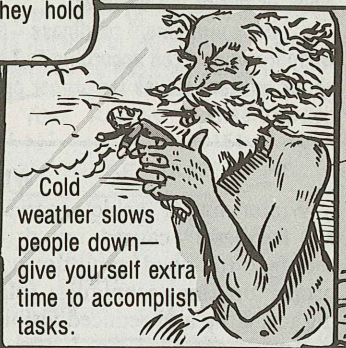
Batteries become sluggish.

Water and humidity collecting in tanks, filters and lines freeze. Water left in an engine removed for repairs can freeze and bust the block. Fiberboard boxes and plastic foam packing aren't waterproof—in fact, they hold water.



Gages stick and give false readings. A gentle tap usually frees them.

Metals contract, and, since different metals contract at different rates, parts that usually work smoothly together begin to bind and rub.



Cold weather slows people down—give yourself extra time to accomplish tasks.

Rough treatment or hot air or water can crack windshields.

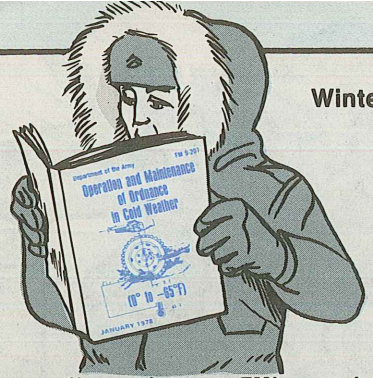
Gloves and mittens make handling tools a real chore. Use extra care and patience in all PM.

Engines are hard to start.

Snow and slush clog vents.

PS MORE

Winter Solutions



- Know what your TM's say about equipment winterization and cold weather operation.
- Make sure snow removal equipment is available and working.
- Brush snow or wipe water from the tops of fuel and lube containers and away from spouts and plugs.
- Brief troops on cold injury prevention procedures and carbon monoxide hazards.

- Cover delicate parts of all equipment and keep electronic gear under cover or out of the weather.
- Check equipment readiness—have weapons winterized according to TM's; check out tent stoves for proper operation and safety.
- Have your library stocked with cold weather pubs.

Winter Driving

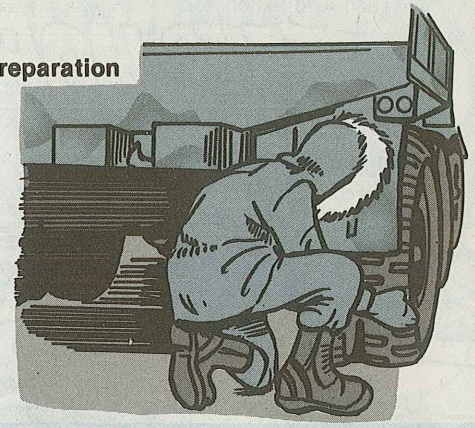
Winter motor vehicle accidents are frequently caused by: driving too fast for road conditions; improper braking techniques; following too close and reduced visibility.

Vehicle Preparation

Make sure all tires have equal tread. Unequal traction results if you don't, and wheel spinning is more likely.

Use tire chains on slick and hazardous roadways.

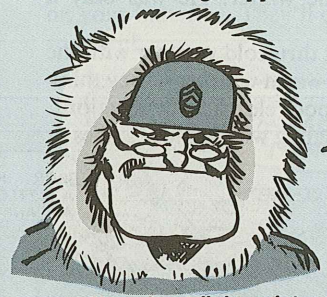
Check your defrosters and heaters—they are your best bet to ensure good visibility. Wiper blades should wipe clean. Replace them if they don't.



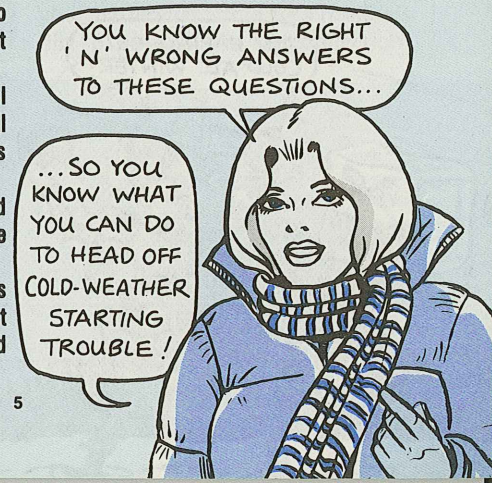
Starting the Day Right

Nothing beats the feeling you get when you hit the starter switch and your engine roars into life. It's the start of a good day!

Hard starting happens only if you let it happen.



- Have I got light, winter-weight oil in the engine? Or will my engine try to turn over in heavy, summer-weight oil—made even thicker by the cold?
- Are my batteries and electrical connections in good shape? Or will weak battery power try to get across dirty, loose hookups?
- Do I keep dirt 'n' water drained out of fuel filters? Or will my engine struggle to start on bum fuel?
- Is the engine air cleaner doing its job? Or will the engine fight to get enough air thru a dirty air cleaner—and bog down on a too-rich fuel mixture?
- Have I reported starting problems? Are they fixed? Or should I just get used to the idea of jump-starting or slave-starting every day...all winter?



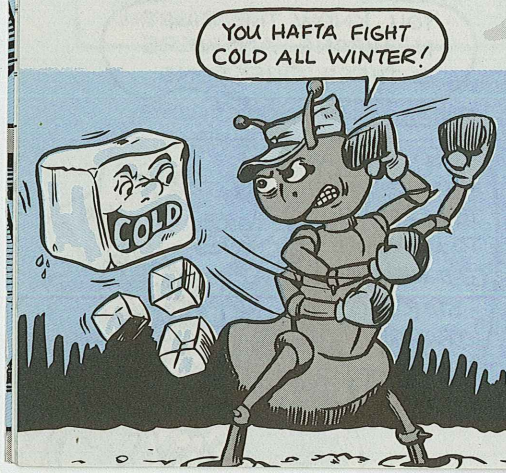
BETTER HOP TO IT!

Remember the ol' story about the grasshopper? He didn't prepare for cold weather—and he didn't make it thru the winter. He was only a grasshopper, tho, with a pinhead brain.

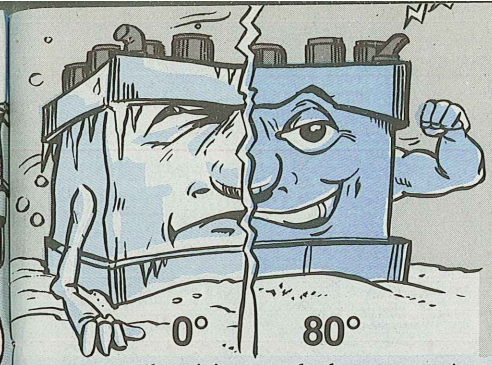
But how 'bout people who think they can get thru cold weather with the same maintenance shortcuts they get by with in warm weather? They think their engines will start with weak batteries and poor electrical connections. Come winter, you see 'em out in the snow struggling with jumper cables or slave cables.

Worse, they limp along like this day-after-day—all winter!

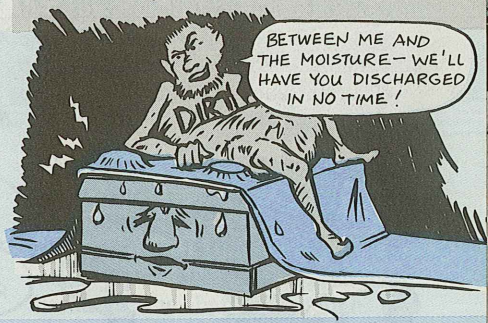
If that's not your idea of a "favorite winter sport", here're some facts you should know about:



• Even if your engine is in tip-top shape...even if your batteries are fully charged, clean and warm...even if battery clamp and cable connections are clean and tight—cold is fighting you all the way to keep your engine from starting. Cold makes fuel harder to ignite. Cold stiffens engine oil so moving parts have a hard time moving.

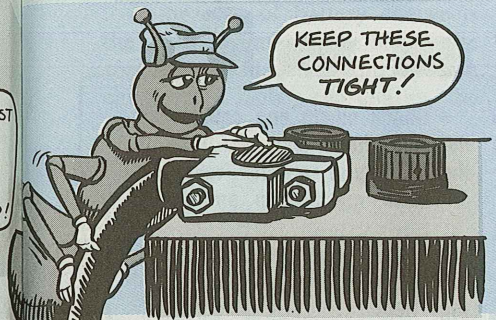


• Chances are, your batteries won't be warm. This means they won't put out full power. At 0°F a fully charged battery puts out less than half the power it would at 80°F. So, if it doesn't get your cold engine started pretty quick, it's dead! How long do you think a weak battery will last?



• Electricity travels thru water. A wet battery—even a damp battery—will discharge just sitting in your equipment. A fully charged battery will slide down hill. A weak battery will hit bottom quicker.

• Dirt and corrosion hold moisture. That's like a wet blanket on your batteries. They'll discharge for sure!

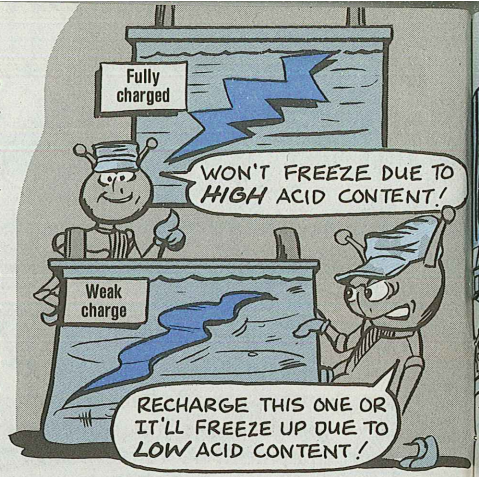


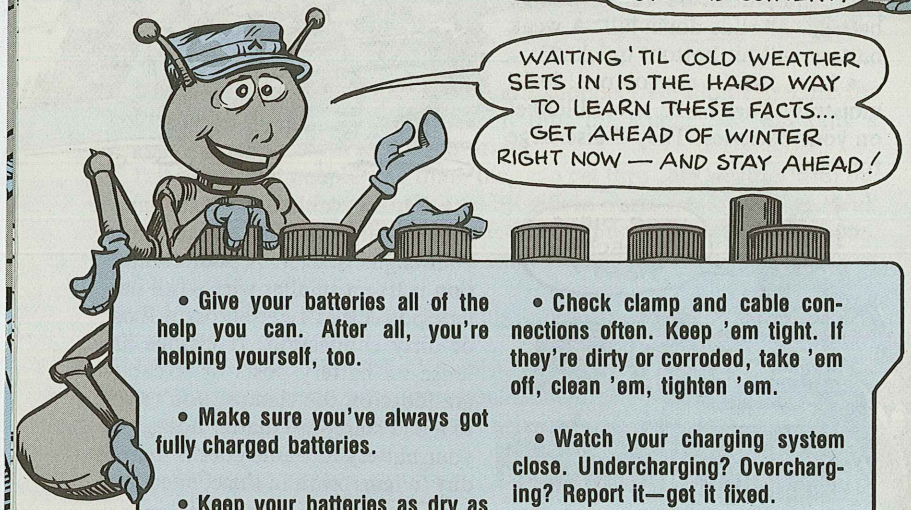
• Battery cables are heavy-gage wire to carry full battery power to your engine starter. A poor connection is like a smaller wire—full battery power can't get across a loose or dirty connection. If clamps are loose on battery posts or if cables are loose on the clamps, you're off to a bad start—no matter how good your battery is. Same goes if there's dirt 'n' corrosion in the connection.

• Cold weather can suck the power out of your batteries in only a few minutes—maybe in seconds—if your batteries are weak. This power must be replaced! That's part of the job of your charging system. You'll have trouble starting every time if your batteries are being undercharged. Overcharging is bad, too; it'll cook your batteries and ruin 'em.

P.S MORE

• A weak battery can freeze into a block of ice. A fully charged battery will take cold down to -90 °F. This's because the electrolyte (battery acid) in a fully charged battery is about one-quarter sulfuric acid. As a battery discharges, the electrolyte becomes less acid and more water. Charging returns the electrolyte to the right balance of acid and water. This's part of the "chemical energy" that turns into electrical energy when you hit the starter switch.





• **Give your batteries all of the help you can. After all, you're helping yourself, too.**

• **Make sure you've always got fully charged batteries.**

• **Keep your batteries as dry as possible. Slush—especially salty slush—will discharge your batteries in a hurry. Wipe 'em off. Better yet, rinse 'em off and then wipe 'em dry.**

• **Never let dirt or corrosion build up on your batteries. Wash your batteries with baking soda and water. Rinse 'em. Dry 'em.**

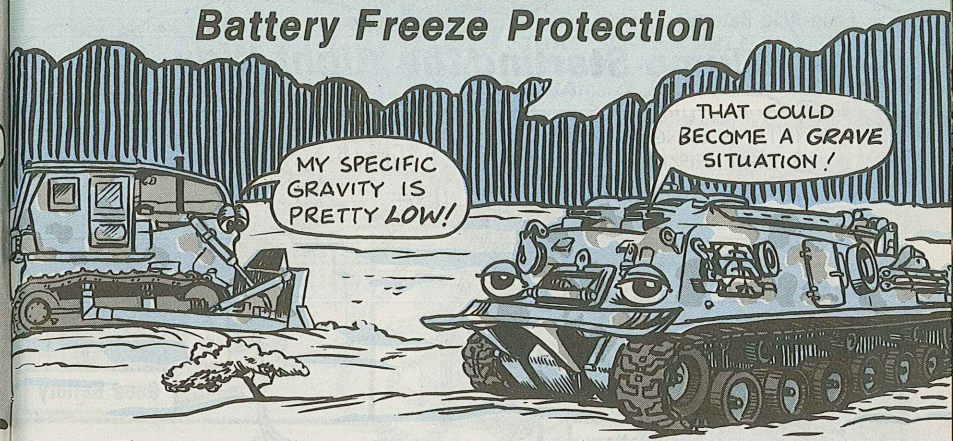
• **Check clamp and cable connections often. Keep 'em tight. If they're dirty or corroded, take 'em off, clean 'em, tighten 'em.**

• **Watch your charging system close. Undercharging? Overcharging? Report it—get it fixed.**

• **You can't start your engine with frozen batteries. Keep 'em from freezing—keep 'em charged up.**

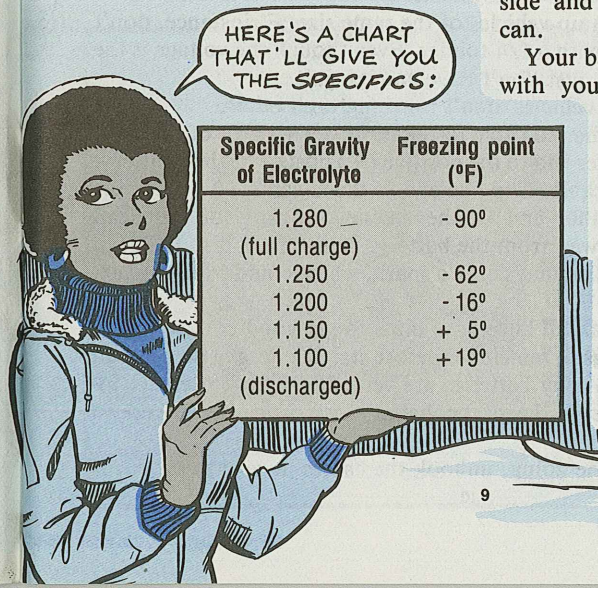
• **Get smart! Dig into TM 9-6140-200-14. It tells you everything you need to know about taking care of your lead-acid batteries.**

Battery Freeze Protection



There's no magic substance to put in your battery to keep it from freezing when the mercury takes a plunge. The only way to keep batteries from freezing is to keep them charged.

A measure of battery charge is the specific gravity. The higher the specific gravity, the higher the charge; the higher the charge, the lower the freeze point.



Specific Gravity of Electrolyte	Freezing point (°F)
1.280 (full charge)	-90°
1.250	-62°
1.200	-16°
1.150	+ 5°
1.100 (discharged)	+19°

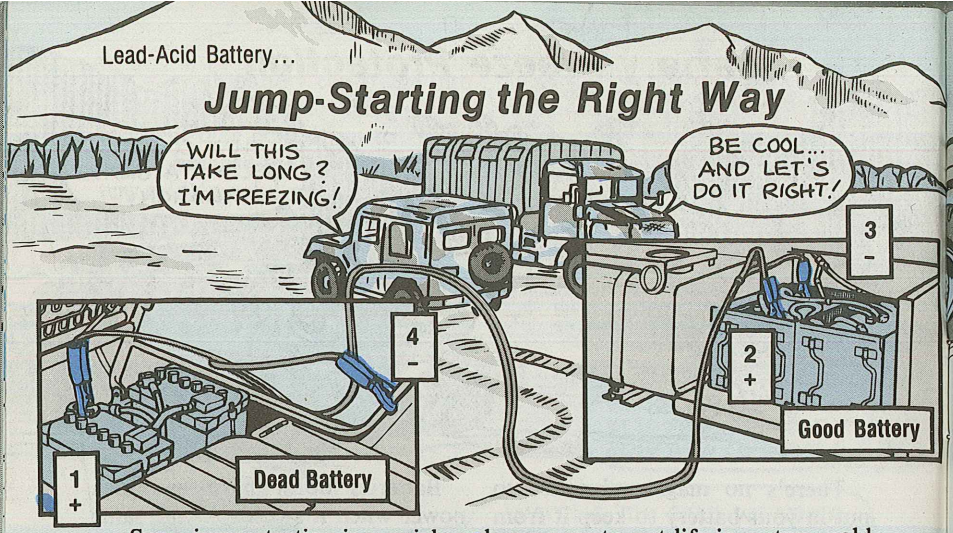
Batteries don't have as much power when it's cold. At the same time, your gear takes more power to get it started. If the temperature is low, it won't take much cranking to discharge the battery enough to freeze.

Head off this problem by keeping your gear in good shape so it'll start quick. If you run the batteries down trying to get started, take them inside and keep them warm if you can.

Your batteries may also discharge with your equipment running. If you run your vehicle at idle, the alternator or generator may not put out enough to charge the batteries. Long idling will discharge the batteries and they freeze.

If you have to have your equipment running, run it above idle speed every few minutes to charge the system.

Jump-Starting the Right Way



Sure, jump-starting is a quick and easy way to put life in a stone cold vehicle.

But there's a right way and a wrong way to use jumper cables. If you hook 'em up wrong, you could screw up an alternator, or, worse, blow up the battery.

An explosion like that can shower you with acid and send pieces of the battery flying through the air—not very healthy.

Take time and do the job right. First, always make sure the voltage of the dead battery is the same as the voltage of the live battery. Never pair up a 24-volt system with a 12-volt system.

Also, it's best to match up vehicles of the same size. F'rinstance, don't try to start a 5-ton diesel with a 1/4-tonner. Even though the voltage is the same, the jeep's batteries just don't have enough juice.

Also, make sure the 2 vehicles aren't touching each other.

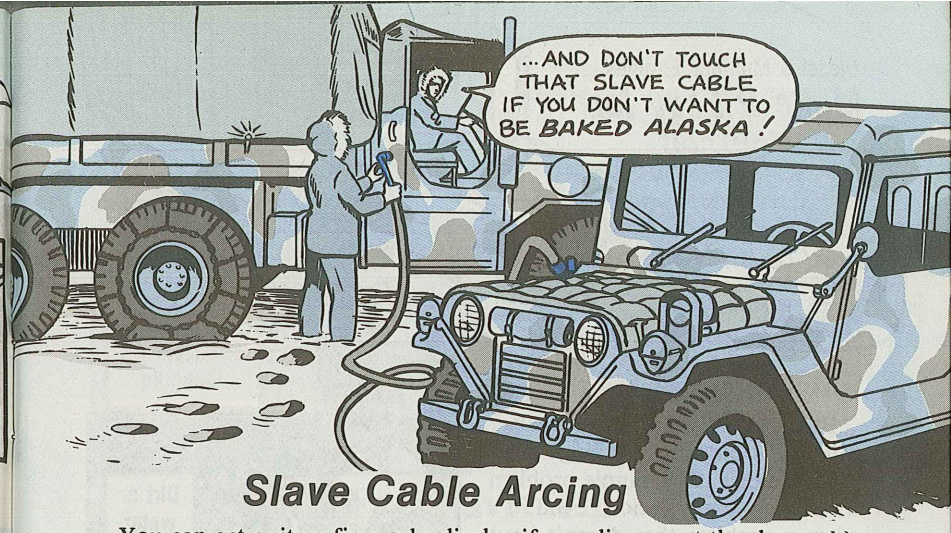
Now, clip one end of the red cable to the positive (+) post of the dead battery. Then clip the other end to the positive (+) post of the live battery.

Next comes the black cable. Clip one end to the negative (-) post of the live battery. Clip the other end to the engine or frame of the dead vehicle—at least a foot away from the battery. Don't hook it to the dead battery at all. If you do, you may cause a spark, which could trigger an explosion.

It's a good idea to clean all hook-up points to get good connections.

A couple of other things to remember before starting. Leave the caps on both batteries. Caps on Army batteries are vented to let off pressure inside. 'Course, you have to keep the battery cap vent system up to snuff.

After you get the engine going, unhook the cables in reverse order.



Slave Cable Arcing

You can get quite a fireworks display if you disconnect the slave cable while the starter is turning.

Problem is, the arcing burns up the connectors and receptacles. Then you'll have to replace the connector or receptacle, or get a new cable for $80!

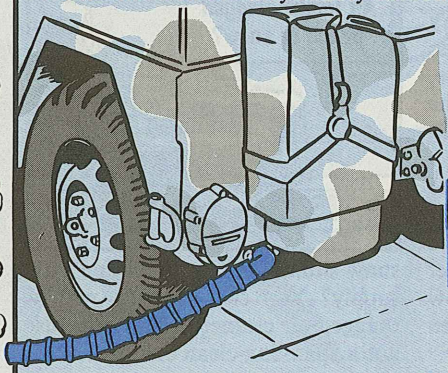
The same thing can happen with jumper cables, too.

Save the fireworks for the 4th of July. Make sure the slave cable or jumper cable is fully connected before you hit the starter. Then don't pull the cable when the starter is engaged.

Be careful around the cable, too. Don't knock it out by accident.

Beware of Deadly Gas

When running your vehicle engine indoors, always use a flexible exhaust extension to carry deadly carbon monoxide fumes outside.

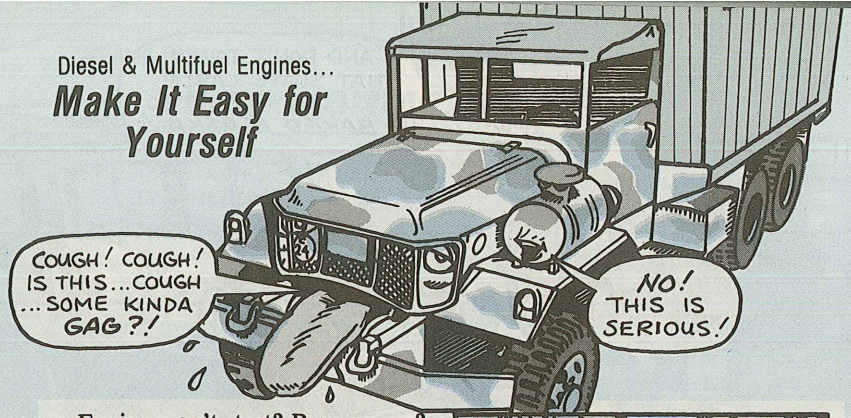


A snug fit over the tailpipe is a must—to prevent a leak. Here are flexible tubes to fit some common-size tailpipes:

NSN 4720-00-	Inside Diameter
174-4668	1 inch
278-8030	1 1/2 inches
278-8027	1 3/4 inches
278-8031	2 inches
174-6818	2 1/2 inches
174-4664	3 inches
174-4671	4 inches

Diesel & Multifuel Engines...

Make It Easy for Yourself



Engine won't start? Poor power? Missing? Coughing? Stalling?

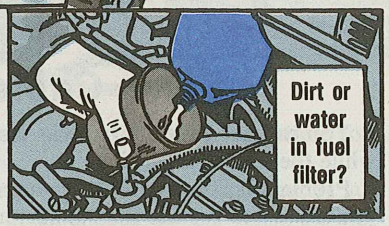
Most times it's a simple problem with a simple solution. And it's often a problem that doesn't have to happen in the first place.

You, the operator, can save yourself from this trouble.

Think filters—fuel filter and air filter (or air cleaner—same thing). A plugged filter is a plug like a cork in a bottle. Fuel and air can't get thru filters that're plugged with dirt or ice. Yes, ice...frozen water!

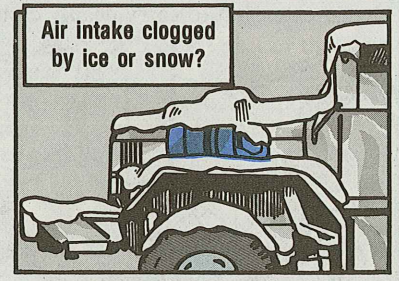
You can quickly find out if a plugged fuel filter is causing the trouble. Try to drain the filter. If nothing comes out, the filter's probably frozen...plugged by ice...water that should've been drained out before. In that case, your mechanic will have to take the filter apart, clean it and maybe even put in a new filter element.

If you get dirt or water from the filter, keep draining until you get it all. If your equipment's got more fuel filters, drain them, too. Get that junk out! It holds up the flow of fuel thru the filter. It can even plug a filter solid.



Easy, right? Even better is draining fuel filters before every operation—like your -10 TM PMCS tells you to do. You can head off a lot of starting and power trouble.

But fuel's not enough. Your engine needs air—lots of it. You know dirt can plug your air cleaner, but did you ever think of ice or



snow shutting off your engine's air supply? You can wind up with a plugged air cleaner even if you just got a spanking-clean element.

Moist air sucked into your cleaner can freeze on the element. Snow can do the same thing. Either way, it's the same as a dirt-plugged element. Air can't get thru!

So eyeball that air cleaner indicator. If the colored flag is locked up in view, your air cleaner's plugged. Get it fixed—element cleaned, dried out or replaced.

Keep snow cleared away from the air cleaner intake.

In damp weather—when there's chance of freezing—it's a good idea to have a clean, dry element on hand for a quick switch in case air cleaner icing is a problem.

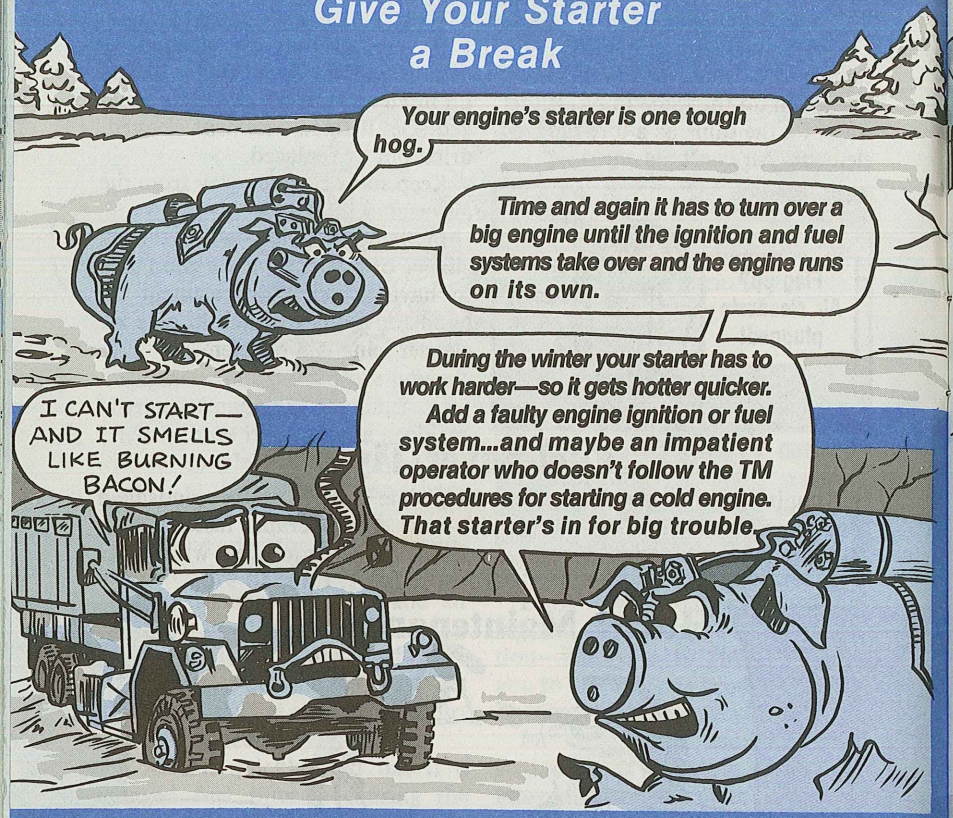
Fuel-Saver Tip

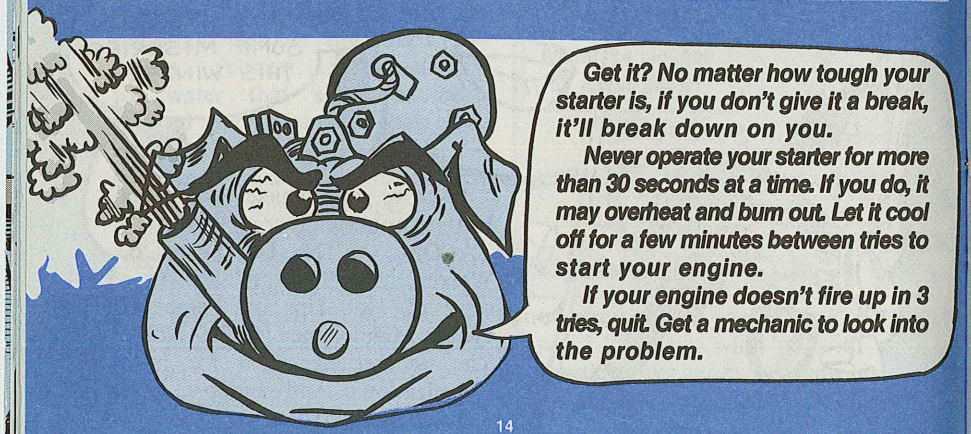
Running your vehicle's engine a long time to defrost the windshield wastes precious fuel. Don't be fuelish—use an ice scraper instead. You can get a combination ice scraper and rubber squeegee with NSN 7920-00-045-2556. Your authority is Appendix A, CTA 50-970.

Heater Maintenance Tips

Improve your vehicle's personnel heater maintenance. Write to TACOM, ATTN: DRSTA-MCB, Warren, MI 48090, and ask for a copy of Hot Tips on Personnel Heater Maintenance (60,000 BTU). The booklet has info for both organizational and support level maintenance personnel.

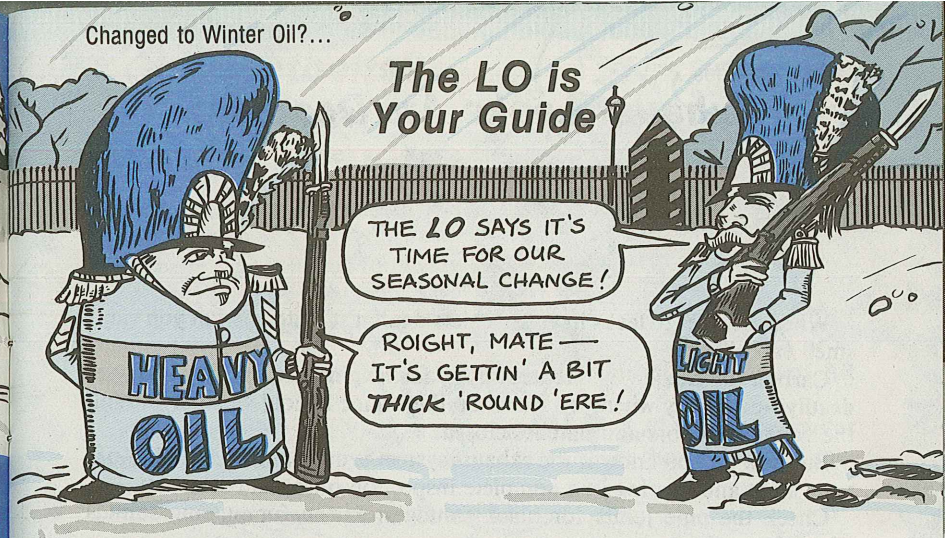
Give Your Starter a Break





Changed to Winter Oil?...

The LO is Your Guide



Believe it when your equipment's lube order calls for a seasonal oil change. It's very important for the life of your vehicle's engine. Summer-weight oil is too thick for cold-weather operations.

The wrong oil affects your engine 2 ways:

- Your engine will have a harder time getting started if it has to fight heavy, cold-stiffened, summer-weight oil.
- Moving engine parts will suffer from wear because the summer-weight oil won't thin out soon enough to do a good lube job.

So, change engine oil seasonally like the LO says—in addition to whenever an AOAP check says a change is needed.

Nix on Starting Fluids

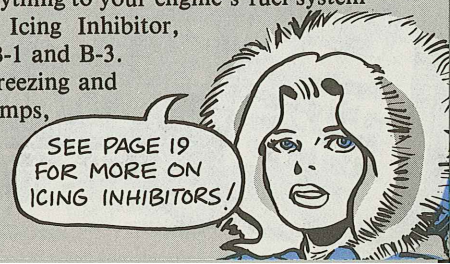
A cold-soaked engine can be a real pain to start.

To make things easier, some engines have ether starting aids built right into the equipment. That's fine.

But what about those engines that don't? Can you use starting fluids to help them get going?

No way! Using starting fluids—spray can or otherwise—is a no-no. They're too dangerous. One wrong move and it's curtains for your engine and maybe you. You shouldn't add anything to your engine's fuel system except Methanol and Fuel Systems Icing Inhibitor, which are listed in FM 9-207, Pages B-1 and B-3.

These prevent condensation from freezing and clogging fuel lines, fuel filters, fuel pumps, injector nozzles and carburetor jets.



Carbon Monoxide...

Exhaust Leaks Are Deadly

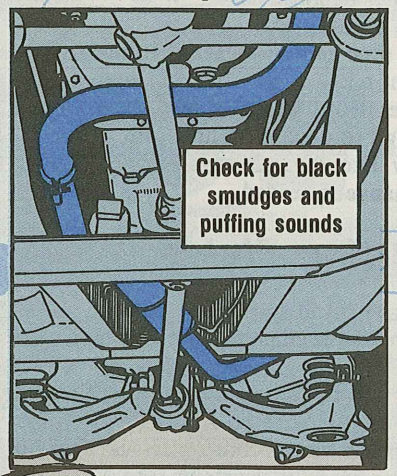
When it comes to leaks in your vehicle's exhaust system, what you can't smell can kill you.

Carbon monoxide is created by your engine. It is odorless, yet **deadly**—especially when you warm up the engine in cold weather with all the windows, doors and hatches closed.

But how do you know if the exhaust system is up to snuff? Simple—use your sight and hearing in a complete inspection once a month.

Check the pipe joints for black smudges. Listen for puffing sounds when the engine's running.

However, never stop up the end of the tailpipe to check for exhaust leaks. The extra pressure will strain the pipe hookups and cause leaks where you didn't have any before.



Once you find a leak, report it immediately to your unit maintenance for quick repair.

Tracked Vehicle Safety

Carbon monoxide poisoning is also a very real possibility in tracked vehicles.

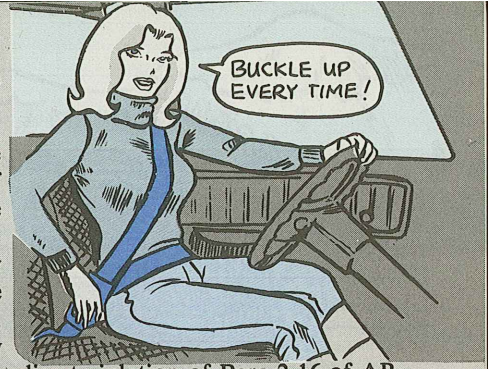
—Make sure all personnel heater exhaust connections are tight and sealed.

—Make sure all engine access panels are in place and secured.

—Don't operate your vehicle's personnel heater with the hatches "buttoned up" unless it's a combat necessity. Leave a hatch open whenever possible. Your protective mask offers no protection against carbon monoxide poisoning.

M880-Series Trucks...

Got Seatbelts? Use 'em!



M880-series trucks have seatbelts. The sad fact is, a lot of 'em wind up buried beneath the seat—forgotten and unused.

Seatbelts were installed for a very important purpose—to help save your life in case of an accident. Failure to use 'em right is not only hazardous to your health but also a direct violation of Para 2-16 of AR 385-55.

This reg says in part, "All Army personnel using AMVs (Army motor vehicles) with restraint systems will use them when the vehicle is in motion."

So buckle up now—before it's too late.

Water Tank Trailers...

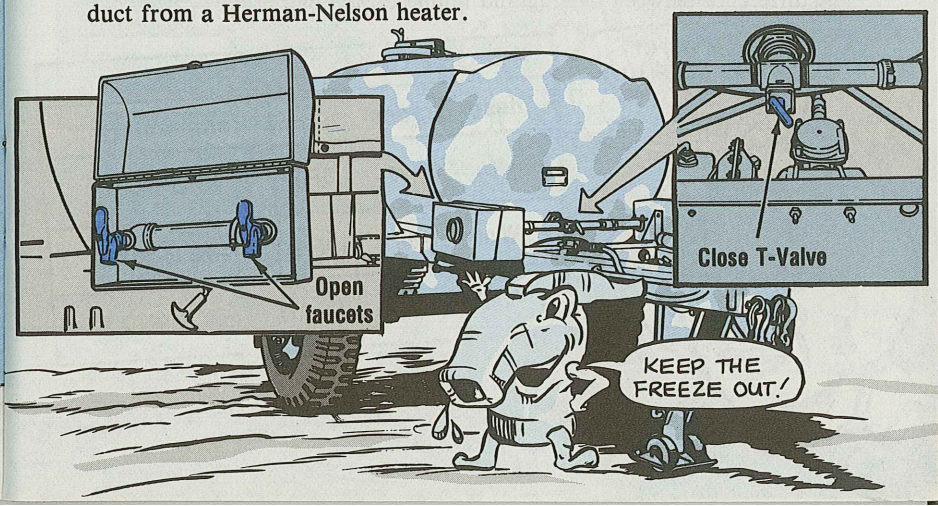
The Big Freeze

The quickest way to foul up the works of your M149, M149A1 and M625 400-gal water tank trailers is to let water freeze in the faucets and pipes.

If you're not going to draw water often, drain the pipes by shutting off the water with the main T-valve and opening the faucets.

Keep water heat in the tank—and freezing cold air out—by making sure the manhole and filler covers are tight.

In temps below 0 °F, park the trailer under a shelter. If you can't, cover it with canvas and keep warm air circulating around the trailer by using a duct from a Herman-Nelson heater.



Get the Right Grade

Does your diesel-powered equipment start poorly or lack full power in the winter?

Could be you're using the wrong fuel. Diesel is diesel, you say? Not true. Diesel is graded, and the grade you use depends on the temperature conditions where you are.

Temperature plays technical tricks with diesel fuel. Diesel contains waxes, and as temperature drops, the wax begins to thicken up. Because the fuel looks cloudy, the technical guys call the temperature where this happens the cloud point. It also means that this wax begins to clog fuel lines and filters.

In order for your vehicle to start quickly and operate at its maximum power, the fuel is blended with fuels with lower cloud points.

Remember these grades when you're fueling your vehicle. It could be the difference between passing and failing on the battlefield.

REPORT CARD		
Diesel Grades		Temperature
Regular grade	(DF-2)	20 to 115 °F.
Winter grade	(DF-1)	−25 to 20 °F.
Arctic grade	(DF-A)	−65 to −25 °F.

Preventing Freeze-ups

Condensation in your fuel tank and elsewhere in your fuel system—like fuel filters—will freeze if the temperature gets low enough.

When it freezes, your engine may not start at all, or it may start and run for a while and then quit.

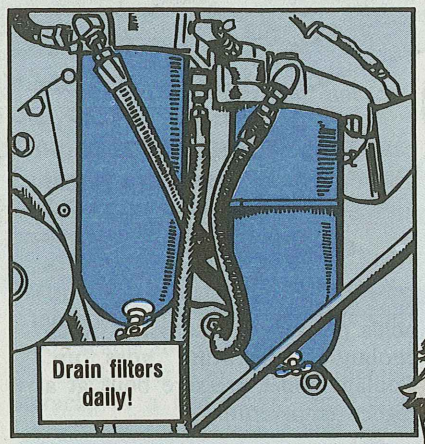
Your first line of defense against water in fuel is to drain your fuel filters daily, or as called for in your TM's.

Diesel

Fuel system icing inhibitors:
NSN 6850-00-753-5061 5-gal can
NSN 6850-00-060-5312 55-gal drum

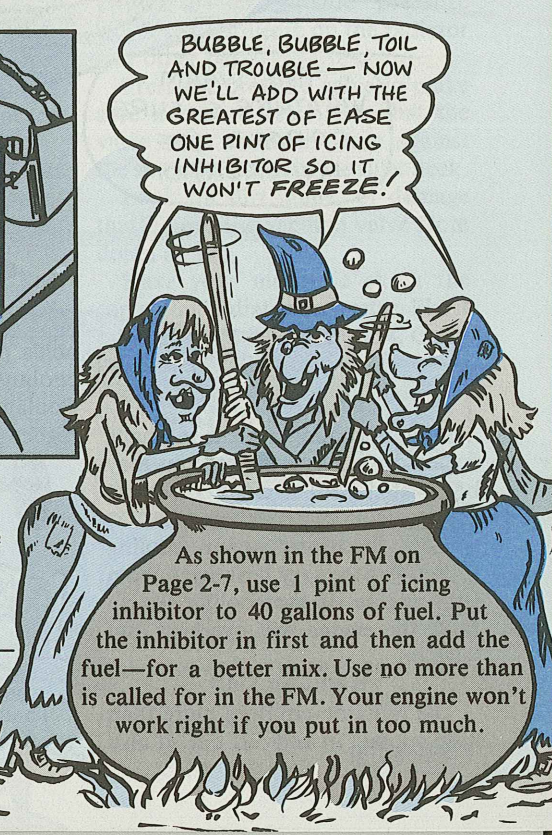
Gasoline

Methanol (MOGAS) fuel additive
NSN 6810-00-597-3608 1-gal can
NSN 6810-00-275-6010 5-gal can
***NOTE: the 1-gal can NSN is -597-, not -957- as shown in the FM**



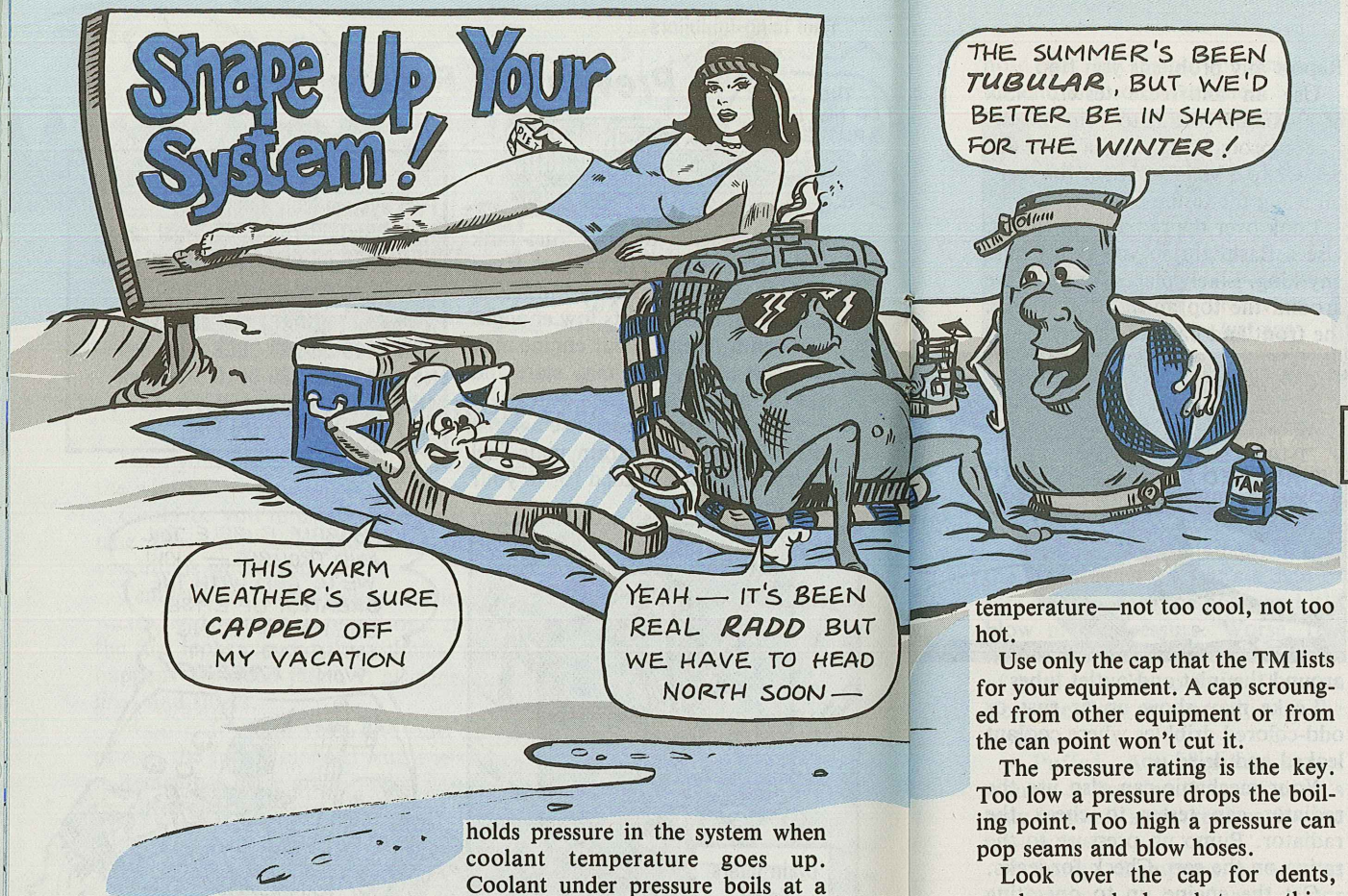
In addition, you keep the fuel tanks up to the full mark so there's little chance for condensation.

Your real hedge against freeze-ups, tho, is icing inhibitor. There are 2 kinds—one for diesel and one for gasoline. Check out Pages B-1 and B-3 of FM 9-207.



As shown in the FM on Page 2-7, use 1 pint of icing inhibitor to 40 gallons of fuel. Put the inhibitor in first and then add the fuel—for a better mix. Use no more than is called for in the FM. Your engine won't work right if you put in too much.

Shape Up Your System!



Is your cooling system in shape for cold weather? If not, you may be greeted with a cloud of steam coming from under the hood.

Even in winter, your cooling system has to carry heat away from your engine. If the cooling system fails, the engine will overheat and seize up.

Radiator Cap

The radiator cap does more than keep coolant in and dirt out. It also holds pressure in the system when coolant temperature goes up. Coolant under pressure boils at a higher temperature.

That's important, because it lets your engine run at the right temperature—not too cool, not too hot.

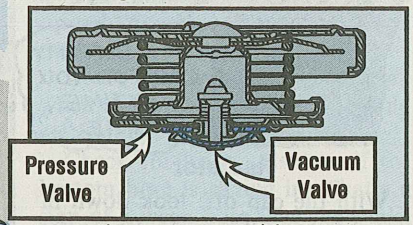
Use only the cap that the TM lists for your equipment. A cap scrounged from other equipment or from the can point won't cut it.

The pressure rating is the key. Too low a pressure drops the boiling point. Too high a pressure can pop seams and blow hoses.

Look over the cap for dents, cracks or a bad gasket—anything that could cause a leak. Check for a snug fit on the filler neck, too.

There're 2 valves in the cap. The pressure valve holds pressure in the system, up to the pounds rating on the cap. If the pressure goes above that, the valve opens to release excess pressure.

The vacuum valve opens when the engine cools down—after

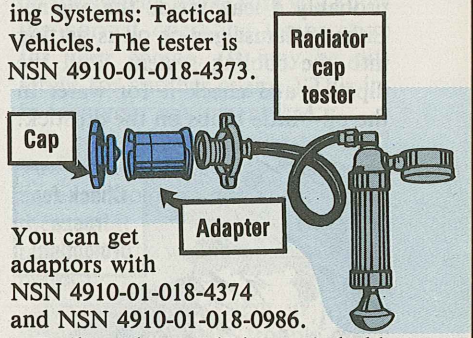


operation—so outside pressure won't put a squeeze on the radiator and other parts.

Press the pressure valve to make sure it moves freely. See that the valve seats clean and true against the shoulder down in the filler neck.

Look for dirt, gunk, or damage that'll keep the vacuum valve from doing its job.

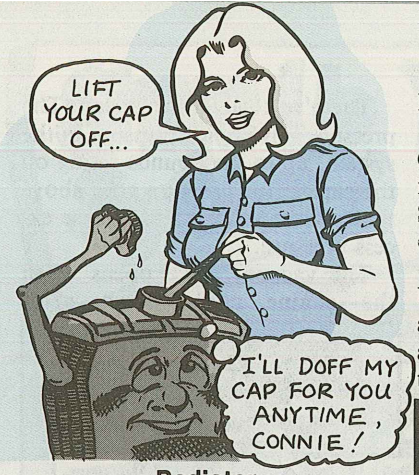
Have your mechanic check the cap with a radiator cap tester, like it says in Para 2-9, TM 750-254, Cooling Systems: Tactical Vehicles. The tester is NSN 4910-01-018-4373.



You can get adaptors with NSN 4910-01-018-4374 and NSN 4910-01-018-0986.

Replace the cap if it won't hold the rated pressure.

PS MORE

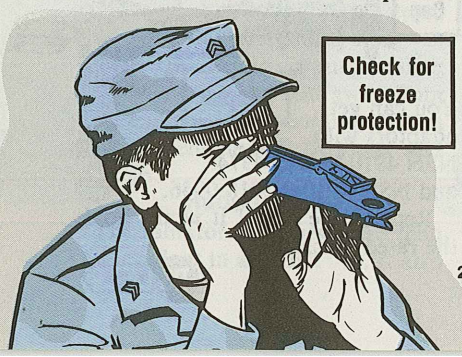


Radiator

With the cap off, look down in the radiator filler neck. You have enough coolant if it's at least over the top of the core—all those little holes that are the tops of the tubes running thru the core.

Good coolant should be almost clear—colored some by the antifreeze. If the coolant is muddy-looking, or there're bits of junk in it, it may need draining and flushing. Report it.

If there's a rainbow of oil slime floating on the coolant, there's probably a leak inside the engine. Either exhaust gas or oil is getting into the cooling system. Pull the dipstick and check it for water in the oil—little blobs on the dipstick.



Report any problems you find.

Use an antifreeze tester, NSN 6630-00-105-1418, to check the freeze protection of your coolant. See C2 to TM 750-254 for the word on using the tester.

Look over the radiator for leaks. Use a flashlight so you don't miss anything. Likely places for leaks are around the top and bottom tanks, the front and back of the core, and

around the inlet and outlet tubes.

Leaks may show up as rust or odd-colored dribbles where coolant leaked and dried up.

Your mechanic can also use the radiator cap tester to check the radiator. Pump up pressure to the rating on the cap. Check for leaks.

Get the engine up to operating temperature and pressure. Then check it again. Keep clear of the fan and belts!

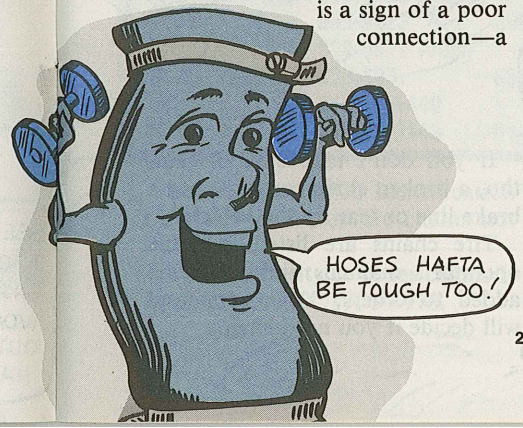
Hoses

Hoses also need a close look. They have to handle heat, pressure and vibration. Hoses rot, harden or crack as they age.

Hoses give a warning, tho, before they fail. Report any of these faults:

- Cracks—These may start at the hose ends, but it won't be long until the entire hose is weakened!

- Hard—If a hose is hard as a rock when you squeeze it, it'll crack from vibration. Or it'll carry engine vibration to the radiator and break the inlet or outlet tubes.
- Soft—Too soft is bad, too. If the hose is mushy, that's a sign of rot. Rot weakens the hose, and it'll blow under pressure. Worse, rotting inside may be putting little bits of hose into the coolant. That can slow the flow or even plug up the system.
- Puffed—A swollen hose means trouble is brewing. Even if there's only a small spot, replace it—the hose is bad.
- Damp—Dampness or wetness is a sign of a poor connection—a bad hose, loose or damaged hose clamps or a bad tube on the radiator or engine. Or the tube may not have been cleaned when the hose was installed.



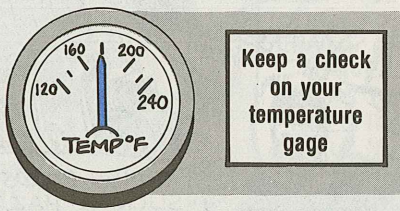
During Operation

Check the cooling system for leaks while the engine is running at operating temperature—when there's full pressure on the system.

Don't remove the radiator cap when the engine is hot! You could get burned!

Check for leaks. Also see if the bottom hose is caving in. That's a sign of a weak hose that can't take the pull of the engine's water pump. Get the hose replaced.

Check the reading on the temperature gage. That's your eye



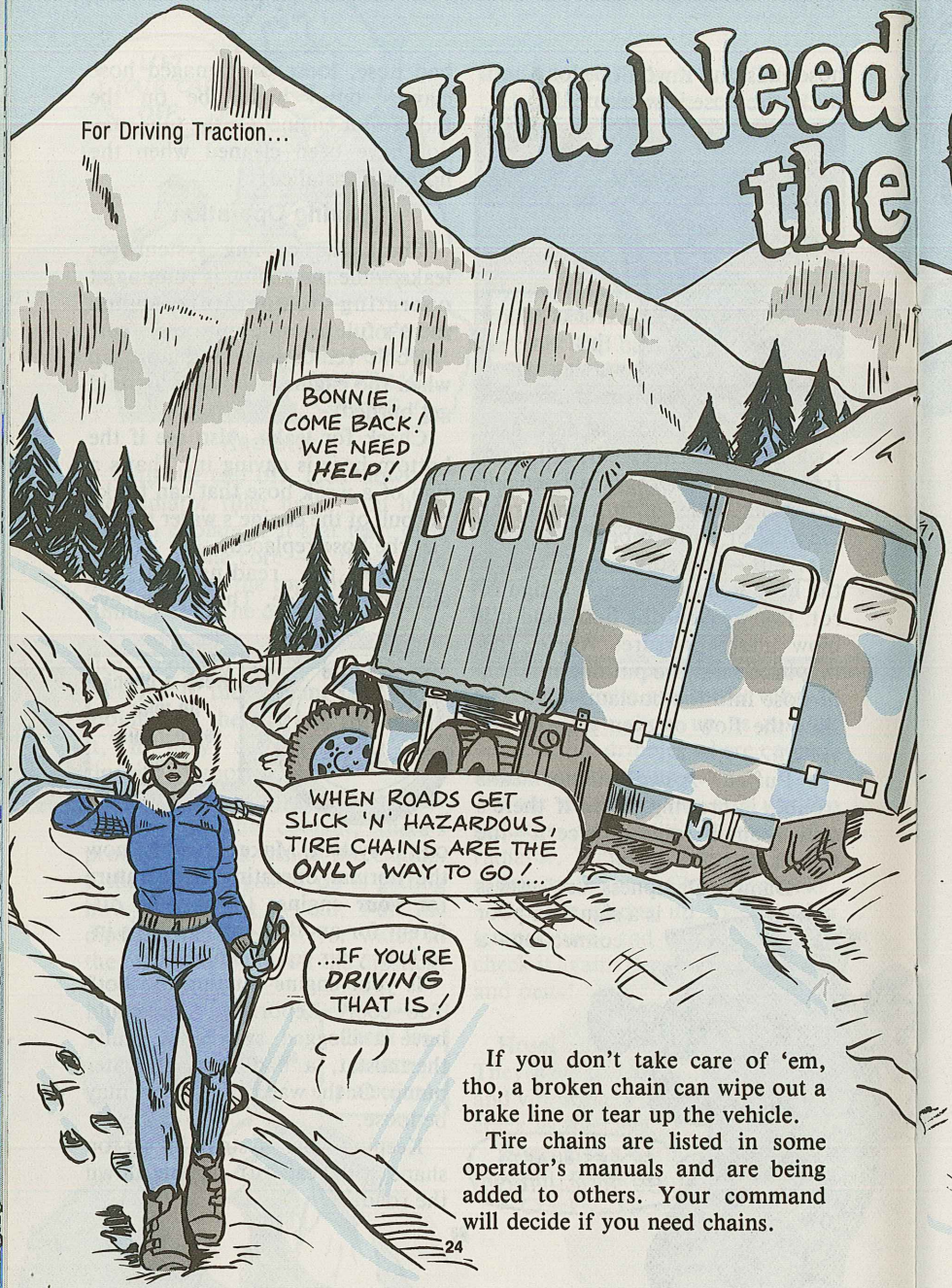
on the system. Make sure you know the normal operating temperature for **your** engine. (It may be different for another engine.) This info is in your equipment TM.

Is your engine running too hot? Too cool? Report it. You could have a clogged system, a faulty thermostat, a bad hose or water pump. Or the water pump hose may be loose.

Keeping your system in tip-top shape will head off trouble down the road.

For Driving Traction...

You Need the Chain Action



If you don't take care of 'em, tho, a broken chain can wipe out a brake line or tear up the vehicle.

Tire chains are listed in some operator's manuals and are being added to others. Your command will decide if you need chains.

Tire Size	Chain Assembly (Pair)	Cross-Chains	Swivel Hooks
	NSN 2540-00-	NSN 2540-00-933-	NSN 2540-00-937-
7.00 × 16	177-7235	6916	0405
8.25 × 20	933-9025		
9.00 × 16	933-9026	6916	0404
9.00 × 20	933-9024	6916	
	933-9030 (dual)		
9.50R × 16.5D	057-0204		
10.00 × 20	933-9034	6916	0404
	933-9020 (dual)		
11.00 × 18	933-6933	6915	0404
11.00 × 20	933-9022	6915	0404
	933-9599 (dual)		
11.00 × 24	933-6935	6915	0404
12.00 × 20	933-6922	6915	0404
	933-6917 (dual)		
14.00 × 20	933-9033	6992	0404
	933-6928 (dual)		
14.00 × 24	933-9023	6992	0404
	933-6929 (dual)		
16.00 × 20	933-6937	6914	0403
18.00 × 22.5	01-024-4440		
18.00 × 33	01-079-3143	01-104-9022	

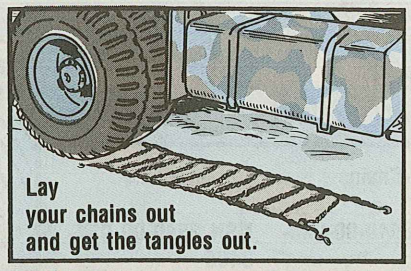
See the FSG 2500 Identification List microfiche for tire chains not listed here.

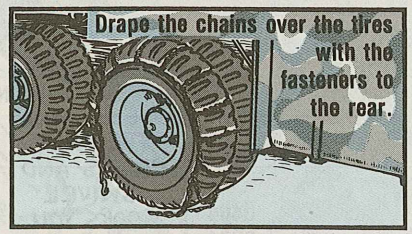
Your authority to order chains is Appendix A of CTA 50-970.

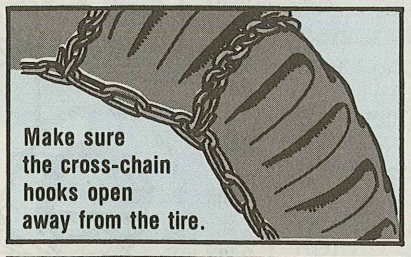
Putting 'em On

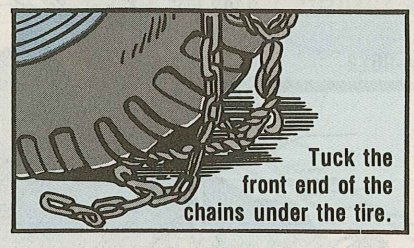
There are several ways to install tire chains. Pick the way that's easiest.

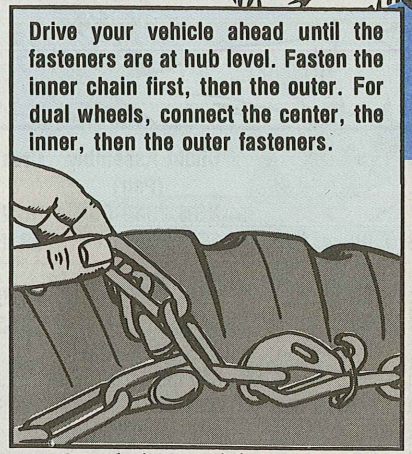
One way is spelled out in Para 20-14, FM 21-305, Manual for the Wheeled Vehicle Driver.











- Get chains as tight as you can by hand. Don't use tools. And never let some air out and reinflate the tires after you put chains on. They'll be too tight. Chains need to be able to creep on the tire.

You can also lay your chains out in front of your vehicle and drive on the chains. Then fasten the chains. Remember, fasteners to the rear, cross-chain hooks **away** from the tires.

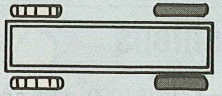
A third way is to make a clip to hold the end of the chain and slip it over the tire.

- Drive forward until the tire makes a complete turn.
- Pull the clip off and fasten the chain.

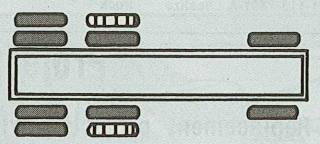
Chain Positions

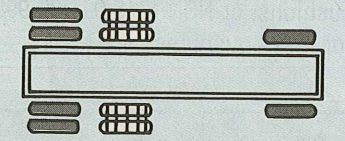
Chains in the wrong places won't do much good—and can cause damage. Best for traction, starting and stopping is chains all around, even on non-driven front wheels.

If your vehicle has a non-drive axle, put chains on the drive axle or axles.



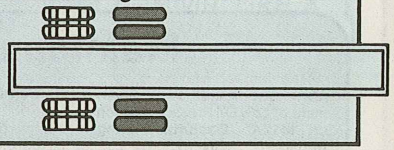
If you've got only single wheel chains, put 'em on the outside tires on dual-wheel axles.





If you have a tandem drive rig, but you have chains for only 1 axle, put them on the front tandem axle.

Trailers don't usually get chains, but you may need them if roads are real slick. Put them on the rear axle if the trailer's got tandem axles.



Maintenance

Check your chains before you pull out of the motor pool. Repair any broken or worn cross-chains.

Check your chains before you put 'em on. You'll save taking them off for repair.

At the end of the season, clean the chains with a wire brush to get off dirt and rust. Soak them in cleaning solvent to loosen stubborn gunk. After cleaning, dunk 'em in used crankcase oil, and drip dry. Store chains in burlap or a canvas bag—like the one they came in—and put them in a dry place.

Pubs

AUDIO-VISUAL STUFF

Available at battalion or post Learning Center

TEC Lessons

020-171-5739-A Operator maintenance on tank external phone
043-061-6600-A LANCE missile system
101-113-7326-A Install and operate the AN/GRA-39 with the RT-524
101-113-7327-A Local Control Unit C-2329/GRA-39
101-113-7331-A Localize and isolate faults in the AN/GRA-39 remote control unit
101-113-7332-A Localizing and isolating faults in telephone circuits
610-091-6576-A Troubleshoot service brake malfunction, ¼-ton truck (M151-series)
610-091-6616-A Replace master cylinder, 2½-ton truck
610-091-6621-A Replace air-hydraulic cylinder on 2½-ton truck
610-091-6626-A Troubleshoot service brake malfunctions on 2½-ton truck
610-091-6641-A Repair electrical wiring on 2½-ton truck
610-091-6686-A Fault isolation on ¼-ton truck (STE/ICE)
662-091-7620-A Replace and adjust carburetor on the 5-KW GED generator set
662-091-7775-A Testing the range selector switch on the 5-KW DED generator set
948-071-0040-F Improved TOW vehicle (ITV)
948-071-6459-A, 948-071-6465-A and 948-071-6460-A 106-MM recoilless rifle

Projectile Cushions

Replacement projectile windshield cushions for M735 and M774 ammo are now available in limited numbers. Write directly to HQ, ARRCOM, ATTN: DRSAR-DSD, Rock Island, IL 61299 and ask for NSN 1315-01-127-9513 for M735 cushions, or NSN 1315-01-130-9966 for M774 cushions.

Maintenance Advisories

AMCCOM MA 83-6—Replacement of Low Oil Pressure Switch on M12A1 Decontaminating Apparatus, NSN 4230-00-926-9488, DRSAR-MAO-NC 201520Z May 83.
AMCCOM MA 83-7—Replacement of Generator and Regulator on M12A1 Decontaminating Apparatus, NSN 4230-00-926-9488, DRSAR-MAO-NC 241920Z May 83.
AMCCOM MA 83-8—Reconfiguration of Chemical Agent Alarm Family M8, M10-M18, DRSMC-MAO-NC 091920Z Aug 83.
AMCCOM MA 83-9—Procedure for Putting on and Adjusting M17-Series CB Protective Mask with Hood Attached, DRSMC-MAO-NC 101920Z Aug 83.
AMCCOM MA 83-10—Packaging of M17-Series CB Protective Mask, DRSMC-MAO-NC 111925Z Aug 83.
AMCCOM MA 83-11—Clarification of M17-Series CB Protective Mask Return Policy, DRSMC-MAO-N 151925Z Aug 83.
MICOM SIL (Supply Information Letter) 2-83—Missile Materiel, DRSMI-SS Jun 83.

If you need a maintenance advisory, contact your direct support unit or your local Logistic Assistance Office (LAO).

SMART! MESSAGES

Here are the latest SMART! messages:

SMART! Msg #29—Development of combination tool to tighten the ring located in the base of the antenna element, AS-1730/VRC, DALO-PLO 191345Z May 83.
SMART! Msg #30—Deletion of TAMMS requirement to use DA Form 2408-9 for aircraft, DALO-PLO 151846Z Jun 83.
SMART! Msg #31—Deletion of TAMMS requirement to use DA Form 2408-9 for ammunition peculiar equipment, DALO-PLO 281907Z Jun 83.


COULD I TROUBLE YOU FOR A LIFT?
SEEMS MY AUTO'S BEEN TEMPORARILY INDISPOSED.
THANKS. MY NAME'S BONN...
SO YOU'RE THE GREAT 0007...
I'M RILEY.
YOU SHOULDA HAD CHAINS ON, RIGHT, MR. BONN?
DIDN'T NEED 'EM IN MONTE CARLO...
SNOW AIN'T THE SAME AS DRY PAVEMENT!
MAYBE SO — BUT THERE 'RE A COUPLE OF RATHER NASTY CHAPS FOLLOWING ME JUST NOW... SO...
...SO IF YOU DON'T MIND — LET'S GET OUTTA HERE!
DOESN'T PAY TO HURRY IN SNOW!
IN FACT, SLOW IS THE ONLY WAY TO GET STARTED WITHOUT SPINNIN' YOUR WHEELS!
LISTEN, RILEY, I'M ONE OF THE FOREMOST DRIVERS IN THE WORLD!
YEAH. AND YOUR CAR'S PARKED IN A SNOWBANK 'CAUSE YOU COULDN'T HANDLE THE SKID!
IF YOU START SKIDDIN' JUST STAY COOL...
...AND STEER IN THE DIRECTION OF THE SKID
...AND IF YOUR TAIL SLIPS OVER THE OTHER WAY...
...STEER BACK TO FOLLOW THE SKID
WE'RE OUT OF CONTROL OL' CHAP.
NAH! THIS IS STRATEGY!
...TO KEEP YOUR FRIENDS FROM PASSIN' US!

Winter Driving Tips

Moving Out

Ease out real slow or you'll spin wheels. Not enough traction ? Tap, tap, tap the accelerator to rock vehicle. Rocking can increase traction. Or try moving out in second or third gear.

TAKE ICY CURVE V-E-R-Y S-L-O-W-L-Y

Curves

Enter curve slowly so you won't slide off the road. Keeping slight pressure on the accelerator helps traction—if you don't pick up too much speed.

On the road

Change accelerator pressure slightly but regularly to keep a feel of traction. Plan braking well ahead. Watch for slick intersections and other problems ahead of you.

WATCH FOR PROBLEMS WELL AHEAD

Skids

Turn the steering wheel in the direction the rear wheels are sliding, and get your foot off the accelerator! Leave the brake pedal alone! Braking will make the skid worse.

Hills

START UPHILL AT FASTEST SAFE SPEED

UPHILL—
Leave plenty of room between you and the vehicle in front of you, so you can hold your speed in case that vehicle slows down. Get up to maximum safe speed before you hit the hill.

DOWNHILL—
If you think you'll have to downshift again, do it before you pick up too much speed—or you'll break traction. Shift fast 'n' smooth. Only tap-tap the pedal if you've got to use your brakes.

...DOWNSHIFT BEFORE STARTING DOWN

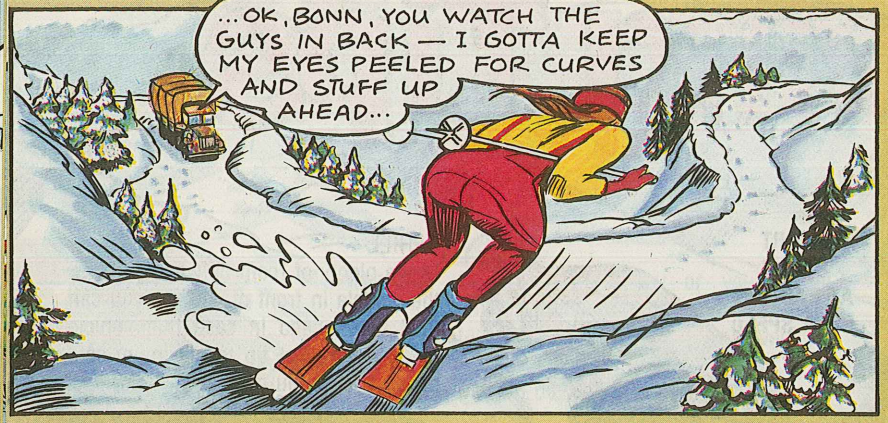
Stopping

Rolling to a stop is best. If you must use the brakes, tap them gently, repeatedly. Sudden braking will send you skidding.

ROLL TO A STOP...

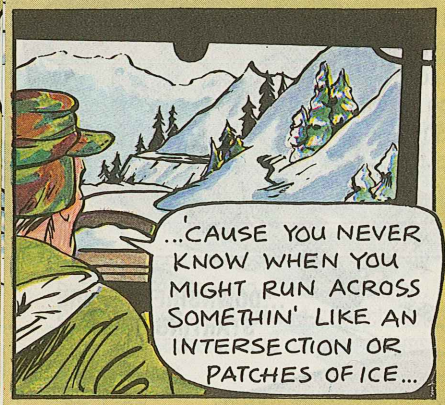
...TAP BRAKES GENTLY BUT ONLY IF NECESSARY

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


...OK, BONN, YOU WATCH THE GUYS IN BACK — I GOTTA KEEP MY EYES PEELED FOR CURVES AND STUFF UP AHEAD...


...AND LET MOMENTUM DO THE REST!


WHEN YOU LOSE YOUR TRACTION, YOU'VE LOST YOUR GRIP ON THE ROAD!

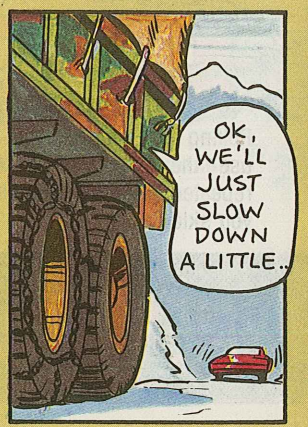

...'CAUSE YOU NEVER KNOW WHEN YOU MIGHT RUN ACROSS SOMETHIN' LIKE AN INTERSECTION OR PATCHES OF ICE...


...OR SKI-DESTRIANS OR HILLS...


BOOM
NICE MOVE, RILEY. COULDN'T HA' DONE BETTER MYSELF!
ONE DOWN...

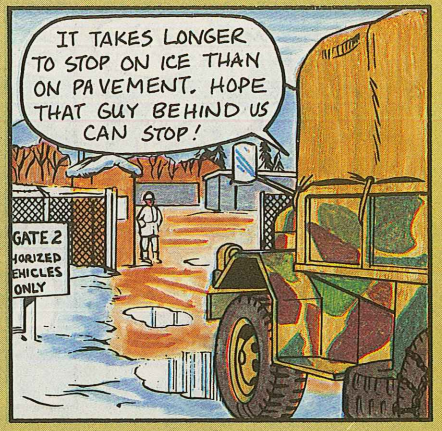

...ONE TO GO.
BY THE WAY WHAT ARE THESE GUYS CHASIN' YOU FOR?

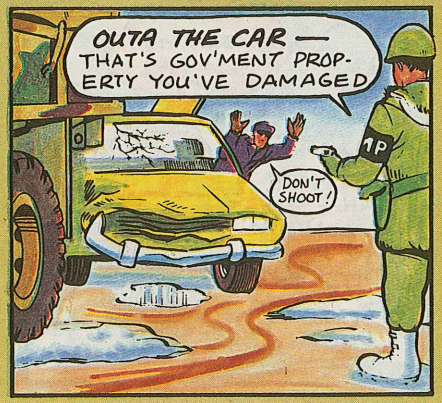

STOW IT, MATE — WE'VE GOT COMPANY! AND THEY KNOW WE'RE HOME!


OK, WE'LL JUST SLOW DOWN A LITTLE..


WELL, IT'S BECAUSE I'M THE SPY WITH THE BIGGEST SECRETS IN THE WORLD...


...AND SO, SOMEONE IS ALWAYS AFTER ME!
WE'RE ALMOST THERE!





Cover Your Aircraft

Pulling preventive maintenance inspections on aircraft in cold weather is no snap, crew chiefs, especially out-of-doors!

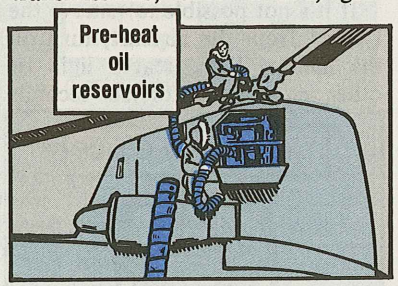
So, when there's no hangar space, don the right duds before you head for the flight line. Be sure you wear gloves. Never touch metal with your bare hands because your skin can freeze to it.

If you're faced with some extended maintenance, rig a maintenance shelter around the work area. Use a salvaged cargo parachute canopy or tentage and a Herman-Nelson heater to inflate and warm the shelter. Some bird covers have ports to accept the heater hose.

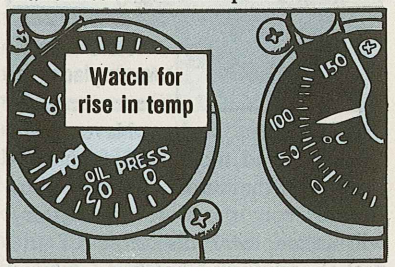
PM Takes Longer

Pulling a PM Daily will take longer because bulky clothing slows your movements. It's mighty important that you take the time to make a thorough inspection, tho, so the bird performs as advertised.

Pre-heating cold-soaked transmissions, short shafts, gear boxes, engines and drive quills takes extra time—and it's worth it. You'll head off leaks from frozen seals.

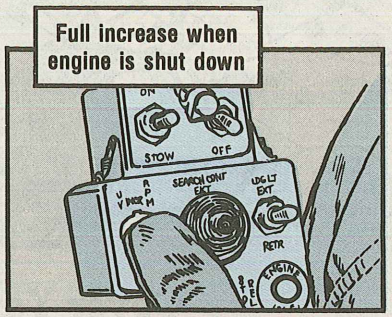


Fact is, moving the UH-1 flight controls prior to system warmup greatly increases the chance of failure of the lubricated-type short shaft. So when the outside air temperature gage reads below zero, for example, pilots should center the flight controls prior to engine start and not move them until the transmission oil temperature rises.



This lets moisture crystals around the seals melt and avoids cutting or scarring the seals. Be sure you follow all the starting info in the operator's manual.

When the Huey engine is shut down in frigid temperatures, pilots should leave the linear actuators in the full increase position. This prevents stripping of internal gears when attempting to extend cold-soaked actuators during the next start up. Then, once the engine has

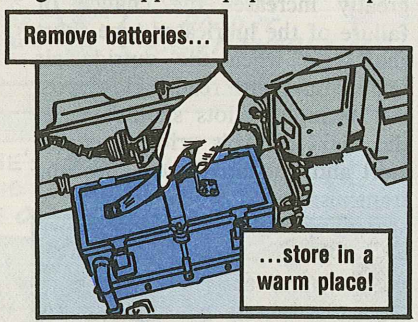


reached normal operating temperature, the actuator check is made.

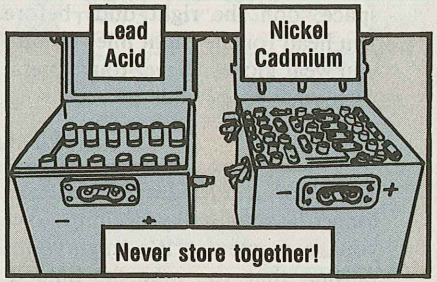
Keep 'em Warm

Even tho the nickel-cadmium battery performs well in cold weather—it'll start the engine below −30 °c—you should keep it warm. Lead-acid batteries should also be kept warm because they can lose up to 50 percent of their charge in cold weather.

Keep the batteries warm by removing them from the aircraft or ground support equipment and put-

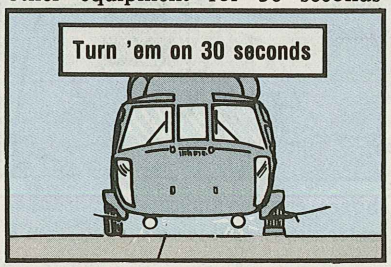


ting them in a shelter. Never store lead-acid and nickel-cadmium batteries in the same shelter, tho. Fumes from the lead-acid battery will cause total discharge of the nickel-cadmium battery, whose cells will then have to be replaced.



Place the batteries on a shelf or dunnage—never on the bare floor. This will give you a more equalized battery temperature.

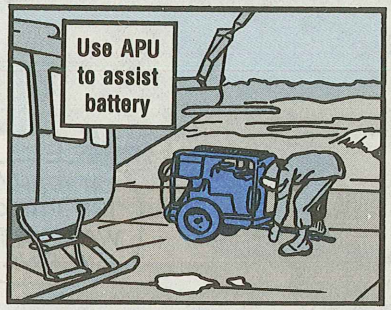
If it's not possible to remove the battery from the aircraft, turn on the landing light, search light or other equipment for 30 seconds



prior to an engine start. The "load" will warm up the battery internally. A warm battery will give you good cranking power and a good spark to head off the possibility of a hot engine start.

Remember, also, you can assist the aircraft battery by using an auxiliary power unit to crank up the bird.

Cold weather also affects the aircraft fire extinguisher. If the temperature is below −40 °F, the pressure decreases and the extinguisher won't work right.

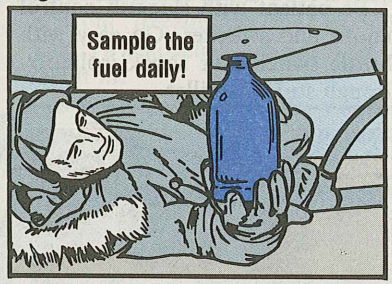


Protect your aircraft from the severe weather. Covers—canopy, airframe, engine, rotor blade, pitot tube...use all of 'em!

Service With a Smile

Fuel contamination is always a possibility in cold weather. If the aircraft is warm when parked, with partially empty tanks, cold overnight temperatures will condense moisture in the tanks to water which will freeze.

So, always keep the fuel tanks topped off. Be sure you sample the fuel on the PM Daily. Drain off enough fuel so that it's clean and bright—free of water.



The oil you add to the engine, transmission and gear boxes should be the type called for in the servicing chart of each aircraft maintenance manual. Also, check out TB 55-1500-200-24 on use of the right aircraft fuel and oil

For example, if you're crewing a UH-1 and the temperature is colder than −25 °F, you should be using MIL-L-7808 oil. Above that temperature, use MIL-L-23699 oil.

The viscosity (flow rate) of fire-resistant hydraulic fluid, MIL-H-83282, also decreases in very cold weather.

The change from MIL-H-83282 to MIL-H-5606 in low temperatures is spelled out on Page 4-1 of TB 55-1500-334-25, on conversion to the fire-resistant red juice. CH-54B choppers in Alaska are authorized to use only MIL-H-5606 at any temperature. CH-54 aircraft in all other areas should use MIL-H-83282.

Yessir-e-e-e, keeping your aircraft in the cold blue yonder means using a little savvy. Read all about it in TC 1-12 and FM 31-71.

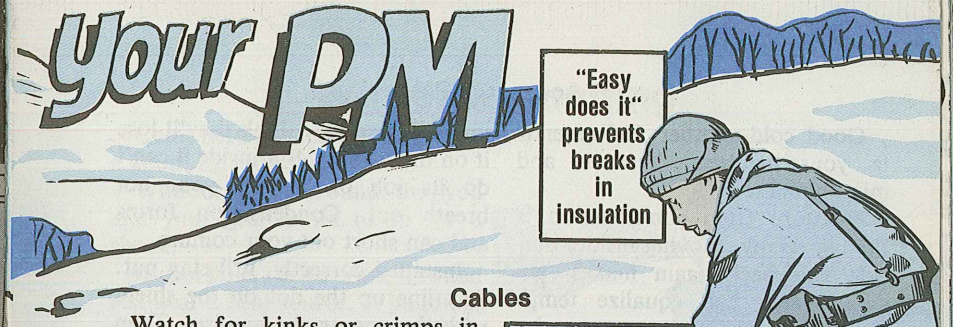
Warm Up to Your PM

Add patience and a little warmup to your PM tools this cold season. They can save your phones, radios, cables and commo accessories a lot of downtime.

Patience—like waiting 10 to 15 minutes for your radio set to warm to its task before you transmit. Radio sets like the AN/GRC-106 can use that extra time to shake off the cold and prevent damage.

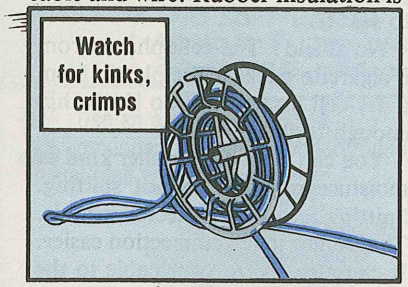
Gear that gets greased—like teletypewriters—needs the time to ward off sluggishness. Worm gears and keyboards, especially.

Be patient with sluggish control knobs and switches. Go easy with brittle switches or shock isolators. Rough stuff's a killer.



Cables

Watch for kinks or crimps in cable and wire. Rubber insulation is



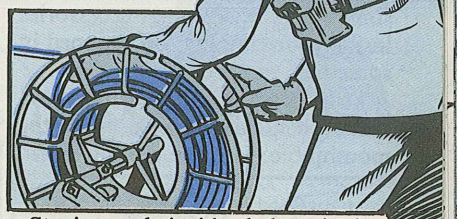
easy prey for cracks and breaks when it freezes. Worse yet, the wiring inside can snap when it's cold.

Keep cables and wire out of the way of feet, vehicles and cargo areas when possible. Running it overhead is a bonus. It not only keeps cable out of the way, it keeps it from freezing to the ground. That's a headache when you have to reel it in.

Leave some slack when you lay wire or cable. Rubber and metal shrink in the cold. Pull wire or cable too tight and you invite a break.

Use both patience and a warmup during reeling operations.

Warm cable before unreeling it, if you can. Reeled cable tends to "freeze" into its coiled shape. Get too rough while unreeling and you can crack or break insulation and wiring.

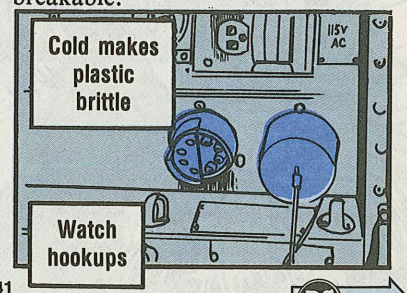


Storing reels inside shelters is the best way to head off that kind of damage. If that's not possible, store cables in bigger coils. That reduces the chance for damage.

Use the same patience and warmup during recovery. Warm cable before coiling it on its storage reel. Use the big coils until it warms up, of course.

Are you splicing or repairing wire? Use cold-weather tape, TL-600. A 30-ft roll is NSN 5970-00-240-0620.

Go easy on connectors and receptacles when temps are near freezing. Cast metal or plastic gets brittle and breakable.

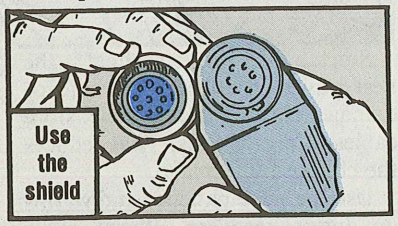


PS MORE

Good cold-weather PM extends to your handsets, headsets and microphones.

Moisture from condensation is the big enemy. Moving inside, outside and back again makes 'em sweat. You can equalize temps somewhat by keeping accessories inside your clothing, or wrapped in something woolen.

You supply some of the moisture, tho, when you speak into the mouthpiece. Use the deicing shield



if your gear has it. That keeps condensation from getting inside the gear and shorting it out.

If the shield is meant to go outside, put it there. Some troops put it inside 'cause they think they'll lose it on the outside. But inside it can't do its job of keeping your hot breath out. Condensation forms and can short out your commo.

Installed correctly, it'll stay put. Just line up the dot on the shield with the one on the handset. Then press down evenly around the shield to seat it.

No shield? The cellophane from a cigarette pack or the plastic from a dry-cell battery will do if it's thin enough to talk through.

You can head off another kind of moisture problem by not spitting. Spitting into the connector, that is. That might make connection easier. It can also freeze your cable to the receptacle. Use a dab of silicone, NSN 6850-00-880-7616, for easy connections.

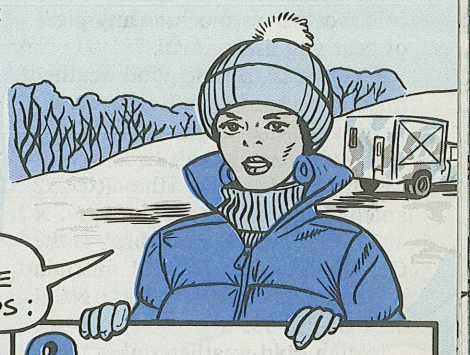
Watch metal or plastic handsets and headsets, too. If it gets too cold and you touch that material with your skin, you might stick.

Winter Grounding

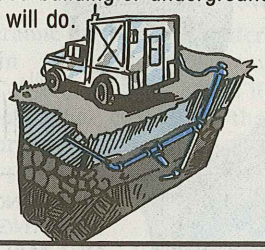
Cold, hard ground makes getting a good, safe ground a chore.

Without a good ground, tho, you and your gear could be in for a shock.

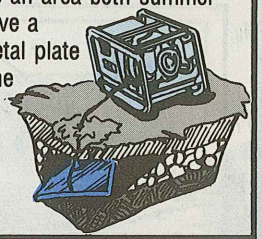
If possible, drive your ground rod near a heat source. A building, or a generator exhaust are both good.



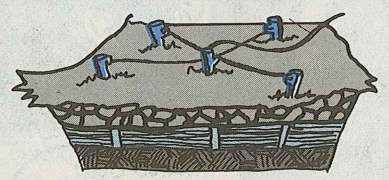
1 Use an existing ground. A grounded building or underground metal pipe will do.



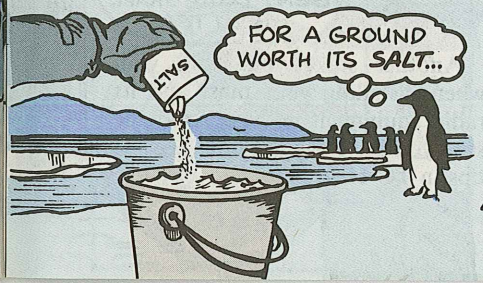
2 If you use an area both summer and winter, leave a 3-ft. square metal plate buried below the moisture line.



3 Install a ground network. That's a cluster of shorter rods connected in series.



4 Bury the rod horizontally. This's easier than driving it straight down. Just be sure you get it below the frost. If it's too shallow, it'll give you poor grounding.



Salt water improves a ground. You make your own by adding one pound of table salt to a gallon of water.

For more on cold-weather grounding, read TC 11-6 Grounding Techniques.

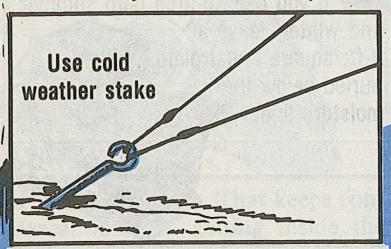
Good PM Warms Cold Antennas

Your mast-type antennas need special attention and good PM in cold weather as much as any piece of gear you use.

F'rinstance, during good weather it's not too hard to sink a guy stake. Cold weather changes all that.

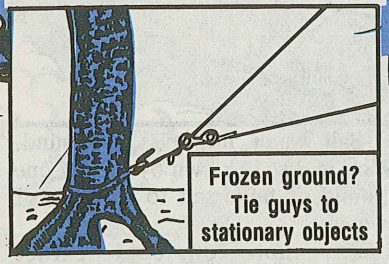
If your mast doesn't have a cold-weather stake (like the RC-292 antenna equipment's GP-101, NSN 4030-00-187-5265) a good sub is the GP-112 for your OE-254 antenna group. It goes by NSN 4030-00-291-9354.

Watch cold-weather stakes, tho. Because they're slimmer, they don't



hold as well when the ground thaws. Keep an eye on 'em during warming days.

In a pinch, you can tie your guy to a stationary object. A tree or pole will do. Don't try to get by

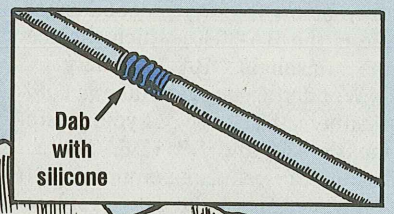


— with fewer guys than your TM calls for. That's asking for trouble.

Another stake you work with when installing your mast and its radio equipment is the ground. Be sure you have a good one. See the tips in TC 11-6.

Grease the Joints

Those mast and whip antenna sections can freeze together for real during chilly weather. Check your pubs for the right lube, of course, but usually a dab of silicone will do.



A 2-oz tube is yours with NSN 6850-00-177-5094. A bigger 8-oz supply is NSN 6850-00-880-7616.

Be sure mating surfaces are clean before you lube. Clean all other outer surfaces as well.

Keep ice off your mast. Besides cutting down the radiating distance of your antenna, it poses a real safety hazard. Think what a chunk of ice on your noggin would do to your day.

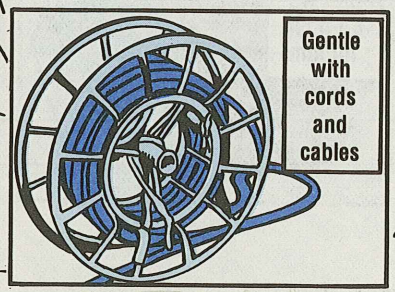
Bowl Dry?

Keep ceramic bowls dry. Water collects in 'em during warm weather. Comes a cold snap, and it turns to ice. That can crack the glass. Course, the freezing temps make the glass more brittle—and breakable — anyway. Handle it carefully.

Once you've wiped the bowl clean and dry, reach for your tube of silicone again. Seal the insulator before you join the 2 halves.

Cable Cautions

Your RF cables need special handling during cold weather, too. Insulation becomes brittle and can break. That can damage delicate inside wiring.



You keep it from knocking around too much by taping it to the antenna where possible—like with your OE-254 and RC-292.

Normal tape loses some of its staying power in sub-freezing temps. Substitute some cold weather TL-600 tape. NSN 5970-00-240-0620 brings a roll. If it's too cold even for the tape, use clamps to relieve the strain on your cable. Order 'em with NSN 5975-00-563-0229.

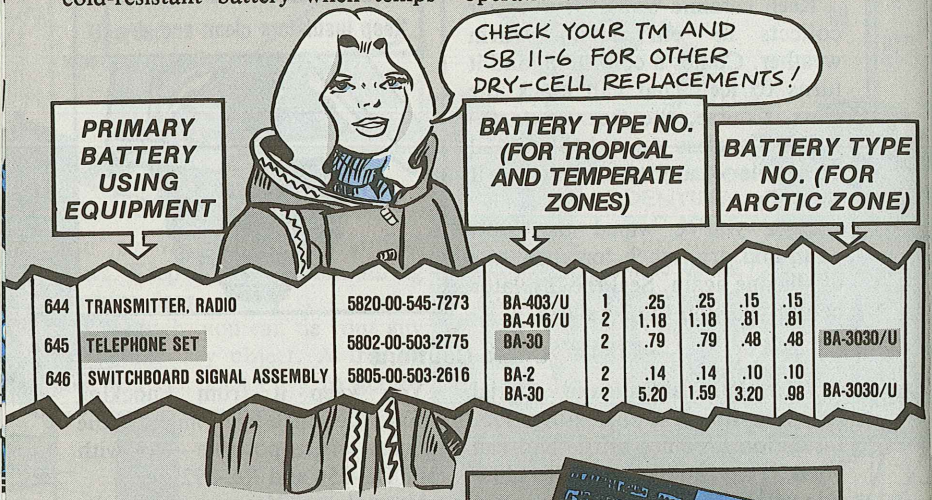
Hot Facts For Cold Batteries

Hot commo and cold batteries won't compute. They do add up, tho—to trouble.

Keeping your dry-cell-using gear communicating during cold weather means keeping them supplied with battery power.

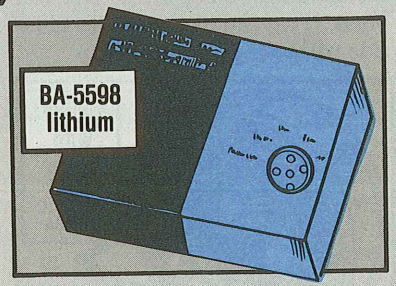
Uncle Sam gives you a hand with some gear. He gives them a more cold-resistant battery when temps drop below freezing. A good example is the BA-3030, which replaces the "flashlight" BA-30 battery.

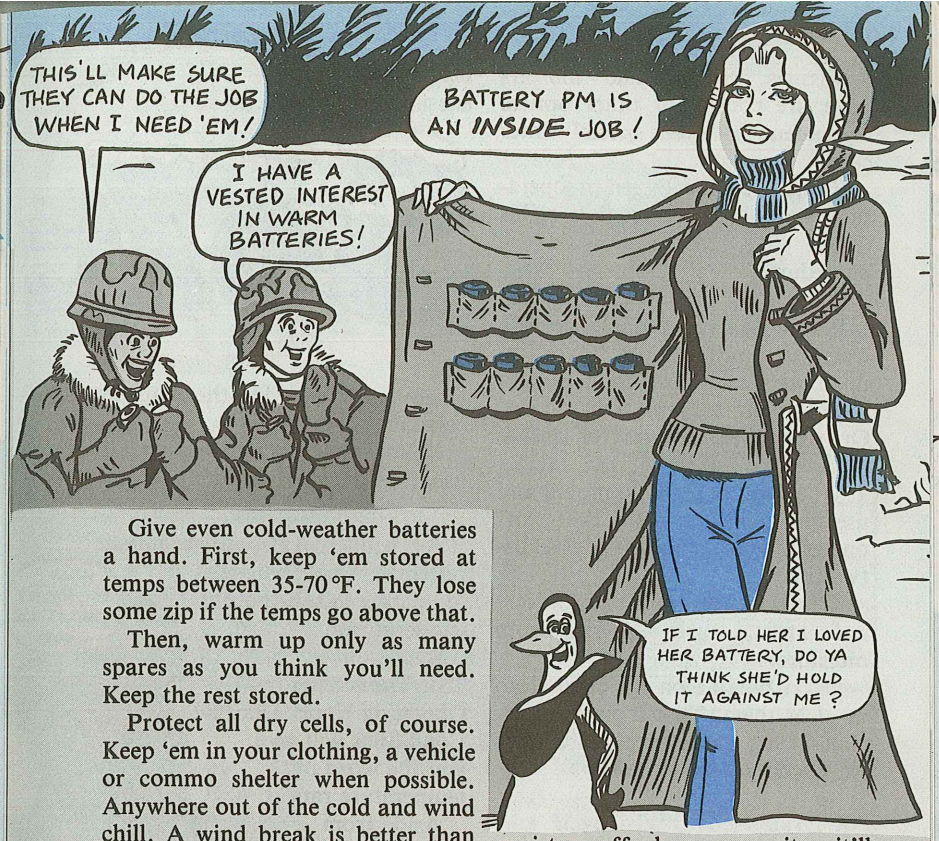
Wonder if your gear takes a cold-weather sub? Scope out your equipment's TM and SB 11-6. The SB lists all dry-cell-using equipment. It has a special column listing replacement batteries for cold-weather operation.



644	TRANSMITTER, RADIO	5820-00-545-7273	BA-403/U BA-416/U	1 2	.25 1.18	.25 1.18	.15 .81	.15 .81	
645	TELEPHONE SET	5802-00-503-2775	BA-30	2	.79	.79	.48	.48	BA-3030/U
646	SWITCHBOARD SIGNAL ASSEMBLY	5805-00-503-2616	BA-2 BA-30	2 2	.14 5.20	.14 1.59	.10 3.20	.10 .98	BA-3030/U

Another big boost for your cold-weather communicating is the lithium battery for your AN/PRC-77 radio set. It's a BA-5598, NSN 6135-01-034-2239. It replaces the old cold-weather replacement for your back pack radio, the BA-398.





Give even cold-weather batteries a hand. First, keep 'em stored at temps between 35-70°F. They lose some zip if the temps go above that.

Then, warm up only as many spares as you think you'll need. Keep the rest stored.

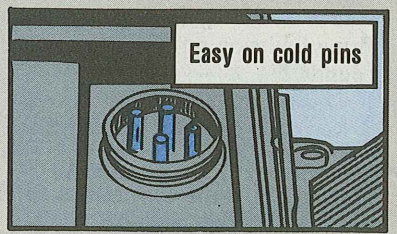
Protect all dry cells, of course. Keep 'em in your clothing, a vehicle or commo shelter when possible. Anywhere out of the cold and wind chill. A wind break is better than out in the open and next to your body is best of all.

Carry as many extras as you can. Then you can switch when the ones in your gear lose zip. Batteries from your gear go in your clothing to warm up. They should regain enough punch to do the job later.

If your gear won't be on line for awhile, don't install batteries. Keep 'em warm as long as you can—but not above 80°F for extended periods.

If you warm batteries in a heated place, watch for sweating. Wipe moisture off when you see it or it'll turn to ice in the cold.

Finally, if your batteries have to mate with plastic pins to do their job, be careful when installing 'em.



Pins get brittle, and can break if handled too roughly.

Cold Rockets, Missiles, and Mortars...

Sub Zero PM

Missiles, rockets and mortars have fire control or other optical equipment that needs special winter care.

F'rinstance, most need preoperation warm-ups to function right. Check your TM's and follow the procedures.

Some aids:

Before you move optics from a warm area into the cold, cover 'em up. Use your anti-condensation bags if your equipment has them. Or, wrap them in layers of clothes or blankets.

When you're ready to mount and use the optics, strip the layers off one at a time. Take a little time between layers.

Otherwise, the optics will cloud and internal parts will rust from moisture.

Never breathe on optics to clean or clear them. That'll give you instant icing...and a clouded lens when you get the ice off.

Rockets

Rocket launcher ignition time changes in low temperatures, requiring sight adjustments. Para 2-3d(1) of TM 3-1055-456-12 on the M202A1 fills you in. TM 9-1340-214-10 gives you sub-zero firing limits on service and practice rounds.

Check your TM.

Keep snow and ice off launchers. If any gets on, wipe the launcher clean and dry.

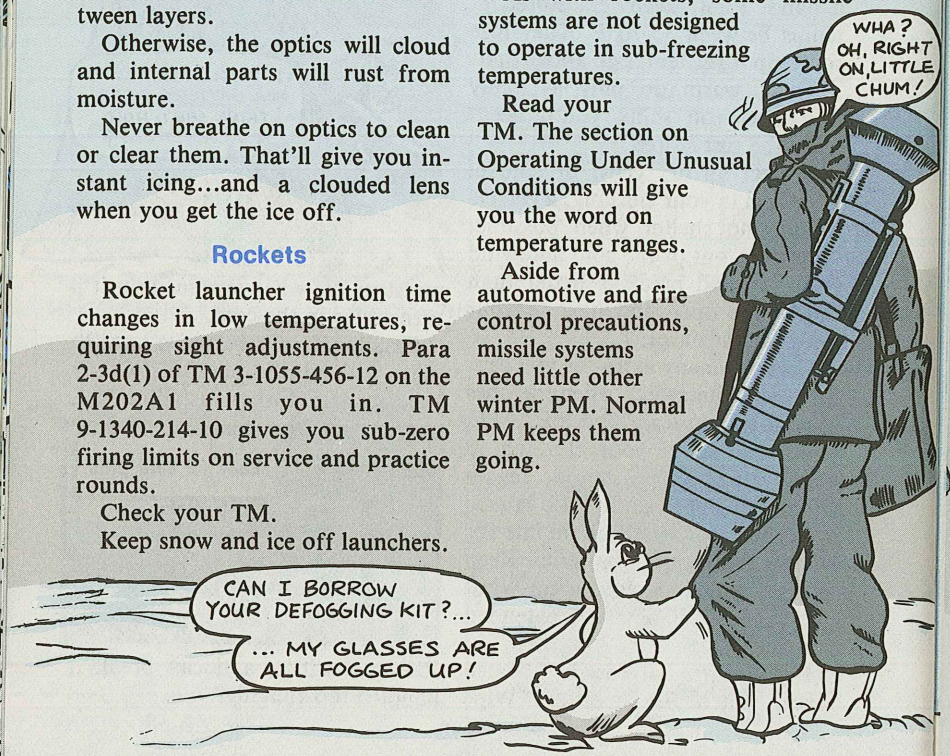
If you have an antifogging kit, use it on the sight assembly lens.

Missiles

As with rockets, some missile systems are not designed to operate in sub-freezing temperatures.

Read your TM. The section on Operating Under Unusual Conditions will give you the word on temperature ranges.

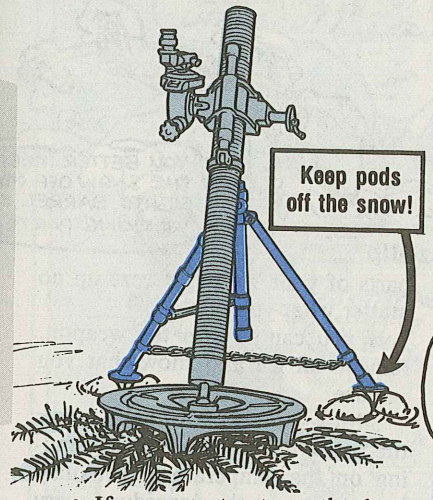
Aside from automotive and fire control precautions, missile systems need little other winter PM. Normal PM keeps them going.



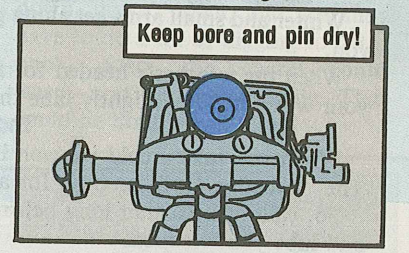
Mortars

Mortars demand PM matched to the cold.

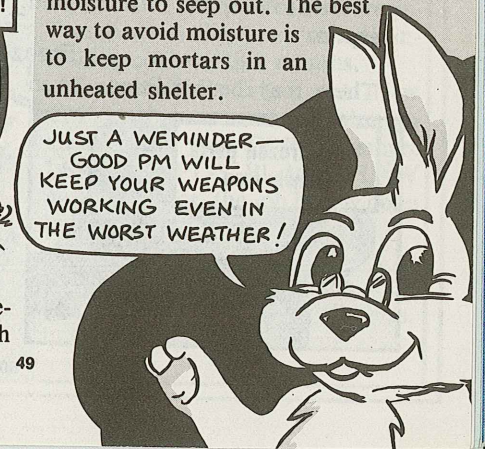
- Keep the bore dry. Keep lube away from the firing pin.
- Keep mortar rounds at the same temperature as your weapon.
- To keep bipods, tripods and baseplates from sinking into the snow, use padding under them. Snow shoes under the front pods or tree boughs under the baseplate do the job. Use whatever's on hand.



- If you must set up the baseplate on snow, coat the bottom with waste oil. That'll prevent pulling up a foot of ice after firing.



- Check the bore for snow and ice before you insert a round.
- Keep snow and ice off moving parts.
- If you move your mortar to a warm area for cleaning, wait at least a half hour before you clean and lube it with CLP. That allows moisture to seep out. The best way to avoid moisture is to keep mortars in an unheated shelter.



Winter and small arms get along pretty well, with some PM assists from you.

When the weather's headed for zero and sub-zero temperatures, clean your weapon. Then, lightly lube the way your TM tells you.

Indoors

When you take a cold weapon indoors, condensation will form on it. The "sweating" will keep up for an hour or so.

So, wait at least that long before you wipe off the sweat. Then, clean and lube your weapon.

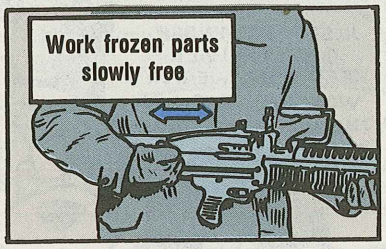
If you don't wait, the sweating will continue after you clean the weapon. It may freeze when you next take your weapon outdoors, and chances are good the weapon won't work right...or at all.

Keep Snow Off

Snow, ice and slush can foul up parts, sights and the barrel, so do your best to keep the stuff off your weapon.

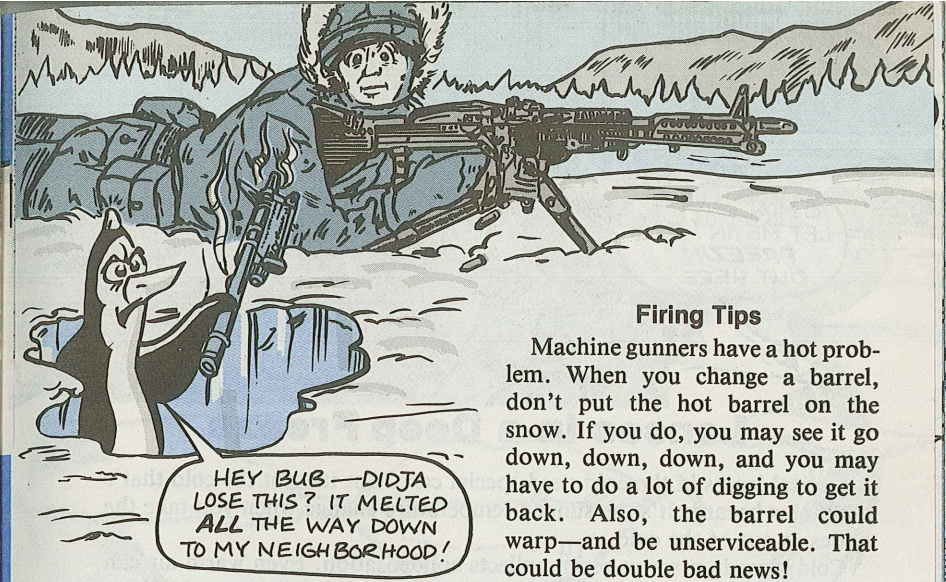
Freeze-Up

There may be conditions when parts of your weapon freeze up no matter what you do.



If you can't warm the weapon, remove all ice and snow that you can see.

S-l-o-w-l-y and gradually work the parts till they free up. Depending on the temperature, you may have to repeat the procedure every 30 minutes. It's good PM.

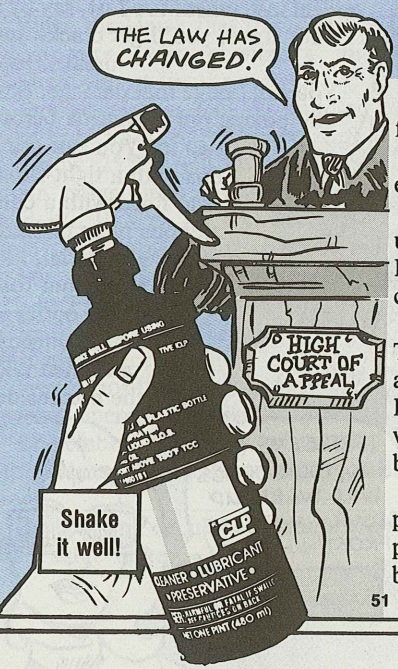


Firing Tips

Machine gunners have a hot problem. When you change a barrel, don't put the hot barrel on the snow. If you do, you may see it go down, down, down, and you may have to do a lot of digging to get it back. Also, the barrel could warp—and be unserviceable. That could be double bad news!

CLP All the Way...

Small Arms Winter Lube



Used to be that LAW was the law for winter lubing of small arms.

TM's and LO's on just about every weapon called for it.

The law's changed, and you now use CLP (Cleaner-Lubricant-Preservative) the year 'round...including cold-weather months.

Revised TM's call it out. New TM's and those under revision go all the way with CLP. Wherever LSA, RBC, PL-S, PL-M and LAW were called for, the job is now done by CLP.

Just remember, shake it well to permit proper mixing of the components. That's a must at all times, but extra important in winter.

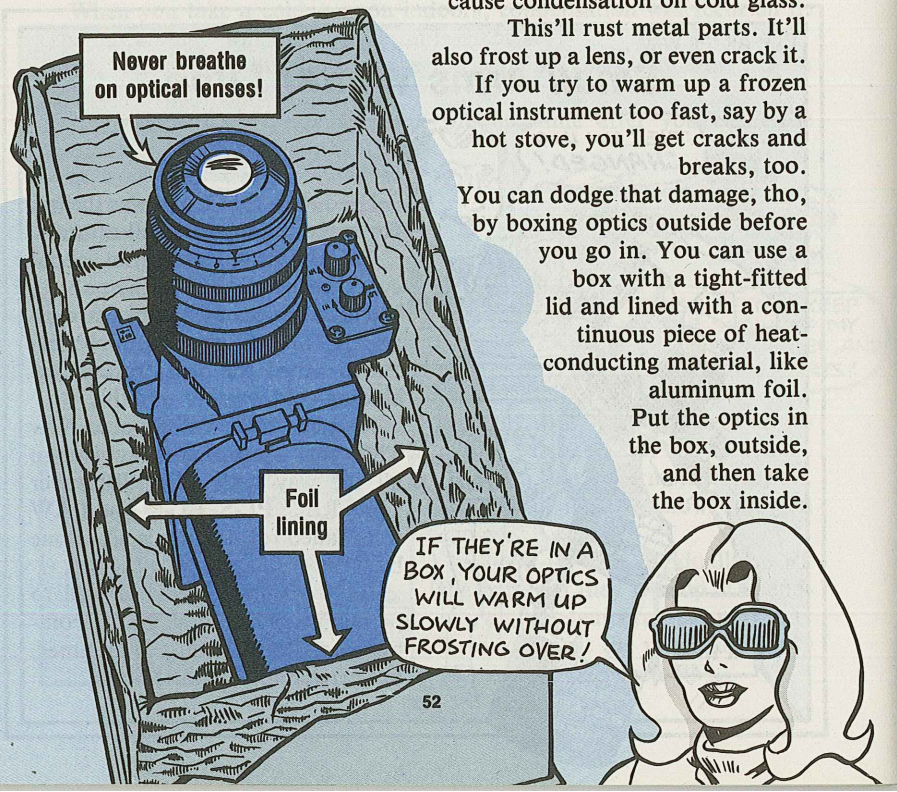
Lenses in a Deep Freeze

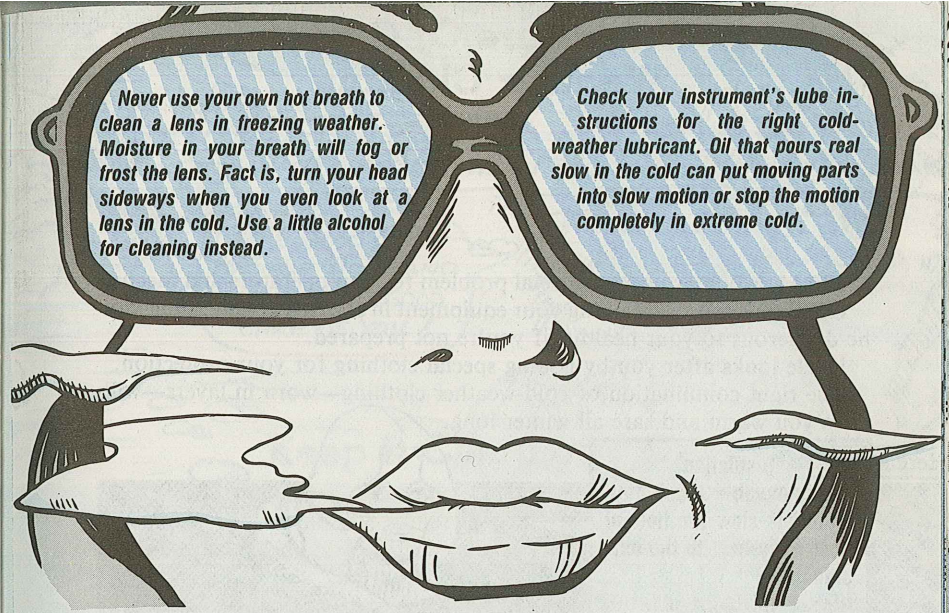
Optical lenses in the cold need special care. But it's not the cold that's the major hazard. It's the sudden temperature change when you take the optics in out of the cold.

Cold glass in a warm room collects condensation. Even warm air can cause condensation on cold glass. This'll rust metal parts. It'll also frost up a lens, or even crack it.

If you try to warm up a frozen optical instrument too fast, say by a hot stove, you'll get cracks and breaks, too.

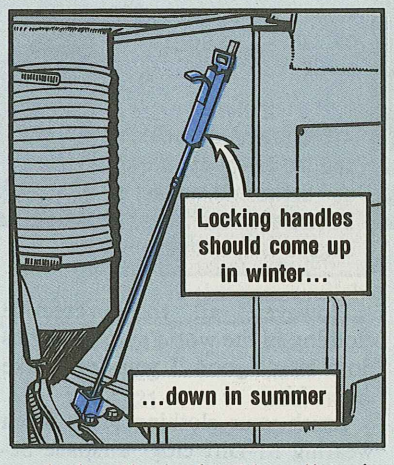
You can dodge that damage, tho, by boxing optics outside before you go in. You can use a box with a tight-fitted lid and lined with a continuous piece of heat-conducting material, like aluminum foil. Put the optics in the box, outside, and then take the box inside.





M109-Series Howitzers...

Set Air Cleaner for Winter



When the Hawk flies this winter, make sure your howitzer's air cleaners are set for the season.

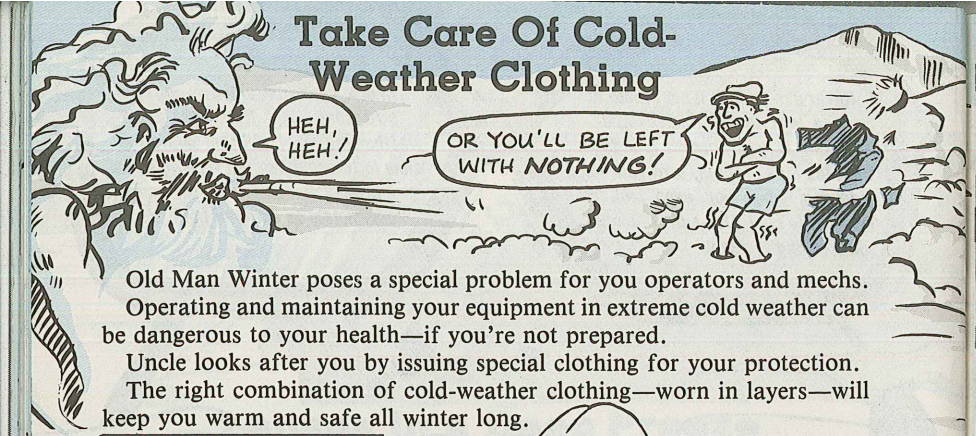
The air cleaner locking handles need to be up when the temperature is below 25 °F. If you leave 'em down, your diesel fuel can get so cold it'll thicken up and not flow right. Then your engine won't run.

For intermediate temperatures (25-40 °F), start the engine with the locking handles in the winter position and place the handles in the "down" position when the engine reaches operating temperature.

Remember, tho, that when the temperature climbs above 40 °F, you put the handles in the "down" position.

If you leave 'em up in the summer, your engine will overheat and maybe burn some valves.

Take Care Of Cold-Weather Clothing



Old Man Winter poses a special problem for you operators and mechs.

Operating and maintaining your equipment in extreme cold weather can be dangerous to your health—if you're not prepared.

Uncle looks after you by issuing special clothing for your protection.

The right combination of cold-weather clothing—worn in layers—will keep you warm and safe all winter long.

Here's why:

Insulation
—Removeable insulated materials slow the flow of your body heat to the outside.

Ventilation
—Ventilation allows air to cool the overheated body areas thru openings such as cuffs and front closures.

Buffering
—The layers of materials, and the layers of air trapped between them, act as buffers against changes in outside temperatures.

However, all the protective clothing in the world's not going to do a bit of good if you don't take care of it.

Brush your clothing often when wearing it. Dirt clogs airspace between the textile fibers and reduces insulation. It also cuts the fibers and holds in perspiration.

Before storage, give your clothing an extra good brushing—in the sunlight, if possible.

Be careful when washing your cold-weather clothing. Some items must be washed in cold water; some in luke-warm water; and some in warm water.

To keep your clothing up to snuff, eyeball Sect I, FM 31-70 Basic Cold Weather Manual.

Keep It Clean and Dry

The extreme cold weather hood, NSN 8415-00-782-3004, is a vital part of your winter protective clothing.

If you take good care of the hood, it'll help keep you warm and comfortable. If you don't, you're in for a long, cold and painful season.

Keep the fur dry by brushing off frost and snow as much as possible. Wet fur becomes matted and stiff. It irritates your skin and eyes when you pull it close to your face.

Oil, grease and mud make the fur rough on your skin, too. Keep the fur ruff as clean as conditions permit.

Hand wash your hood in lukewarm water with a mild detergent. Rinse thoroughly in clean water, shake out and drip dry.

Never machine tumble your hood or lay it on a stove or heater to dry.

Prevent Cold Metal Burn

To protect your hands from metal burns in temps as low as −60 °F, CTA 50-900 authorizes the use of anti-contact gloves. These cotton skin-savers feature soft deerskin reinforced palms, thumbs and fingers. Here're the sizes available:

NSN 8415-00-	Size
227-1220	small
227-1221	medium
227-1222	large

They can't take hours of rough, heavy duty work, tho. Substitute regular gloves as soon as you can.

Words To Sleep By

Of course a sleeping bag's never gonna take the place of a nice, soft bed. But with a little effort on your part, it will provide enough comfort and warmth to get a good night's sleep.

When you roll the bag up from the top, the insulation settles into the foot. So just shake the bag a few

times while holding it by the foot. This spreads out the feathers and makes a warm, even layer of insulation.

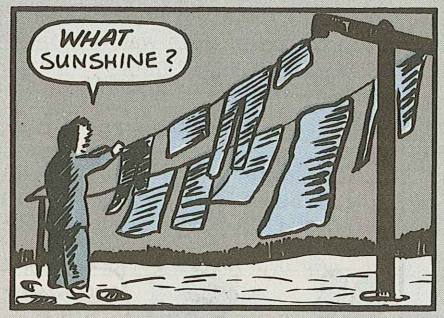
Don't wear damp clothing while in the sleeping bag. Also, avoid sweating. If it gets too warm, open

the slide fastener for ventilation.

For maximum protection from the cold, put a sleeping mat, NSN 8465-01-109-3369, between the bag and the ground. More padding, such as clothing items, may be used

between the bag and the mat for added comfort and insulation.

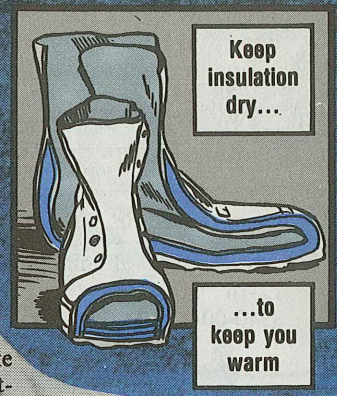
After using the sleeping bag, leave it open for a few hours to let it air out. Fresh air and sunshine fluff up the feathers, too.



Clean bags work better than dirty ones. Remove dirt and grease by spot-cleaning with a damp cloth and soap. Brush and clean clothing before getting in for the night.

Never dry-clean a sleeping bag, tho. The cleaning vapors could put you to sleep—permanently.

Better Than a Foot Warmer



The black cold-weather boot and the white, extreme-cold-weather boot will keep your tootsies toasty when the temperature drops. But you have to help them!

The boots keep you warm because there's a layer of insulation sealed inside. If insulation gets wet—like from a hole or when the valve's left open—the boot can't keep you warm.

Boots are inspected before winter, and again after the temperature warms up, to make sure they are still serviceable. Inspection and testing is covered by Para 21-14 and 21-15 of TM 10-8400-201-23.

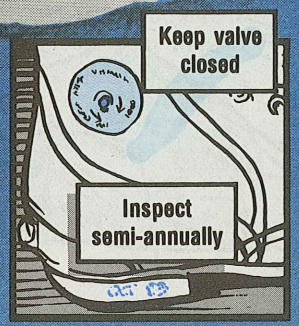
Keep your boots clean. Wash 'em with soap and water. Use a general purpose detergent like NSN 7930-00-357-7386 for stubborn dirt.

Wash the inside of the boots with soapy water at least once a month.

Take the laces out and clean between the tongue and the eyelets. Dirt or grit here can wear a hole in the boots.

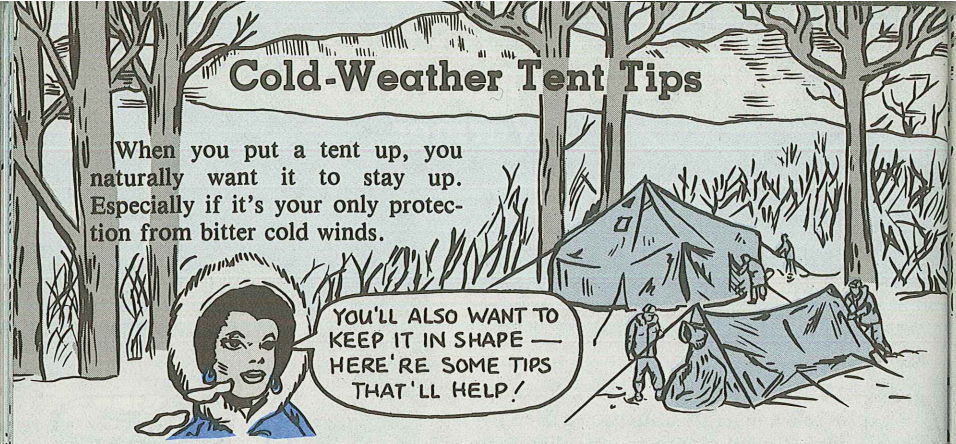
Look for cuts or holes. Patch any holes with cold-weather boot maintenance kit, NSN 8465-00-753-6335. Have the boots tested after you patch 'em and make sure they're OK. Use a piece of tape to patch holes if you don't have the repair kit handy.

Keep the air valve closed unless you go up in an aircraft. Close the valve when you land. An open valve lets in moisture. You only need to wear one pair of cushion sole socks. Carry dry socks and change often. Check out Chap 21 of TM 10-8400-201-23 for more information on maintenance and repair of these boots.



Cold-Weather Tent Tips

When you put a tent up, you naturally want it to stay up. Especially if it's your only protection from bitter cold winds.



Instead of aluminum pins, use 12-in steel tent pins, NSN 8340-00-823-7451. Appendix A,

CTA 50-970 is your authority for the steel pins.

If the ground's frozen too hard to get even the steel pins in, chop small holes in the ground. Fill the holes with slush or water. Then put the pins in. The slush or water will freeze and anchor 'em.

To get the pins out, chop the ground around 'em till they loosen up. Never pound 'em sideways with a hammer to break 'em loose.

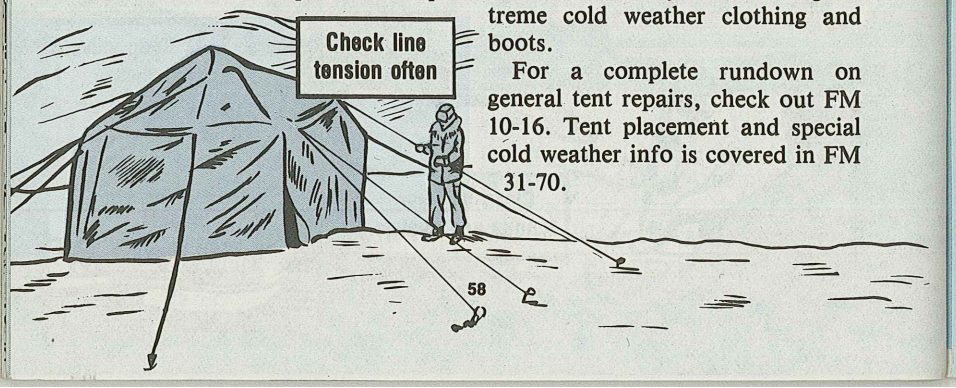
When there's strong wind, tent line tension is important. Ropes must be tight to withstand the force. When the weather's wet, tho, ropes need some slack to allow for shrinkage.

Slide fasteners that won't slide are a pain. Interlocking slide fastener lubricant, NSN 9150-00-999-7548, solves the problem.

On frame-type tents, cold canvas may not completely cover the frame. Don't force it. Lay it over the frame, and secure it. The heat from inside the tent will warm the canvas, and you'll be able to finish tying it down.

Bulky winter gear can catch on the tent door and slide fastener and tear the canvas. So be careful going in and out when you're wearing extreme cold weather clothing and boots.

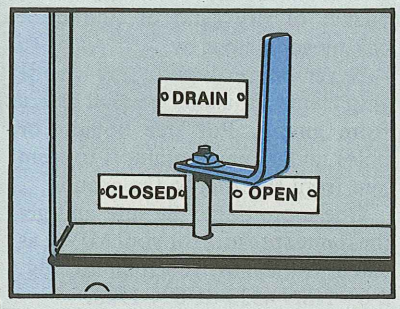
For a complete rundown on general tent repairs, check out FM 10-16. Tent placement and special cold weather info is covered in FM 31-70.



Fix It If You Can

Any repairs you can do on fatigues—spelled out in Chap 4 of TM 10-8400-201-23—may be done on the BDU. Both darning and patching are OK.

Remember to Drain

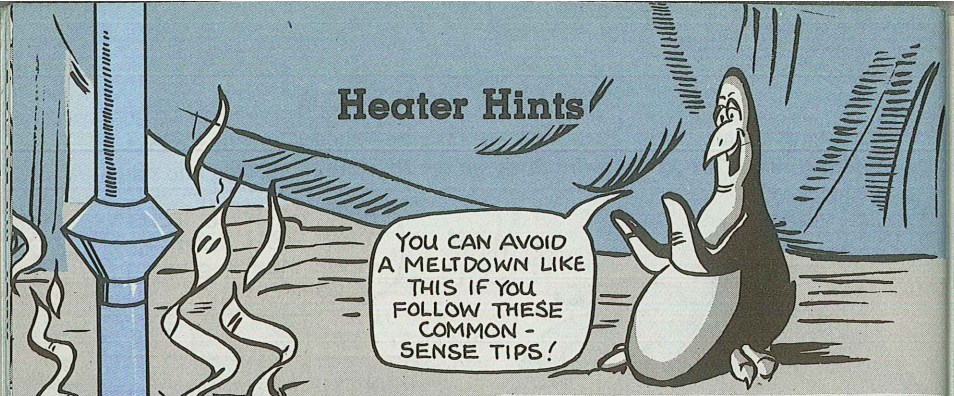


When it's cold outside, be sure to drain the water from your M12A1 decon apparatus. Water left standing in the M12A1 freezes only a few degrees below 32°F or 0°C.

It can ruin pipes, hoses and the pump housing.

Follow the cold-weather procedures in Para 2-38 of TM 3-4230-209-12.

Heater Hints

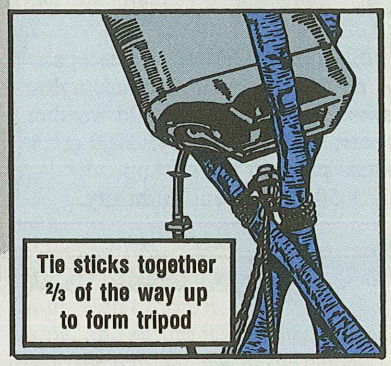


Your M1941 and M1950 (Yukon) heaters mean the difference between success and failure in cold-weather operations. Read TM 10-4500-200-13 as if your life depended upon it.

Here're some more heater hints that'll come in handy:

—Don't put the heaters directly on frozen ground. The heat will melt it and turn your tent floor into one sloppy mess. Instead, put 'em on a piece of scrap metal, pile of stones or brickbats.

—Make sure the fuel can is on a steady support. If a suitable structure isn't available, make one. Take 3 poles or sticks about 2 meters long, tie 'em together about ⅔ of the way up and spread 'em out to form a tripod. The fuel can should be at least 1 meter higher than the stove. If there's a wind or if the can's wobbly, tie it to the tripod. Make sure the can is tilted so the air is trapped in the uppermost corner.

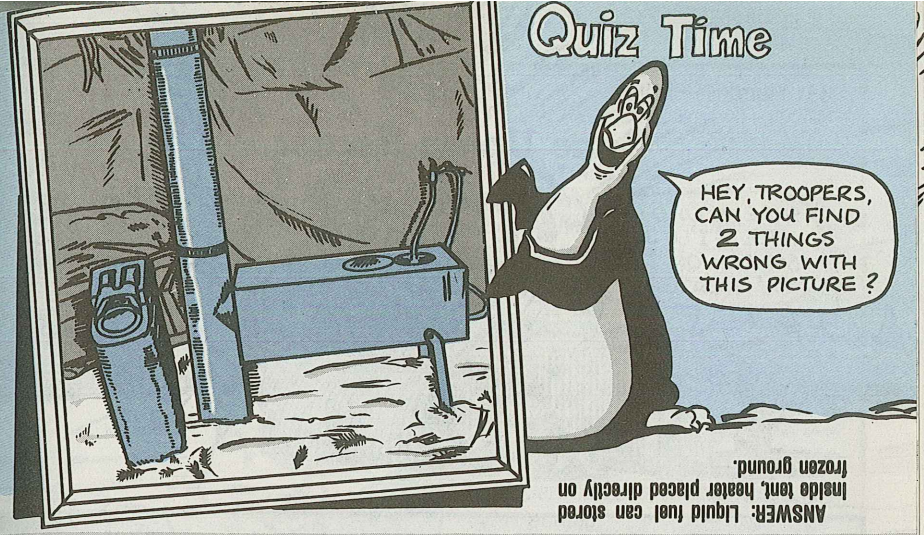


—In case the burner flame gets out of control, keep a fire extinguisher, bucket of dry sand or pound of baking soda close by.

—Never store liquid fuel inside your tent. Outside, keep it away from ammo. Put tree boughs or poles under fuel containers to keep 'em from freezing to the ground.

One more thing. Be sure and get the flame spreader for your M1941 as listed in the TM. It's Item 20, Fig. 2-6—NSN 4530-01-094-1928.

Quiz Time



ANSWER: Liquid fuel can stored inside tent, heater placed directly on frozen ground.

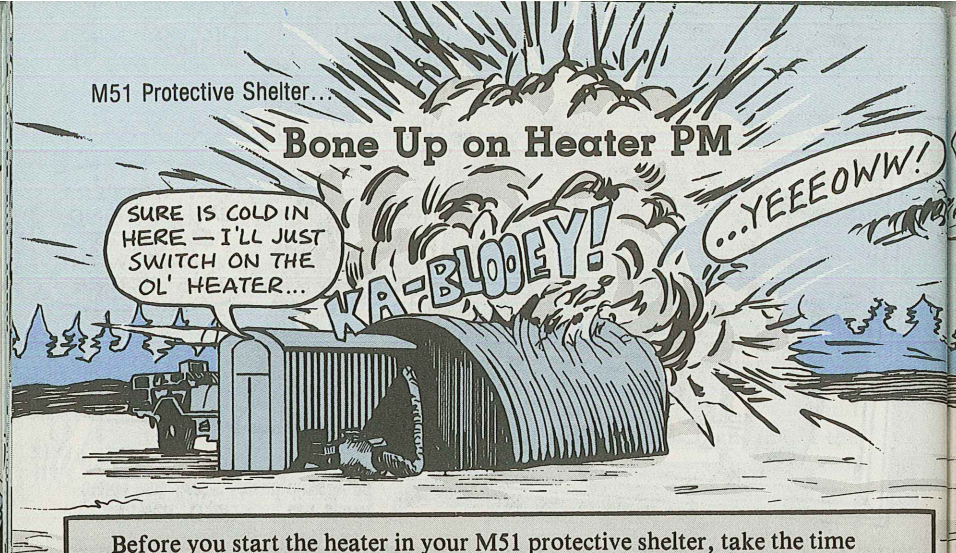
Steam Cleaner Antifreeze

To keep your steam cleaner from freezing when you're not using it, fill it with a 50/50 mix of water and antifreeze. Pump the mix out and save it for later before you use the cleaner.

Make sure you go by the detailed instructions in your manual.

NSN 6850-00-181-7929 gets a gallon of antifreeze and NSN 6850-00-181-7933 gets 5 gallons.

Bone Up on Heater PM



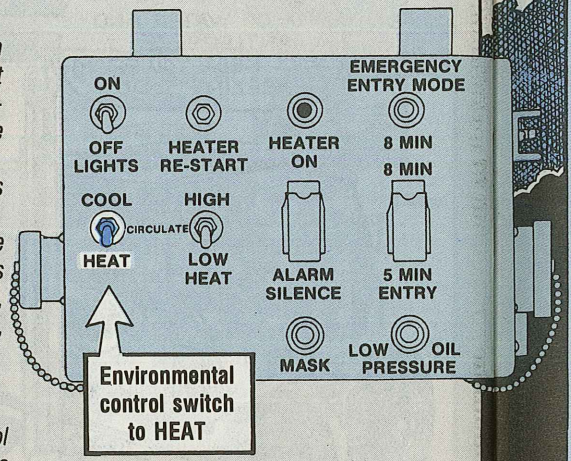
Before you start the heater in your M51 protective shelter, take the time to check it out. If gas fumes are in the shelter when the heater is turned on, you and your equipment could be burned. A few simple checks could head off this disaster.

Before Operating

- *Eyeball the combustion heater in the environmental equipment cabinet for loose or missing hardware, corrosion, physical damage and possible gasoline leaks.*
- *Sniff inside the shelter for gas vapors.*
- *Disconnect the plenum and let the recirculation fan blow out any vapors for a few minutes. If there are no leaks, replace the plenum. If there are leaks, notify your supervisor.*

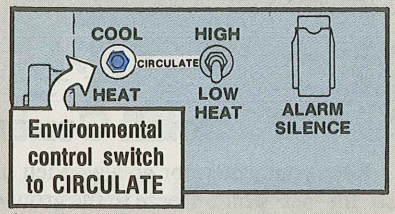
Starting the Heater

- *Set the environmental control switch to heat. In a couple of minutes the "Heater On" light should come on. If it doesn't, wait 5 minutes, then press the heater restart switch and hold it for 3 seconds. Wait 2 more minutes. If the light still doesn't come on, check the troubleshooting procedures on Page 3-6 of TM 3-4240-264-12.*
- *When the "Heater On" light comes on, set the high-low heat switch as required.*



Turning Heater Off

- *Set the environmental control switch to the middle position (CIRCULATE).*
- *Keep the recirculation fan running until the heater cools down and the heater fan stops. Next time starting will be easier because excess unburned fuel is purged.*



Cold-Weather Posters

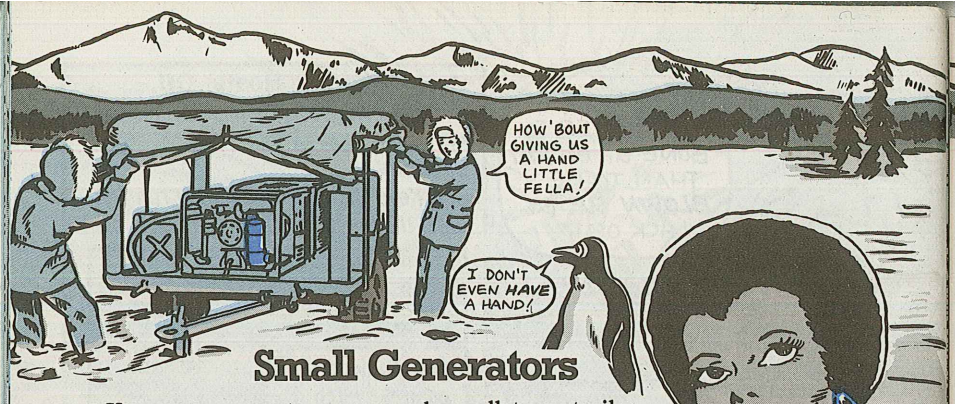
There's nothing like big posters to give your cold-weather preparations a push. Stick 'em on bulletin boards, orderly rooms and maintenance shop walls.

Here're some timely ones:

DA POSTER	SUBJECT
750-52	Optical Antifreeze/ Battery Tester
750-70	Is Your Radiator Ready for Winter?
750-71	Engine Coolant Up-to-Snuff?
750-72	Keep Batteries Fully Charged
750-73	Drain Multifuel Filters
750-76	Give Your Batteries a Full Life

Your unit can get on automatic distribution for DA Posters by processing DA Form 12-4, Block 6.

For back copies, process DA Form 4569 for AUTODIN.



Small Generators

Keep your generator on a wooden pallet or trailer so the set won't freeze to the ground. Use the shelter of buildings, tents, or vehicles to protect it from the wind.

Keep ice and snow wiped off. This'll keep the melted stuff from getting in where it shouldn't.

Set the air intake shutter to the WINTER setting whenever the temperature drops below 32°F. This lets warm air from the manifold keep the carburetor from freezing.

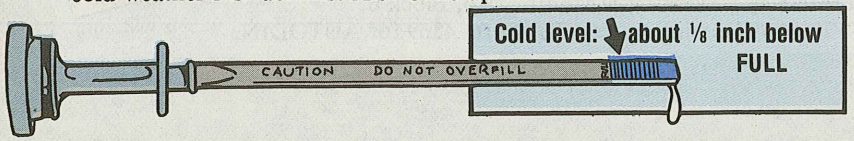
Keep the fuel tank full to reduce condensation. Less moisture in the fuel means less chance you'll get a frozen fuel line.

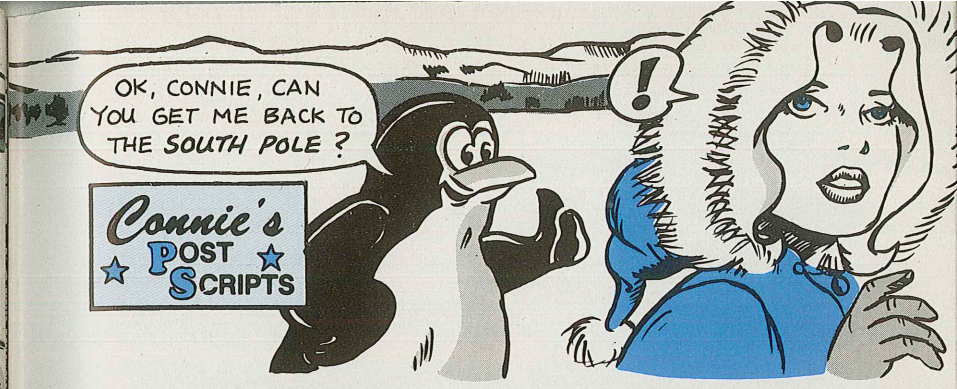
Store bulk oils and lubes inside a heated shelter, if possible. Makes them easier to pour...and saves you from guessing how much room to leave for expansion in the oil tank.

Be careful not to overfill when you add oil in extreme cold weather. If the oil is cold, leave it about ⅛ inch below the FULL mark on the dipstick. It'll expand when the engine warms up.

Use the right fuel antifreeze compound. Technical methanol does the job in gasoline; diesel fuel takes fuel system icing inhibitor. The ratio for both is 1 pint for every 40 gallons of fuel.

'Course, you know to check the generator's engine TM for any special cold-weather instructions. Also bone up on FM 9-207.





T142, Not T156

Yep, we blew it. The track story on Page 8 of PS 370 is primarily about T142 track, not T156 as the headline says.

Field Desk Stool

To get the stool that goes with field desk, NSN 7110-00-267-1999, use NSN 7105-00-282-0684.

M60D BII Source

Basic Issue Items (BII) for your M60D machine gun aren't in your armament subsystem TM's. Instead, look on Pages 67 and 68 of TM 9-1005-224-10. BII for the M60 and M60D are the same.

AVIATION MESSAGES

Cat 1 EIR Phone
AUTOVON 693-2066
(24 hours)

If your unit has not received a message in which you have an interest, check with your next higher headquarters.

AH-1-83-08, UH-1-83-12 SOF Concerning the finite life schedule for parts incorporated in the hydraulic servo cylinder assembly on AH-1 and UH-1C/M 240100Z Jun 83

AH-1-83-09, UH-1-83-13 SOF Concerning the finite life schedule for parts incorporated in the servo cylinder assembly on AH-1 and UH-1C/M and other components of the hydraulic actuator assembly on all AH-1 aircraft. This is a supplemental message that contains additional information and supersedes parts of the original message 012000Z Jul 83

AH-1-83-10 SOF Concerning the force gradient 212000Z Jul 83

CH-47-83-06 SOF One time inspection of CH-47C/D fiberglass rotor blade sealant installation 222145Z Jul 83

OV-1-83-01 SOF One time inspection, wing attachment bolts, P/N 134WM10053, for evidence of possible hydrogen embrittlement and bolt clamp-up 161705Z May 83

MIM-83-47-06 New torque requirements of FRB tip cover mounting screws 291230Z Jul 83

MIM-CH-47-83-MEC-02 Bubble windows 231840Z May 83

MIM-CH-47-83-MEC-03 Incandescent light bulb problem 231530Z May 83

MIM-OH-58-83-MEC-02 Swashplate and Support assembly 031510Z May 83

MIM-OH-58-83-MEC-04 Use of Molub-alloy-771-grease 201500Z Jul 83

MIM-OV-01-83-MEC-01 Requirement for programmed aircraft restoration 161710Z May 83

MIM-OV-01-83-MEC-02 Erroneous tripping of VIDS warning latch 231535Z May 83

MIM-T63-83-MEA-01 Strainer element GTE fuel control 172015Z Jun 83

MIM-T63-83-MEA-02 Remove salt water contamination after operating in salt laden air 281830Z Jun 83

MIM-T63-83-MEA-03 Deletion of the tow strap eye bolt and attaching parts on the engine governer during rigging 151500Z Jul 83

MIM-UH-1-83-MEA-03, MIM-AH-1-83-MEA-03 Approved nuts for tail rotor drive shaft changes 011935Z Jul 83

MIM-UH-60A-83-MEA-11 Expanded aft center of gravity limits and revision of the component overhaul/retirement lives 021900Z Jul 83

☆ U.S. GOVERNMENT PRINTING OFFICE: 1983—659-007/11

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


IF YOU'RE NOT READY FOR ME— YOU'RE NOT READY AT ALL!