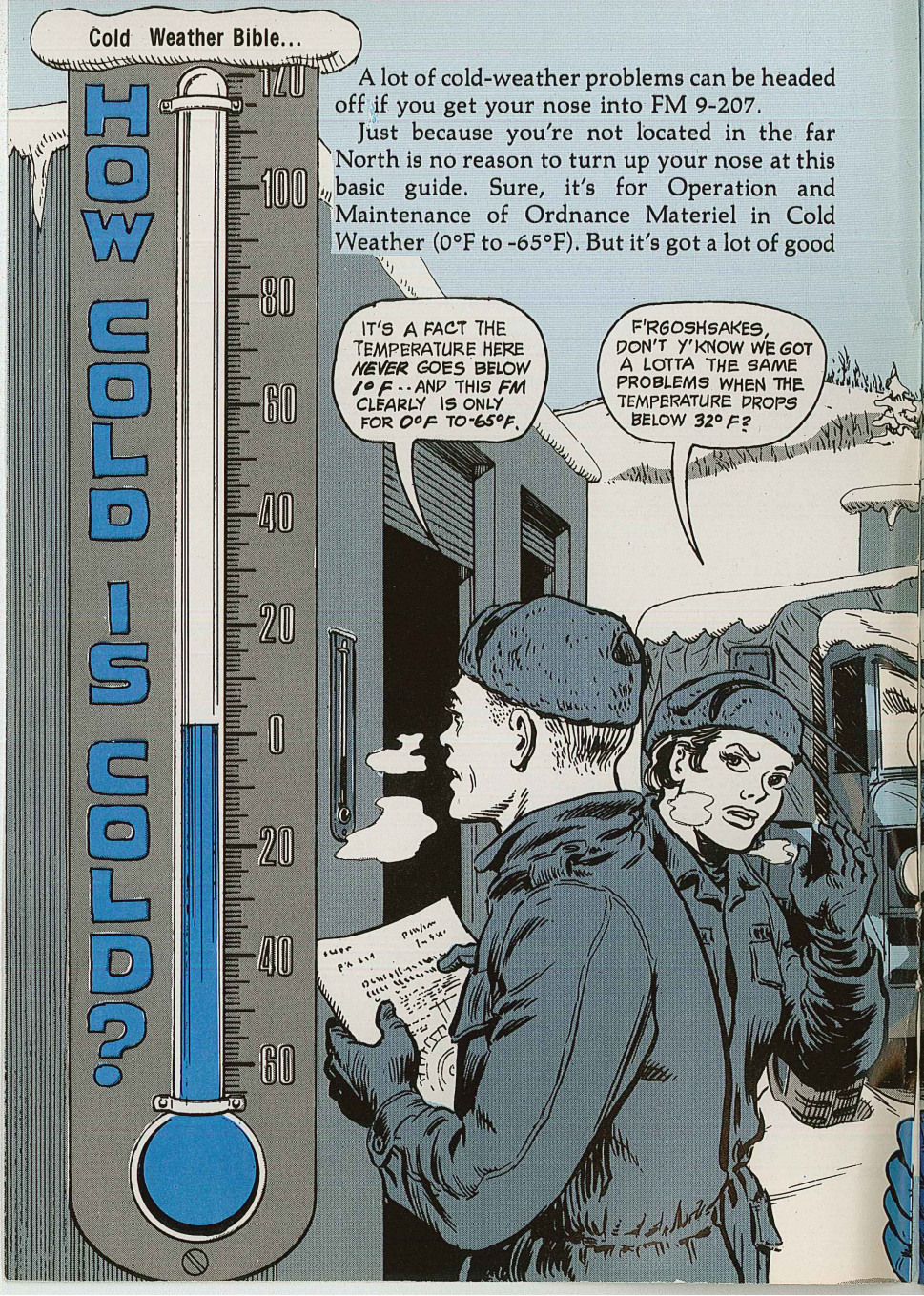
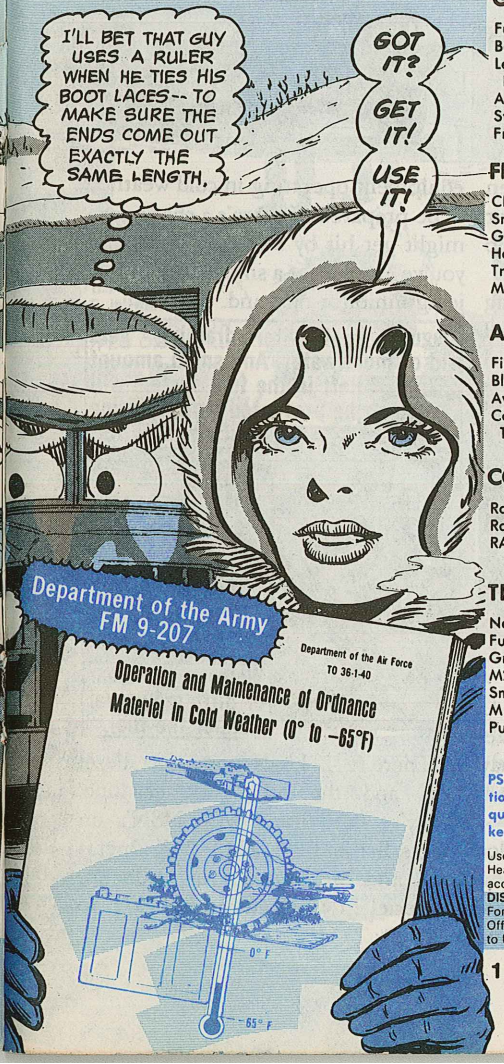

Issue 347
PS
October
1981
THE PREVENTIVE MAINTENANCE MONTHLY
HAS EVERY SOLDIER IN YOUR SQUAD READ THIS ISSUE? PASS IT ON!
WOT A TIME FOR BATTERY PM!!
MURPHY ANDERSON
Cold Weather Issue



A lot of cold-weather problems can be headed off if you get your nose into FM 9-207.

Just because you're not located in the far North is no reason to turn up your nose at this basic guide. Sure, it's for Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to -65°F). But it's got a lot of good poop for you if you're in an area where the temperature dips well below freezing—32°F—and stays down there for a couple of weeks.

It makes more sense to have FM 9-207 on hand and then find that you don't need it than it does to need it and not have it.



PS THE PREVENTIVE MAINTENANCE MONTHLY

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ISSUE NO. 347 OCTOBER 1981

GROUND MOBILITY

FIREPOWER

AIR MOBILITY

COMMUNICATIONS

TROOP SUPPORT

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

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GROUND MOBILITY

Fuel Icing Inhibitor...

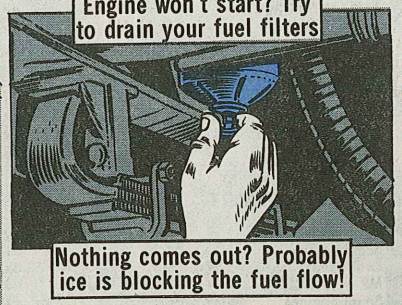
Palm Trees and Icicles

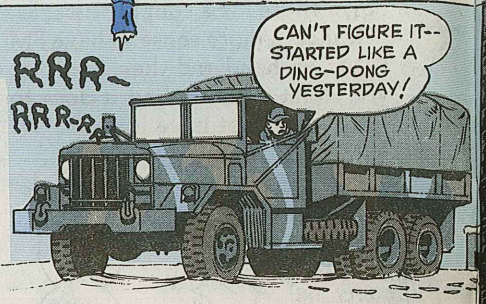
It's hard to think of coming cold weather problems when you're outside sweating in shirtsleeves.

It's even further from your mind when you're in an area that hardly ever has a hard freeze during winter.

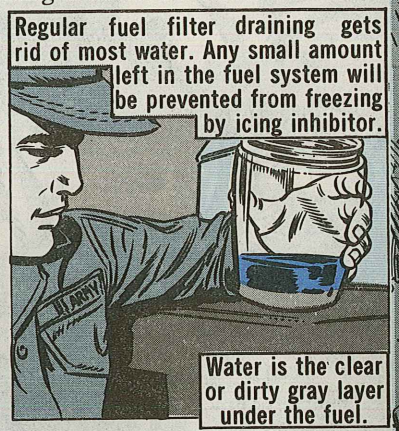
Hardly ever? Watch it! That's a trap waiting for you. Even in middle Florida the temperature has been known to drop to 20° F. And in other "southern" areas the mercury can drop to around 0° F.

Then you're a sure bet for fuel icing problems! Condensation in your fuel tank and elsewhere in your fuel system—like fuel filters—will freeze. It'll stop your engine—dead. You may not be able to get your engine started. Or it may start and run for a while—and then quit. You'll go through a lot of wheel-spinning—troubleshooting for problems not related to freezing—because you don't think of your equipment operating in cold weather.

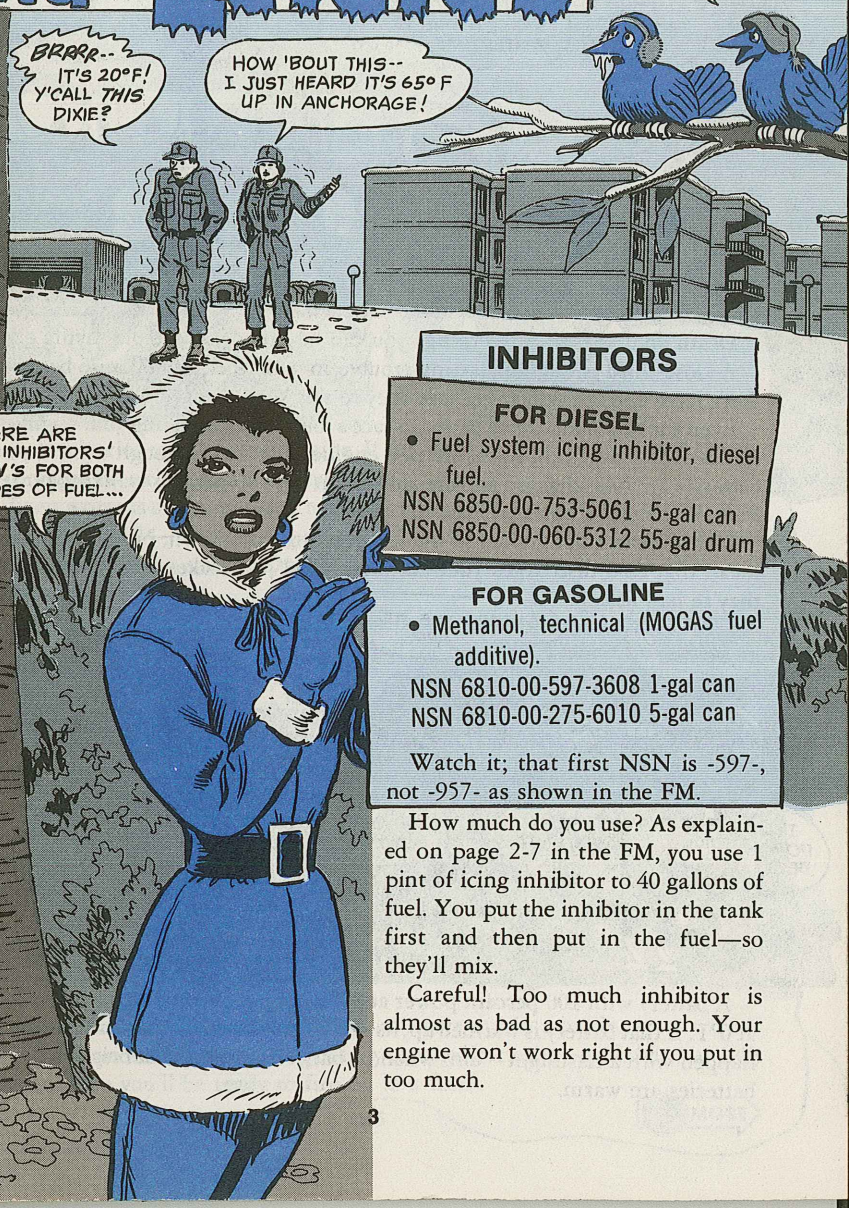




Be prepared! If there's a chance you might get hit by a freeze, make sure you've got at least a small stock of fuel icing inhibitor on hand.



There're 2 kinds—one for diesel fuel and the other for gasoline. They're both listed with NSN's on pages B-1 and B-3, FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to −65°F):



INHIBITORS

FOR DIESEL

- Fuel system icing inhibitor, diesel fuel.

NSN 6850-00-753-5061 5-gal can
NSN 6850-00-060-5312 55-gal drum

FOR GASOLINE

- Methanol, technical (MOGAS fuel additive).

NSN 6810-00-597-3608 1-gal can
NSN 6810-00-275-6010 5-gal can

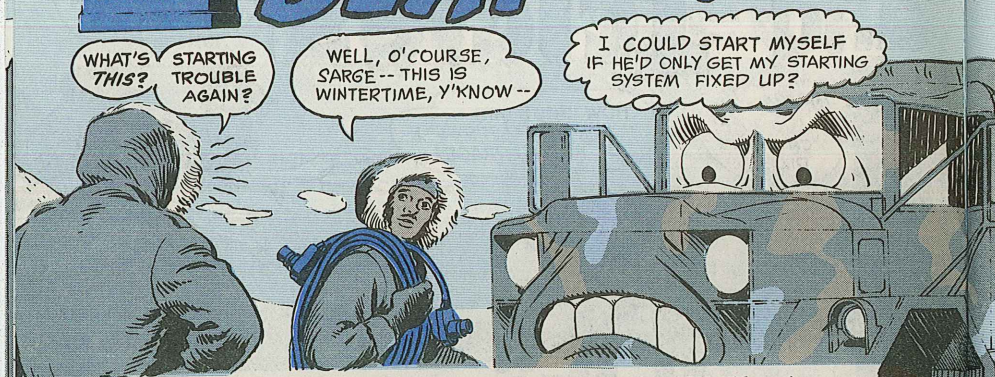
Watch it; that first NSN is -597-, not -957- as shown in the FM.

How much do you use? As explained on page 2-7 in the FM, you use 1 pint of icing inhibitor to 40 gallons of fuel. You put the inhibitor in the tank first and then put in the fuel—so they'll mix.

Careful! Too much inhibitor is almost as bad as not enough. Your engine won't work right if you put in too much.

Lead-Acid Batteries...

BEAT Engine Starting FAILURE

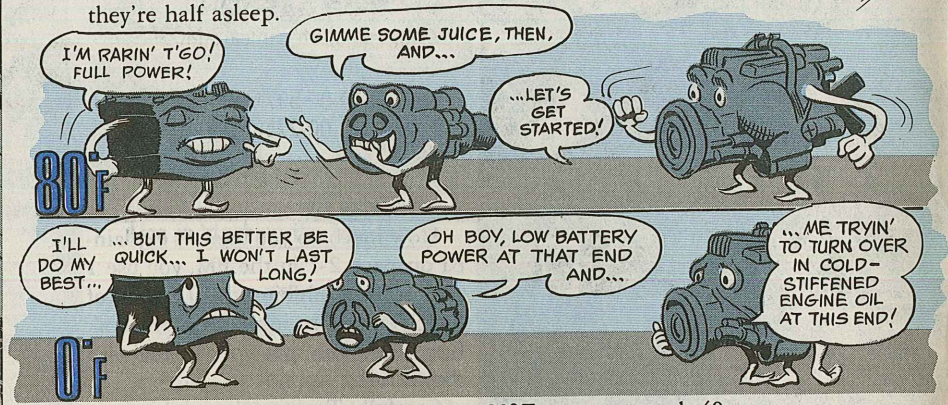


Death and taxes are two things you can be sure of, as the old saying goes.

A close third is engine starting trouble in cold weather...because batteries don't have enough poop...because they're not kept charged up.

Even the best maintained batteries face a tough fight cranking your engine in cold weather. Fighting cold-stiffened engine oil is hard enough even if your batteries are fully charged and are able to put out 100 percent cranking power. But cold batteries don't put out full power.

Battery power goes down as the temperature goes down. No, this does not mean that cold discharges your batteries. Cold just makes 'em groggy—like they're half asleep.



A battery with 100 percent power at 80° F can put out only 40 percent power at 0° F. If that battery is warmed up, its power goes back up. The same thing can happen with a flashlight—dim when its batteries are cold but bright when its batteries are warm.

Both Feet in a Hole

Trouble is, many batteries are too weak—discharged—to put out full power even at 80° F. So there's not much cranking power left when the temperature falls to 0° F—or lower. Then this puny power's sucked up fast by the starter

motor as it tries to crank your engine. If the engine fails to start in the first few seconds of cranking, that's all she wrote.

Even worse is a battery that's too weak to operate the starter at all. You may hear only a click—just enough power to close the starter relay (switch) but not enough to run the starter. Or you get nothing from the battery—it's dead, completely discharged.

Sure, you may get your engine started by slaving or jumping from another vehicle. You can do it again tomorrow and the next day. You can limp along all

winter—while hoping you don't have to move out in a big hurry.

Or you can make sure you've got fully charged batteries—and they stay fully charged—so you'll be ready to fire up in a flash.

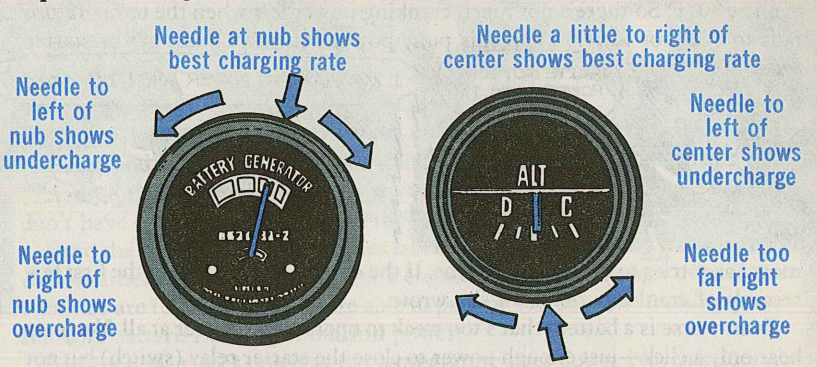
PS MORE

The Eyes Have It

Most important for keeping your batteries fully charged are your own eyes—especially the eye you keep on your charging system.

After your batteries are used to start your engine, they're recharged by the charging system. This is the generator (or alternator) that's driven by the engine. Also part of the system is the voltage regulator that controls charging.

You can tell when your charging system's falling down on the job just by eyeballing the battery-generator indicator (voltmeter or the ammeter). This is explained on Pages 4 & 5, DA Pamphlet 750-34, Preventive Maintenance of



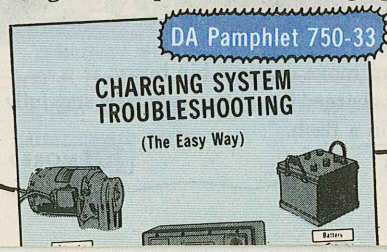
When your engine's been running for a few minutes, the gage should show charge—not overcharge, not undercharge. If it shows undercharge, you'll have weak—or dead—batteries when you need to start your engine next time.

Lead-Acid Batteries. (The "idiot light" on some equipment signals only undercharging, but the bat-gen indicator and ammeter show the full range.)

Undercharging is the big problem in cold weather. If your batteries don't get a full charge, they won't be able to do their best next time you need to start your engine.

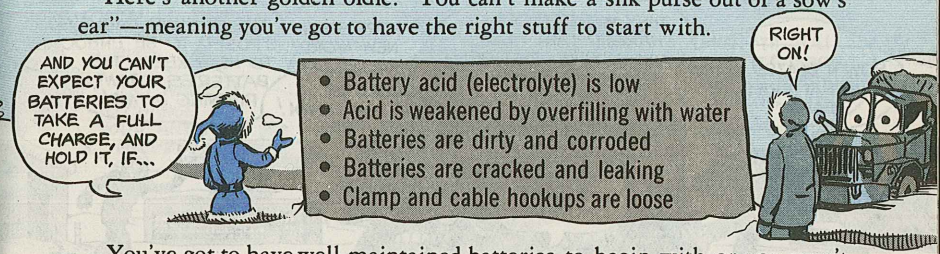
Report charging problems! Get 'em fixed! The problem may be as simple as a loose belt. Or the belt may be glazed—hard 'n' shiny on the sides—so it slips on the pulleys. Tightening or replacing the belt may put your charging system back on the track.

If the problem's something else, your mechanic can chase it down by using DA Pamphlet 750-33, Charging System Troubleshooting (The Easy Way), along with the -20 TM for your equipment. DA Pam 750-33 covers 25-amp, 60-amp, 100-amp and 300-amp charging systems in wheeled and track vehicles.

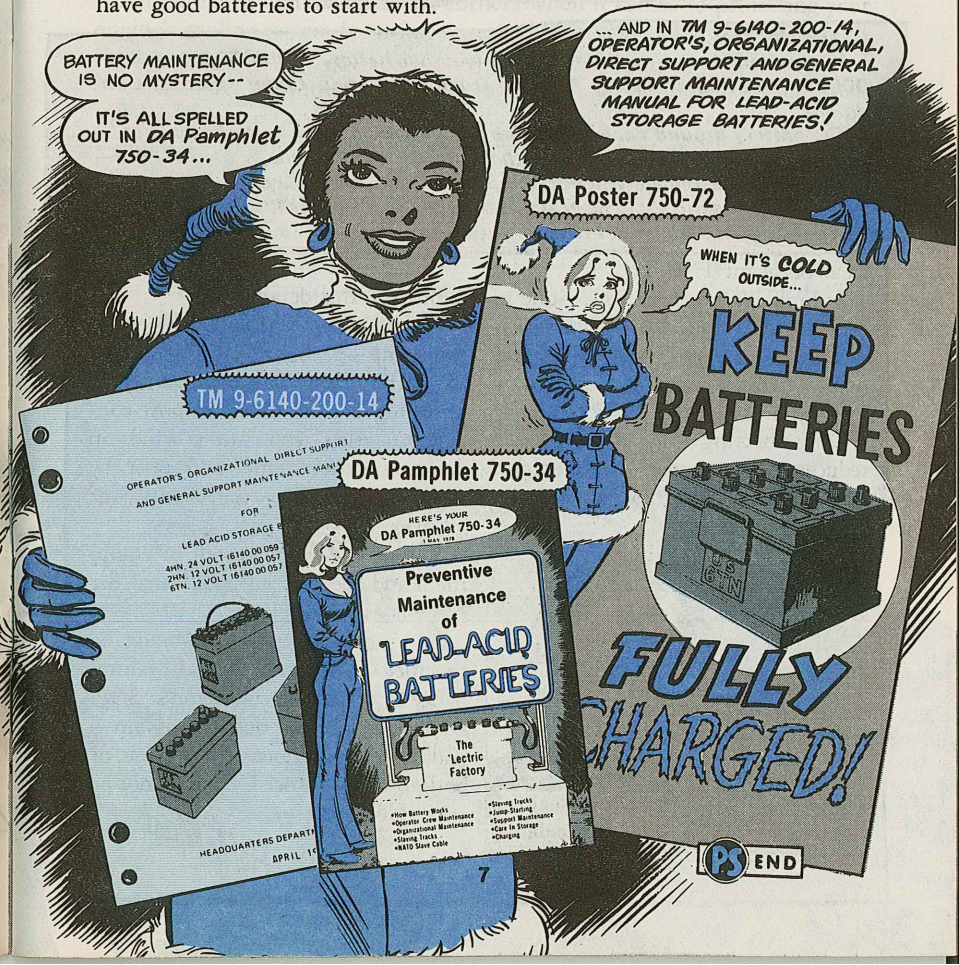


Right Start for Good Start

Here's another golden oldie: "You can't make a silk purse out of a sow's ear"—meaning you've got to have the right stuff to start with.

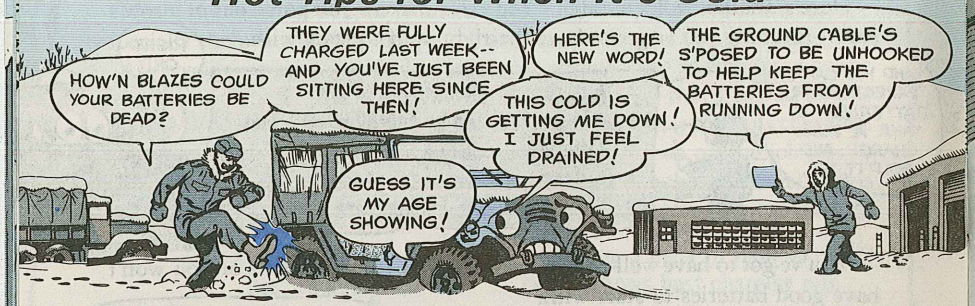


You've got to have well-maintained batteries to begin with or you won't have good batteries to start with.



Lead-Acid Batteries...

Hot Tips for When It's Cold



Dear Half-Mast,

I ran across a new wrinkle on cold weather battery PM in TEC 944-441-0009F, Wheeled Vehicles: 2½-Ton Truck, Operation Under Unusual Conditions:

The battery ground cable should be disconnected if the batteries cannot be removed to a warm area when the outside temperature is below 20°F—especially if the vehicle will not be operated for several days.

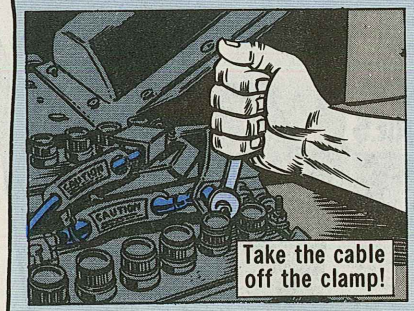
This poop doesn't show up in any of the pubs dealing with lead-acid batteries. What do you think about it?

SGT T. M. H.

Dear Sergeant T. M. H.,

I think it's a terrific idea—one of several steps that can be taken by mechanics to insure that your equipment's batteries will be rarin' to go when you need 'em.

Disconnecting the battery ground reduces the chance of electrical leakage—especially in old wiring with cracked insulation.



But add this detail:

Disconnect the ground cable from the clamp—do not take the clamp off the battery post. This'll prevent your upsetting a good clamp-to-post connection. Also, you won't wind up damaging the clamp and post by removing/installing the clamp over 'n' over.

Taking the batteries out of equipment and keeping 'em in a warm, dry place is even better.

But such requirements should be specified for Organizational Maintenance in your local command's SOP. Depending on your outfit's mission—and other conditions—either one, or both, of those procedures may not be advisable.

Half-Mast

Cooling System Antifreeze...

"Safe" Is Safe Enough

For sure, you don't want to cut corners when it comes to protecting your engine's cooling system from freezing. And it's just as important to keep rust and corrosion from plugging up your cooling system.

But that does not mean you've got to put in new antifreeze for every cold-weather season. The Army's MIL-A-46153 antifreeze—ethylene glycol, inhibited, heavy duty—can do a good job for several years.

Just make sure sure your coolant meets the freeze, reserve alkalinity and cleanliness requirements spelled out in TB 750-651, Use of Antifreeze Solutions And Cleaning Compounds in Engine Cooling Systems.

If your coolant checks out OK, you don't need new antifreeze. You keep the same antifreeze year 'round, year after year—as long as it stacks up by the TB.

Steering Knuckle Boot Cement

Need cement to install your 2½- or 5-ton truck's steering knuckle boots? You can get a good seal on those boots with cement, NSN 8040-00-515-2250. That'll get you a quart.

Logbook Protectors

Use NSN 7510-00-763-5996 to get the plastic bags that fit over your equipment logbooks.

Fuel/Lube/Hydraulic Systems...

Winter Troubleshooting

Think "ice" when you're troubleshooting equipment problems in freezing weather—'specially when hydraulic, fuel and lube systems fail to do their jobs.

Water is not good in those systems at any time, but water may pass thru without causing an immediate problem.

Big trouble comes when that water freezes in a hydraulic line, in a fuel filter or a steering gear. Ice is like a rock-hard plug! You've got to thaw out the frozen line, filter, steering gear, etc. Then you've got to drain the system—completely—to get all of the water out. Then you refill the system.

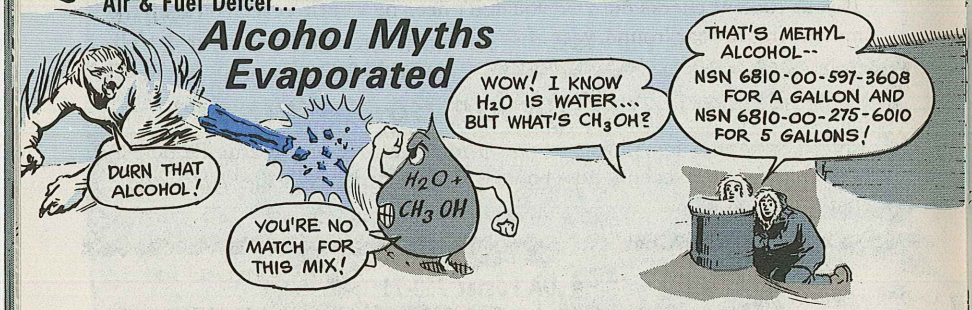
It can be a big job.

Even worse, tho, is spending a lot of time and effort trying to find some other cause of the trouble because you didn't think "ice".

Even better, think "prevention". It'll head off both water and ice problems. You get a lot of good "prevention" dope in FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather.

Air & Fuel Deicer...

Alcohol Myths Evaporated



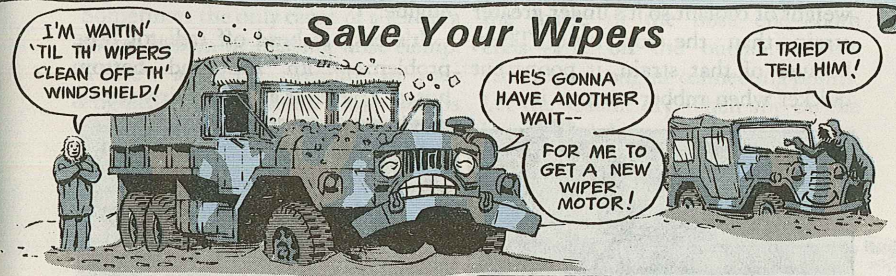
No, alcohol does not prevent water from forming in your equipment's gasoline tank or elsewhere in the fuel system.

No, alcohol does not "dry" the air in your vehicle's compressed air system.

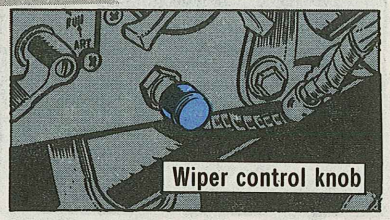
Alcohol prevents the freezing of water—condensation—already in the fuel system or air system. When alcohol and water are mixed, they stay mixed. If the percentage of alcohol is high enough, the mixture won't freeze.

The same kind of alcohol is used in both compressed air and gasoline fuel systems. Although it's identified only with MOGAS in FM 9-207, Page B-3, methanol, technical, is the same stuff used in the alcohol evaporator in your truck's compressed air system. You may also see it called methyl alcohol.

Save Your Wipers



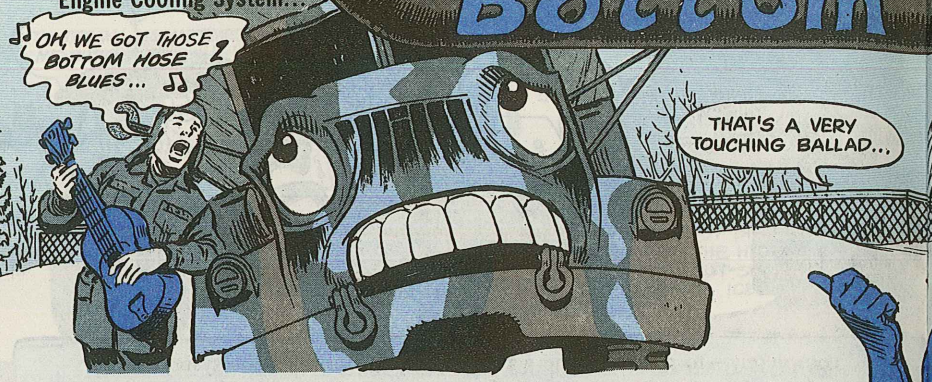
Your windshield wipers are not meant to clear away snow or ice that's built up while your vehicle is parked. If you don't clean off your windshield before you start your wipers, you'll lose a blade, bend or break a wiper arm or strip the wiper motor's gears.



Always turn your wipers off when you shut down your engine. Some people like to warm up their engine before cleaning the windshield. But the wipers will operate when the engine's started if the wiper switch is left ON. This's bad news for the wipers if they're frozen to the windshield or bogged down in heavy snow.

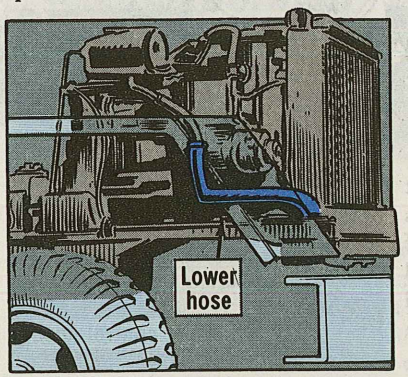
Bottom Hose BLUES

Engine Cooling System...



Pity that poor lower radiator hose on lots of water cooled engines.

It gets the worst of the deal all around. It takes a beating from brush and flying rocks in cross-country operations. It's always carrying the full weight of coolant so it's under greater strain than the top hose. Then, because of that strain, it poops out quicker when rubber rot sets in.



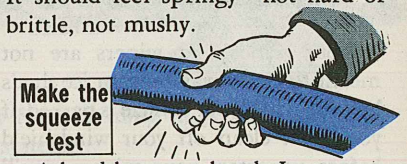
It's easy to overlook the lower hose during inspections because it's out-of-sight, out-of-mind. So the first clue of trouble is the hose blowing out from rot and pressure. All, or most, of the coolant's lost—including mighty expensive ethylene glycol antifreeze.

If someone's not around to notice the lower hose blowout and shut down the engine, the engine may seize up—resulting in serious damage to the engine.

It's easy to head off radiator hose problems—both top and bottom hoses. Your eyes and one fairly strong hand are all you need.

Cracks or leaking, of course, are bad signs. Get that hose replaced!

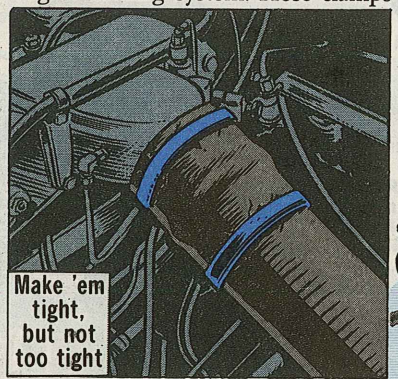
Grab ahold of the hose and squeeze. It should feel springy—not hard or brittle, not mushy.



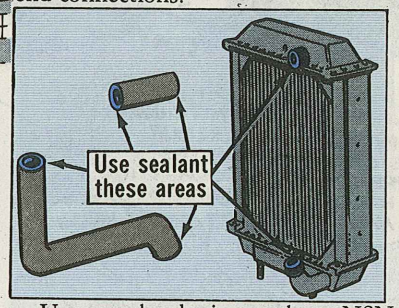
A hard hose can break. It can even cause radiator damage by carrying engine vibration to the radiator.

A mushy hose is rotten. If it doesn't look rotten on the outside, you can be sure it's rotten inside. The hose is headed for a blowout—but, in the meantime, pieces of rotten rubber are being carried into the engine cooling system. This stuff will plug up the cooling system and cause overheating—and probably cause thermostat failure.

Make sure hose clamps are tight. Sometimes the only cause of a leak is a loose, broken or missing hose clamp. There's a lot of pressure in your engine cooling system. Hose clamps must be tight. Careful, tho, so you don't overdo it and cut into the hose when you're tightening those clamps.

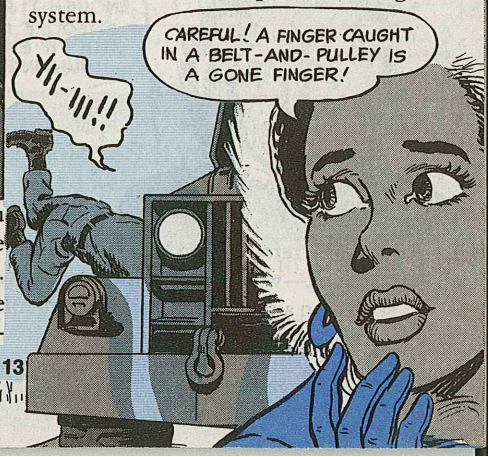


When you install a new hose, use sealant—just a little—for extra insurance against leaks. Also, the sealant may help prevent an extra long coolant hose from coming off at the end connections.

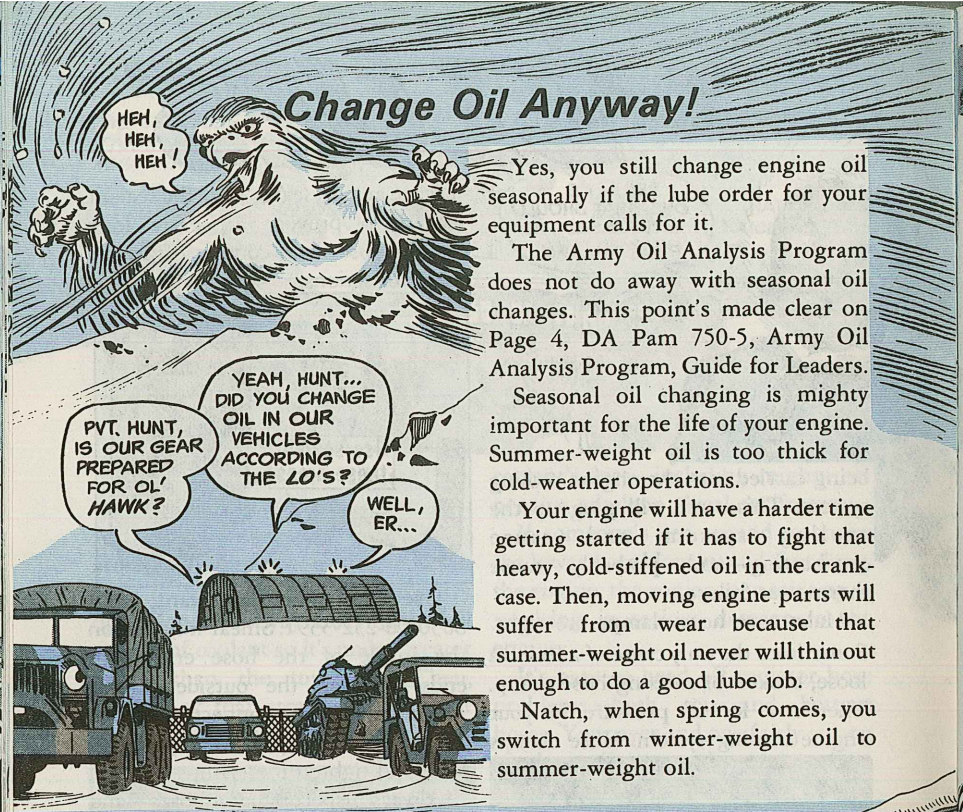


Use non-hardening sealant, NSN 8030-00-252-3391. Smear it lightly on the inside of the hose end—both ends—and on the outside of the radiator and engine connecting points. Let the sealant dry. Then slip on the hose and tighten the clamps—snug.

Always inspect radiator hoses—and the rest of your cooling system—for leaks both before and during engine operation. A leak may show up only when pressure builds up in the cooling system.



Change Oil Anyway!



Yes, you still change engine oil seasonally if the lube order for your equipment calls for it.

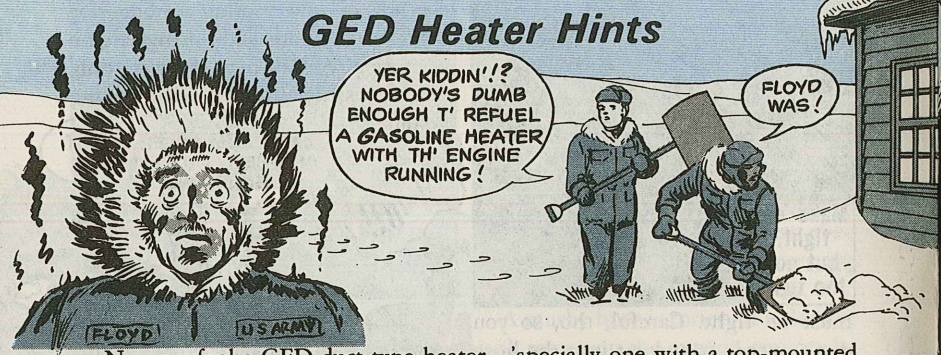
The Army Oil Analysis Program does not do away with seasonal oil changes. This point's made clear on Page 4, DA Pam 750-5, Army Oil Analysis Program, Guide for Leaders.

Seasonal oil changing is mighty important for the life of your engine. Summer-weight oil is too thick for cold-weather operations.

Your engine will have a harder time getting started if it has to fight that heavy, cold-stiffened oil in the crankcase. Then, moving engine parts will suffer from wear because that summer-weight oil never will thin out enough to do a good lube job.

Natch, when spring comes, you switch from winter-weight oil to summer-weight oil.

GED Heater Hints



Never refuel a GED duct-type heater—'specially one with a top-mounted fuel tank—when the engine is running or still hot after shutdown. Gasoline spilled on a hot engine could cause a mini space shuttle blastoff...and a batch of burns—or worse!

FIREPOWER

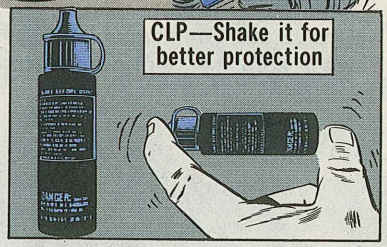
COLD WEAPONS and CLP

Weapons TM's spell it out loud and clear: When the temperature dips to 0°F and below, lube with LAW.

Here's the good news:

CLP (cleaner/lubricant/preservative), which can be used instead of LSA, PL-S, PL-M, OE/HDO, RBC, OEA and cleaning compound, also replaces LAW.

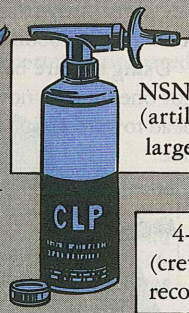
You use CLP year-round. As always, you use it lightly. You also shake and mix the contents as usual, but a few extra shakes in cold weather can give you maximum protection. It mixes the contents better.



Wherever your LO or TM calls for a winter lube, CLP is authorized.

US Army Armament Command messages DRSAR-MA 192000Z Jun 80 and 181745Z Jul 80 give you the word on CLP.

1 gal (artillery and large bore weapons) NSN 9150-01-053-6688 (Also for refill of smaller bottles by armorers).

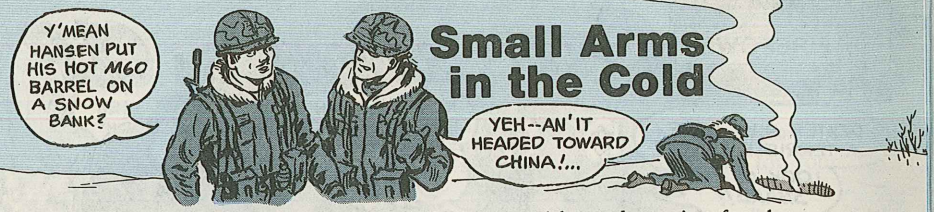


1 pt (spray bottle) NSN 9150-01- 054-6453 (artillery, small arms, large bore weapons).

4-oz bottle NSN 9150-01-079-6124 (crew-served weapons, machine guns, recoilless rifles, etc.)

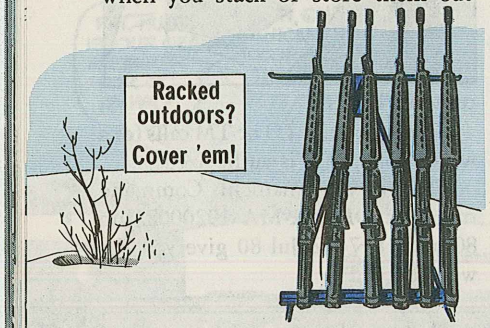
$^{2}/_{3}$-oz bottle NSN 9150-01-102-1473 for M16A1.

Small Arms in the Cold



Small arms function well in cold weather, and a minimum of lube plus PM will keep them operating effectively.

Whether it be rifle or machine gun, when you stack or store them outdoors, keep them covered. A poncho or blanket works fine.



When they're covered, you keep ice and snow out of the barrel, off the sights and away from working parts.

If you can, keep weapons in a roofed, wind-free shelter when you're not using them.

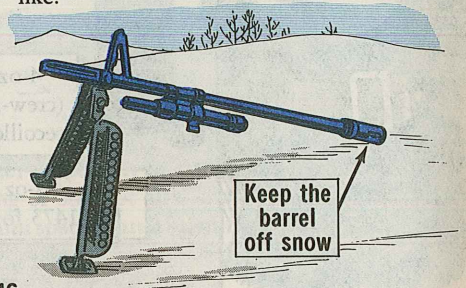
If you bring your weapons into a heated shelter to clean them, they'll sweat with condensation for about an hour. Wait the hour, let them sweat, and then clean them.

Reason: If you rush the cleaning job, the weapon will keep sweating. When you take it outside the sweat will freeze, parts won't move, you may get ice in the barrel.

If parts do freeze, move them slow and easy till they're free. That way you won't break anything.

During firing, keep barrels or other hot parts away from snow, which will turn to ice as soon as the barrel cools.

Using a spare barrel? Don't lay the hot one on the snow. It may warp...or head toward China or wherever quick-like.



Grenades & Ammo

Dry gloves are a must when you use grenades in sub-freezing weather.

Be sure they're free of moisture, snow and ice so they don't freeze to the grenade after you pull the pin. Otherwise, you'd better be prepared to rip the glove off and throw the grenade and glove with your other hand...quick.

Ammunition

Small arms ammo needs one basic precaution.

Remove all snow or ice from ammo before you use it.

Most large caliber ammo, including rockets, has a minimum and maximum temperature in which it can be used. Some, including LAW, have the info stamped on it. With others, you have to check your weapon TM. If you operate in sub-zero weather, be sure the ammo you use is made for cold weather.

Before use, clear off snow and ice.

Hot Shooting in Cold Weather

To shoot hot when the weather is super cold, you need to think ahead.

Things that give you no problem in ordinary weather can break an artillery tube when the thermometer shivers in the -20°F to -65°F range.

Take, f'rinstance, bore cleaner. It can freeze in the chamber and keep you from loading a round. It can also freeze in its can, so keep it in a warm spot—if you can find one!

Keep bore cleaner away from the gas check pad and electrical ring mechanism. A dry cloth is all you need to clean these parts.

You have to be 'specially careful with gas check pads in cold weather.

CLP is an authorized alternate for bore cleaner. You only have to use one-third as much of it, and it is free flowing down to -65°F.

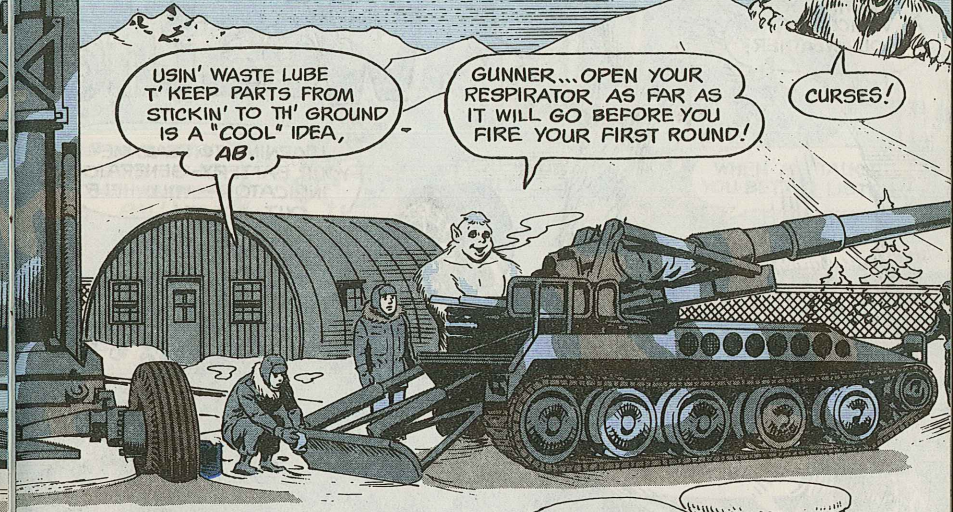
Recoil Roundup

In really cold weather, give extra attention to your recoil system.

A recoil oil level that was OK during normal temperature may show low when the temperature drops. After a few rounds, the oil should warm up and the level will rise.

If your recoil has an adjustable respirator, in cold weather have it OPEN as far as it will go before you fire your first round.

A respirator that's covered with ice or snow won't work well, so keep it clear.



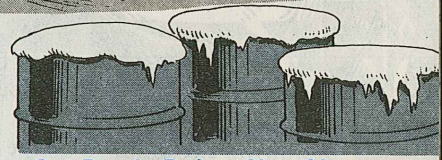
Cold Weather Lube

Ordinary lube can get hard under extreme temperatures. Study the LO for your weapon and use the lubricant recommended for 0°F to -65°F.

The towed howitzers, such as the M198 under LO 9-1025-211-13, mainly use year-round lubes.

Read both the LO for your weapon and FM 9-207, Operation and Maintenance of Ordnance Materiel in Cold Weather (0°F to -65°F).

(NOTE: Your LO may call for OE/HDO 10 in the transmission, final drive and/or gearcases during normal temperatures. If so, before you get into 0° to -65°F weather, drain and refill them with OEA or GOS subzero gear oil.)



Get Ready Before You Aim

There are 2 ways to emplace your weapon in the snow:

1. With the easy way, you just drop the trails and spades and hope they won't freeze so tight you can't get 'em out.

2. With the smart way, you wipe some waste lube on parts of the trails and spades that contact the snow so they'll be easier to pull out. You can also lay something like tree boughs or straw between the trails and spades on the ground. Remember to make a cushion between the freezing ground and the firing jacks/firing platform, too.

Cold Weather Starting TIPS

HAVING PROBLEMS STARTING YOUR VEHICLE IN COLD WEATHER?

LEARNING TO READ ME-- YOUR BATTERY-GENERATOR INDICATOR-- WILL HELP OUT A LOT!

The battery-generator indicator gives you information on both the batteries and the generator.

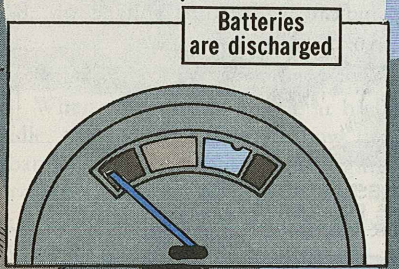
Before you even try to start your vehicle in cold weather, get a reading on the condition of your batteries.

AB SNOWMAN IS SURE BIG IN COLD WEATHER PM!

YOU KNOW IT!

WHEN *HE* TALKS, YOU BETTER LISTEN!!

You do this by simply flipping the master switch ON, with everything else that draws electric current turned OFF. The needle reading will tell you the condition of your batteries.



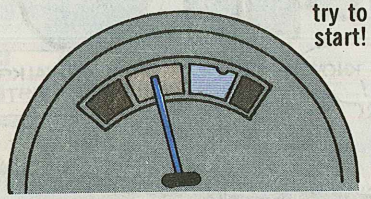
YOUR NEEDLE COULD BE IN THE RED BECAUSE...

1. Batteries are defective or they need charging.
2. Battery cables are loose.
3. Battery terminals are corroded.
4. There is a short in the system.

GET YOUR MECHANIC TO HELP YOU FIND OUT WHAT IS WRONG AND HAVE IT FIXED BEFORE YOU TRY TO START.

PS MORE

If your batteries give you a needle reading in the yellow, it means they're putting out enough for you to try to start.



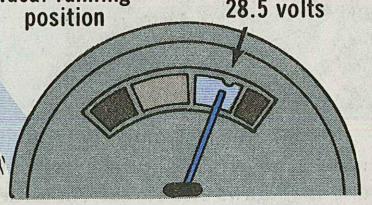
Do it by pressing in on the START button (STARTER SWITCH) while you keep on watching the Batt-Gen indicator.

If the needle stays in the yellow, your batteries are probably OK and you should be able to start.

If you can't, something other than the batteries is at fault—starter frozen or grounded, etc. Get your mechanic to find out what it is and fix it.

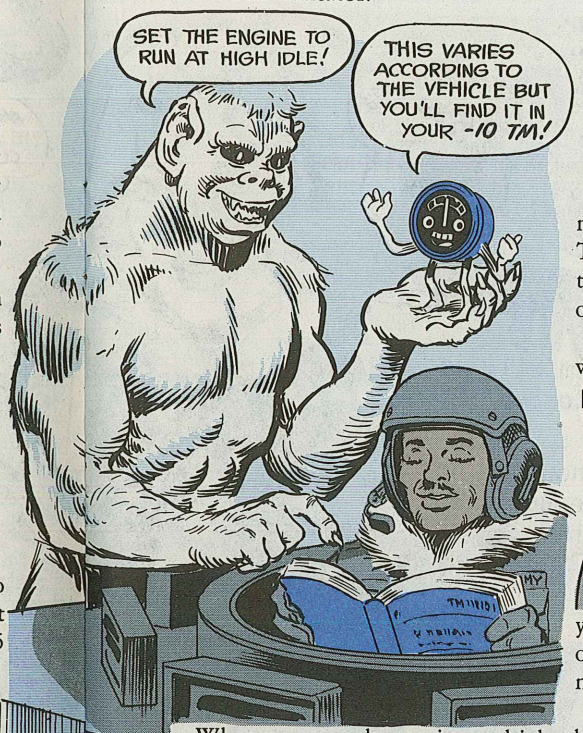
If the needle drops deep into the left-hand red segment, your engine won't start. Either your batteries are discharged, or one or more of them has a bad cell. Get your mechanic to check the batteries and try again.

The little white dot in the green on most Batt-Gen indicators shows



where the needle is supposed to register when the engine's running. It indicates a battery voltage of 28.5 volts.

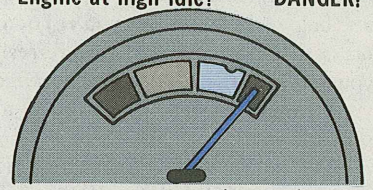
Even after you get your engine started, you still need to watch your Batt-Gen indicator.



When you run the engine at high idle, the indicator doesn't show the battery voltage. It shows the charging voltage going into the batteries. In other words, the Batt-Gen is showing you your generator output.

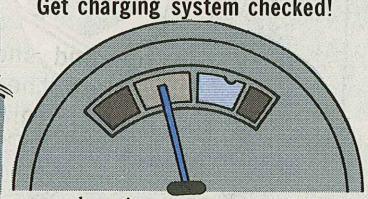
If everything is working right, the needle will settle about at the white dot in the green band. (Some Batt-Gen indicators don't have this dot). Actually, if the needle is any place in the green, it's OK.

If the needle shows in the right-hand (30-34 volt) red band when you are running the engine at high idle, it



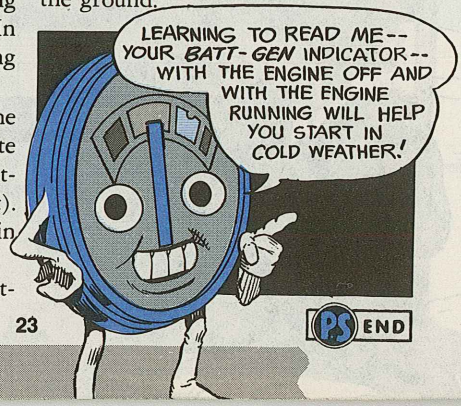
means your generator is overcharging. Turn the engine OFF and don't run the vehicle until your mechanic finds out what's wrong and fixes it.

A needle that stays in the yellow with the engine running means that



your charging system is not putting out the way it should. Get your mechanic to check it out.

He'll look at the condition of the batteries, generator belt tension and battery cable connections, particularly the ground.

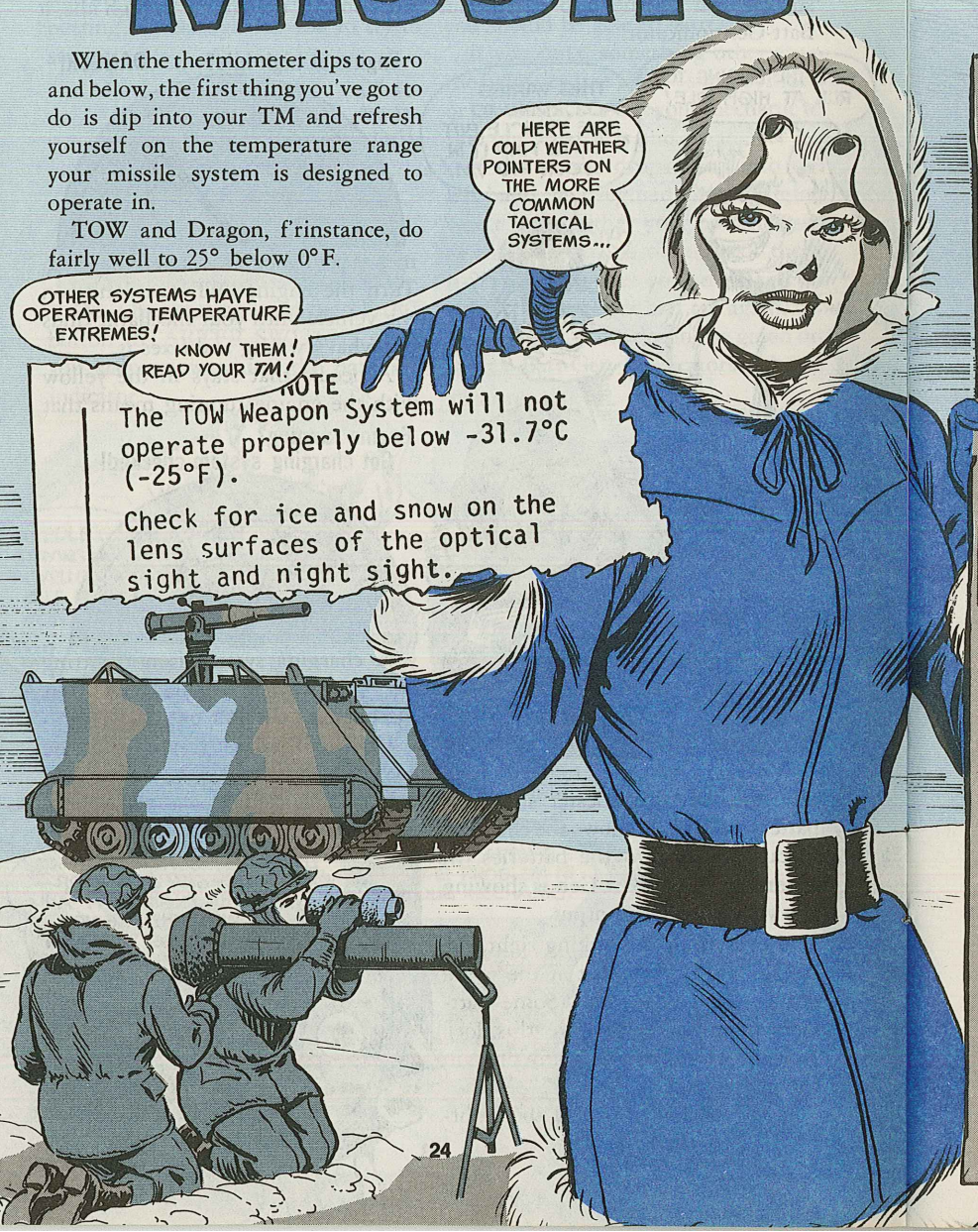


PS END

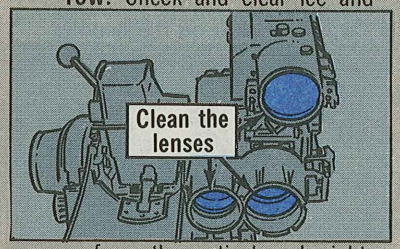
Missile Zeroing

When the thermometer dips to zero and below, the first thing you've got to do is dip into your TM and refresh yourself on the temperature range your missile system is designed to operate in.

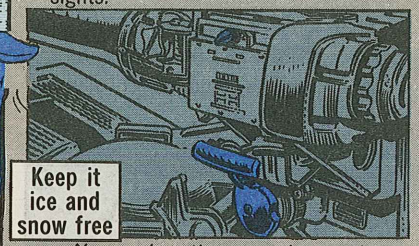
TOW and Dragon, f'rinstance, do fairly well to 25° below 0°F.



TOW: Check and clear ice and



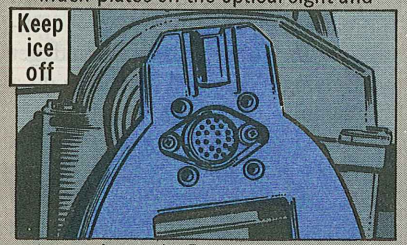
snow from the optical and night sights.



Never breathe on the optics (lenses). You'll have an instant coat of ice.

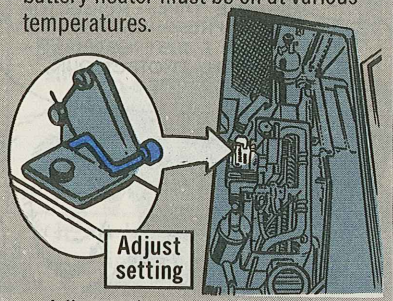
Be sure switches, clamps and other moveable parts are free of ice and snow.

Clear any snow or ice from the index plates on the optical sight and



traversing unit. Be sure connectors are clear. Clean as TM 9-1425-472-12 tells you to.

CHAPARRAL: Drain water as required from the main power unit (MPU) and fill the MPU fuel tank after each day's operation. Warm up the batteries before you start the MPU. Page 2-198 of TM 9-1425-586-10 has a chart on how long the battery heater must be on at various temperatures.



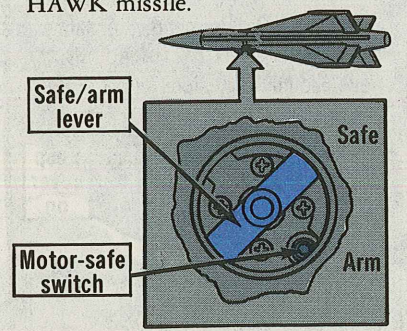
Adjust the WINTER/SUMMER settings for the battery box, carburetor inlet and oil pan baffle as shown in Para 2-37 of your -10 TM.

DRAGON: Optics need the same precautions as TOW. In addition, never remove the lens cover from the tracker until you're ready to sight

and fire. Replace the cover after missile impact.

For Cool HAWKS...

Ice and snow can put the screws to operation of the SAFE/ARM lever (rocket motor safety and arming lever) of your MIM-23B Improved HAWK missile.



You can beat the cold and a frozen-solid switch by taping some clear plastic over the lever pocket.

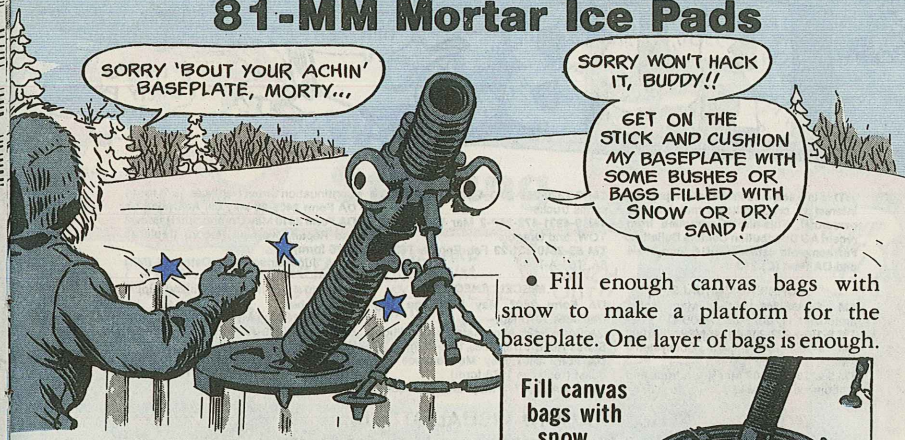
For night action, first cut a piece of reflection tape, NSN 9905-00-935-7773, and stick it on the handle.

Then, cut a 4 x 4-in square of clear plastic, NSN 8135-00-068-9466, and place it over the lever pocket (over the reflector tape).

Tape the plastic to the missile with pressure sensitive tape NSN 7510-00-926-8939. Those NSN's should get you enough tape and plastic to do a battalion.

The clear plastic by day and the reflector tape allow you to see the lever's position (safe or arm) as well as to keep ice and snow from freezing around the handle and blotting it from view.

81-MM Mortar Ice Pads



The blast from your M29-series 81-MM mortar can snap shocks and crack the baseplate when the mortar's emplaced on frozen ground.

So, you've got to cushion the baseplate. You can do it in one of 3 easy ways, or come up with something better on your own, depending on what's available.

- Put a brush matting under the baseplate. Never go overboard, tho. Two layers of small tree limbs or bushes is all you need. Too much can cause the baseplate to slide.

- Fill enough canvas bags with snow to make a platform for the baseplate. One layer of bags is enough.

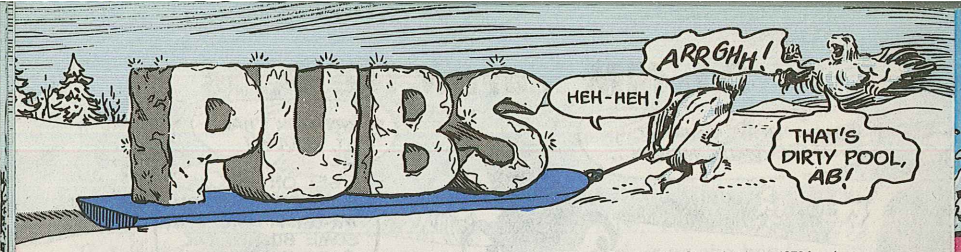
- If it's handy, fill bags with dry sand...again, just enough bags to make a platform for the baseplate.

One other caution: Never touch any of the exposed mortar metal with your bare hands. If you do, you'll get an instant weld and a serious, painful injury.

Camouflage Repair Parts

Snow pattern camouflage screens take a beating from winter storms. Here're some parts you'll need to keep 'em in top shape:

ITEM	NSN 1080-01
Radar Scattering Repair Kit, Snow	075-3266
Radar Scattering Cloth, Snow	073-3194
Radar Transparent Cloth, Snow	073-3197
Batten Spreader, Snow	073-3196
Twine, Snow	073-0817



This is a selected list of recent pubs of interest to organizational maintenance personnel. This list is compiled from recent AG Distribution Centers Bulletins. For complete details see DA Pam 310-4 and DA Pam (C) 310-9.

TECHNICAL MANUALS

TM 5-3895-348-14&P-1 Mar Roller motorized, Hyster Mod C350B-D
TM 9-1010-223-20&P Mar M224 mortar
TM 9-1090-206-12 Apr Subsystems XM97E1, XM97E2
TM 9-2320-212-20P Mar ¾-ton truck and ambulance M37, M43
TM 9-2320-260-20-3-4 Jan 5-ton M809-series trucks
TM 9-4931-472-24P-2 Mar Night sight, TOW, and Dragon
TM 55-2840-231-23 Feb Engine T63-A-5A, T63-A-700

MISCELLANEOUS

DA Form 2402 May Exchange Tag (replaces 1973 tag)
DA Form 2406 May Materiel Condition Status Report (replaces 1979 form)
DA Form 2407 May Maintenance Request (replaces 1978 form)
DA Form 2407-1 May Maint Request Continuation Sheet (replaces 1973 form)
DA Form 2408-20 May Oil Analysis Log
DA Form 2410 May Component Removal and Repair/Overhaul Record (replaces 1975 form)
ML-A Jun Management Data List (ML) (fiche)
PAM 310-4 Apr Index of tech and supply pubs (fiche)
PAM 750-10 May MWO index (fiche)
SC 1680-97-CL-A07 Jun Survival kit, indiv vest
SC 5180-90-CL-N05-HR Jan Tool kit, master mechanic's: NSN 5180-00-699-5273 LIN W45060

AUDIO-VISUAL STUFF

Available at battalion or post Learning Center

TV TAPES

TVT 44-116 HAWK—Prep for movement by air
TVT 44-118 Chaparral simulator evaluator AN/TSQ-T3

TEC LESSONS

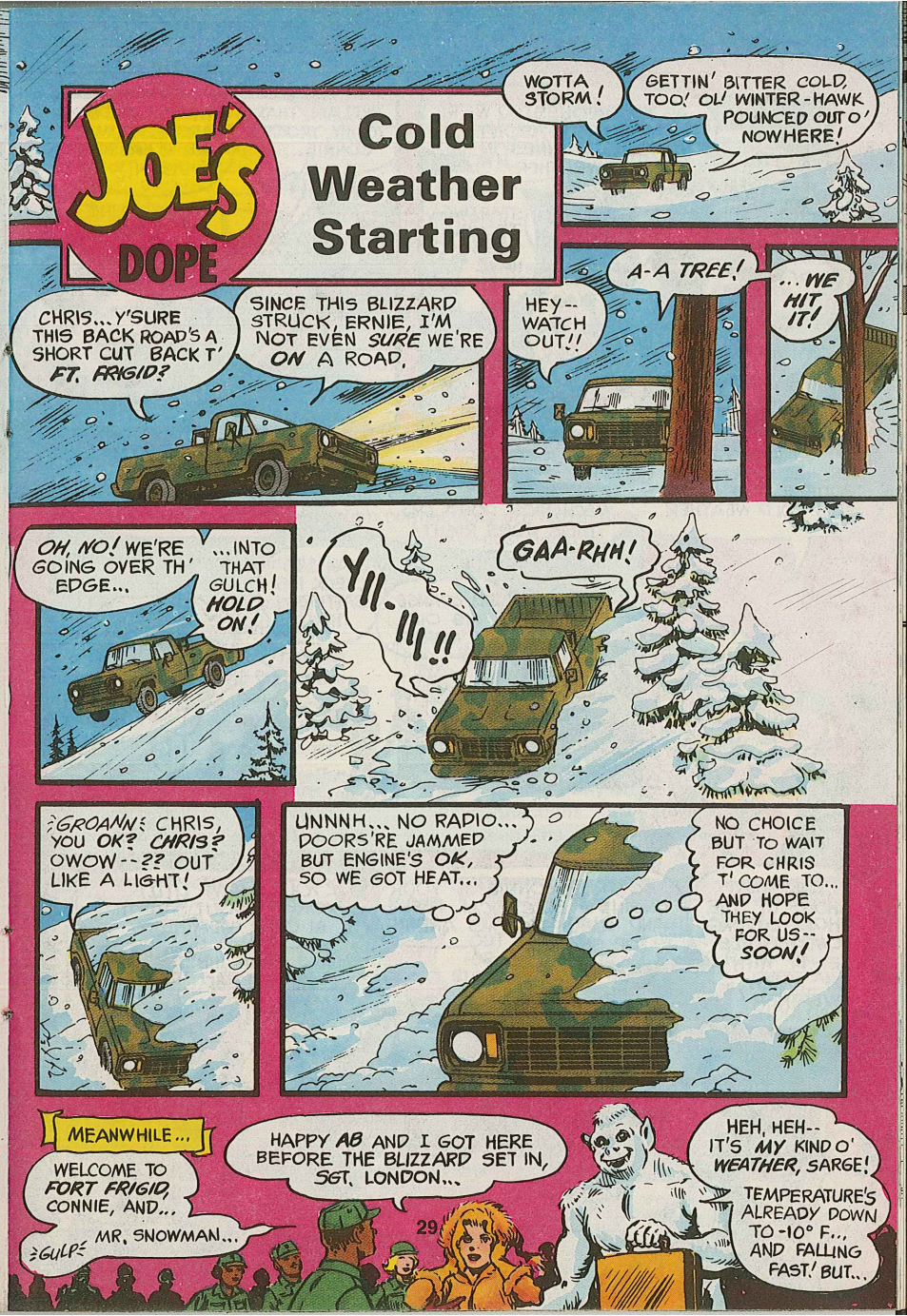
020-171-5382F M226 grenade launcher, Part I
043-441-5451-F March order of I-HAWK launcher, Part II
043-441-5464-F IHIPIR synchro alinement, Part I
043-441-5466-F ILCHR synchro alinement
043-441-5514-F IPAR emplacement, Part II
043-441-5522-J Removal, replacement of stabilizing system in the IPAR
043-441-5526-J Electrical alinement of stabilizing system on IPAR
043-441-5527-J IPAR electrical alinement of the preselectors
043-441-5538-J M2 aiming circle (air defense)
043-441-5553-J IBCC scan servo gear train alinement
043-441-5556-J IBCC synchro alinement
043-441-5564-J IROR maint services, Part IV
043-441-5565-J IRPR maint services, Part V
043-441-5568-J Automatic freq control alinement of IROR
043-441-5580-F I-HAWK launcher quarterly checks Part III
043-441-5581-F I-HAWK launcher quarterly checks Part IV
043-441-5598-J Individ synchro alinement of ICWAR
043-441-5976-F Vulcan carrier M741 Part I
043-441-6013-J Vulcan: remove, replace feeder
043-441-6015-J Vulcan: remove, replace cannon
043-441-6021-J Vulcan: remove, replace conveyor elements
043-441-6023-J Vulcan: remove, replace conveyor chutes
043-441-7918-F Chaparral: Cleaning jackscrews, adjust air ducts
043-441-7919-F Chaparral: Boresighting, adjust launch rails, sight
043-441-7920-F Chaparral AN/TSM-85 test set
043-441-7932-J Chaparral semi-annual PM
043-441-7125-A Radio AN/VRC-49 quarterly PM
101-113-7152-A Radio AN/VRC-46 quarterly PM
102-906-1006-A AN/TNH-20 (V) troubleshooting
104-301-7513-A Troubleshooting AN/PPS-5 Part 2
104-301-7514-A Testing AN/PPS-5 Part 1
104-301-7516-A Alinement of AN/PPS-5 Part 1
104-301-7517-A Alinement of AN/PPS-5 Part 2
222-011-6230-J Operator PM on PU-619/M
222-011-6241-A Operator maint on aircraft control AN/TSQ-70A
231-906-3046-A AN/TLQ-17 turn-on and turn-off procedures
231-906-3050-A Operation of AN/TNH-11 sound reproducer/recorder set
231-906-3060-A AN/GLQ-3B, inventory of S-318/G
231-906-4020-A Load AN/TRA-32 antenna
231-906-5023-A AN/TRQ-32 whip antenna installation
231-906-5025-A AN/TRQ-32 radio shutdown procedures
580-113-6574-A Op maint on TT-76/GGC
(FOUO) 580-113-6568-A Prep TSEC/KW-7 for op
580-113-6575-A OP maint on TT-98/FG
600-011-6632-J Rig engine controls UH-1H
600-011-6662-J Leak, op check of hyd sys in OH-58 A/C
621-113-6001-A Op reel unit RL-207/G
621-113-6002-A Op PM on RL-207/G
621-113-6401-A Install RL-31-E (ground)
621-113-6402-A Install RL-31-E (flatbed)
621-113-6403-A Op RL-31-E
621-113-6404-A PMCS on RL-31-E
621-113-6406-A Install reeling machine cable, motor driven RL-172 (*) /G
621-113-6407-A Op RL-172 (*) /G
621-113-6408-A Op PM on RL-172 (*) /G

Converted Fire Extinguisher?

If you use a salvaged, non-pressurized fire extinguisher, NSN 4210-00-251-7903, to clean the hellhole of a UH-1, paint it a color other than red. Label the extinguisher with the cleaning solvent it contains. Store that baby in a safe place. You wouldn't want to add fuel to a fire you're trying to put out!

Lamp Listing Wrong

Sorry to have to tell you this, but a mistake crept into TM 9-2300-378-20P/2-2 for the M60/M48 tanks. On Page 34-29 the description for Item 1 of Fig 34-62, Elevation quadrant lamp, is wrong. The SMR code should be PAOZZ and the bulb NSN is 1240-01-016-2271. This will get you the 2.5-volt bulb.



AS YOU REQUESTED, WE'RE HERE TO TALK ABOUT STARTING ENGINES IN COLD WEATHER!

RIGHT! STARTING TROUBLE DOESN'T HAVE TO HAPPEN!

EXPLAIN THAT TO MY TROOPS, CONNIE...

...ALL BUT TWO ARE HERE, BUT PLEASE BEGIN...

SURE, SARGE...

ENGINE STARTING TROUBLE OFTEN COMES WITH COLD WEATHER...

--BUT USUALLY ONLY BECAUSE EQUIPMENT OPERATORS AND MECHANICS DON'T DO THEIR JOBS RIGHT!

TRUE, COLD DOES MAKE ENGINE STARTING MORE DIFFICULT...

URGH!

I'LL CHANGE HIS OIL, T'MORRA.

...AN' I'LL CHECK HIS BATTERIES THEN!

?

!

...AND THAT SHOWS UP THE SHORT-CUTTING SOME PEOPLE GET BY WITH IN WARM WEATHER!

SO TRUE, CONNIE! IF YOUR ENGINE'S ELECTRICAL, FUEL AND LUBE SYSTEMS ARE IN TOP SHAPE...

...YOU'LL HAVE LITTLE WORRY ABOUT STARTING IN COLD WEATHER!

YUP-- HE STARTED LIKE A CHARM!

+30 +20 +10 0 -10 -20 -30 -40 -50 -60

Batteries

PEAK BATTERY POWER IS A MUST, BECAUSE YOUR ENGINE BECOMES HARDER TO START AS THE TEMPERATURE DROPS.

YET BATTERY POWER GOES DOWN AS THE TEMPERATURE GOES DOWN...

YOUR BATTERY'S JOB IS LIKE HAVING TO JUMP A LITTLE HIGHER EVERY TIME ANOTHER ROCK IS ADDED TO YOUR PACK!

Efficiency percentages at different temperatures

FULLY CHARGED BATTERY

100%	80°F
50%	15°F
30%	-20°F
10%	-30°F

NOW-- JUMP A LITTLE HIGHER.

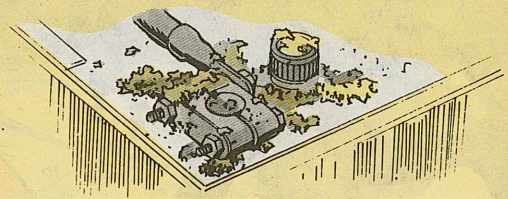
YEH-- IT'S ONLY *ONE* MORE LI'L ROCK.

MAKE SURE YOUR BATTERIES ARE FULLY CHARGED...

...AND ARE KEPT FULLY CHARGED BY THE CHARGING SYSTEM! HERE'S HOW *YOU* CAN HELP...

Electrical power is lost when connections are loose, dirty or corroded. This starts with the clamp-to-post hookups on your battery—where electrical starting trouble is most common.

Corrosion is heaviest here. The post and clamp are soft lead—and get loosened and damaged.



★ Make sure the clamp-and-post connections are clean and tight!

★ If you find any other loose connections, make sure they're clean—no dirt, no rust—before you tighten 'em.

AW, MR. SNOWMAN-- WHAT'S TH' BIG DEAL?

YEAH, CONNIE, WE CAN ALWAYS SLAVE START!!

CONNIE-- I THINK IT'S TIME...

RIGHT, *AB!*

TROOPS, THIS POSTER SPELLS OUT THE NEED FOR COLD-WEATHER STARTING POWER!

SGT. LONDON, WE GET NO RESPONSE TO OUR RADIO CALLS!

?

CHRIS AN' ERNIE SHOULDA BEEN HERE AN. HOUR AGO!

For YOUR copy of Connie's Poster, just flip the page.


JOE'S Dope Sheet
When battery power gets low--
Which it does in the cold and the snow--
If PM's not right
You've just lost the fight:
'Cause you'll never be able to go!
WE HA E WORLD'S BES UIPMENT ...Take care of it
IF YOU WANT TO DISPLAY THIS CENTERPIECE ON OARD, OPEN STAPLES, LIFT IT OUT AND PIN IT UP.

'SCUSE US, AB, CONNIE... WE'VE GOT AN EMERGENCY SITUATION... GOT TO ACT FAST...

UNDERSTOOD, SARGE! THOSE SOLDIERS MAY FREEZE TO DEATH IF THEY AREN'T FOUND PRONTO!

PERHAPS CONNIE AND I CAN ASSIST YOU IN THE SEARCH, SGT. LONDON!

GOOD! MEN-- GET A 2½- AN' A ¼- TON READY!

BUT... SARGE, NOT ONE OF OUR VEHICLES WILL START UP...

BATTERIES ARE DOWN ON A COUPLE O' TRUCKS, AN'...

...THE OTHERS JUST WON'T FIRE UP!!

BLAST! WE GOTTA MOVE! TWO LIVES ARE AT STAKE!

HMM-

HAVE YOU CHANGED TO WINTER-GRADE OIL YET?

WHY, ER... WE MEANT T'DO THAT NEXT WEEK...

THAT OIL IN YOUR CRANKCASE CAN BE MORE HEADACHE THAN HELP WHEN...

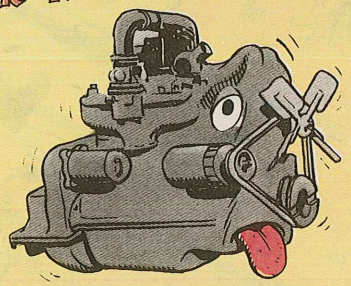
... YOU'RE TRYING TO GET YOUR ENGINE STARTED!

Oil

Cold makes oil thick and stiff.

Your engine's got to fight through this heavy syrup to turn over—when it's already got other trouble trying to start.

RRR-RRR-RRRRR-RR!



JUST CAN'T START...

OIL'S TOO THICK!

It's bad enough when you've got light-weight, winter-grade oil in your engine. It's a losing battle for your engine if you neglect to change from heavy-weight summer-grade oil before cold weather sets in.

YOUR LUBRICATION ORDER MAKES IT CLEAR...

!

?

...USE THE RIGHT OIL FOR THE SEASON!

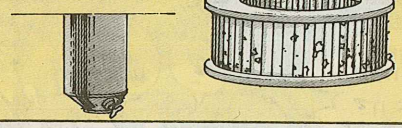
...AND HOW ABOUT YOUR FUEL PM?

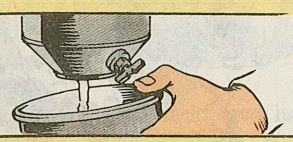
LIKE ANYTHING THAT BURNS...

...FUEL IS HARDER TO GET STARTED BURNING (IGNITED) AS THE TEMPERATURE GOES DOWN!

Fuels

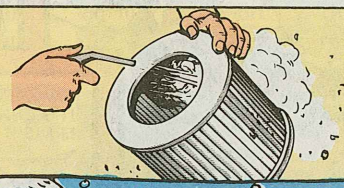
Your engine's fuel/air system is further crippled when there's dirt or water in the fuel and when air cleaners are plugged by dirt.





Drain fuel filters to get dirt out of the fuel system and also to get rid of water that can freeze and block up your fuel system.

Clean air filters help insure that you'll get the right fuel/air mixture for quick ignition and smooth engine operation.

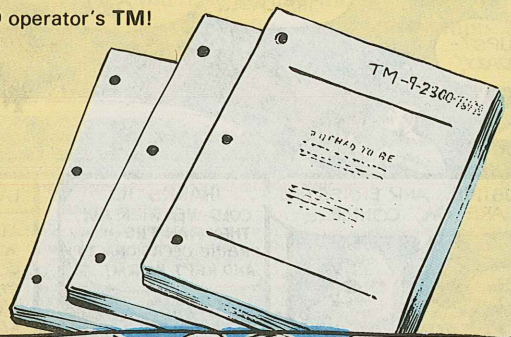


WHEN STARTING YOUR ENGINE IN COLD WEATHER, THE RIGHT WAY AND THE ARMY WAY ARE THE SAME!

By-the-Book

Go by-the-book...your -10 operator's **TM**!

It has a special procedure for starting your engine in cold weather. You can have the best maintained electrical, fuel and lube systems and wind up with nothing but starting headaches if you fail to stick to the special cold weather starting procedure.

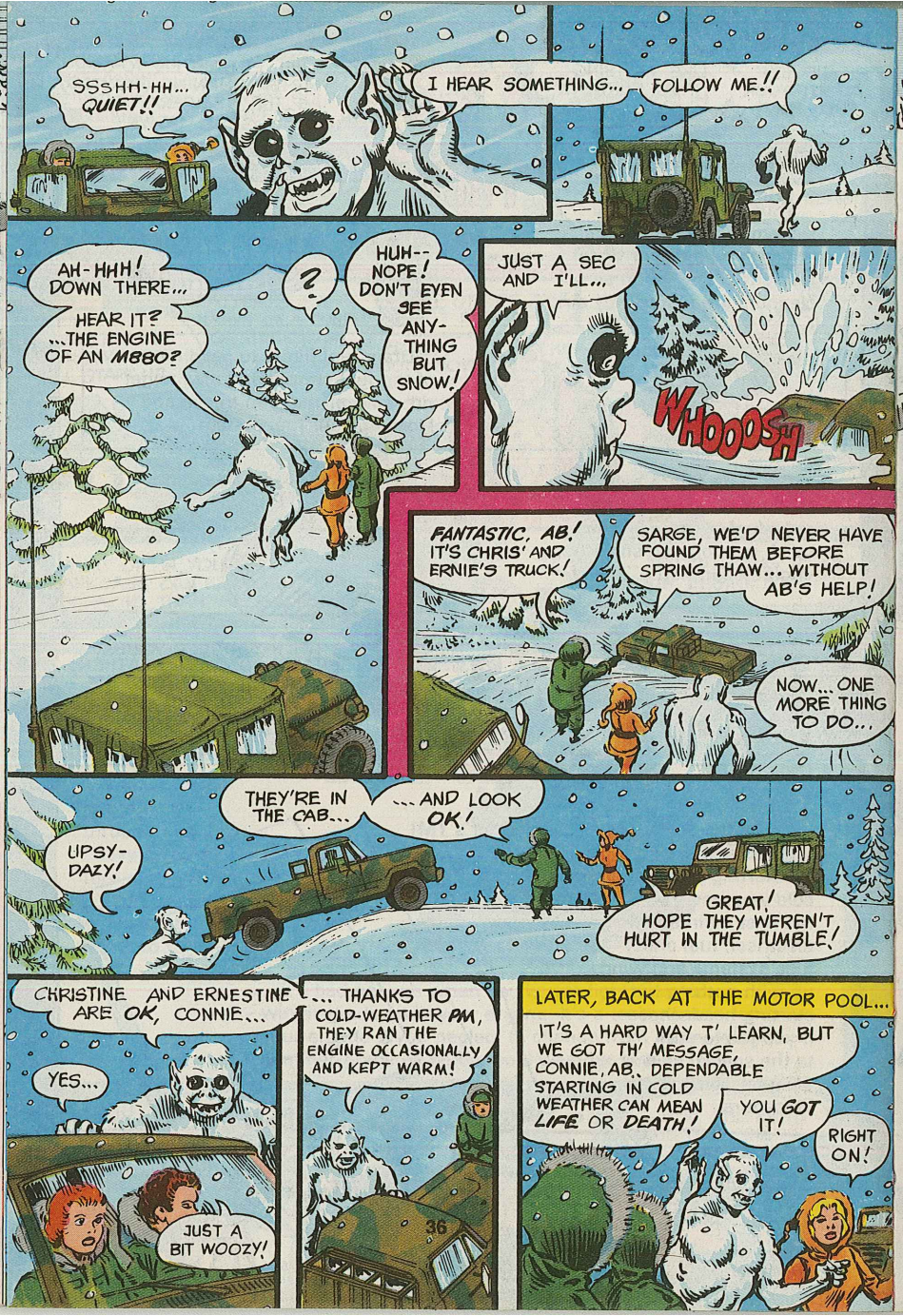


GOTCHA, AB-- AND FROM NOW ON, OUR COLD WEATHER PM AND OPERATIONS WILL BE "BY-THE-BOOK"!..

...BUT WE GOTTA FIND OUR BUDDIES BEFORE IT'S TOO LATE!

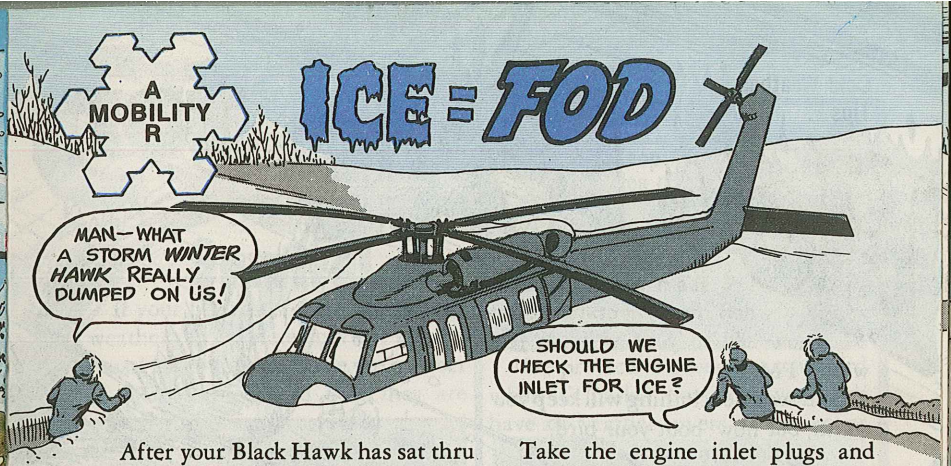
?

RIGHT, SARGE-- HURRY... WE'LL USE MY ¼-TON!



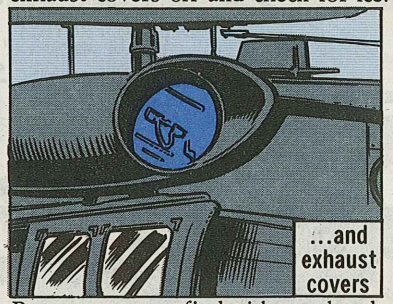
A MOBILITY R

ICE = FOD



After your Black Hawk has sat thru a snow or sleet storm, make sure it doesn't have ice in the engine inlet. Ice will give you FOD problems for real!

Take the engine inlet plugs and exhaust covers off and check for ice.



Remove any you find with your hands. Para 8-78 in TM 55-1520-237-10 says you have to thaw the engine out with hot air before the pilot attempts a start.

That'll head off FOD problems.

Aviation Messages

If your unit has not received these messages, check with your next higher headquarters.

Safety of Flight

CH-47-81-12 Technical, RCS CSGLD-1860, Inspect CH-47A/B/C forward transmission lubrication hose assys, TB 55-1520-241-20-15 DRSTS-MEA 031630Z Jun 81

OH-58-81-05 Maint Notice, Temporary waiver of OH-58C turbine outlet temperature sys checks DRSTS-MEA 181430Z Jun 81

AH-1-81-16 Maint Notice, Torque on AH-1S(FM-AM) tail rotor gear box retaining nuts MS2104226 DRSTS-MEA 041810Z Jun 81

AH-1-81-17 Maint Notice, Procedures for use of battery on AH-1 during external power use for testing DRSTS-MEA 191830Z Jun 81

UH-1-81-07 Maint Notice, RCS CSGLD-1860, UH-1 stabilizer bar tube (NSN 1615-00-169-5085, P/N 204-011-328-11) installation, inspection DRSTS-MEA 171850Z Jun 81

General 81-06 Maint Notice, Turbine engine washing DRSTS-MEA 161810Z Jun 81

OH-6-81-02 Maint Notice, OH-6A controls support bracket assy P/N 360A7304, NSN 1615-00-050-4318 DRSTS-MEA 041550Z Jun 81

UH-60A-81-14 Technical, RCS CSGLD-1860, One-time inspect for UH-60A Black Hawk swashplate assy, main rotor head, P/N 70104-08000-043/-044/-045/-046, TB 55-1520-237-20-20 DRDAV-EEB 051730Z Jun 81

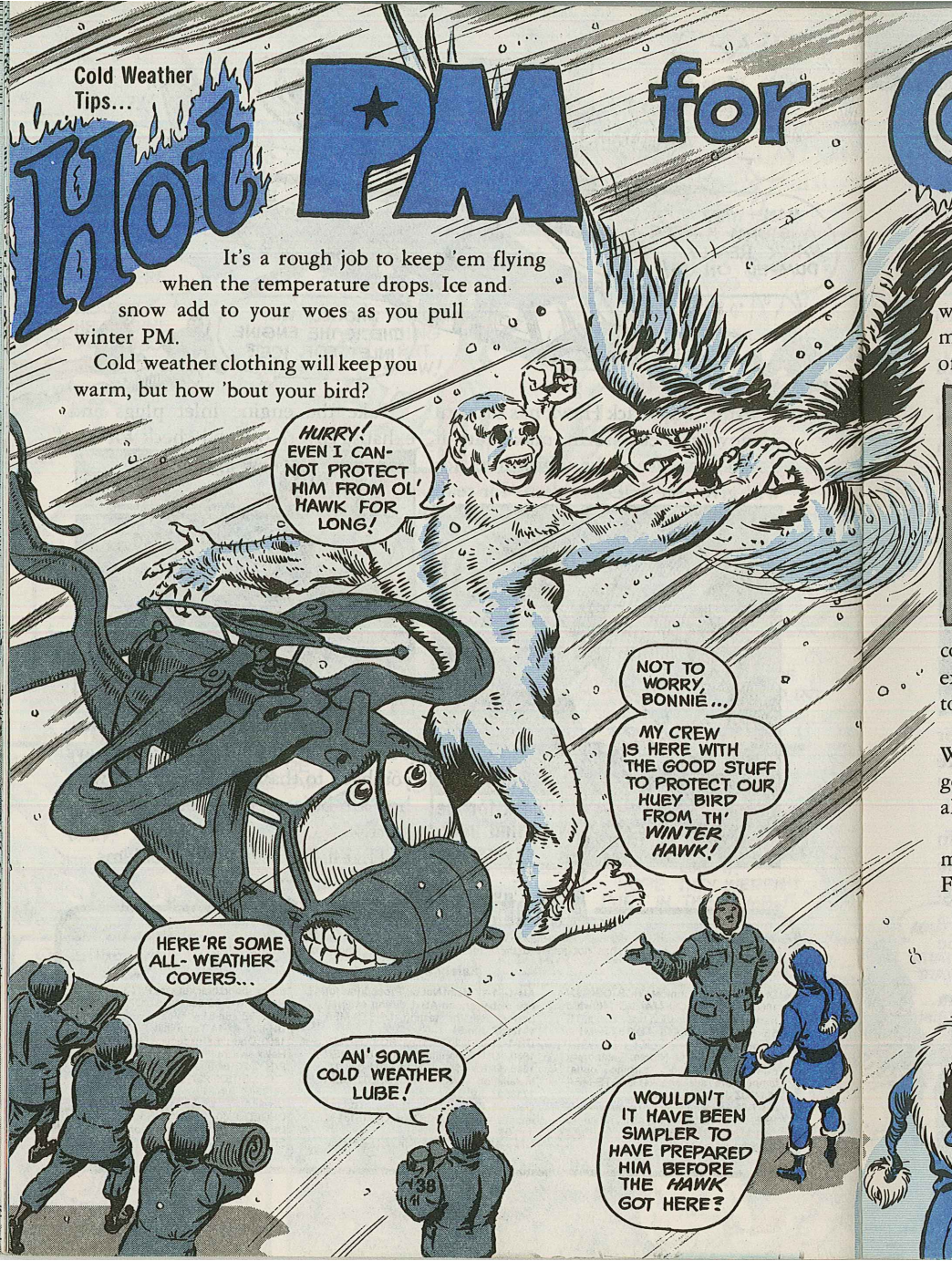
UH-60A-81-15 Maint Notice, RCS CSGLD-1860, Recommended fuels for UH-60A Black Hawk operations DRDAV-EEB 262200Z Jun 81

Cold Weather Tips...

Hot PM for Cold Birds

It's a rough job to keep 'em flying when the temperature drops. Ice and snow add to your woes as you pull winter PM.

Cold weather clothing will keep you warm, but how 'bout your bird?



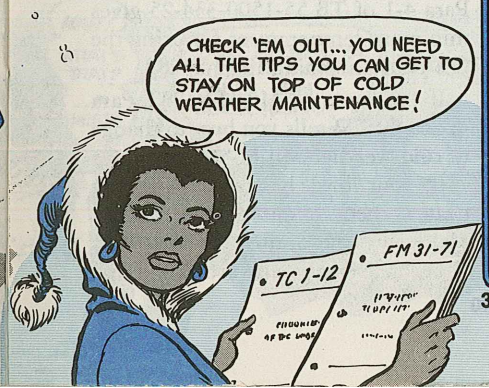
Survival

If your bird goes down during cold weather, a complete survival kit is a must! Make sure you have the number of kits required, and that they are

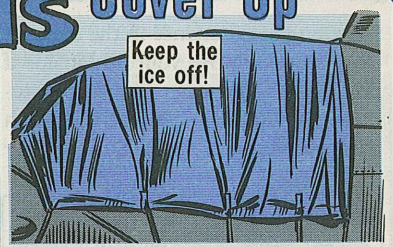
complete. If your unit SOP requires extra survival gear, make sure it's OK, too.

Check out Chap 5 of TC 1-12, "Cold Weather Flying Sense." It's full of good poop on staying warm, fed and alive until you're rescued.

Other chapters have tips on maintenance when it's cold. So does FM 31-71.

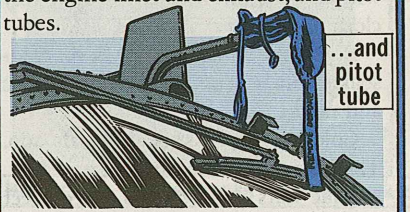


Cover Up



Use protective covers on your bird when it's parked outside. If you don't have all-weather covers, at least cover

the engine inlet and exhaust, and pitot tubes.



Put covers on when the bird's dry or they'll freeze in place. If your aircraft's in the hangar, cover it up before you park it outside.

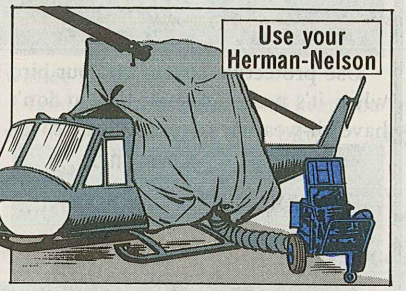
Eyeball those areas not protected by covers extra close during your daily inspection. Make sure blowing rain or snow hasn't frozen up the works.

If a cover is frozen on your bird, loosen an edge and use heat from a ground heater to melt it loose. Keep the surface temperature below 160° F, tho.

PS MORE

Maintenance in the Cold

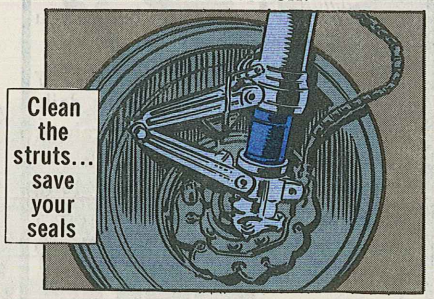
Pulling maintenance in the cold is a slow process. Move your bird inside if possible. If you can't, use a maintenance shelter or use canvas or a parachute shroud to rig a temporary shelter.



Use a ground heater such as the Herman-Nelson to warm and inflate your shelter. A warm, ventilated area will allow you to work without bulky clothing and heavy gloves.

Be careful when you work on cold-soaked birds. The cold makes plastic and metal parts brittle and weaker.

Cold gets to gaskets and seals, too. They expand and contract...and leak. Torque nuts and bolts to the correct value, but be careful not to overtorque. You could twist them off.



Wipe shock struts and hydraulic cylinders clean. Use a rag dampened with hydraulic fluid to get dirt, ice and grit off the pistons before the seals are damaged.

Service pressurized systems according to the instructions in each aircraft maintenance manual. Remember that any moisture present will freeze into ice crystals and damage seals.

When you're moving your bird from a warm hangar out into the cold, open the doors a little so that the temperature can equalize on both sides of the windows. That keeps 'em from cracking.

Avoid bending rubber hoses or rubber covered wires while they're cold soaked. Rubber gets brittle and stiff and could crack.

Use oil and hydraulic fluid listed in the bird lube chart for the temperatures where you're operating. Para 4-1 of TB 55-1500-334-25 gives minimum temperatures for using the fire resistant fluid Mil-H-83282.

If you have the Mil-H-83282, Para 4-2 of the TB tells you how to change to cold weather Mil-H-5606.

If your bird has a fuel-burning heater, check it out by the manual. Make sure the drains and vents are clear, and remove any soot build-up.

Landing Gear

Landing gear—skids or wheels—needs attention,too. Eyeball your tires regularly. When the temperature drops, tire pressure drops.

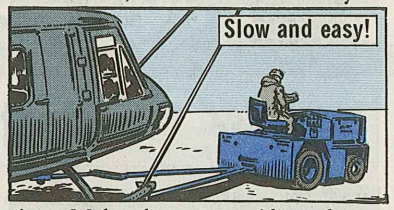
Tires get stiff, too, and get flat spots. These should go away when the tires roll.

Tires and skids can freeze to the ground. If they do, use liquid deicer or heat—not over 160° F—to free 'em. Move the bird immediately to keep it from freezing down again—maybe even tighter!

Use boards, evergreen boughs or something similar under tires to keep them off snow or ice.

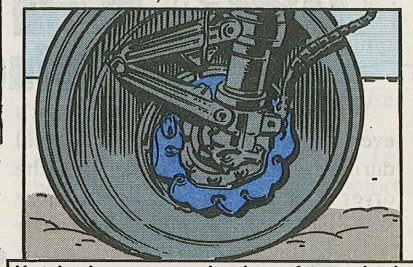
Ground-handling wheels on your helicopter may bog down in snow while being towed. Remove the wheels and tow your bird on its skids like a sled.

When you're towing your bird on snow or ice, slow down and take your

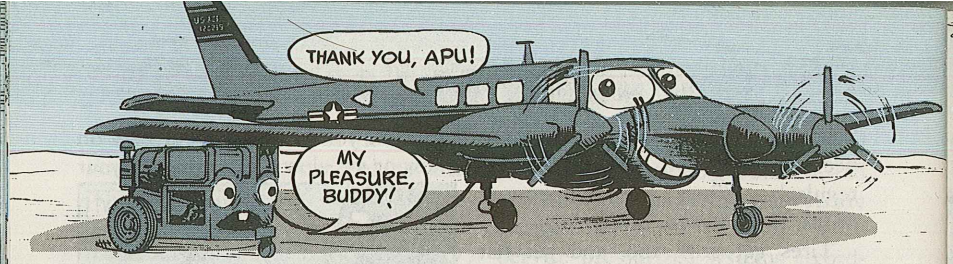


time. Make the turns wide and easy. Give yourself plenty of stopping room. Use chains on your tug, if you've got them, but keep it slow.

Excessive braking can result in frozen-up brakes for real! If the wheels roll thru snow while the brakes are still hot, the snow'll melt and



refreeze around the brakes, locking them up. Use a heater to thaw out and dry the brakes.



Batteries

Use an APU for starts when your bird is cold-soaked. That'll make for a faster start and less chance for a hot start.

If you have to use a cold battery for a start—say you're out in the boonies—turn on your searchlight for a few seconds first. That'll activate and warm the battery and help on the start.

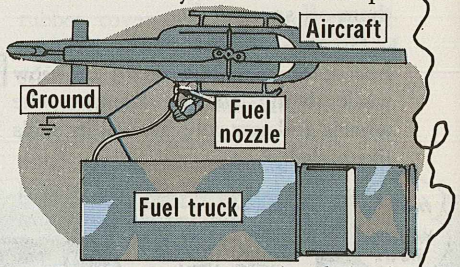
Charge or replace the battery if the pilot reports a low-voltage reading during his post-flight test.

Refueling

When the temperature drops, it's even more important to be careful during refueling. The colder it is, the dryer it is; the dryer it is, the more static electricity becomes a hazard.

Static can result from the aircraft moving thru the air, or by brushing frost or snow off the aircraft. Fuel flowing thru the filler neck can also generate a spark that ignites fuel.

Good grounds are hard to find—but the aircraft must be grounded. Make sure the aircraft and tanker are bonded together, and the nozzle is bonded to the bird before you remove the cap.



If you're not using a closed circuit fueling nozzle, put the regular nozzle in all the way. That'll keep static down and lessen the chance for a fuel spill.

Use extra care if you have to take fuel out of an aircraft. Spilled fuel can cause instant frostbite.

Preflight Preparations

Getting ready to fly involves more than a short checklist when the temperature is 30 below. The time to find problems is before you leave.

Warm things up with a ground heater. Preheating gets lubricants and hydraulic fluids warmed to operating temperatures. That reduces strain on engines and transmissions and makes for faster starts. Piston engines benefit from less resistance from the oil, and fuel vaporizes better for a quicker start.

Keep fire extinguishers handy while you use a ground heater to warm things up. Keep heaters away from fuel and oil drains, vents and supply tanks.

Never blow hot air—over 250° F—on ignition harnesses, hoses or self-sealing tanks. It'll damage 'em for real!

Be careful when you remove ice or snow from windows. Too much heat can melt plastic windows. Uneven heating can crack glass or plastic. Never use hot water, either; it'll crack 'em too!

Never use deicer on plastic windows. It'll craze them (a series of small cracks), meaning you'll have to change them.

Water anywhere in the fuel system can freeze and block fuel flow. Top off the fuel tanks after flight to reduce condensation, and drain the sumps daily.

Check oil and hydraulic levels after your bird's warmed up.

Warm up your avionics, too. Let them warm 5 to 10 minutes before changing frequencies or transmitting.

PS END

Save Elbow Grease

It's no longer necessary to "fix" an aircraft radio that's not broken. It figures! So the pull-out intervals for avionics gear has been removed by "CECOM Technical Assistance GRAM No. 19" (18 Mar 81). The TM 11-1510- and 1520-series manuals are being updated.

Keep 'em Flying!

The Time Between Overhaul (TBO) has been removed from the T53-L-701, T53-L-701A, and T53-L-703 engines used on OV-1's and AH-1's. Messages AH-1-80-27 and OV-1-80-14 authorizes users to continue these engines in service in an on-condition basis. So, keep them flying until a health indicator test indicates a performance drop.

PM HEATS

COMMO

SURE, YOU COMMO TYPES CAN BEAT THE *HAWK*...

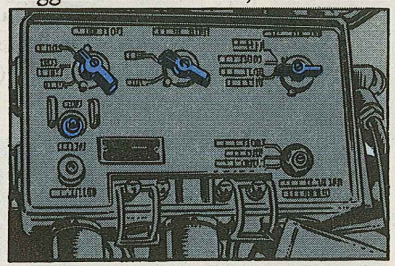
...BUT KEEPING YOUR COMMO HOT WHEN TEMPS ARE NOT TAKES A LITTLE PATIENCE AND SOME COLD WEATHER *PM!*

LOOK-- IT'S MACON!

Patience, like waiting 10 to 15 minutes so your radio set can warm up before operation. Sets need that extra time to shake off the cold-soaking Ol' Man Winter lays on 'em.

Everything works better when it's warm, of course. That goes double for commo gear that gets greased—like teletypewriter sets. Worm gears and keyboards need the "defrost" a warm machine can give them.

Control knobs and switches get sluggish in the cold, too. Shock



isolators and plastic switches get brittle. Either way, be patient when using 'em.

Cold Comms

CURSES!

MAYBE WE CAN GET SPARKS T' WARM UP OUR *GEAR!*

BETTER YET-- *COLD TROOPS... ME, F'INSTANCE!*

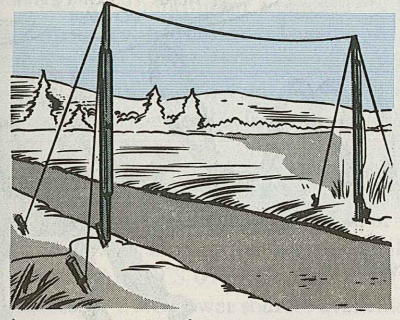
Remember that cable will contract in the cold.

LEAVE SOME SLACK WHEN PUTTING IT OUT...

IF YOU DON'T, IT MIGHT *SNAP!*

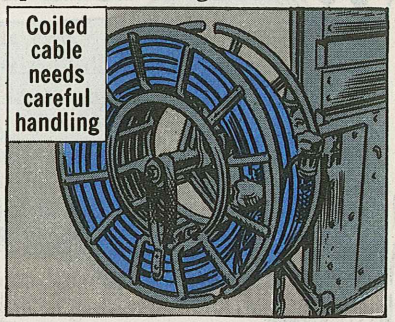
Watch for kinks and crimps in cable and wire. Rubber insulation is easy prey when it freezes. Worse, the wires inside break easier when they're cold.

Your best bet is to keep them off the ground and out of the way of feet, tires,



boxes, etc. In fact, stringing 'em overhead gives you the added advantage of not letting wires and cables freeze to the ground. That creates a pain when you start to recover 'em.

Patience is a virtue when reeling wire and cable, too. Coiled wire freezes in coils, of course. If possible, warm it up before unreeling.



If you can store it inside a shelter, so much the better. A good idea is to take tightly-coiled cable and store it in bigger coils where it's warm before taking it into the cold. That'll reduce the chances of a pinch or break.

PS MORE

That's good for cold cable, too. Before coiling it, warm it up if possible. Cold wires inside can break.

If you have to splice or repair wire, get a tape that'll hold in the cold. TL-600 tape, NSN 5970-00-240-0620 does the job. It comes in a 30-ft roll.

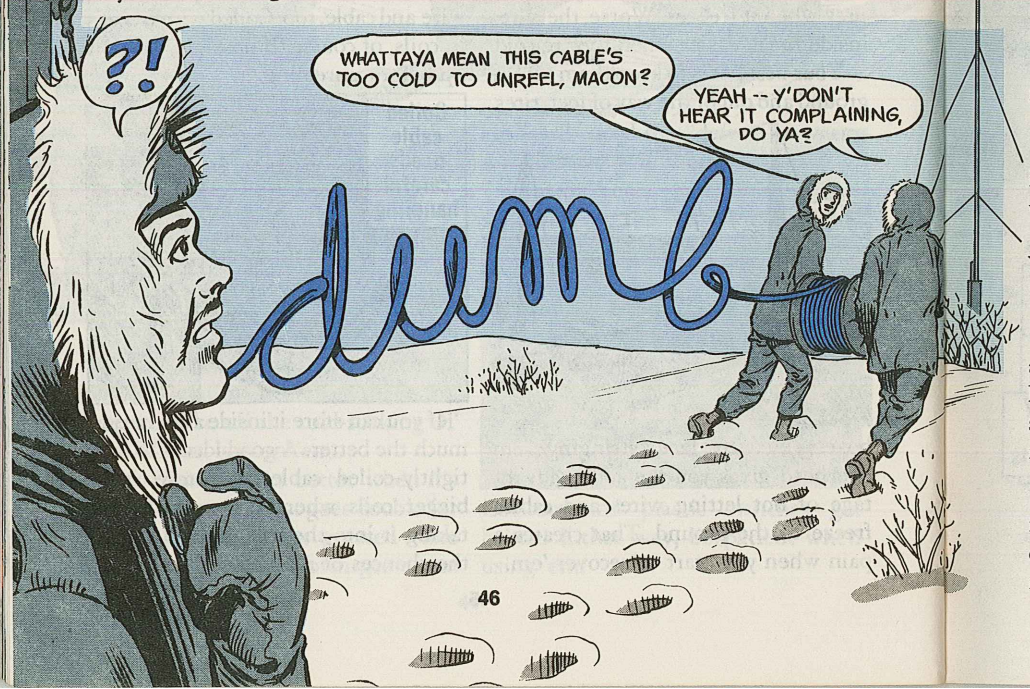
A final word on cables. Go easy on receptacles and connectors when attaching cables. One or the other or both will be cast metal or plastic and brittle from the cold.

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

Moisture from condensation is their biggest enemy. Moving inside and outside and back again makes 'em sweat. The best protection is to wrap them in something woolen like a scarf, or carry them inside your clothing as much as possible to equalize the temps.

The biggest source of moisture, tho, is you. Your breath on the microphone condenses inside the set and can short it out.

The best defense is to use the deicing shield that comes with the component. If yours is missing, use a substitute until you can get another.



The cellophane wrapper from a pack of cigarettes will do the short-term trick. The plastic from a dry-cell battery will too, if it's thin enough so you can still be heard.

A word to the wise on those accessories: If yours don't have rubber earphones, watch where you put your ear. A metal or plastic surface can attach itself to you and make for a painful separation.

If you can't keep a thin layer of clothing between you and the earpiece, hold it a fraction away from the skin.

A Reel Belt

Can't fit the positive drive belt over the groove pulley on your RL-207 reeling machine?

Don't go hunting for a bigger belt. Have your support get the right pulley.

Some reeling machines have an over-sized pulley. The right part is Item 11 in Fig 12 of TM 11-3895-209-24P. It comes only by part number, SC-C-555937, with Federal Supply Code for Manufacturer of 80063.

The belt you need is Item 11 of Fig 2. The number's not listed, so jot it down. You need NSN 3030-00-892-4575 to do your reeling thing.

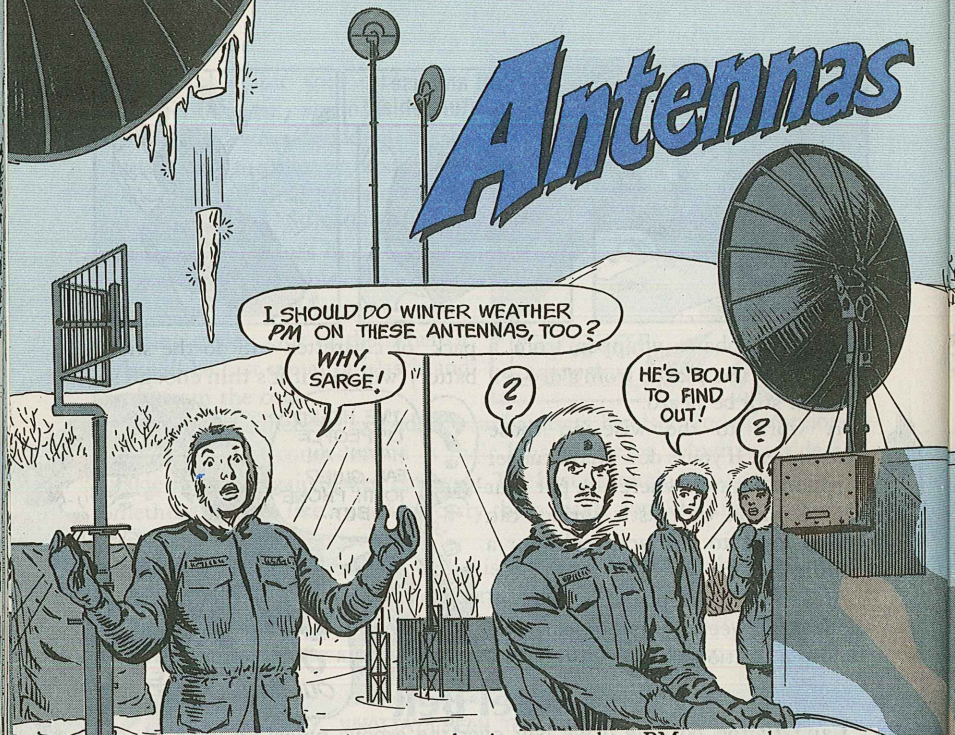
RATT Rig Ready?

To be ready, your AN/GRC-142 or -122 radio-teletypewriter set must have at least 2 of its 3 power sources available. That's the word in CECOM Msg DRSEL-ME-PCS 091230Z May 81. If you've got one AC and one DC power source, or 2 AC power sources available, you're in. If not, your set is not combat ready.

AN/PRM-32 Calibration

You don't have to send in your AN/PRM-32 or AN/PRM-32A radio test set for calibration anymore. The headshed says the test sets don't need to be calibrated to make the GO/NO-GO checks on the AN/PRC-90 radio set. The next issue of TB 43-180-1 will say so.

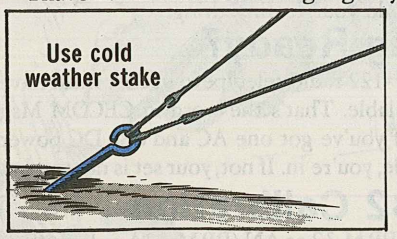
Antennas

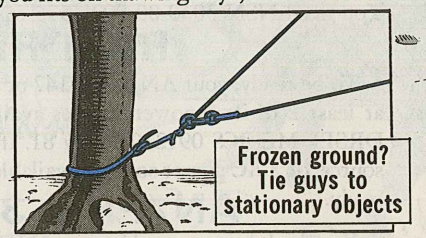


When you start passing around winter weather PM, never leave your antennas out in the cold.

When Jack Frost puts a good freeze down, staking your mast gets tricky. Use a good cold weather stake. If your antenna doesn't have one, such as the RC-292 antenna equipment's GP-101, NSN 4030-00-187-5265, use the OE-254 antenna group's GP-112/U, NSN 4030-00-291-9354.

That smaller arctic stake might give you fits on thawing days, tho. It has less



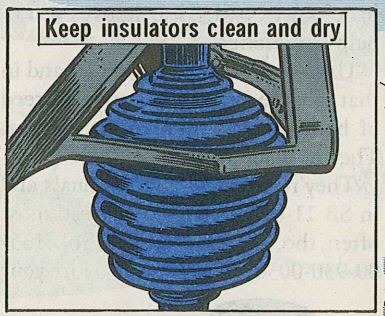


surface to hold it firm in wet earth.

When the ground is just too hard for proper staking, tie your guys to a stationary object like a tree.

Take Cold Comfort, Too

Ceramic insulator bowls need to be dry before a cold snap. Freezing water expands and breaks the glass.

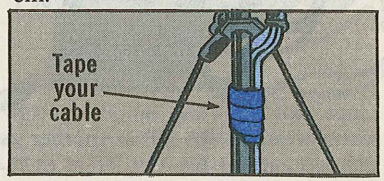


'Course, just being cold makes the glass brittle. Handle it with care.

Once the bowl is clean and dry, give it the silicone treatment before putting it back together.

Finally, go easy with cables and cords. The cold makes insulation brittle.

Really cold weather can cause metal connectors to shrink, letting in moisture. If you think yours might, tape 'em.

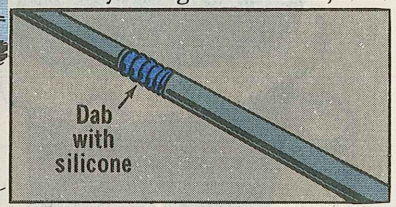


And, when taping is necessary, like the CG-107 cord that goes to the RC-292, use some low-temp tape like TL-600, NSN 5970-00-240-0620.

Never try to get by with fewer guys than your TM calls for, tho. That's trouble.

Never forget a ground, either. For cold weather work, see the tips in TC 11-6, Grounding Techniques.

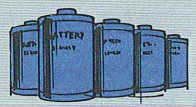
Both mast- and whip-type antenna sections can stick together like glue during a freeze. Check your TM's first, but usually adding some silicone, NSN



6850-00-880-7616, between sections heads off this stickler.

Before slicking 'em down, be sure they're free of dirt and dust. Keep your whole antenna that way if possible.

Ice anywhere on a mast is a no-no, too. Besides cutting down on radiating range, it's unsafe. A falling piece of ice carries a lot of weight.



Dry Cells vs Cold Weather...

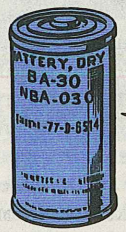
Warm's the Way

Like most everything when the temps start dipping toward zero, dry-cell batteries need to warm to their task.

And, since a big part of your communicating depends on those little power packs, it behooves you to help 'em along.

Uncle Sam has given you a hand in that job. He issues you a special breed of battery for several pieces of gear. They're made for the cold.

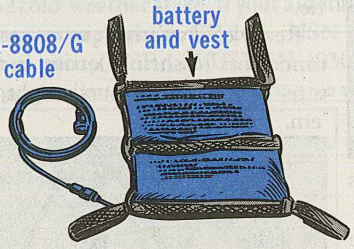
They're listed in your manuals and in SB 11-6. The one you'll need most often, tho, is the BA-3030, NSN 6135-00-930-0030, which subs for your warm weather BA-30's. Another is the vest-carried BA-398, NSN 6135-00-926-3503, which replaces a back-pack radio's BA-4386. The vest is worn around your body to keep the power packs warm.

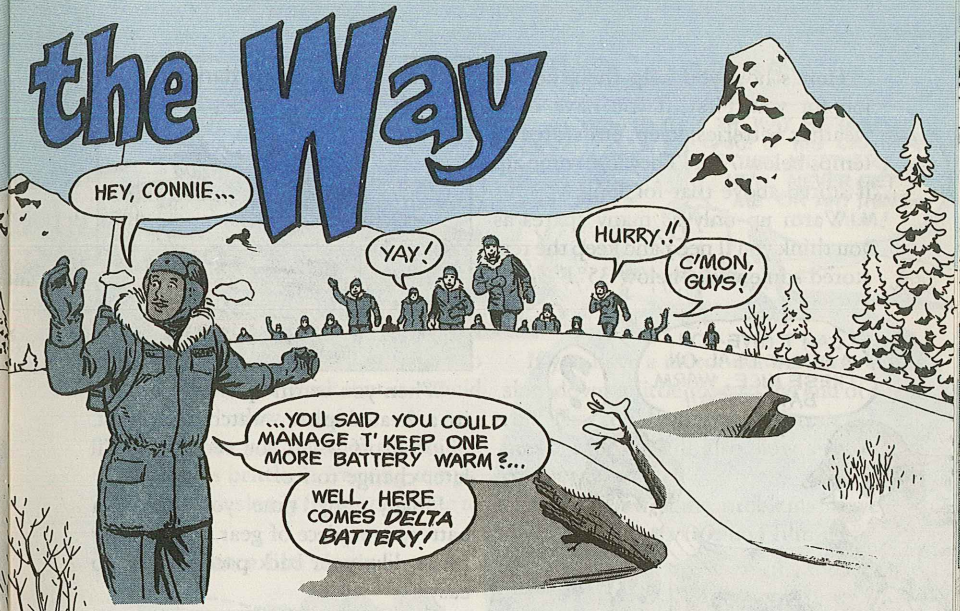


Dry-cell battery

BA-398 battery and vest

CX-8808/G cable



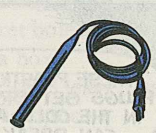


You'll want to switch over to these cold weather friends when the mercury drops.

'Course, if the mercury keeps dipping, like on toward a big fat zero, even cold-shedding dry cells won't be much good. Then, it takes an even bigger contribution from you to keep talking.

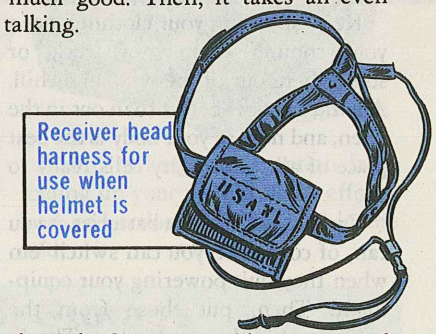
Keep batteries warm with these cables

CX/11991/PRT-4



CX-11990/PRR-9

Receiver head harness for use when helmet is covered



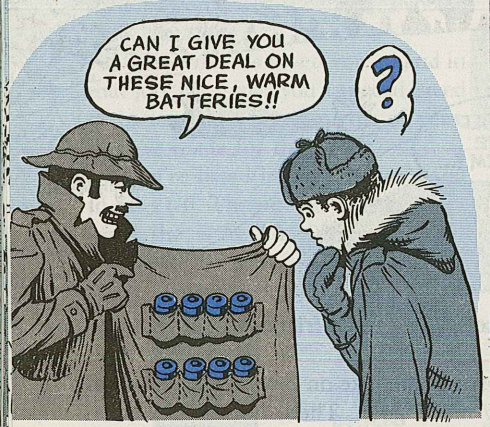
Once again, Uncle Sam came through. Some gear, like your squad radio setup of AN/PRR-9 and PRT-4's, comes with a cable that lets you keep the batteries inside your clothing while the radio works out in the cold. Most battery-using equipment doesn't have this advantage, tho. It's just got you.

Keep in mind that it's the temp of the cell that counts. A battery will work in the coldest weather as long as it's warm.

PS MORE

Here's how you help them do the job for you. First, if you have cold weather batteries, keep 'em stored at temps below 70° F. They lose some zip if stored above that for long.

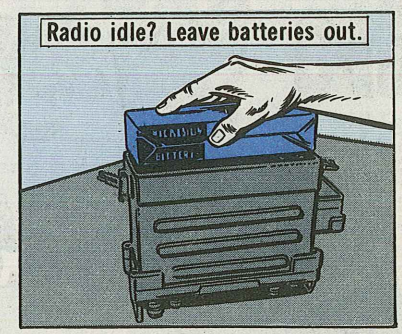
Warm up only as many spares as you think you'll need and keep the rest stored somewhere below 35° F.



Keep spares in your clothing, or in your commo shelter, or truck, or somewhere out of the wind and chill. A wind break is better than out in the open, and next to your body is the best place of all to keep dry cells ready to go.

Carry as many extra batteries as you can, of course, so you can switch 'em when they quit powering your equipment. Then, put those from the equipment in the warm place. They'll probably regain enough oomph to do a job for you later.

'Course, if you won't be needing your gear for awhile, don't install batteries. Keep 'em warm as long as possible.



When you warm up those dry cells in a heated place, watch for sweat. Wipe it off when you see it—or it'll later change to ice.

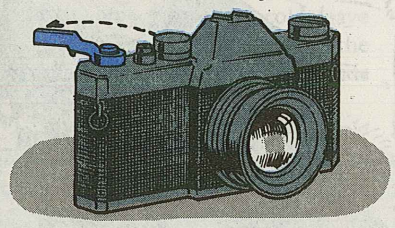
Finally, any time you install a battery in a piece of gear with battery plugs, like your back pack radio's, go easy.

Hot Tips for Cold Cameras

Winter weather doesn't have to stop your camera work, but it should bring it to a slow crawl.

Like when you advance that frigid film. It gets brittle in freezing temps, so advance it slowly from one frame to another.

Advance film slowly

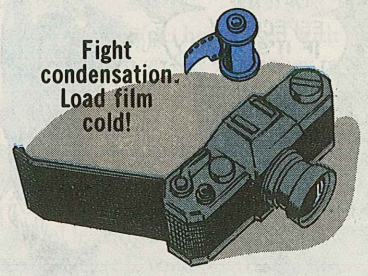


If you go too fast, you get broken sprocket holes and static marks on the film. Broken sprocket holes also leave chips in the camera box.

Fast rewinding can leave static marks on exposed film, too.

If you have a motor-driven camera, slow down a little toward the end of a roll. That could save you the hassle of a break. Motors will also slow a bit in cold weather.

To head off some problems, leave the camera in its case and film in the package until you're ready to use 'em.



Then, to keep condensation from fouling up your photographic efforts, load and unload your camera in the cold.

Dry Cell Storage

If you store your dry cell batteries in a refrigerator, be a little choosy. Pick a "fridge" in which only batteries will be kept. Never use one you and your buddies use to store soft drinks and such.

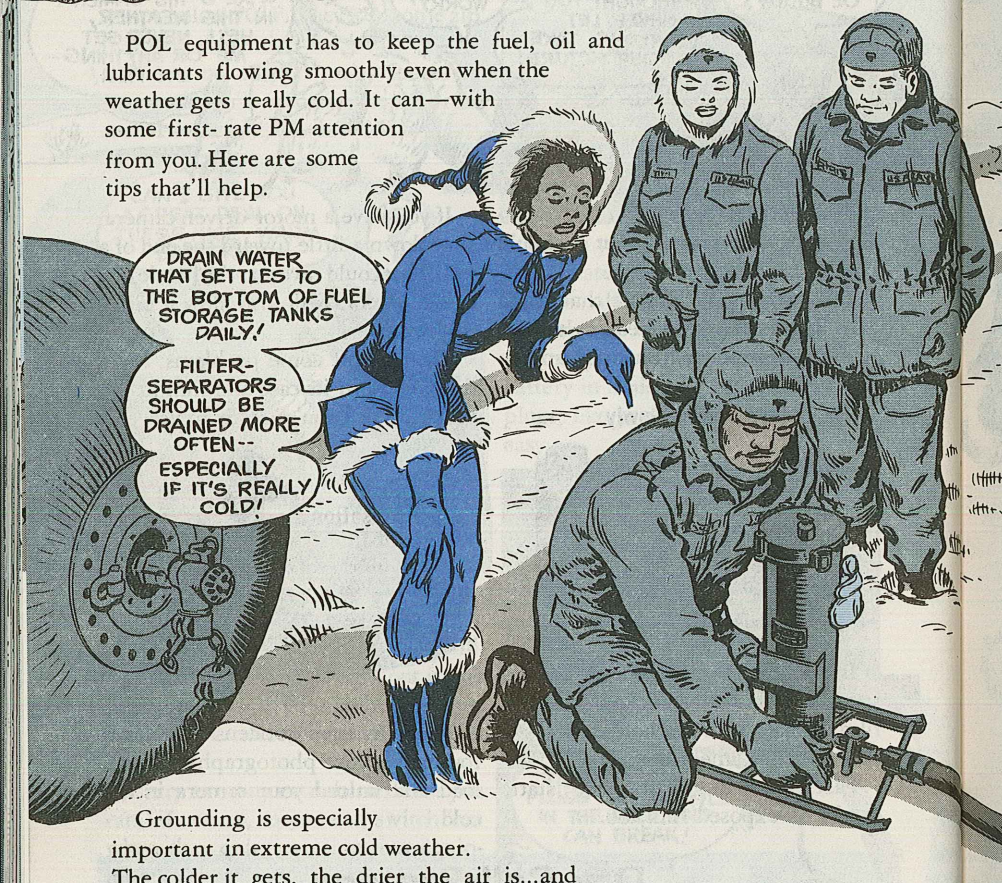
Those swinging doors will let humidity build up, and humidity will damage or shorten the life of your batteries.

TROOP SUPPORT

POL Equipment...

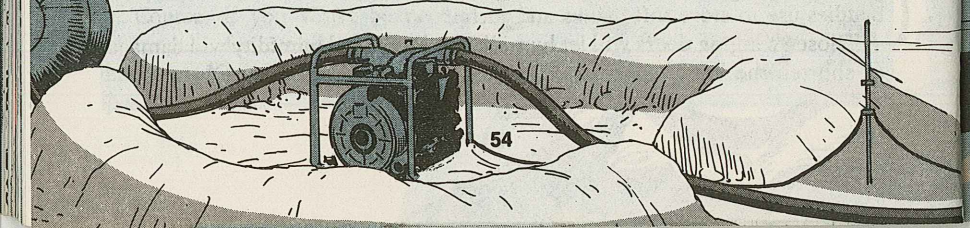
WINTER PM KEEPS FUEL FLOWING

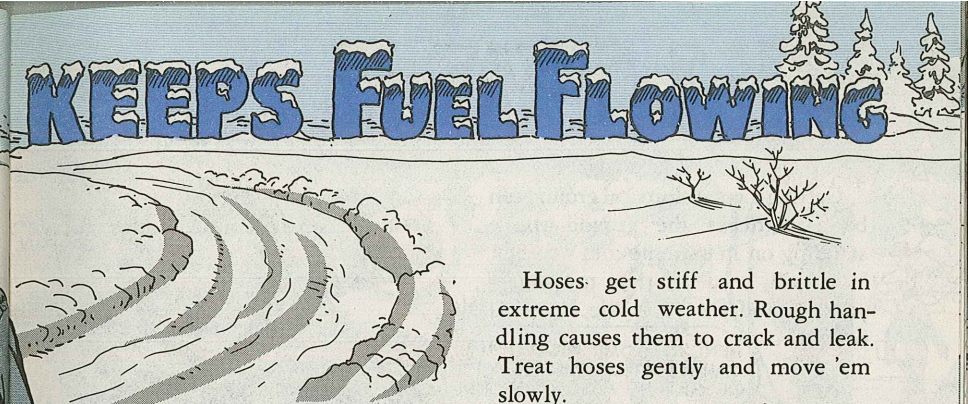
POL equipment has to keep the fuel, oil and lubricants flowing smoothly even when the weather gets really cold. It can—with some first- rate PM attention from you. Here are some tips that'll help.



Grounding is especially important in extreme cold weather. The colder it gets, the drier the air is...and that means more danger from static electricity.

Protect POL pumps from bone-chilling winter winds. Build a windbreak out of snow or ice if no permanent shelter is available.



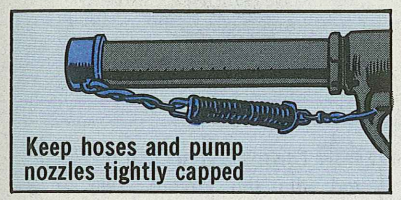


If possible, disconnect and drain smaller pumps so that they can be stored in a building or tent at night.

Use the right winter grade of oil in pump engines. The LO will let you know which one's right for the temperatures in your area.

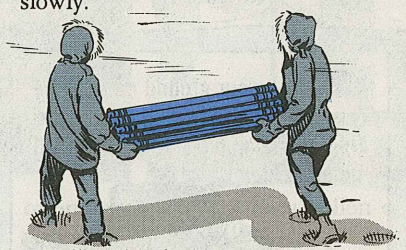
When you add oil that's cold, leave the level about ⅛ inch below the dipstick full mark. The oil expands when it warms up.

Keep hoses and nozzles tightly capped when you're not using 'em to prevent dirt and snow from getting in. Manhole covers should be kept securely sealed, too.



Keep hoses and pump nozzles tightly capped

Hoses get stiff and brittle in extreme cold weather. Rough handling causes them to crack and leak. Treat hoses gently and move 'em slowly.



Collapsible fuel hoses used with the FARE system go flat when they're left out in the cold. A flat hose won't deliver much fuel.

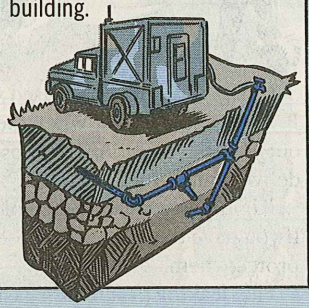
Rigid hoses survive the cold better. If you have to use flexible hoses, try to protect them.

Fuel leaking past frozen gaskets and seals is a real cold weather problem. Doubling up on standard seals can slow the leaks. Keeping seals and fittings clean'll help, too.

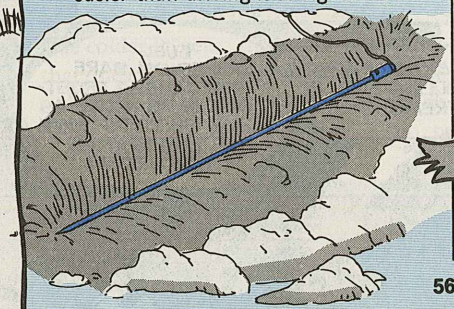
Cold-Weather Grounding

Getting a good electrical ground can be as hard as the ground you're standing on in extreme cold weather. You still need it, tho, to protect yourself and your portable electrical equipment.

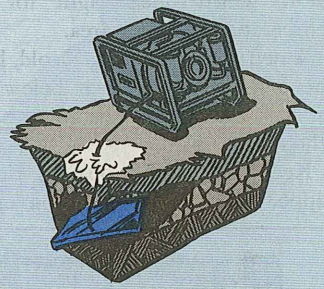
1 Hook your ground cable to an existing ground—like an underground metal pipe or a grounded metal building.



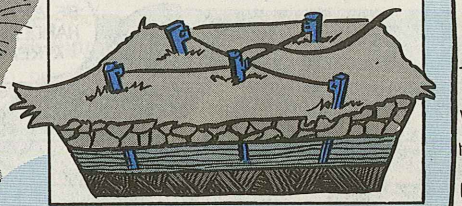
2 Bury a standard 9-ft ground rod, NSN 5975-00-642-8937, horizontally in a trench. Be sure it's below the moisture level. That's easier than driving it straight down.



3 Bury a 3-ft square metal plate below the permanent moisture level.

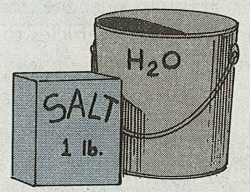


4 Drive a 3-ft section of ground rod into the ground. Two or 3 sections at different locations form a ground network.



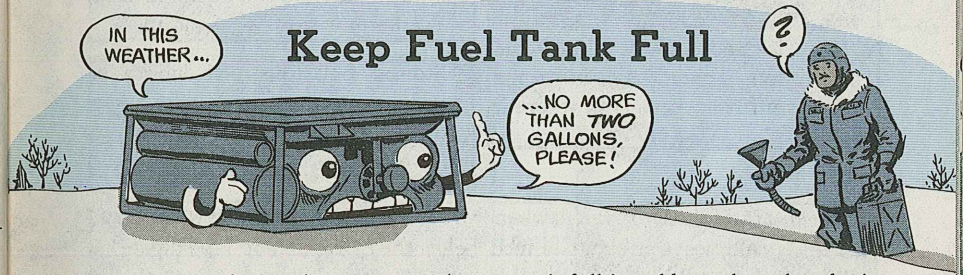
Frozen earth or ice won't give the best ground even with a rod in place. Improve the ground by putting the rod near a source of heat—a building or the exhaust outlet from a generator, f'rinstance.

Pouring a chemical solution around the ground rod location will help you get a better ground, too. Make the solution by mixing a pound of common table salt with a gallon of water.



TC 11-6, Grounding Techniques, has a lot of other good grounding tips.

Keep Fuel Tank Full

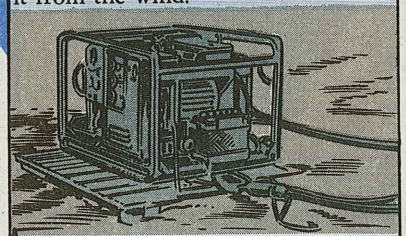


Keep the fuel tank on your M2 burner unit full in cold weather...but don't overfill it. Two gallons fill the tank and keep condensation down. Never fill the tank past the bottom of the fuel filler tube, tho. The fuel needs that room to expand when it warms up. This info updates Para 2-4a, TM 10-7360-204-13.

★Small Engine

Proper cold weather preventive maintenance will make your engine easier to start and easier to keep running.

★Never leave the engine sitting in snow or ice. Keep it 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 the engine, too. That'll help 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. That lets warm air from the manifold keep the carburetor from freezing up.

★Storing bulk oils and lubricants inside makes 'em easier to pour. Saves you from guessing how much room to leave for expansion in the oil tank.

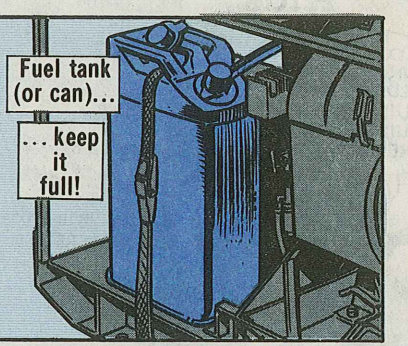
★Be extra careful not to overfill when you add oil in extreme cold weather. If the oil is cold, leave it about ⅛ inch below the FULL mark on the dipstick. It'll expand when the engine warms up.

Cold oil? Fill to just under FULL

★Cold Care

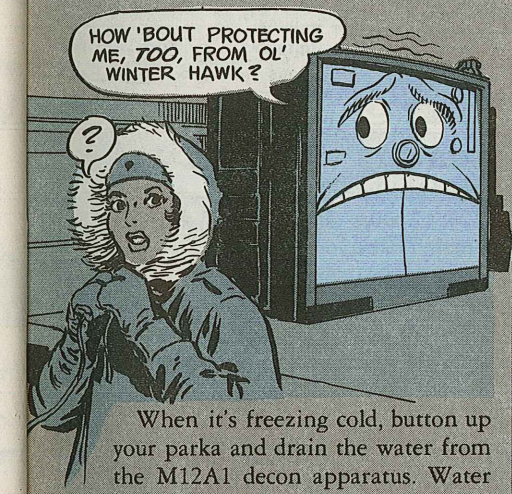
★Keep the fuel tank full to reduce condensation. Less moisture in the fuel means less chance you'll get a frozen fuel line.

★Use the right fuel anti-freeze 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. (See page 3 for more details).



★Check your engine's TM for any special cold weather instructions.

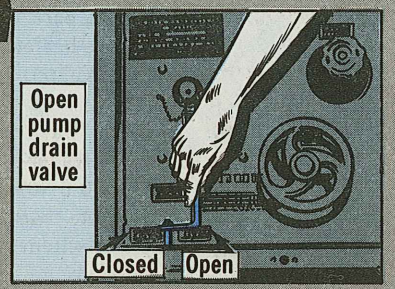
Drain M12A1 Decon



When it's freezing cold, button up your parka and drain the water from the M12A1 decon apparatus. Water left standing in the M12A1 freezes only a few degrees below 32° F or 0° C.

Result? Pipes, hoses and pump housing crack and bust.

Remember: Ice is not nice for the M12A1. Follow the cold weather procedures in Para 2-38 of TM 3-4230-209-12.

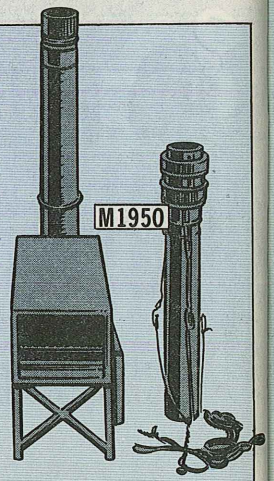


Your Cold Weather Library...

Pubs and Training Aids

FM 9-207	Operation and Maintenance of Ordnance Materiel in Cold Weather
FM 31-70	Basic Cold Weather Manual
FM 31-71	Northern Operations
SB 9-16	Personnel Heater, Winterization Kit Policy (Construction and MHE)
SB 11-576	Cold Weather Batteries for AN/PRC Radios
SB 38-100	Preservation, Packing, Marking
TC 1-12	Cold Weather Flying Sense
TC 21-3	Individual Operations, Survival in Cold Weather Areas
TB Eng 347	Winterization Techniques for Engineer Equipment
TB Med 81	Cold Injury
TB Med 269	Carbon Monoxide Symptoms, Treatment, Prevention of Overexposure
TB 9-2855-series	Winterization Kits
TB 750-651	Use of Antifreeze Solutions and Cleaning Compounds in Engine Cooling Systems
TM 9-247	Materials and Chemicals used for Cleaning, Preserving, Abrading, Cementing Ordnance Materiel
TM 9-6140-200-14	Lead-Acid Batteries
TM 750-254	Cooling Systems: Tactical Vehicles, w/CH 1, 2
TF 7-1550	Extreme Cold and Deep Snow—Combat
TF 8-3977	Cold Climate—Personal Hygiene
TF 8-4879	Cold Injury—Prevention
TF 9-3109	Cold Weather Starting—Tanks
TF 9-3957	Cold Weather Vehicle Operation
TF 10-4780	Cold Weather Clothing
TF 20-6222	Cold Weather Training
TF 21-3398	Cold Weather Uniform
TF 21-6111	Northern Operations

Space Heaters



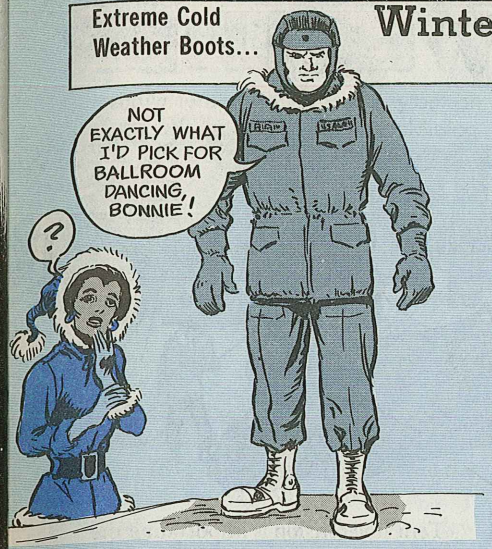
Warm up to a copy of TM 10-4500-200-13 to get the hot poop on operation, parts and maintenance on your space heaters. Those M1941 and M1950 (Yukon) body warmers need good PM.

By the way, be sure you get the Flame Spreader—Item 20, Fig 2-6—NSN 4530-01-094-1928.

And note that the correct NSN for the poker—Item 10, Fig 2-6—is 5340-00-368-7439.

Extreme Cold Weather Boots...

Winter Wonderland for Feet



Extreme cold weather boots may make you look like Mickey Mouse, but they keep your feet warm and dry.

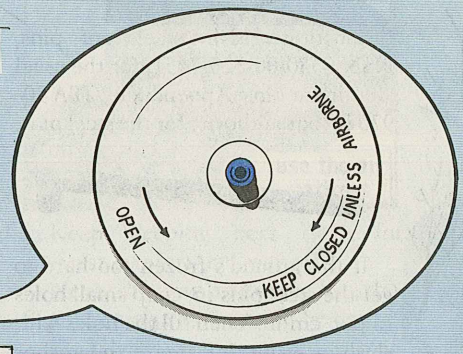
The boots can't take a lot of abuse, tho. One puncture—either on the outside or inside—puts 'em out of action...for good.

Use cold weather boot maintenance kit, NSN 8465-00-753-6335, to repair small holes. The patches are only good for emergencies. They won't hold up long in the field.

The patches stick on better if you apply the adhesive to both the boot and the patch.

Turn boots in to support at least once a year for testing. They'll make sure the boots are still serviceable. Don't wait for the yearly inspection if you suspect a leak, tho. Get 'em checked immediately.

Use soap and water to clean your boots. A spray on/wipe off general purpose detergent—NSN 7930-00-357-7386 f'rinstance—takes care of tough stains. Never dry boots near a fire or other heat source.



Keep the pressure release valve closed except when you're flying in an Air Force transport. Moisture gets in when the valve's left open and ruins the boot.

One pair of cushion sole socks is all you need to wear, but change 'em often to keep your feet dry.

Watch out for concertina wire. One touch can be the kiss of death to your extreme cold weather boots.

FM 31-70 has some more cold weather boot poop.

Tents...

COLD-WEATHER TIPS

Your tent may be all you've got to protect you from frigid winter winds. That's why it's got to stay in the best possible shape.

Substitute 12-in steel tent pins, NSN 8340-00-823-7451, for the usual aluminum pins. Appendix A, CTA 50-970 is your authority for the steel pins.

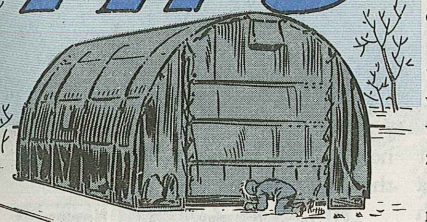
If the ground's frozen too hard to get the steel pins in, chop small holes to put 'em in. Then fill the holes with slush or water. It'll freeze and anchor the pins.

Remove tent pins from frozen ground by chopping the ground around them till they loosen. Never pound 'em sideways with a hammer to break 'em loose.

Tent line tension is important if the tent's to stay up through winter storms. Ropes must be tight to stand up to high winds. When the weather's wet, tho, they need some slack to allow for shrinkage.

Slide fasteners that won't slide are a nuisance. Slide fastener stick-form lubricant, NSN 9150-00-999-7548, unsticks 'em.

On frame-type tents, cold canvas won't always completely cover the frame like it should. Never force it.



tho. Lay it over the frame and secure it. When heat from inside the tent warms the canvas, finish tying it down.

Be careful when you go in or out of the tent wearing extreme cold-weather clothing and boots. The bulky winter gear catches on the door and zipper and can tear the canvas.

FM 31-70 has tips on tent placement and special cold-weather info. General tent repairs are covered in FM 10-16.

Shake the Chill Out

A little exercise can help you sleep better—and warmer—in your sleeping bag. The insulation settles into the foot of the bag when you roll it up from the top. Shake the bag a few times while holding it by the foot to redistribute the feathers and make a warm, even layer of insulation.

Leave the bag open for a few hours after you use it so it can air out. Fresh air and sunshine fluff up the feathers, too.

Keep sleeping bags clean for greatest comfort and warmth.

Never dryclean a sleeping bag, tho. The cleaning vapors could be deadly.

Use the insulated pneumatic mattress, NSN 8465-00-518-2781, between your cold weather sleeping bag and the ground for maxi-protection from the cold.

Extreme Cold Weather Parka...

Liner Learning—Warmer Wearer

The way you put the liner in your extreme cold weather parka makes a difference. You'll stay warmer with the liner in right.

For the older style liners, the white, fleece side goes toward the parka shell. It creates a space for warm air between the cold outer shell and the inner layer next to your body. It's that insulation that keeps you warm.

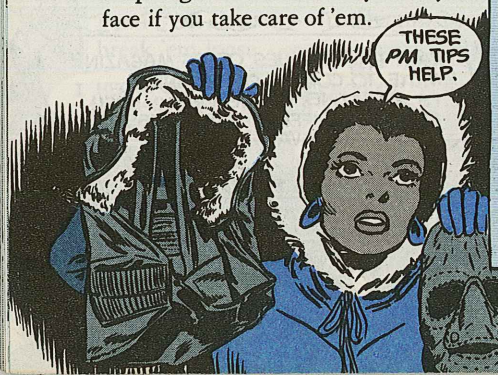
Newer, quilted liners have a layer of slick protective cloth on each side of the insulation, so the insulating dead air is trapped between them.

Dirt 'n' sweat rob your liner of its insulating ability, too. Keep it as clean as possible for best results.

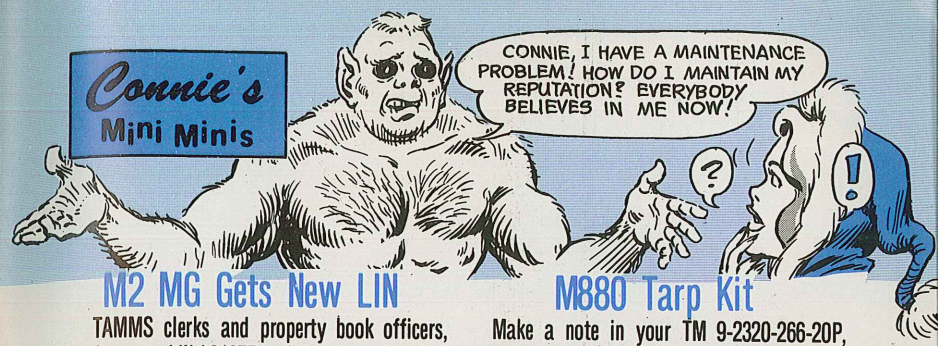
Hood Needs Real PM

Your extreme cold weather hood, NSN 8415-00-782-3004, and extreme cold weather face mask are the only things between you and a frost-bitten face when you're working outside.

The artificial fur ruff and the mask keep frigid winter air away from your face if you take care of 'em.



- Keep the hood and its fur ruff clean...the mask, too. Hand washing's the only way. Use warm water and a mild detergent like laundry detergent, NSN 7930-00-985-6904. Rinse the hood in clean water and shake out the excess water; then, hang it up to dry. Never lay it on or near a hot stove or heater, tho. Too much heat ruins the fur. Machine washing does, too.
- Never let snow and frost collect on the fur while you're wearing the hood. Brush them off as soon as you can. The fur can't keep the cold wind out of your face if it's all wet and matted.



M2 MG Gets New LIN

TAMMS clerks and property book officers, lend an ear: LIN L91975 and "Machine Gun, Cal. .50, HB, Flexible (Ground and Vehicle) W/E" now go together. The word's in US Army Armament Command Materiel Management Letter (31 Mar 81). L91975 replaces L91838.

Did Your Unit Get PS?

The PS Magazine printer has had trouble making the mailing labels for recent issues stick on the boxes and packages. If your unit did not receive its shipment of PS Magazine recently, jot a note to: MSG Half-Mast, PS Magazine, Lexington, KY 40511. Tell him which issue didn't arrive. Some copies may still be available.

New Supply Pub

There's a new pub on handling requests for items with part numbers or NSN's not on the AMDF. Make sure you get a copy of DA Cir 700-81-1, Supply Requisition Processing (Jul 81). It replaced DA Cir 700-29.

M880 Tarp Kit

Make a note in your TM 9-2320-266-20P, Page 2-167, and Fig 101, for Kit, cargo box top, NSN 2540-01-013-5850. You can't get it as a kit. You can get only the component parts as listed. The codings in the TM and AMDF are being changed.

Quality News

Tech inspectors will find the latest on quality control and technical inspection of aircraft in FM 55-411 (Jan 81). For a good list of reference pubs and other features, eyeball a copy.

Protective Mask Paint

Do you NBC NCO's need touch-up paint for paint-chipped metal clips and buckles on the protective masks? NSN 8010-00-085-0559 gets a 4-oz bottle of paint for the job. You can spot paint the metal on the M17/M17A1, M24, M25/M25A1/M14A2 or M9/M9A1 masks. Make sure you remove the clip and buckle assembly from the mask before painting. The paint helps prevent copper buildup from ruining the mask.

Tank HOTLINE

AUTOVON 694-6582

Every day — 24 hours

Call it to get help on any problem you have with tanks.

After you apply the info you get from the Hotline, let 'em know how it worked out. Feedback is vital. If everything's rosy, tell 'em...if it's not, tell 'em again.

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


In EXTREME COLD...
Batteries
Oil
Antifreeze
Need EXTRA Care!