

**PS**

**THE  
PREVENTIVE  
MAINTENANCE  
MONTHLY**

**SEPTEMBER - OCTOBER 1953 NUMBER 9**

**HOW TO  
MEASURE  
HIGH ANGLE  
CART**

**see page 186**



# PS IS OFFICIAL



PS Magazine has had updates let us know lots of new readers as to who we are and how we do what we do.

In all cases, attention is respectfully invited to page 2 of Issue Number One. It tells all, and is the proverbial baseball. Beware for the rest, or to speak.

Except one thing that seems to bother you every so often and makes PS quite sad. You pick your loaded pencil in our general direction and you say to us, " . . . and just how official is PS?"

Well sir, PS has eight heads—PS is official as they come. With a capital "O." It's not what you'd call a dispositive, but everything it says to you is as checked and double-checked as technical facts should be. Everything in PS is approved by the technical authorities who approve those same facts for the direction that come later—and publication in PS constitutes official approval.

Besides, friend, the ones who know the PS best can tell you that nobody ever got a gig for adopting PS information to local conditions. If it's good facts and it works to practical advantage, then by all means let your common sense be your guide and share power to you.

They may occasionally get blamed, but you'll not get blamed. Just tell them you saw it in PS.



### Preventive Maintenance... A Command Responsibility

"Preventive Maintenance is not a modern invention. Commanders have always been charged with insuring that all elements of their commands, human and material, be ready and able to accomplish an assigned task. This can be done in only one way—by insuring the interest of every member of the chain of command—to do it, by recognizing that maintenance is not the job of the technician, important as he may be, but the job of the commander. PM is a command responsibility."

Major General I. B. White  
Commanding 10th Corps

SEPTEMBER-OCTOBER 1952

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**PM MAGAZINE**, the Preventive Maintenance monthly, publishes procedures and questions. Write to: Editor, PM Magazine, Aberdeen Proving Ground, Maryland.

For copies of this magazine, or for other information, contact the nearest office of the Army, Department of Defense, or the nearest office of the Army, Department of Defense, or the nearest office of the Army, Department of Defense. For more information, contact the nearest office of the Army, Department of Defense, or the nearest office of the Army, Department of Defense. For more information, contact the nearest office of the Army, Department of Defense, or the nearest office of the Army, Department of Defense.

## THE LAST ENEMY NO. 2—MUD AND ICE

Dear Editor,

So far as artillery is concerned, we've found only one way to combat mud and ice, Enemy No. 2 in the Far East. With grease.

Effort grease and lubrication.

Much of the time traveling in Korea meant wading through mud or water—detouring around blown-out bridges. Most of the bridges have been blown out. Doesn't take long for the mud and water to freeze. When you try to set up your artillery piece up against all kinds of difficulties.

Chances are the axles in the trail spools have gotten clogged with mud and ice. Which means that they have to be cleaned and lubricated before the spools can be put in place.

Then there's the firing jack. Ease of operation is important. When the plunger freezes it slows you down five or ten minutes in getting your gun into firing position. You've got to keep your firing jack free of dirt and ice, and well lubricated.

We've found that on the M5-Howitzer the equalizing support joints must be lubricated immediately after going thru water, and given a thorough grease job at the same time. This procedure applies also to equalizing support links. Some outfits let their ball and socket on the rear of the trails get wet, causing them to rust. They should have grease on them just about every time that's made.

Out in the field it's hard to hang onto gun covers, so most of the guns are out in the weather unprotected during the rainy season.

# Combat Maint





# enhance Stories

The crate slides rest and won't give the proper road. The whole gas should be taken, used two or three times a week.

Epi Roy J. Oakley  
Korea

## THEY IS STRANGER THAN FICTION —(CHANGE YOUR PLAT)

Dear Editor,

Have to tell this one on myself but in the interest of some other fellow who may find himself in such a spot—here goes.

I'm a driver for a TC outfit in Korea and was pushing a load of stores to a forward area, growing about the terrain I had to cover and the equipment I had to do it with, when one of my five Go (inside dead) blew out. I wasn't too far from home so I decided to keep going.

When I pulled in to the motor pool the place was pretty well deserted. It was late and I was beat so I hit the sack. I didn't think anybody'd notice the flat, it being an inside tire, and I could take care of it in the morning.

I sure wasn't expecting the fireworks that woke me up a few minutes later. Seems that when I parked that truck on the lot the flat tire was smoldering inside the casing and it soon got the good tire to smoldering. Then the good tire blew out and the air from it caused the smolder to flare. Then the wooden body of the trailer was aflame—and then the engine—and then...

Epi L. W. Sudd  
Korea



### DRIVE IT TO 'EM STRAIGHT

Dear Editor,

I'm writing a message I hope you'll publish to all drivers and mechanics. Let's hear drive on those guys. They aren't driving tanks or commercial trucks for a civilian reason. They are driving combat vehicles (in this theater) and let education or Driver's maintenance be the life of those vehicles.

Instead of getting in a truck, turning on the switch, jerking the transmission in 1st gear and burning up the clutch and tires—let's lock them over, feel of a few of the bolts and nuts for looseness, get those luggies as you would your baby.

Those vehicles can and will save your life in combat if you do your part. Your part as a driver is also taking care of them—not just conveying the vehicle around.

In 24 months of combat in the ETO, the last time around—of 26 vehicles in My Dry 218 FA Bn there was one 1/4-ton out of commission for one day. A brake job. And credit goes to 26 drivers and their section chiefs. They did the job there in combat, we can do it now—20 or 30 minutes a day.

Keep them tight, keep them lubricated and clean, and the vehicle will do the job for you.

Sgt. E. J. Smith

AFPO #12, San Francisco

### NOT TEP-ON WEP SHELLS

Dear Editor,

One thing I learned in Korea which is worth passing on is the importance of keeping your WEP (white phosphorus) shells tamped up in hot weather. If you don't, the phosphorus will melt and run down to the low side of the casing, still setting the shells' center of gravity. When fired they'll come out of the gun like a cat with six, and hit anywhere from here to Nelly's barn.

W. Glenn E. Turner

Korea



# TURRET DRIFT on the M46 and M46A1 tanks

**T**urkish Marine soldiers attributed failure on the spring breaking in the traversing mechanism's "The Stack" unit (Fig. 1).

To replace this spring, have field maintenance remove the unit and take out its insards. Page 473, ORG 9 SMC, G-244, April 1951, gives an idea how the assembly comes apart—the part that's breaking is labeled "AA". The spring might look like "AA" in the SMC, or (more likely) it looks like the later-type spring in Fig. 2.

To depress new spring into the unit, get a piece of 1/4" steel about 6" long and 1-3/4" wide and press spring into place by gripping steel in your fist and using a flat end. Avoid pliers or screwdriver because they'll damage the spring.

The spring (G244 G28007) isn't in stock—but it can be requisitioned on the basis of MWO-G244-W28, soon to come. In the meanwhile, to keep from drifting around in a turret-drifting tank, waiting for a spring to come through—your best bet is to have field maintenance make one.

Get a small piece of spring steel, preheat, cut and file it till it's

1-1/2" thick, 1-3/4" wide and 2-1/2" long. Heat and shape it with a pair of round-nose pliers (Fig. 2).

To give the home-made spring the proper elasticity, heat it to a cherry-red color (1400-1600°F) and drop it in oil. That'll make it hard. To temper the spring: attach it to a wire and dip it back into the oil, pull it out, and ignite the oil on the spring with a torch. As soon as the oil burns off, immerse it in the oil again, immediately pull it out, and ignite the oil. Repeat this dipping and burning procedure six times. When all's done, you'll have a spring that'll keep your turret from drifting when parked on a slope until the requisitioned spring comes through.



The more attention she gets,  
the less trouble she gives.

## your M38 feelin' great?

### LEAKY CUM FILTER

M38 Cumo type oil filters give little trouble but they need some attention to keep them working right. Besides the usual checking after two or three thousand miles of operation, they sometimes start leaking and require extra care.

The reason for this leak may be that in manufacture the cup flange (the sealing surface) is left unscrubbed and rough. As a remedy, smooth down the flange on a piece of abrasive cloth resting on a flat surface. If you can replace the gasket (Black No. C190/737688) with a new one, swell. Otherwise take the old gasket out, turn it over, and reassemble. A good gasket means a lot if you want a leak-proof filter (Fig. 1).

This idea can also be used to keep fuel pump sediment-cups in trim if they go astray.

### THROTTLE WIRE BREAK

There's been some complaint of M38 throttle wires breaking off where they're stacked inside the racket tube of the hand throttle. This tube should be lubricated regularly but it's often forgotten.

Needing a little oil, the racket tube gets stuck. Next thing you know, you pull extra hard—the handle comes out with a jerk, and the wire is broken. This can be uncomfortable if it happens while loading. If preferred, graphite can be used in place of oil. In any event—it's a part you should be able to move, so why not keep it movable?



Fig. 1—Not only do you need a good gasket for a high-grade Cumo filter, you also need a smooth sealing surface on the cup flange. And remember to tighten the bolts evenly, all the way around, when you reassemble the filter—uneven tightening makes for leaks, as you know.

## BUCKLED DIFFERENTIAL COVER

Removing and replacing the front or rear differential cover a few times can give it a permanent kink. The stuff the cover's made of isn't tough enough to keep its shape when there's been steering pressure against it. And that means DO leaks down under.

Using a thin coil spring and a soft metal, like aviation Aluminum PL, can help at this point. Or, try cutting a ring from some mild steel to fit the circumference of the cover, drill holes for the cap screws, and weld it to the outside of the cover. Add a roller and Easher gasket to this and you're set.

But most important, it's best if you make the cover tight without buckling. To get an even tightness on the housing, put all the screws on finger-tight first. Then working clockwise, give each screw a quarter turn at a time until they all have a proper and equal snugness.

Incidentally, if you're raising an MLJ with a roll-away floor jack, be careful. A light scratch from the jack can crack the differential cover.

## FUEL LINE MOVE

The bottom of your clutch pedal may be rubbing at your fuel line everytime your left foot lays down on top of it. In fact on some vehicles the loose breathing at the fuel line shut-off valve has been cracked by the pedal being too close and vibrating it too hard. If the situation

there looks threatening, you can move the line safely away from the bottom pedal clevis, according to a couple's men who've written PE about the change.

Their idea is to put a hole in the front body-mounting bracket directly in line with the fuel line and run it through this hole. (Fig. 2 and Fig. 3). That way, the bracket acts as a handling board and keeps the line and pedal clevis away from each other's rubbing.



Fig. 2 — If fuel line in the position gets bumped by clutch pedal clevis, pressure the line and run it thru the mounting bracket.



Fig. 3 — After you've drilled a hole in the bracket and run the line thro, clip the line on the other side using the spare bolt hole.

## VACUUM IN DISTRIBUTOR

When an M38 started to sputter and backfire, Ed Hinesdale, OCT at Camp Stewart, Georgia, found that disconnecting the tube between the vacuum booster and windshield wiper made the little glass pump like a lifeline. Reconnecting the hose and tracing the vent line through the distributor and into the carburetor-air-intake pipe, he discovered that the elbow, terminating the vent line in the carburetor-air-intake pipe, got plugged with brass somewhere along the production line. By clearing the brass-plugged passage he made everything OK.

While screwing around, M38T #88 noticed that the spark had been

weaker and returned to normal after the vacuum line was disconnected. That figures, since air becomes a better conductor of electricity as pressure is reduced. The partial vacuum accidentally set-up by the distributor made an easy air path for ignition current to reach ground inside the distributor case, short-circuiting the spark plugs. While it won't happen in all vehicles, a job with a booster (like that on the M38) creates enough of a vacuum to make the difference. And from the positive side, this is a good way to test the sealing, venting, and waterproofing of the distributor. When everything else is fit and snug, and all the vent connections tight, disconnect the top vent-line, cap it with your finger, and the engine should start to die.

## TRAILER-CABLE SOCKET-COVER FIXES

Two ways to keep trailer cable socket covers from warping or breaking reflectors.



An unfastened cover causes cable damage. If you grind off the top of the cover, it will be free for good locking action.



Or if the ball's broken, pry the M38's receptacle so it opens from the side, and plug the socket in sideways, top-reflector clear.

## TRACK-JACK MODIFICATION

Dear Editor,

If any of your readers are plagued by the soft-loaded end-connector-puller pin, snapping off their M4, M26, M28, M26A1 and M47 track-jacks (oh, my aching back!), they'll want to hear how we went about re-engineering our jacks from **bleasted** to **blessed**. We modified the jack's pin (41-F-2995-980) so it would stand up and do the rugged job of pulling off the end-connector from most center-guide chevron-type tracks.

Our fix: cut off the puller-pin, and in its place weld a wedge-shaped lug that's the general size and shape of a drive-sprocket tooth. The lug (cut from a piece of armor plate) is 2" long, 2-1/2" wide, and 1" high. Cut and shape both ends so the lug will fit into the connector's wedge-bolt recess and clear the

track-pin. Then weld this wedge-shaped lug onto the overall surface of the track's puller-pin mount. Mount the lug so its pulling surface is a perfect 90° from the jack's body as shown below.

When using this modified jack-pin, reverse it from the usual position, insert the lug into the end-connector's wedge-recess and pull away—it won't slip or break and the connector comes off neat 'n' easy. Requisitioning new fixtures because of a broken or sagged puller-pin is a thing of the past in our outfit.

**SPC A. H. Lewis**  
AFM, Maryland

(Ed Note—Sounds OK, but get a good weld on that lug. Your fix can also be used on the M24 track-jack (Picture 41-F-2997-98) by making the lug a little smaller.)



EXPLANATION OF  
WEDGE-SHAPED LUG

The best behind the best  
Keeps a track with us too

# ICY DRIVING



**W**HAT makes ice-driving dangerous? More often than not it's the driver—doing the wrong things at the wrong times and for the wrong reasons. People who have never thought it out are fond of saying, "Let's all go 15 mph and we'll be safe!"

This is not so. Ten little speedometers, in the wrong places, can be as deadly as one mouse.

Slippery roads mean less grip of your tires on the road—much less traction is depend on. You need to learn to get along with as little traction as you can. And it takes traction to hold a heavy truck on a down-hill just as sure as it takes traction to get it up the next up-hill.

Don't let the idea scare you, ice-driving can be as easy as rolling off a log. But if you try to be a smart guy, you can roll off a mountain.

**Notes** This is one of a series of articles for the man with the wheel in his hand. All the pro's and con's that have been argued about since the birth of the four-wheel carriage will come out in the open. These articles are especially for the guy who wants to see his head as well as the rest of his parts.



To let's slow way down at the top of the hill and get to fourth gear—no lower in the way slip on you—then you can down the hill using your brakes lightly and letting your good job up slowly.

A last warning leads never to long right on up the next hill, and doesn't need a much traction. In case you never hitting the base of a canyon all at 15 mph that you are crawling up to it at 15 mph that about you to slip back down. Then a truck starts to spin on a hill about the only thing that can hold it is a truck with the wheels being a one on the road.

Under slippery conditions like the one will happen—there on to take control on you down with you gear up approach the mountain of a road. However, if you need to slow and not needed to be specific to that get a little on the slow side. Then you don't spin when you start another thing—no big corner—no matter how you can give to many on as by with gear. That's it right from all the winter conditions.





When you get around the last corner and see the road straight before you, drop the rear top gear.

If there is another hill going up right ahead of you, start on your gas. The more speed you have at the foot of the hill, the less trouble you will have getting over the top. Being up—if it is not too steep a hill—will usually insure to get you over the top. But your speed will fall as you go up so that you will need several gears when you reach the top.

In a level road with a hill coming up, get as speeded enough to help yourselves it that's how the whole job up to your time. Spend that steady motion you did on the level. Trouble starts when you try to turn a sharp curve that coming back without enough traction to take care of the forces involved. The object wants to keep going the way it's going and it takes time to drag it or change its direction. With your track, this force comes only from the grip your feet have on the ground, and they haven't much grip on ice. You've got to commence stopping a long time before you want to be stopped.

Would you happen to be in charge of a company over icy hills, do you your men take sufficient interest so that one track is white over the hill ahead before the next one starts down. When leading tracks start such hills, remember that a trail is not from a year ago means a necessary and well you do it yourself under, but if there's a sign up for them not lead you at the bottom of the pile. Least remember how the lead track every minute, or not and carbon chloride, or not the water hills.

Now let's look at a more particularly a simple looking one. We will have a tendency to slow way down when turning on ice, but unfortunately that gives us a tendency to slide right down into the center. The trick is to keep enough speed to provide centrifugal force to balance the pull of gravity. Thus the bank of the turn does its intended job and you go right around with no trouble.



*Connie Rodd's*  
"SHOCK 'N' SAVED DRIFT"

*Wellman,*  
*spare that truck!*

To my everlasting amazement, the crowd of boys found out way back at the rear of the lot just fast that the public just heard in our jumps flying through the air, and made crawling, swiftly along like ferreted balloons. So they showed 'em and showed 'em and showed 'em.

Well, as pleasure, they're fine. But you guys who are playing hot and sticky that they show what a military machine gun do when it has to, and what it should do in everyday use. Tank men are not flyboys—and for their own good reason.

Say you weigh your machine tank, and divide the weight by the number of road wheels. It comes out about four tons per wheel. But this figure applies only to a tank standing still on the level. When climbing out of a ditch or over a sharp ridge, you can have **all 42 tons**

of tank on one or two pairs of rollers. This is called "Weight Transformer" and is a happy man in the helms. I tell you so.

Likewise, crawling at a good careless clip, you could hit a hole with a runway-on blow. The tank can take it, but how about your truck?

To avoid a sudden change to walking, less armor, bear this in mind: Always be so gentle with your horse as you possibly can, whenever and wherever you can. Then when you **have** to bug out, you can go full blast with your legs that Betty'll hold together till you get out. If you hear the old girl to dash right along, for the fun of it, she may lie down like a flustered mule when you need her most, leaving you with your tail in a creek. It's like the stolen living machine says, "Now when I come from, they're not showing for camera angles." **BOG-O . . .**

Face up at the rear of a hill!

*Avoid the rocks, and share the trail  
with*

*Go the easy way around when you can  
Only hurry when you ~~gotta~~ go  
Climb out of ditches slowly  
Stay off the sides of hills unless you  
must see 'em*

### *Witch words*

They're thinking of putting up a sign that says "Caution" right next to the drag-brake adjusting wires on your Mini and Mini which drag-brake. What the sign will caution you about is that this here wire is an **adjusting** wire and not a tightening screw. It's like an

When testing the witch, you pull the cable off the drum with your clutch disengaged, and if your drum keeps on turning after you've stopped pulling, you need an adjustment. So you turn the adjusting screw clockwise until it has enough drag to stop the drum when the pull is stopped.

### *Timing hint*

All 2-1/2-ton Mini-series vehicles, manufacturer's serial number 90471 or above, have the double-spring arrangement overdriving clutch. In testing or moving these vehicles the transmission must be in reverse to insure free movement of the vehicle backward, even though the transfer case is in neutral. Of course, a neutral or any forward-speed transmission position is satisfactory for forward movement or setting.

There is no free backward movement possible with the single-spring unit (prior to manufacturer's serial number 90471) unless a propeller shaft is

removed. (Always jack up one wheel clear of ground on each side to relieve residual strain before disconnecting propeller shaft.) These single-spring unit Mini's are in the process of being modified into double-spring units, so check your clutch before heading out a prop shaft.

The important thing to remember is that even with the double-spring clutch, you can't run the Mini's backward unless the transmission's in reverse.

### *Leave the seat on the voltage regulator*

Some few never learn, and worse, they can't be taught. This could not include you, of course—but we keep running across people who insist that their generator regulators are made just because the ammeter falls back to two or three amps (after they drive a few miles). This is absurd and not serious. What gives Canada shock is when these boys wear out their regulators and up to fix 'em.

Believe me, when your ammeter shows a high charging rate for a few miles after starting and then falls back to two or three amps, it's money in the bank. It means that you have paid back the battery charge you borrowed to start the engine and are once again the proud possessor of a full battery. If the ammeter shows **continued** high-charge for all day, or if it shows no charge at all, then, and only then, take it to the best electrician. If you are not personally a junior Edison, believe your girl Canada: Voltage regulators cannot

be adjusted right unless you have the right meters—and the adjustment. Put her down the end on the voltage regulator.

### *Wankel's meter*

Calling all agencies operating Wankel Motor Model No. 140GKB: You need to add a word or two to the Southern Coach Company's Maintenance Manual, under Lubrication Group 14, Page 1, Item 17; and Operator's Manual, Page 16, Item 17, when it says that the Wankel Motor Model No. 140GKB crankcase capacity is 15 quarts.

Since the oil capacity of the engine crankcase is 15 quarts, all right enough—but after oil filters and lines get installed by Southern Coach, the capacity is 20 quarts. Therefore, when draining the oil from the crankcase only, the required amount for refill is 15 quarts. If the filters and lines are also drained, the required amount for refill is 20 quarts. The visual gauge on the crankcase and the dipstick are currently calibrated for 20 quarts.

### *Open loading valves*

When the sign reads "Wet Floor" we get that sign to work our finger over and see if it's over. That same sign warns drivers into pulling out loading-valve control handles when it isn't necessary. This can end up heating.

When the handle is pushed back, the control cables often bind without opening the valves all the way. With the valve only partly open, pressure builds up in the crankcase. When you've got your

hands full without leaks above the place.

As a help, by reducing the amount of wire coming out of the wire housing. Also, clamp the wire housing closer to the valve and apply a light lubricant to the wires. A little graphite on the valves wouldn't be bad either.

But to make sure, whenever these valves are closed and reopened, raise the engine hood and check to see if they're open all the way.

### *Piston breakage*

It seems that a number of 375-cc Royal W60's are suffering broken piston skirts. The break occurs at the bottom, in oil-wiping ring groove. Since this is below the scotchless box, the break is often not detected for some time. When changing oil on these trucks, you'd be smart to look closely for fragments of ring or piston in the oil. Run a finger up into the drain hole and feel around for scrap metal. If you find any, pull the pan out and check the pistons with a light, with particular attention to #1 and #4. If there is a hole called piston, be sure that a LRB is sent forward by the pilot screw effect, giving the engine number, the vehicle number, and preferably accompanied by the "O" ring or seal ring from the damaged cylinder.

### *Cleaning batteries*

The question of washing batteries with a solution of bicarbonate of soda is still in the wind. So now, here comes the caution again—when it's used carefully, some of the stuff may creep into the battery and neutralize the electrolyte. Measurements of acids will mea-

trailer axle. It may do a quick cleaning job but it's dangerous.

Some fellows use it just to wash the caps—while the caps are off the battery. They clean the vents and follow this with a thorough water rinse before replacing the caps. The recommended way is a thorough cleaning **with water only**.

It's important to keep those vents in the caps clean. If the water-soaked wick, the battery will get heavily acid and force the valves open. This pressure forces the acid out thru the caps then onto the battery case and the battery casing, causing deterioration.

But clean vents, or otherwise, you'll always want to keep the electrolyte at the right level—and definitely not overfilled.

## *Seal the car*

The Air Corps indicated most of these 17 paragraphs had Southern Counties but whether they're at an Air Base or no, it'd be a good idea to check the air-brake hose at the front and rear wheels.



Fig. 1—In its old position, the air-brake hose gets rubbed raw on the shocks, or even is roughly—added—elbows and moves the hose.

It means that at the rear wheel especially, the hose rubs against the shock absorbers (Fig. 1).

If the hose gets chafed open, it's naturally not a healthy situation. To keep the hose at a safe distance from the shock absorber takes only a couple of 90° street elbows, 1/4" pipe thread (Bendix Part No. 215671 or equal). Install the elbows as mentioned (Fig. 1) and point them straight up. If the old hose (Bendix Part No. 204888 Air-Hose Assembly, 7' 11" length) isn't real worn, just connect it to the elbows. Then release the shock control spring—more is further up in the subframe so you'll have about 1-1/2" of clearance between the shock absorber and the air hose.

If the hose is already shot, get a shorter replacement (Bendix Part No. 215629 Air-Hose Assembly, 7' 10-1/2" length). With this shorter hose, you won't need the shock control spring at all (Fig. 2). And instead of pointing the top elbow straight up, lower it to a horizontal position, pointing left.



Fig. 2—If the hose is already shot, get a shorter replacement. You will need to add the elbows, but you can eliminate the spring.

Get Up To Date On Your

# M135

## AIR-ROSE COMPLAINTS

From ME Wilson Greenwell, Camp Stewart, Georgia, comes a good hint on air-hose couplings. They had trouble installing air-brake hoses on the M135's because the couplings are too close to the cage body. By turning the couplings 15-deg. toward the outside of the vehicle they could hook up the trailer lines without any trouble.

## ROCKER-ARM NUTS

The adjusting-screw (arrow) on #8 exhaust valve of your M135 may be hard to get at but tighten it, **you must**. If it's left loose the clearance adjusting-screw will

back off—you'll have too much clearance—and the push rod may slip out of place. Then the rod can get bent, jammed, or jump out of the cam followers.

New push rods may be harder to get at than that clearance nut. So, too, tighten the nut and spare the rod.

## SHIMMY AND WANDER

If your M135's acting like a loquax from a grass skirt, look for loose steering-union attaching-nuts **under** the front-side fender-houseshield (left and right).

People have been torquing the three cap screws that hold the fender-houseshield in place while doing as much good as nothing. You've got to remove the shield, and torque the transition attaching-nuts (see figure) to 40-125 foot pounds.

If they're too tight, you'll have hard steering; if too loose, you'll have shimmy or wander.



## the case of THE REVERSED POLARITY



Some strange and mysterious cases of reversed polarity have been reported.

And the explanation in this case seems to be the practice of assembling a home-made jumper cable to start vehicles having a dead battery, by connecting them electrically to another vehicle through the slave receptacle.

Which is quite all right, understandable if you're careful.

The trouble begins when you're not careful.

You can get your leads hooked up wrong and will start the engine, which reverses the polarity of the system. As soon as the engine starts, and turns the generator, the reverse current cuts out, and the reversed polarity of the external bat-

tory reverses the polarity of the generator. This, if not detected, will freeze the regulator relay and eventually burn out the generator and the regulator.

You can spot the condition right away, however, and correct it easily. Look at the ammeter in the started vehicle, gauging the engine a little. If the needle swings over into the discharge side, you have a reversed generator.

The cure is simple. Shut off the engine, go outside and reverse your jumper connections. Check your hook-up by turning on your headlights (on the dead vehicle) and read the ammeter. If it shows discharge, your hook-up is correct. Shut your dead vehicle and the same process that got you into trouble will now get you out. Before driving, again read your ammeter, headlights off and engine running. There's the showy charge.



# JOE DOPE

## HOW TO TUNE UP AN ENGINE

Ever hear of  
POSENER'S  
LAST STAND  
at Purple Hill  
back in '32?

Well, he seems the last Posener of  
the U. S. Army. He had a career of  
thirty years... and he did not re-  
sist!

But... yes... but the long way was good...  
and with your maintenance, the long thing  
was shorter a time up... (Aaa... PAPER roll...)

His longest and twenty years later in the day we bring  
you Pat, Posener III... in Rome... vicinity Corviale Hill

HEY  
POSENER  
HERE  
YECOM?

POSENER A COMPANY OF  
ARMY AND NAVY'S  
POSENER AND ME!  
HEY... YECOM? YECOM?  
DON'T RESPOND?





CLIMB AROUND  
HIM AND HE'LL  
TAKE OFF. I TOLD  
YOU LAST WEEK  
TO ASK FOR  
A TUNE-UP!

AAA, NOT ON  
LOOK OF  
TUNE  
UP DO?



IT CAN LOSE  
YOU YOUR  
VEHICLE?

AND I'M ALWAYS  
CAMERADAGED  
WHEN MY UNIT  
ARCHAIC WANTS  
ME TO HELP HIM



... MY BOY...  
LET ME SHOW YOU  
HOW... AS A MATTER  
OF FACT KNOWS THE  
RIGHT TIME 'CAUSE  
I JUST DEVELOP'D  
THE PERIODIC  
MAINTENANCE ON  
MY VEHICLE?

**1** CHECK ...  
FUEL  
OIL  
WATER  
**CHECK  
BATTERY**



SCAN BY  
DIRECTION  
WITH LAMPING  
AND WATER ME



ONE OIL  
WITH CERTAIN  
CHECK BATTERY  
FOCUS

**2** DRAIN  
WATER  
AND OIL  
FROM  
**GAS TANK**



REMOVE OIL  
THE OIL  
FUEL, SCAN  
THE WHEEL  
AND GET  
THE OIL AND FUEL



REPLACE  
CAP QUICKLY  
FROM AN OIL  
IS OFF, AND  
OIL

**3** BLOW  
OUT  
FUEL  
LINES  
CLEAN  
FUEL PUMP



**4** REMOVE  
AND  
CLEAN  
SPARK  
PLUGS



TO THE CONNECTION AT EACH END ... REMOVE CONNECTION TO PL—AIRFLOW DIRECTION FROM HIGH TO LOW CHANGE IN PL.

REPLACE SPARK PLUG CAPS, IF APPLICABLE... TIGHTEN PLUGS 12-16 FOOT POUNDS.

**5** CLEAN  
DISTRIBUTOR  
INSIDE AND  
OUT



**6** CHECK AND ADJUST VALVE CLEARANCES

VALVE CLEARANCES

\* RUN ENGINE AT 2000 RPM



**7** CHECK AND ADJUST IGNITION TIME

IGNITION TIME

\* RUN ENGINE AT 2000 RPM



**8** CHECK PERFORMANCE OF FUEL PUMP WITH A GAUGE

PERFORMANCE OF FUEL PUMP WITH A GAUGE

\* RUN ENGINE AT 2000 RPM



# 9

## AIR CLEANERS



# 10

## MANFOLD VACUUM

DOES AIR CORRECTLY  
REACH PLATE  
CHAMBER, CARBURETOR,  
AND MANIFOLD LEAKS.



### ENGINE'S ON THE BALL

IF THE GAUGE & LIGHT  
READING SHOW IT AND IS  
WORKING VACUUM COULD  
INDICATE AN OILING  
PIPE PROBLEM WHICH  
WOULD CAUSE  
OILS MIXTURE



### CHOKED VALVE

IF NEEDS VACUUM  
DROPS TO ZERO WITH  
THROTTLE WOUND UP.



### LEAK

IF CARBURETOR BLEWBY  
TWO CHANGES IN THE NEEDLE  
DROPS OVER 5 AND 15



### STICKING VALVE

IF NEEDS DROPS AT INTERVAL  
FROM 15 INTO BOTH ZONES



### POOR RINGS

NEEDS STAYS BUT  
LOWER THAN NORMAL



### LEAKY MANIFOLD

NEEDS STAYS BUT  
FLUCTUATES BELOW 15

It's a  
Tough  
Life for  
You

THAT'S ALL THERE IS  
TO IT EXCEPT FOR RE-  
PLACING WEAR-  
TEAR AND  
CLEAN-UP.

THEY-OR-ETERNITY I  
AGREE, BUT NOW-ONLY  
HOW DOES IT DO FOR  
YOU?? ANSWER ME  
THAT!

WHY MAN... IT KEEPS  
THE ENGINE READY  
TO PERFORM...

IN SUDDEN EMERGENCIES  
THE VEHICLE WILL  
RESPOND QUICKLY...

...SO WELL AS SAVE  
YOU TROUBLE... THIS IS  
TRUE ON A DASHLOW  
AS WELL AS...

...UNDER TACTICAL  
CONDITIONS?

**JOE'S**

# Dope Sheet

Let's see  
"Gotta see  
E  
L



*Bill Egan*

**WE HAVE THE WORLD'S BEST EQ**

PHOTOS: BARRY BRON; ILLUSTRATION BY BILL EGAN; DESIGN: BOB BEE; HAIR: BARRY BRON; MAKEUP: BOB BEE

"I pinch our pants!" Says Joe,  
regard the taxpayers' dough—  
it won't penny of gain  
to look down the drain  
but the big things—  
the trucks—are let go.

LOOK  
FOR  
THE  
SIGNAL  
LIGHT



**EQUIPMENT .. Take care of it**



**THE GUNS  
ARE BETTER  
THAN THEY  
WERE  
BUT THE  
ELEMENTS  
THAT TEAR  
AT MACHINES  
AND MEN  
ARE STILL  
THE SAME**

## HOW TO MEASURE

**I**n spite of all the fine new all-terrainers are said to give all-terrain, a lot of things happen in normal use that you never notice until you start to miss more than you're getting.

The matter here you, caddy and steam and oil and rope, you still get

to haul your wagon to where it's needed, over ground that'd shake the teeth off a horse's jaw. When it gets there it sits around in the open to be struck by chill of night, and spoiled to bursting by sun and gasped for. For all its natural life your gear is shored by sand and silt, and all its movements are hindered and shocked by roud after round of pounding impact.

Let's see what can happen.

In the first place there's this-





# HIGH ANGLE CANT<sup>®</sup>

## ON YOUR HOWITZER

rolling. This is the name for what happens when metal pounds against metal and makes dents or troughs. Then there's shrink and stretch of differing alloys, or even the shift of molecular structure, from extremes of heat and cold and from the twist and shrink of torsion vibrations. All this heating and hammering does little to improve the tensile-strength properties of those multi-millimeter boundaries lying between the two slabs of steel you call trunnions.

By and large, the average gun or howitzer takes most of this beating without much visible damage. But it's what you can't see that hurts your score and lets your target assemble away to safety when you think he's nearly scored in a reallock.

This is the cant that doesn't always show up in your sights. It gives you a rough time at the high-angle ranges because it only affects your fire when the tube's away up in the air when the clouds won't

hide other machinery, your artillery wants an occasional lookdown over to be sure its geometry is still like the original meant it to be.

It's still to be forewarned. Your best computations land your shells hundreds of yards off the target—and you won't even know why.

If you think this can't happen to you, ask the nearest observer how often you landed your opening rounds anywhere close to where they were ordered. Especially when you're up around five to eight hundred miles—with a gun tube a degree to one side of where you think it should be.

The causes are many and the corrections are exacting. But with accuracy being the aim that often lets the winner take his shares home full of arms, you'll want to run through the checks on the following pages. They'll soon tell you whether or not your guns are shooting where they're looking. ■



THE ONLY WAY TO WIN AT ALL IS TO WIN AT ALL  
THE ONLY WAY TO WIN AT ALL IS TO WIN AT ALL

# HOW TO <sup>44</sup>QUICK-CHECK-ON-CARRIAGE

1 String a plumb line from a taller or tree to a sturdy level area.

2 Place pole exactly with bubble on it about 10 ft. from plumb line.

3 Right on an aiming point with automatic scope at 100- or 200- yds.

4 Release weight as needed. Then do with at 100- and steps to 200 yds.

5 Release bubble and right on aiming point again . . . because it read for.

6 When an aiming point at each 100 yds, use it to establish hole or plumb.

# FIRE CONTROL EQUIPMENT



- 3 Acquire an aim elevation. Put vertical hair cross on glide line.



- 4 Level the cross level and longitudinal bubble on the right cover.



- 7 At each 100-rod step, level cross bubble to right on aiming point.



- 8 If right is off aiming point, bring it on by turning gun only.



- 11 If they register at all steps, within 1000 yards, equipment is okay.



If the right is on the aiming point

Set the indicator on the line

- 12 GO SET DISTANCE



**WHEN YOU GET TO THE POINT,  
REMEMBER THE OLD PROVERB  
ABOUT TIME, TOOLS AND  
TRAINING.**

**1. First, level the transition.** Using your plumb line for fair line accuracy, you can level the transition by removing earth from beneath the wheel or grade on the high side, or by placing a jack under the sole of the gas to raise the low side until the transit's vertical line of sight is dead on the plumb line, both at 0° elevation and also at the top of the plumb line (see line from 700 table).

**2. Inspect the gazer's quadrant** for general malfunctions (TM 5475 gives a good rundown on them in 4c).

**3. Set the accurate quadrant at "0".**

**4. Place the quadrant on the robot leveling plate and elevate or depress the tube until the bubble is centered.**

**5. Turn the quadrant 90° and replace on the leveling pad (usually called end-to-end test).**

**6. Cross-level test.** Center the cross-level bubble and run the elevating knob throughout the limits of motion. The cross-level bubble should remain centered; if it doesn't remain centered, the level vial is not correctly aligned and must be adjusted. (And you may as well have a reputation handy because you can expect the bubble to be out of balance.)

**7. First vertical-alignment test.** Center the already checked cross-level bubble. Elevate and depress the tube, checking to see that the horizontal mark, the plumb line, and at the same time, watch the cross-level bubble. The

bubble should remain centered. If the bubble moves off-center, the prism isn't aligned in vertical with the tube and must be corrected.

**8. First vertical-alignment test.**

Level the tube. Fix range quadrant. Center the angle-of-sight level-bubble. Operate the cross-leveling knob throughout the limits of motion; the angle-of-sight level-bubble or the longitudinal level-bubble should remain centered. If the bubble moves off-center, either the prism isn't aligned (parallel with tube's side-or level) or isn't correctly installed.

**9. Elevation scale test.** Range quadrant. Level the tube (for the elevation scale at zero). Then the elevation scale and the micrometer should read zero; if not, adjust the scales or indicators as zero. Make the angle-of-sight test described in Fig. 11. Compare readings indicated by the gazer's quadrant with those on the range quadrant at low, medium, and high elevations. If the two instruments disagree, adjustments or repairs are called for.

**10. Elevation quadrant.** Place the tube at zero or at the accuracy (500 mils) elevation above the minimum elevation. Center the longitudinal level-bubble on the elevation quadrant by turning the elevation knob. The elevation scale should indicate the same reading as that shown by the gazer's quadrant and the accuracy of the elevation quadrant should read zero. If the two instruments don't agree, set the elevation scale to agree by resetting the elevation instruments to zero. Compare readings indicated by the gazer's quadrant with those on the elevation quadrant at low,

medium, and high elevations of the tube. If the two instruments differ at any elevation, adjustments or repair is in order.

**10. Angle-of-sight test.** Level the tube, cross-level the range quadrant, and set the elevation scale at zero. Center the angle-of-sight level-bubble by turning the angle-of-sight micrometer knob. The angle-of-sight scale should read 0 (000) and the angle-of-sight micrometer should read zero — if they don't, adjust the scale.

**11. Quadrant-mount leveling-align, alignment test.** Level the tube with the gunner's quadrant placed on the leveling plate on the breech ring. Place the zero quadrant on the quadrant mount. The gunner's quadrant level-bubble should center itself. If it doesn't, the quadrant mount leveling-screws are not in correct alignment; make the adjustment or repair.

**12. Quadrant-mount-plate cross-level-alignment test and cross-level test.** Center the cross-level bubble. Elevate and depress the tube, checking to see that the horizontal track the plumb line, and at the same time watch the cross-level bubble. The bubble should remain centered. If the bubble moves off center, the quadrant mount piece is not aligned in azimuth with the tube, or the cross-level vial is not correctly aligned; make adjustment.

**13.** While telescopes are not given level, small imperfections are okay if the equipment checks out to within 1:100 mils. (Page 56, Para 11.)

**14. Telescope mount-to-levelling-plate alignment tests.** Azimuth alignment: center the previously used cross-

level bubble. Elevate and depress the tube, checking to see that the horizontal track the plumb line, and at the same time watch the cross-level bubble. The bubble should remain centered. If the bubble moves off center, the mounting-plate piece is not aligned in azimuth with the tube and must be corrected.

Vertical alignment: level the tube. If the mount contains quadrant alignment marks, set them and longitudinal level with the gunner's quadrant. Depending upon the particular telescope mount being used, center the longitudinal level-bubble by turning the longitudinal leveling knob or the elevating knob, or center the angle-of-sight level-bubble by turning the angle-of-sight micrometer knob. Operate the cross-leveling knob throughout its limits; the longitudinal level-bubble or the angle-of-sight level-bubble should remain centered. If the bubble moves off center, either the mounting-plate piece is not aligned vertically with the tube or the level vial is not correctly aligned and must be corrected.

**15. Paracentric telescope prism-alignment test.** Make sure there's no looseness between the paracentric telescope and the mount socket. If there is, tighten the range screws. Traverse and elevate the gun to get the scope circle centered on an aiming point. Release the catch and turn the telescope head through a complete circle. Look through

**NOTE:** Don't elevate to full angle; try about 45°. Be at will the fire-control instrument. Keep the gunner's quadrant on the leveling leveling knob is accurate, it will give false readings because it cannot be affected by the elevation and traverse unit.

the telescope to see that the intersection of the crosshairs is exactly on the same sighting point. Turn the telescope head through a complete circle in the opposite direction, and check that the corner of the cross-hair returns exactly to the same sighting point. If the intersection of the crosshairs has moved off the sighting point either vertically or horizontally after rotating the head in either direction, the prism glassess within the telescope hat become displaced and must be corrected.

**12. Telescope mount rock-bottom-most hole.** Test for alignment in a vertical plane parallel to the tube's vertical axis. Center the cross-level bubble. With the telescope azimuth scale set at zero, traverse the gun and sight on the plumb line and is coincident with the vertical hair of the telescope reticle. Sight through the telescope and ensure the elevation measurement looks through the center of travel.

**Be not force mechanism beyond extent of travel.** The vertical hair should remain in coincidence with the plumb line. If the vertical hair and the plumb line do not remain in register then, the scope rocker is not properly aligned on the mount and must be corrected.

**13. Test for alignment in a vertical plane, perpendicular to the tube.** (Carriage on which the tube can be placed at zero elevation.) Depending upon the particular telescope being tested, center the longitudinal level bubble by turning the longitudinal leveling knob or the elevating knob, or center the right-of-line level bubble by turning the right-of-line measurement

knob. Set the primary telescope azimuth scale to zero (pointing 90° away from the tube). Hang a plumb line and align it with the vertical hair in the telescope reticle. Sight through the telescope and ensure the telescope elevation measurement looks through the center of travel. The vertical hair should remain in coincidence with the plumb line. If the vertical hair and the plumb line do not remain in coincidence, the telescope rocker and the mount are not correctly aligned and must be adjusted or repaired.

(Incidentally, all major adjustments to the Fire Control equipment should be made by Ordnance.)

When these checks and adjustments are run through, the bore-sight vertical line should touch the plumb line and the sight should stay on your sighting point. If the sight doesn't stay on, or returns to the sighting point, there's residual cant in your auxiliary plane.

When an auxiliary piece of this type is found and immediate attention cannot be given to locating the cause, temporary adjustments can be applied to the gun by predetermining the cant at various elevations and making corrections for it before firing.

The product method given in all test books, to test scope mounts with a trial glass piece and the mount holder is no longer recommended. Since test 6, 7, and 8 will give a more accurate reading.



## HOW TO MAKE A CANT CHART



1 With your assistant at the reverse end, use diameter tape to measure tree diameter.



2 Allow the readings by the plank line method. (See page 204, Fig. 1.)



3 Lay in an existing scale of 100-yard dead about 1/2" interval.



4 Break logs to 100 mils. Select both percentage right count tables.

5 Sight through the diameter and determine amount of mils the cross hairs are off the reading scale. This is done by turning the diameter micrometer and noting the amount of mils it has deviated from its original starting point. (At this point, you measure the gap to bring right hairs on-reading scale. Move rule on plank line as all times.) This mil deviation is your cant correction for 100 mil diameter.

6 Now proceed by 100 mil steps to maximum diameter. Use this step (5) of each diameter and find the cant deviation. Record these mil corrections on your log chart so they can be applied to proper diameter to correct for your actual cant.

7 The chart on your chart should look something like this:

Diameter	Correction
100	0 0 0
200	0 1 0
300	0 2 0
400	0 12 0
500	0 17 0
600	0 16 0
700	0 0 0
800	0 0 0

Fig.





#### CLUTCH PRESSURE-PLATE

Dear Half-Mast,

I have a question about the clutch pressure-plate of the M1C M-342-11. It's had several rebuilt assemblies come back to me with bearings they wouldn't operate properly. Each had had the same number of shims cut when the back plate was put on a smooth surface and a gage used. The distance from the surface to the plate bearing varied. If we removed shims on the left side and reamed it out, it still didn't work. We ended up reaming them back to the depot and drawing new ones.

Sgt F. A. F.

Dear Sgt F. A. F.,

It may just be possible that the pressure plates you received at first were not properly rebuilt, and the reamings was probably the best bet under the

circumstances. I don't recommend much field work on this type clutch (unless a hydraulic press is available) since the pressure spring exerts a 500-lb pressure. When new, they use 4 shims on each flywheel-riding stud—and if there are less than two shims remaining on each stud, the clutch drive-disk facing is undoubtedly worn enough for replacement. With the pressure plate on a surface plate (with friction surface downward) try to insert a .015" feeler gage between the surface plate and pressure plate—working from the base of the plate and not the outer edge. Repeat your check at six or eight different points around the base, and if the plate is distorted enough to let the gage in, turn in the plate. Clearance of the pressure-plate-driving lugs in the flywheel-riding slots should be .008" to .009". Clearance of clutch flywheel-riding in the clutch sleeve should be



1-147 (plus 1/16", minus 0"). Distance of the shock-piston-to-lever linking ball is 3/16".

*Half-Mast*

#### REBOUND CLIPS

Dear Half-Mast,

Some of our jumps have spring-clip clamps which are not bolted, but clamped on. The question is, how can we keep the clamp tight? Would some sort of wedge between the clamp and spring decrease the spring's operating efficiency?

Sigs H. T. H.

Dear Sig H. T. H.,

I have a working suspicion that you know the answer as well as I do. Do us a bit your point about the wedge restricting the spring action we made, like it right on the toggle.

Rebound clips don't need to be tight in function all right. As long as the open side of the clip is parallel to the opposite side, don't worry about it.

*Half-Mast*

#### OE AND PE

Dear Half-Mast,

Is it OK to use OE, Preservative (PE) or in place of regular OE in my M10? If all it does block under normal use with a good filter?

Sigs G. E. N.

Dear Sig G. E. N.,

Stick to regular OE for vehicle operation. In a pinch it's OK to feed your engine PE (S), but this is for use

intended for heavy-duty service. Its primary job is to guard the inner works of the engine and other metal parts against rust—and it's re-matched for vehicles tagged for limited storage or shipment (see TM 9-2875, page 28, para. g).

Filters don't catch all the carbon buildup (gum, etc.) washed off by the detergent additives in the oil. Some of the stuff remains in suspension in the oil and changes its color. Under normal operation—oil filter things being equal—this change in color doesn't curdle the oil's lubing power.

*Half-Mast*

#### CAR POLISH

Dear Half-Mast,

I have a staff car for AEC Provisional Group, and I have a hard time keeping the car polished.



I have tried several brands of polish and I can't find one that can be put on and polished fast. Auto wax is excellent, but it takes too much time to use a can. The places I drive and weather conditions here make it a must to use a polish often. Can you suggest a good polish?

PAUL M. T.

Dear FFC Y. H. T.:

You and I and a million other guys are looking for the same thing—a "miracle" car polish. And we all shy away from auto wax for the same reason—it's excellent stuff, but it demands plenty elbow grease. Well, with numerous new waxes who know their "hairs" hair, it's the preferred auto polish.

Some new products on the market are made from polishes, but as with wax, they can only be applied to a perfectly clean surface—so you've still gotta wash before you put on the dash—and that when a new polish job is needed the old stuff has to be thoroughly and carefully removed with soap or other special cleaners. The same treatment goes when painting (or even just spraying) is called for.

Unless you're in the worst kind of climate, a good wax job should keep longer shining for three months or the very least. Washing a car with detergent in between washings often shortens the life of any wax. Just plain water, a lot of it, and a sponge is cleaner and kinder to a car than hot's quite ready for a new wax job.

A lot of mistakes like our all round by Wax, Auto paint, 52-W-113 listed in Oct. J., 581 K-1, Nov. 1949.

*Half Mast*

#### **BEST-CURE FOR CHROME**

Dear Half-Mast:

What can you suggest for use in offering preservation of chromium on Delmar's vehicles stored at installations on coastlines? I will still discuss there

and a number of commercial-type vehicles stored there at Camp Cooke and the salt air is causing the chromium parts to rust quite badly.

What can be used to prevent further rusting?

F. L. G., OCT



Dear Mr. F. L. G.:

Give a simple good suggestion, but your choice depends on what you mean by "waxed." Is it gonna be a long term stuff, say maybe a couple months, a pint to so—in case these vehicles being put aside temporarily?

Before you do anything about preservation, how's about how getting rid of the old wax—you can rub down the chrome with some steel wool or wash off the wax with mineral spirits, paint thinner or methyl alcohol—but end up with as clean a surface as possible. And then, if it's long-term storage you're after, paint the chrome with a thick coating of Compound, Rust Preventive, 420-673. Heavy, to be sure, but it'll keep 'em the salt air. (Come time to take the vehicles out of storage, wash off the 420-673 with Standard Solvent, 51-B-6210 and they'll be as good as new.)

And for good general preservation from rust, fill a spray gun with 52-C-5000 Compound, Inhibitor, Lubricant 15-102. This is an almost clear liquid

which costs the driver and keeps it  
clean for six months.

Both are indispensable preparations  
used on vehicles to prevent corrosion  
during salt-water feeding, so speak.

*Half Mast*

#### MEGOW ENGINE OIL

Dear Half-Mast,

Can you make 20 weight oil by put-  
ting equal amounts of 30 weight and  
10 weight together? We have a staff  
car in our motor pool (Buick '74) and  
the manufacturer recommends the use  
of 20 weight oil.

Lgt G. E. N.

Dear Lgt G. E. N.,

Sorry, but the answer is no. The sim-  
ple arithmetic of "add and divide"  
won't work in this case—mixing 30  
weight and 10 weight oil will not give  
you 20 weight for your '74 Buick with.

Each oil weight is produced with  
very definite characteristics of its own  
—specifically its molecular size. Oil re-  
marks denote that merely mixing equal  
amounts of two weights, as you sug-  
gest, won't combine 'em. It's much the  
same as mixing raw peas and potatoes  
—they'll mix but they won't blend. If  
you'd like to see how the different oil  
weights separate, put the mixture in a  
jar, shake well, and let it sit several  
weeks.

The Langmuir theory of lubrication  
is illustrated in TM 5-2011 (May 1949).  
If you aren't familiar with it you may  
find it interesting.

Since 30 weight oil isn't needed,

would it just pass quartermaster office  
for supply or through local purchase.  
Also look into SR 715-112-90 (25 Jan  
64). It's the SR that covers local pur-  
chase authorizations.

*Half Mast*

#### MANIFOLD-GASKET FLOT-RINGS

Dear Half-Mast,

Concerning the metal ring gaskets for  
manifold gaskets on the GM engine  
used in the CCKW and ARVN trucks,  
please answer the following questions:

Do they belong in the oil can?

How important are they?

Do they contribute to gasket failure  
if in the oil can?

Mr. L. C. A.

Dear Mr. L. C. A.,

Those metal rings act as a shield on  
the exhaust side of your manifold.  
Without them, all of the heat blast is  
directly against the gasket. Without  
them, you're going to replace gaskets  
that have been burned right through  
the copper. Besides which, the rings  
also act as down-rod.

If you've got the rings in closed  
something, I would suggest you get rid  
of the oil can.

*Half Mast*



## 'WINDY' WINDSOCK'S AIR MAIL DEPARTMENT



Dear Windy,

It is a pleasure to note that you realize the importance of preventive maintenance for Army Aircraft. This new phase of *Outboard* has, during the past year, expanded far beyond our expectations, and is still growing. With its rapid growth, the inevitable influx of hastily-trained mechanics offers a challenge which PG Magazine can assist in combating. Preventive maintenance and proper handling of aircraft can never be overemphasized.

I would like to recount some of my own experiences while commanding a Light Aircraft Maintenance Company in Korea this past year. It appeared obvious that the many aircraft were in our shops for maintenance. Upon close observation, we discovered that preventive maintenance was rarely registered.

### — LACK OF SIMPLE PREVENTIVE MAINTENANCE

In spite of the fact that all Corps, Division, and Unit is equipped with aircraft are supplied with trained personnel and tools to perform major maintenance, some simple in-

tellectual maintenance discrepancies were discovered, such as:

**Strength improperly measured**, which in the high winds no engine in Korea—could tear a wing, strike the landing gear, or twist the fuselage.

**Brakes not checked** to insure that all brake clips are in place. A landing with this aircraft could possibly result in a total wreck and serious injury.

**Oil cap not replaced properly**, which inevitably results in the loss of oil while airborne, and a possible loss of the engine.

**Tires improperly inflated**, could cause a ground loop while taxiing.

**Air filter not clean**, causes an overheated engine.

**Safety wires on bolts missing**. These are required everywhere on the aircraft where bolts may vibrate loose.

Mind you, All these simple first- and second-echelon jobs were being neglected, and believe it or not, they were the cause of 30% of the major maintenance jobs of our company—to say nothing of the total wrecks and lost lives.

## LACK OF CAUTION

I have faith in the line chief's and mechanics, but sometimes, I enjoy one-of-a-kind when I make my own preflight check on the aircraft. On occasion, I have seen a "Line Pilot" jump in his ship, run it up, and then yell to the line chief, "Is everything OK?" The line chief, being busy at the time, may give his OK—and recall, after the ship is airborne, that something serious was wrong.

I wish I had the opportunity to take pictures of the results of carelessness with aircraft. Just picture a man pulling through a ship with no one in the cockpit and no checks

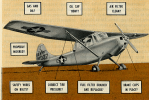
under the wheels. The engine misfires, and the man winds up flat on his back with a mild aircraft spinning around the area creating havoc.

Or a color picture of the man who backed into the propeller while checking a running engine. Quite messy.

I could go on forever. Why men get careless when they handle aircraft I will never understand. We can never stress enough the importance of safety precautions and preventive maintenance.

Capt. R. W. Lockfield  
Reno

## SIMPLE MAINTENANCE—often neglected



# Windy's Windstorms



## WINGS ALOFT

Big Windsock, as his name implies, spreads the word as to which way the winds are blowing. Here are some items that are in the wind, some are already covered by TO changes, others are being attended now.

## GROUND BREAK-IN

Unfortunately, some folks have been giving new and rebuilt engines up to four hours of ground time before test flying them. Their idea, of course is to provide a slow break-in. Which is a fine idea, except that the coverings and cooling baffles on an airplane are not set up to provide adequate cooling unless they are subjected to ram effect due to flight to help them. Now these engines have all been given a test block run before issue, and they are actually ready for flight when issued. However, if you want to be extra sure, instead of running 'em in on the ground, give 'em a few hours or so of "low cruise" time in the air. Just go buggy riding for a while.

## THE DIRT BIRD GETS IT

The "bird" in this case is the filter element in your carburetor air cleaner. It seems a depressing number of people are washing these filters out in solvent and replacing them dry. That don't work it. You shd' gotta be dipped in oil and let drain before the use do you any good. Admitted, it makes it harder to keep your airplane shining, but that dirt that looks so bad on the air cleaner will rain out with the engine if it gets inside.

## L-18A FUEL VALVE

If you can't fly with your side windows raised without leakage from your fuel static wicks, see TO 11-12M-44-77 and send a UR per SR 708-45-5 and TO 08-15D-34.

That's what it says in the book. Of the record, Windy has seen L-18As and LC-119Cs flying with the old tie-wire drain cocks, and some thing safety wire making damn sure they were shut-put in by some backward maker with no feeling for progress, no doubt.

### L-19 BRAKE LOCK

It is now lawful, and recommended, if your L-19 has the T-handle brake lock, that you take the two springs (PIN 04600250), the four shackles (PIN AN 318-2), the two pins (PIN AN 303-1D), and the two pins (PIN AN 308-2-1) out of the rubber-pedal installation. This removes the brake locking function of the control lock. It appears that the dual brake locking system was confusing people and resulting in lost rubber-pedal arms. This dual locking system has been eliminated on later ships.

### BELL CRANK CHECK

Checking the rubber bell-crank assembly for cracks, breaks, tightness and so on will be done at the intermediate inspection in the future. TO 81-128L.A-6 will say so. Meanwhile, go look at yours, and sorta keep an eye on it.

### L-19 NOSE COWLING

If Betty is flying around with a busted nose, cracked nose-riding that is, you can stop-drill the cracks and install a doubler. Pictures on this will be along later, common sense should do you for now.

## WATCH THAT GAS CHECK!

Dear Windy,

Some time ago Maj F. L. Johnson and I were on cross country. When ready to return, we checked the ship for services, and took off. We had no trouble until we switched gas tanks, whereupon the engine quit. Fortunately we had ample altitude, and were able to try everything we could think of to restart it. When we switched back to our first tank the engine started and ran with no trouble, jockeying at the nearest available field we found that we had water in the gaslines. The fuel-filter bowl was of course full, but in draining the tank we found it about two-thirds full of water. Thinking back, we decided

that while we had drained the gas-couls on jet TC, we had not been careful to use the filter was, in fact, gasoline flowing from them. We had let our natural desire to keep ourselves and our engines clean get us into a bad spot. (We later found out that the next plane to leave this field had crashed on take-off from the same cause.) So, in the light of this experience, we urge everyone to not only drain a little gasoline from the decouls, but to actually test it, look at it and smell it to be sure it is gasoline. Particularly when using colorless fuel.

Maj M. C. Light  
Washington, D. C.

## SUPPLY & DIRECTIVES

# NEW UER FORM 468



Here's a shot in the arm for aging tools, tools, or what have you got that you don't quite like and wish you had the guy who built it by the short arm. Here is your chance. We come before, to talk about into the lower office and not get outta you never dreamed of.

**T**HE Tech Service and your devoted store, and if you only know it, they want to fill your front-line prescriptions with equipment that's just like you'd have built it yourself if you'd only had half a chance.

Here's your chance.

This is the new UER form for reporting defects and deficiencies. It serves the Chief of Ordnance like a hospital chart serves the Medic on his rounds. You get a guy with a fractured whipling? Write him down in. Your windshield keep coming through with no glass in 'em? Keep on that thing your nails, when you can bite a pencil point instead and tell the UER all about it.

They keep sending you crates when the stock number calls for spinals? Push back the home office their few copies of Keweenaw's Grip Sheet and see how that you start getting spinals.

Deliver PB, brother, it works.

They're listening for your needs back at the Pentagon, but you're the guy that's got to hold it if you want help.

Report only one deficiency in a form. Start with the instructions at the top of the front page and work down, give full information, but skip the sections that don't fit your problem. (And if some of the terms sound weird, it's because the form's used for equipment supplied by all tech services.)

This is to identify the article of which the defective item is a part. If there's more than one article involved, list them, too. You can use the space on the back marked "Remarks". Naturally, you'll want to give the USA number, serial number, date of the issue, time in use and mileage for most vehicles—unless there's too many of them, then list the USA number and serial number only.

All is ready if the defective part was originally a part of the article—i.e. was actually on the article at the time of delivery.

Fill in only if the defective part was not part of the article originally, such as replacement parts for a non-repairable engine cylinder, etc.

This is the complete history of the incident. No need to be beautiful here.





If the 70's on the article have any illustrations or diagrams showing the part in question, refer to the page numbers. Or send pictures and drawings of your own.



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# CONTRIBUTIONS



## HOOKUP HELP

Dear Editor,

When the 1-1/2-ton trailer, 2-wheel, Model A is connected to the 3-1/2-ton Model B, GMC, the right-hand black-out-marker on the trailer will not light.

A separate wire is provided for each black-out marker-light on the Model A. Each wire is terminated at a separate pin in the plug for connection to the trailer receptacle on the truck. The truck's wire (color marked #14) for the trailer black-out-lighter should divide and connect to both "A" and "C" terminals. "A" should lead to the left and "C" to the right black-out-marker to both receive current (see EM 2417 on the 3-1/2-ton Model B).

But in checking with TM 5-8754 (the Model B Manual) Fig. 50 shows that "C" connection has been omitted from the diagram, and wire #14 is not divided. On a trailer connected to the Model B the right black-out-marker will

not light until a jumper is connected from "A" to "C".

You can make your own light connection as follows: Use a short length of #14 FWD gage rubber-covered stranded-copper-wire (similar to wire used on truck) and utilize it to terminal "C" of receptacle on truck. Splice the other end of this wire to wire #14 on the trailer. Splice this wire carefully, and with rubber-tape, and give it a protective cover with friction tape.

L. W. Hoadley, OCT\*  
Camp Stewart, Georgia  
\*Ordinance Corps Technician

## GMC SYMBOLS

Dear Editor,

For the benefit of Sgt K.L.H. Korte (PN Magazine, November) and any others who may be interested, the following may be of help in figuring out the meaning of the symbols on the GMC

models: CCKW, CPKW, etc.

Chassis serial suffix "1" always indicates split type axles, suffix "2" always indicates the rear axle. "A" is [34], "C" is [34] and also.

The second letter in the model indicates the type of cab. "C" is common cab, "F" is cab-over-engine, "K" indicates front axle driving, "W" indicates both rear axle driving.

**R. Mills, DeWanna Inspector  
Post Levels, Washington**

### DELOODING BATED TRUCK

Dear Editor,

Here is an idea that'll save the single-hummer mechanics much work when hooking loose a tire which has rusted to the rim. By using the weight of the truck, the tire will break loose.

**W.D. John Higgins  
HWA-Chicago**

(Ed. Note—If you're wondering what's holding up the road while the jack breaks the tire loose, remember that when a flat's really flat there's no jack storage.)



Fig. 1—Place tire on solid ground, jack on the end in line with bumper, and "jerk away."

### STERRING-ROCKLE BOOT

Dear Editor,

I thought you would be interested in what the Ordinary Self-maintaining deep-horn in Fort McChilton has done with the RH steering-knock-out boot.

They have fabricated a boot from heavy 3-ply cover-top material, using the damaged rubber boot as a pattern. This fabricated boot has done a wonderful job protecting the steering knuckle. It will stop abrasion, but will effectively keep water and dirt out.

By using the wire retainer from the regular rubber boot, the fabricated boot is very easily installed and will stay in place.

**J. H. Pallas, DCT  
Fort McChilton, Alabama**

(Ed. Note—Sure, why not? But before making yourself unnecessary work, try drawing RH, Steering Knuckle Boot, D712741888) from your supply chain—make sure you have the right size they have you.)

### HAIRING COMPOUND

Dear Editor,

In your October issue, Number 5, p. 187, which entitled "Wide Open Spoor," Seals, Synthetic Rubber, Truck Number 7800-818071 is a good Air Force number. Army synthetic rubber order is Composed, Sealing, Synthetic Rubber followed #12-63211-90.

**W. Rowell  
Camp Evans, New York**

(Ed. Note—You are on right.)

## OIL FILTER TROUBLE

Dear Editor,

In my opinion the engine oil filter are uneconomically installed on the Ford trucks, 1-1/2-ton, 4x1, C&F, Model F80, and could perhaps cause failure of the filter cases and/or metal panel upon which the filter is mounted (Fig. 1).

Filter inlet and outlet lines are so routed as to cause shaking of these lines. The length of lines (flexible) is such that short life can be expected. Location and length of lines could easily cause damage while maintenance service are being performed on engine. The gaps metal upon which the filter is mounted is such that the weight of the filter is liable to cause metal fatigue and result in cracking of the metal around the filter mounting bracket.

I'd suggest that a filter mounting bracket be fabricated and mounted as indicated (Fig. 2), that the fabricated bracket be installed on the cylinder head, utilizing the drilled and tapped

holes provided and used for this purpose by the Ford Motor Company when installing standard-equipment filters. Both inlet and outlet lines used in connecting the filter should be of the same type as those used by the Ford Motor Company when standard-equipment filters are installed—the steel type, Ford part number 11A-05567.

Installing Cast Iron filters should result in less maintenance costs, and will be useful in any way with the servicing of the engine. Estimated labor and material cost for replacing these filters as recommended above is \$8.00 per vehicle.

R. L. Gibson, OCT  
Camp Cooke, California

*(Ed Note—From the illustration it looks like the filter was sitting right smack on top of the sparkplugs. The actualy, the filter is placed between sparkplugs, and adequate room has been left for servicing.)*



Fig. 1—Note oil filter as installed, location and length of lines makes servicing difficult.



Fig. 2—Repositioning oil filter in this way, cuts maintenance and facilitates servicing.

## LAZY WALT REMOVS

Dear Editor:

Here's a little helper I use when removing the engine assembly from the front-to-rear track (J.C.O.E. Model H-50-1). I always had trouble with the track at the bottom of the clutch housing when doing this job. There's just one little seam between the cross member and the transmission flange. By tugging the nuts from these nuts,

I found that by breaking an open end wrench about 30° I could "get around the corner" at these nuts without harm.

Walt E. A. Fife  
APO #12, New York



Fig. 4—This tool eases engine assembly removal in tractor-truck (model H-50-1).

## COOL WINTER START

Dear Editor:

Opening up where it's cold, this little trick may help someone who has trouble starting his engine while trying to start it.

Be sure the vehicle is in neutral, turn the ignition on, and remove the distributor cap. Tapping the cap over, you can use a coin or washer as a jumper from the center to coil-wire distributor on any one of the edge or spark-plug-wire electrodes. If you then wiggle the points, a spark will occur in that particular cylinder. Do this on all the cylinders in turn, and they will be fired, and cleared of excess gasoline.

The point is that you can get a hot initial spark by this method than by using the starter, since there's no starting drain on the battery.

Walt E. F. Clyde  
APO, Maryland

### CLOSED PIPING ELBOWS —ON RACIAL ENGINES

From the Engine Shop, Fort Knox, Kentucky, comes along an idea for clearing out clogged priming elbows (Continental No. 20074) on 6075-C1 model engines. Mr. Henry Tibbitts suggests forcing grease through the elbow with a portable pressure gun. At about 100 lbs. of pressure the grease forces out any particles of leather, soapstone, or dirt that are clogging the elbow.

The idea's a good one, but instead of using a special gun, why not attach the hose at the head of the standard high-pressure hose-type latex gun that's OK for all tanks and gas and water cartridges? Force the priming grease into the gun and pump grease through it.

Afterward, gauge the pressure at the open end of the elbow, and remove the rest by flushing in degreasing solvent and by blowing through the primer hole with an air hose.

## Connie Rodd's

### BRIEFS

#### Colored Grease

Did you know that all greases under Spec MIL-G-10924 (GDS) are compatible with each other? They are. The colors may range from light yellow to dark green, and may streak when they're mixed, but you can use them together.

But these greases may or may not be compatible with the late-type the manufacturers use to pack wheel bearings of new vehicles. Which means that new vehicles loaded with too little grease in the wheel bearings may need a clean-and-repack job. See your local expert.

#### Grease confused?

If you're puzzled about what's with the grease on battery terminals, look at page 147 of PS No. 4. It talks about compound for terminals being scooped out of the grease.

New vehicles may get a light coat of grease on the battery terminals as protection against corrosion (from spilled electrolyte, etc.), and/or as an insulator or water proofing. To keep the grease on the terminals—and after a battery cleaning, give the terminals a new coat

of grease. Use a grease with a high melting point, so it'll stay on through heat or cold.

#### Don't lose the key

According to MIL-C-282-23A-102, locking the covers that hold the broadcast key to the broadcast plug on the FM-MH gen. set, is a must. This you do by repack utilizing two new screws (Part No. 730033, Stock No. 0044-730033) and two other jobs (Part No. 301300, Stock No. 4001-301300). The old screws go to Ordnance maintenance for modification into the new type.

#### Dry-cell batteries

These small batteries used in night-lighting devices operate best at -20°F. But, if you'll take them away in an inside pocket to give them handy warmth when they're not in use, they'll be charged for action when needed.

Keeping the batteries inside the instruments when you're not using them in hot/dry/dust/dew/humidity weather. The chemical action set up in an un-insulated battery can damage the battery tube. Puffs of chloride of zinc ammonium are forced out of the battery and will corrode the metal they touch.

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