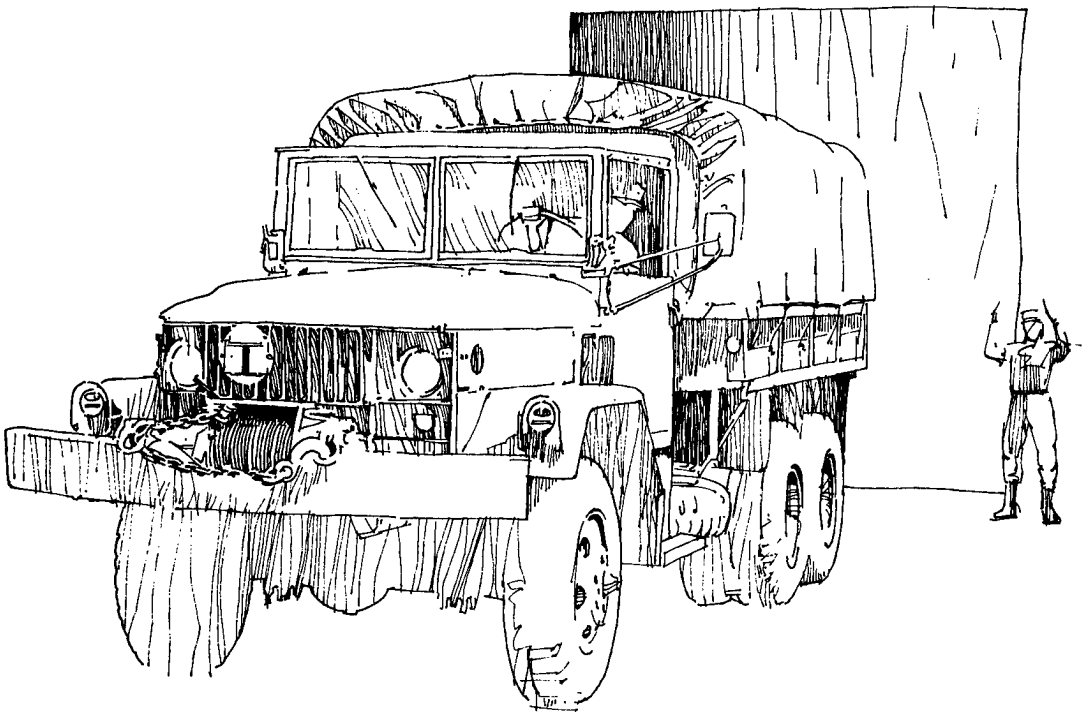
1989

Army Motor Vehicle Safety Reader



A collection of articles from *Countermeasure* dealing with Army motor vehicle operations

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AMV Safety Reader

Backing Accidents Are Preventable

Backing accidents are preventable. If drivers will remember the following simple rules, backing accidents will be a thing of the past.

. Plan movements to avoid backing if possible.

. Use a ground guide if available. If no ground guide is available, driver must walk around the vehicle and check for obstacles or hazards.

. Back slowly.

. Stop the vehicle any time you are not certain it is clear.

. When backing, watch the sides of the vehicle as well as the rear.

. Keep an eye on people and vehicles moving around you to be sure they do not become a hazard.

. Make sure the gear is not in reverse when you intend to go forward.

Sedans and Wagons–Costly Fender-Benders

Of all the commercial vehicles used by the Army, sedans and station wagons were most frequently involved in accidents. During FY 84, the 777 accidents involving sedans and station wagons were more than four times that of the commercial 1/4- and 3/4-ton trucks and nearly 49 times greater than the 1/2-ton truck.

Because a large number of sedan/station wagon accidents are minor in nature, the tendency is to view them as unfortunate "fender-benders." A closer look, however, shows them to be a lot more than that. During FY 84, these so-called fender-benders cost the Army more than $3.9 million and resulted in 3 fatalities and 112 nonfatal injuries. These figures are greater than those resulting from accidents involving any other Army commercial vehicle.

Percentage-wise, sedan and station wagon accidents accounted for almost half of all the accidents that involved Army commercial vehicles and 22 percent of all AMV accidents. This is 11 percent more than that of the jeep which led the tactical vehicles in accident involvement. In short, during the first half of FY 84, Army sedans and station wagons were involved in more accidents than any other Army vehicle--tactical or commercial.

Failure on the part of drivers to anticipate potentially hazardous conditions or situations and to take timely precautions, together with failure to pay proper attention while driving, were the leading driver errors causing Army sedan and station wagon accidents. Foremost among these driver errors were driving too fast for existing weather and road conditions, following other vehicles too close, and failing to yield right of way.

Weather conditions played a big role in nearly one-fourth of these accidents. Rain, snow, and ice, alone or in combination, contributed to significantly more sedan and station wagon accidents than to other AMV accidents.

Although materiel failures and malfunctions were not major causes of accidents, a few such failures did occur. The most frequent mechanical malfunction involved the brake system. The percentage of failures involving the steering system and tires and tubes was divided equally.

A review of a few accident briefs points out the ease with which even minor accidents can occur and the need for all affected personnel to take their responsibilities seriously.

In one instance, a sedan driver was going downhill. As he approached an intersection, he braked to ease the sedan to a halt behind another car that had stopped for a red light. The brakes failed and his car rammed the car ahead of him, causing $740 in damages.

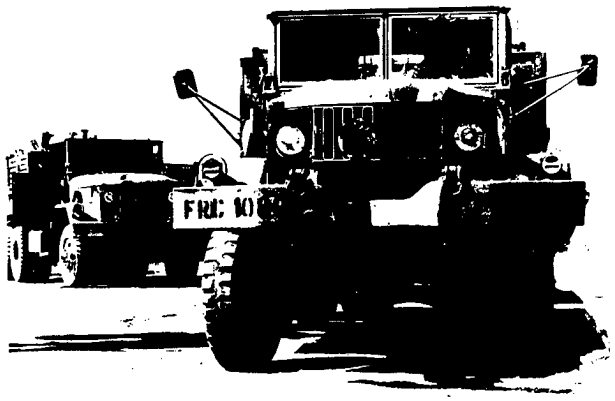
In another accident, the operator of a sedan was speeding as he came to a sharp rise in the road. The entire front part of the sedan bounced into the air, then came down hard, causing the front undercarriage to hit the ridge in the road. Damage costs exceeded $1,300.

An Army sedan sideswiped an oncoming car when the sedan driver did not have enough room and time to safely pass another vehicle ahead of him. Following too close behind a trailer being towed by another vehicle caused still another Army sedan accident. When the driver

towing the trailer had to abruptly hit his brakes, the sedan operator could not stop in time to prevent a collision with the trailer.

The job of preventing mishaps such as these rests with commanders, supervisors, and the drivers themselves. Concern on the part of these people together with positive action is the key to accident prevention. Are your vehicles being properly maintained? Are your drivers performing thorough inspections of their vehicles as they are required to do? Have your drivers been properly trained and licensed for the mission requirements placed on them? Are they being closely supervised? Are counseling and refresher training tailored to the specific needs of your drivers? Are safe operating procedures established and strictly enforced in your unit? These are but a few of the many questions to ask yourselves. And your answers are most important as they can point out areas where corrective action is needed.

The fact is the Army can ill afford these accidents referred to as fender-benders. They are numerous and costly and produce injuries and deaths. And most can be prevented. Take the time to examine your operations closely to identify weaknesses and apply cures--before other accidents can occur.



Improving AMV Safety in Field Training Operations

AMV accidents are the No. 1 cause of injuries and fatalities during field training exercises. And the causes rarely change. Year in and year out, the Army suffers losses from the same causes. Here is a typical AMV training exercise accident profile:

. Driver error was the predominant cause factor.

. Unsafe mechanical/physical conditions and hazardous roadways were often significant contributing factors.

. Vehicle was a 5-ton truck operating independently during daylight hours.

. Driver was 18 to 21 years old, E-3, and had been on duty between 5 and 8 hours.

. Truck was either hit from left side by a POV after driver failed to clear left-rear during turn, or driver was speeding and misjudged lateral or straight-ahead distance and hit another moving vehicle.

Command emphasis and close supervision are required to improve safety in AMV operations. It's up to you to make sure that soldiers are properly trained and supervised. You must provide counseling and refresher training tailored to your AMV operations. It is also your responsibility to establish and enforce safe operating procedures in your unit. Consider the following recommendations for your AMV safety program:

. Review your current unit driver qualification standards and apply them to identify the most highly qualified/safe driver candidates. Identify and eliminate driver training candidates who have demonstrated immaturity, irresponsibility, poor driving records, or irrational behavior trends.

. Review your unit SOP and written policies to ensure that the responsibilities of senior occupants of vehicles are clearly understood by all personnel.

. Review your unit safety program to make sure that continuing driver education and training programs are professionally presented and mandatory periodic driver safety training classes are attended by all drivers.

Often a tactical unit will not have enough qualified and experienced drivers available to move their AMVs to and from the exercise site. One innovative captain faced with this problem assigned NCOs and officers as senior occupant supervisors in each vehicle. Their job was to instruct and provide the training which the inexperienced drivers lacked. By this expedient, the unit was able to provide training, experience, and close supervision not otherwise available for their drivers. In this case, the unit completed their FTX without a single AMV accident.

As a unit commander or a first-line supervisor, you must constantly remind your drivers and soldiers of their individual safety responsibilities. Stress that as drivers it is their duty to operate their vehicle in a safe manner. Make them know that you hold them responsible for their actions. It is your duty to take prompt, positive action with all drivers who willfully disregard safe procedures. Pay special attention to the following areas before and during your next FTX:

. Make pre-exercise site surveys to identify hazardous road conditions which can be avoided during the exercise. Determine load capabilities of bridges in the FTX area and brief drivers on weight limitations.

. Before an operation, vehicle crews should be briefed on road and weather conditions. Drivers should also be cautioned that regardless of posted or nonposted speed limits, all vehicles should be driven at a speed safe for existing road conditions.

. Jeep, Goer, and gamma goat drivers should receive special training. These vehicles, especially jeeps, overturn easily, and vehicles that overturn produce significantly more injuries.

. Wheeled and tracked vehicles should be thoroughly inspected and any mechanical deficiencies promptly corrected. Vehicle checks should include brakes, windshield wipers, horn, headlights, turn signals, and mirrors. Water and oil levels need to be checked. Tires should be inspected for wear and tear and proper air pressure. Also check battery and fuel tanks. Truck tail gates should be secured and safety straps fastened. Reflector lights should be cleaned and rear turn indicators and taillights should be tested.

. Fire extinguishers in the vehicles must be the correct type and properly charged.

. Main and machineguns on tracked vehicles should be checked. Main gun tubes should be pointed rearward during convoy movement.

. Normally, the actual loading and unloading of cargo is not a driver's duty. However, an improperly balanced load can be the cause of a serious accident. Therefore, to ensure proper load distribution, the driver should be present during the loading of cargo.

. Whenever vehicles are being positioned, particularly when backing, ground guides must be used to prevent vehicle damage and personnel injury.

. Because of their design, most Army tactical vehicles are required by regulation to travel at a speed slower than the posted maximum. Drivers must always be aware of the distance between their vehicle and the vehicle in front. Following too closely, particularly in convoys, is a major cause of accidents. Remember, an adequate following distance is one in which the driver can stop safely if the vehicle in front should suddenly apply brakes. Also, following distances should be increased during bad weather and other poor driving conditions to allow for the driver's lack of visibility or other hazards.

. Another good habit for drivers is to check their vehicles during convoy halts. During these breaks, the driver should take time to make a walk-around inspection of tires, suspension, and load. And while en route, be alert for any unusual noises, vibrations, or changes in engine performance. If noticed, report these conditions to maintenance personnel who normally are available in convoys to help make repairs or provide vehicle recovery.

. Drivers should never exceed established safe speed limits.

. Radio communication checks are essential between vehicle commanders and command posts. Communication checks should include APCs, tanks, and all radio-equipped vehicles.

. Army regulations and SOPs must be strictly followed wherever ammunition is stored, handled, or transported. Caution and warning signs should be available for use at storage sites and on vehicles transporting explosives.

. Maximum attention to safety by all personnel is required at vehicle refueling sites. Soldiers must never smoke at a refueling site. Vehicles must not be fueled with engines

running. Fuel spills must be promptly cleaned away. Clothing which becomes fuel-soaked should be removed immediately.

. To prevent any possibility of carbon monoxide poisoning, personnel should not sleep in, on, or under any vehicle.

Prevent AMV Driver Error Accidents

Troops, weapons, and supplies have to be moved safely and efficiently for the Army to accomplish its mission.

Motor vehicle drivers are the link between mission objectives and the material the Army must have to do the job. However, lives and equipment lost in motor vehicle accidents break the link and seriously hamper the Army's ability to perform its mission.

Army accident records show that AMV accidents usually have more than one cause, but driver error is involved in almost 7 out of 10 accidents.

Army vehicles are built to operate over all kinds of terrain under all types of conditions. But even the best vehicles in the world soon become useless if driven unsafely or maintained improperly.

AMV drivers are professionals with the required specialized knowledge and training. As such, they must strive to eliminate driver errors.

Following basic driving principles and techniques is one way for drivers to do their jobs right, especially from the standpoint of Army safety requirements. Five areas need to be reviewed, reemphasized, and constantly kept before drivers:

. Vehicle maintenance
. Defensive driving
. Backing
. Off-post operations
. Weather

Vehicle maintenance

AMV drivers are required to do a daily maintenance inspection of their assigned vehicles. During this inspection, they should find mechanical defects (e.g., loose battery connections, broken wiper blades, broken speedometers); they should check for leaks, body damage, proper lubrication; and they should assure all components and attachments are secure. A preoperation inspection includes checking engine oil, coolant, hydraulic fluid, tire pressure, and instruments and gauges. Also, every tool must be properly secured and stored. A post-operation inspection similar to the preoperation inspection should be made.

Defensive driving

Defensive driving begins with the driver's attitude. The attitude of a professional is one of individual responsibility for the vehicle, the lives of passengers, the cargo, and the driver's own life.

Before starting a vehicle, the professional driver adjusts the seat and mirrors and clears the vehicle--checks the sides, rear, and front for any obstruction. The professional driver always fastens the safety belt if the vehicle is equipped with them.

Speed is the major cause of driver error accidents. Posted speed limits are only one factor when determining correct speed. Existing road conditions, weather conditions, type of vehicle being driven, area of terrain, sight distance, speed of other vehicles, driver's physical condition, and stopping distance must all be considered to correctly determine proper speed.

Maintaining control of the vehicle is a prerequisite of defensive driving. Control depends on the vehicle's speed and the driver's steering ability. Drivers must slow before entering curves, stay on their side of the road, and maintain safe following distance.

Turning at intersections requires the defensive driver to signal intent to turn, slow down, check for vehicle clearance, and swing wide but not across centerline or stop lines on near side

of turn. Operators of trucks, especially those with trailers, should make intersection turns with extreme caution.

Backing

Backing, even when done at slow speed, is more dangerous than going forward. All vehicles 2 1/2 tons or larger, vans, and all trucks with trailers are required to use ground guides during backing operations. When a ground guide isn't available, the professional driver gets out and sees whether the rearward patch is clear. Even after such a check, backing must be done with extreme caution. As a rule, do not back long distances unless it is absolutely necessary. It is usually safer to turn around and cover the distance going forward.

Off-post operations

Most Army tactical vehicles, because of their design, are required by regulation to travel at a speed slower than the posted maximum. Professional drivers are aware of this and maintain proper speed.

Following too closely, particularly in convoys, is a dangerous practice. An adequate following distance is one in which the driver can stop safely if the vehicle in front of him should suddenly apply brakes. Under normal driving conditions on an open highway, the safe following distance for trucks, tractor and semi-trailer combinations, or similar type vehicles, is 300 feet in the daytime and 500 feet at night. However, during bad weather and other poor driving conditions, following distances should be increased to allow for the driver's lack of visibility or other hazards.

Weather

The first drops of rain are danger signals that tell drivers to use extra caution. Rain reduces visibility, loosens grease and grime that form slippery surfaces, increases braking distances, and induces hydroplaning.

Snow and ice reduce tire traction even more than wet pavements. When vehicles are driven on packed snow or ice, they should be equipped with snow tires or chains. It is essential to reduce speed and maintain control to keep from skidding when trying to stop or turn. Bad weather conditions demand the professional driver think ahead.

Driver errors cause accidents, kill soldiers, and destroy vital combat equipment. They don't have to happen. Following basic driving principles and techniques can prevent driver error accidents.

Drivers, Train Them And Win

If Army drivers are not properly trained, we don't win the next war! Year in and year out, analysis of accident data points out **inadequate driver training** as a major cause of AMV accidents. Soldiers continue to be injured and killed because the Army fails to train them in how to drive an Army vehicle safely in all of the conditions that the vehicle can be expected to operate. Yes, these soldiers knew how to drive in the civilian world and were probably fairly good drivers, as long as they were on controlled, well-paved, and properly marked highways. Yes, these drivers received their initial training in their AIT phase and arrived at their units with a learner's permit; and, of course, the chain of command immediately identified these individuals as school-trained drivers.

Wrong! These soldiers are as inexperienced in the handling of an Army vehicle as they were when they first found out that Dad's car could get them places a lot faster than their bicycle.

What has happened, and become a matter of course, is a young hard-charging soldier, right out of AIT, is assigned his first Army vehicle and told to "get it ready."

First mistake! The supervisor or section leader assumes his new driver is up to par on every aspect of his vehicle; why of course, he's school trained. Wrong again!

Sure, he's had some school training, but in the basics only, and with limited exposure to every phase of his vehicle's capabilities. What he needs now is to come under a well-structured,

well-defined set of standards that he must meet before he can become the driver of that sophisticated piece of equipment. That's where that training officer or battalion S3 comes in and identifies and requires such a program.

Too often the unit commander is told "train your drivers, but do it during motor stables." Wrong again!

Yes, hold that unit commander's feet to the fire and make him allocate time and resources toward getting his drivers trained, but have S3 set up a comprehensive driver training program, identify very specific tasks, conditions, and standards that suit your mission and equipment. Cover every facet from proper maintenance procedures, driving in all types of weather over all types of terrain, towing procedures, and especially emergency procedures peculiar to that vehicle.

The Army has manuals on all types of driver training with some good information in them. There is now one manual that offers a concise, well-thought-out sequence of training along with excellent examples of a viable training program that can be conducted at the battalion or squadron level. That manual is FM 21-17, Driver Selection, Training and Supervision, Track Combat Vehicles. FM 21-305, Manual for the Wheeled Vehicle Driver, offers the same basic information. By combining the format from FM 21-17 with that of FM 21-305, a viable training program for wheeled vehicle drivers can be developed.

The wheeled vehicle drivers' program becomes critical when you realize that within most combat units the wheeled vehicle drivers are not school trained and are actually working in their secondary skill.

All this sounds good so far, but it still has to be implemented, carried out, and most important, tested and followed up.

A battalion level driver training section is a good way to carry out such a plan. S3, gather your senior experience in the unit and develop a challenging program that gives driver training the importance it justly deserves.

Identify time, training areas, and specific levels of accomplishment before a soldier is issued a driver's license. Give this program the highest visibility and develop it into a major training objective. Recognize these individuals by developing a driver's award within the battalion to signify their importance to the team effort. These drivers will be handling highly sophisticated and expensive equipment that will require a much higher degree of teaching than has been administered in the past.

For too long, the Army driver has been left to his own resources and has managed to do a good job, but given that extra measure of specialized training, that extra recognition of this additional skill, and the confidence that he is well-trained in all phases of combat driving will do more for this Army's combat readiness posture than any other endeavor.

It's time to put the emphasis on drivers' training and regard these soldiers as being the key to the successful deployment of our units in combat. Let's raise the standards of training and enforce those standards to what you would want them to be if your life depended on it--because it does!

Maintenance--A Combat Multiplier

Maintenance is critical to our wartime survival. With the expected intensity and lethality of the envisioned battlefield, survival will depend, in part, on an efficient and responsive maintenance program. A sound maintenance program will be an advantage--our combat multiplier. What is a sound maintenance program? Many commanders can easily list some elements, but few can outline how these elements fit together to form an effective maintenance program.

An effective maintenance program revolves around its elements and their interaction. To illustrate the elements of a sound maintenance program, a "maintenance wheel" is used to show how elements must interrelate (see the chart at the end of this article). The three major elements correspond to the wheel's hub, spokes, and rim. Effectively integrating these elements into a coordinated program can keep equipment rolling. Let's examine each of the three elements.

Hub. The firstline supervisors form the all-important hub of the maintenance wheel. They are the catalytic force of the maintenance program--its leaders and trainers. They are the principal directors of the program, ensuring that the available maintenance resources (the spokes) interact properly for smooth operations. Without their positive support and active participation, an organization's maintenance program would be disjointed and would fail to function.

Many of these firstline supervisors are junior noncommissioned officers (NCOs). Their first measure of effectiveness is how well they and their subordinates maintain their assigned equipment. They are responsible for effectively using their resources to support the maintenance efforts. The NCO's responsibility for maintenance is explicitly outlined in FM 22-600-20, The Army NCO Guide. He is responsible for the individual training of soldiers in their MOSs and in basic soldiering skills. He must train soldiers to employ, maintain, and care for the weapons, combat vehicles, and equipment with which they do their jobs. He must also assume responsibility for the maintenance, serviceability, accountability, and readiness of arms, clothing, vehicles, and equipment.

Supervisors must be aware of the influence they wield. Organizational studies document that the amount of consideration shown by a supervisor is positively related to work unit efficiency. A good maintenance program, therefore, develops around a responsible firstline supervisor. He should be given the responsibility for the materiel readiness of the organization's equipment, provided the authority to carry out this awesome task, and then held accountable for its readiness condition.

Many firstline supervisors want to subordinate their maintenance responsibility to what they view as their responsibilities as a soldier and a technical specialist. But without operable equipment, today's soldier cannot perform his mission and will not be able to fight or support the fighting soldier. Maintenance and training are two tasks that cannot be subordinated or separated from mission accomplishment. General Edward C. Meyer described maintenance and training as "the two balls that the juggler can never drop."

The supervisory hub is the center of the wheel and forms the core of the organization and its maintenance program. The hub brings the spokes (maintenance resources) together and ensures smooth interaction. It is the driving component that powers and controls the direction of the spokes and the way the wheel goes.

Spokes. The second element of the wheel is its 13 spokes. They provide the support and shape of the wheel. The spoke "names" are self-explanatory and a detailed description of each is not necessary, but some elaboration of the importance of each to a sound maintenance program is appropriate--

. Time is perhaps the most critical available resource. Adequate time must be set aside to perform operator and organizational maintenance. This time should be useful and productive.

. Training in maintenance must have the same emphasis that is given to unit training in military occupational specialties (MOSs). The quality of maintenance training will determine whether or not the unit's equipment will be available to accomplish its mission. Full advantage must be taken of both formal schooling and training that can be accomplished within the organization.

. Operators must be assigned to each piece of equipment and must be responsible for the care of that equipment. Operators must be able to perform preventive maintenance checks and services and must be present for all scheduled maintenance periods. Trained operators can prevent many equipment failures, and inexperienced operators can nullify all the efforts to properly maintain equipment.

. Tools and test, measurement, and diagnostic equipment of the right kind must be available and must be used. Unit personnel must be knowledgeable in the use of all tools necessary to perform their level of maintenance.

. Scheduled maintenance periods, just like scheduled training periods, are necessary. The Joint Chiefs of Staff recognized the importance of scheduled maintenance in specifying that a program of preventive maintenance would be established by all services.

. Facilities and an adequate work area must be provided. To the extent possible, the maintenance area must be covered, safe, and clean. Military maintenance personnel are often forced to work under adverse conditions. These conditions can be improved through self-help

programs and the continuous indoctrination that maintenance operations must be done the same way in peacetime as they are in wartime.

. Publications and technical manuals and their appropriate use save time and help identify proper maintenance procedures. A good library, to include current operator manuals for each individual piece of equipment, is both a service and a training aid; however, the manuals must be used. The failure to use manuals and lubrication orders can be disastrous and may result not only in damaged equipment but possible injury or death.

. Standing operating procedures must spell out maintenance procedures for supervisors at all levels and provide a means of improving the cost-effectiveness of military maintenance.

. Maintenance management system planning must ensure that the maintenance mission supports the unit's mission. This system should include the organization's maintenance SOP, a means to forecast and plan for scheduled operation, use of quality controls, methods of reporting to higher headquarters, procedures for maintaining current records and files, and submissions of historical reports.

. Higher level maintenance requirements must be taught. Unauthorized maintenance may result in costly, inadvertent damage to equipment and create major problems for the supporting maintenance units. Organizations must be taught not to perform maintenance beyond their authorized level. The organization and its supporting maintenance units must work as a team to achieve the highest equipment operational readiness rates. Support activities are a valuable means of assistance; but it must be remembered that cooperation and coordination is a two-way street.

. Assistance and inspection reports are a means to measure the maintenance program's effectiveness. Additionally, the use of assistance teams to help in areas where internal expertise is not available should be encouraged. Organizations should look forward to inspections as a way to validate their programs. Inspections should be thought of as an aid, not a detractor.

. Incentive awards for effective maintenance efforts cannot be overemphasized. Good maintenance practices must be rewarded and poor practices corrected. Incentive awards must be publicly presented to positively motivate personnel. Corrective actions, by the same token, need to be publicized.

. Repair parts lists and prescribed load lists, representing demand-supported and command-directed items, must be accurate. Reconciliations, followup actions, and supply discipline must be continually exercised. Additionally, repair parts received must be applied to equipment as soon as possible. Alternative supply sources must be investigated when necessary.

All 13 spokes are important to a maintenance program "wheel"--any weak spoke can have an adverse effect on the organization's maintenance efforts. Many of the spokes are both dependent upon and complementary to each other. This interaction can lead to one spoke counteracting the weakness of another; but over a period of time, the stress may be too much and the spoke will break.

The spokes, while providing support for the maintenance wheel, are not the most critical component. The two most crucial components are the hub and the rim of the wheel. Weakness at either can cause the wheel (maintenance program) to slow; their breakage can cause it to stop.

Rim. Surrounding the hub and the spokes is the rim, representing, in my example, the command section. This section is responsible for planning, organizing, staffing, directing, and controlling all operations of the organization. Management and its functions extend to the maintenance efforts. One of the most important incentives to a successful maintenance program, according to former Secretary of the Army Clifford L. Alexander, Jr., is "the personal manifestation of maintenance consciousness by the commander" through his personal interest, attention, and involvement. Without the total conscious backing of the command section, the maintenance program--like the wheel--would continue to roll roughly for a while but would eventually break apart.

The top priority of the Department of the Army maintenance management improvement program, according to former Deputy Chief of Staff for Logistics Lieutenant General Arthur J. Gregg, was to "focus command attention on maintenance and assure that it receives a balanced share of the commanders' time and emphasis." Yet, the command section, when performing its management functions, must avoid such "eyewash" maintenance as clean, newly painted

vehicles, but with no gas and dry batteries. The most frequently mentioned detractors to a sound maintenance program found in the 1977 Perceptions Maintenance Study were--

. Working under arbitrary and unrealistically imposed work schedules.

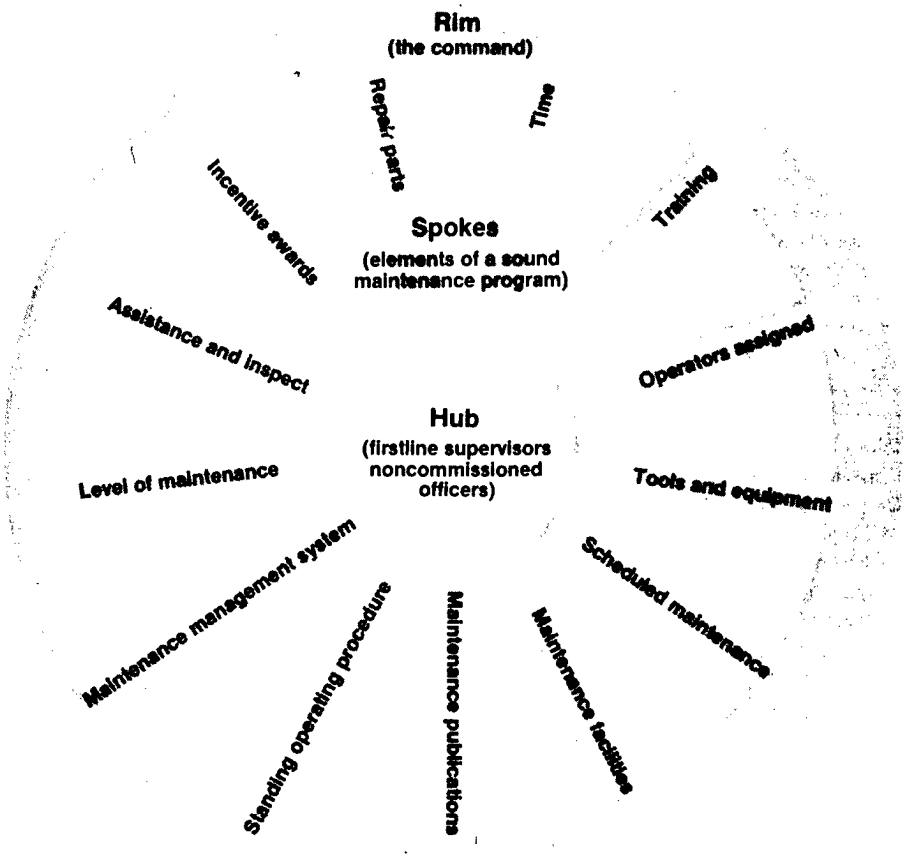
. Doing "busy work."

. Maintenance personnel being kept on duty when there was nothing to do or being called in from scheduled off-duty time to work. "Eyewash" maintenance and these detractors are under the control and authority of the command section. To have harmony and balance in the maintenance system it is imperative that responsibilities of each organizational level be defined and kept in perspective. This means that standards be established for subordinate supervisors and that checks be created to ensure that supervisors perform to those standards.

Decentralization and trust in the lower echelons must filter down from the top. The commander controls the availability of all maintenance resources (including the most precious resource--time) through his supervisors. The command section--the rim--provides the shape the maintenance wheel will take and provides the resources on which the "wheel" will roll.

A sound maintenance program comprises three essential components: maintenance resources, supervisory personnel, and a command element. The "maintenance wheel" model provides a basis for understanding the maintenance components and how they interact with, and complement, each other. The wheel is an applicable model for any size unit, from platoon to corps. For maintenance to be a combat multiplier, the wheel must roll!

--from Army Logistician



Improper Use of Cotter Pin Breeds Trouble

"A little neglect may breed mischief: for want of a nail the shoe was lost; for want of a shoe the horse was lost; and for want of a horse the rider was lost."

Benjamin Franklin wasn't writing of cotter pins when he wrote the above maxim for Poor Richard's Almanac, but the philosophy sure applies. Let's take a look at just a few examples.

. The driver and two passengers were en route to the motor pool in an M151 1/4-ton truck when the wheel came off. One passenger was injured. The **cotter pin** had been left off during some previous removal of the wheel bearing assembly which allowed the nut to vibrate or twist off. Then the wheel came off.

. There was no apparent reason for what happened! He was driving along the highway, lost control of his vehicle, and the vehicle flipped on its left side. The driver was thrown from the vehicle and the two passengers were pinned under it.

On-scene investigation showed the left rear wheel came off. A further maintenance check found that the **cotter pin** had not been put in the left rear spindle. The main hub nut loosened and fell off the spindle, causing the wheels to come off.

. An M151A2 was traveling west with the driver and two passengers. The right rear wheel came off the vehicle. A passenger was thrown from the vehicle and landed on the blacktop roadway, sustaining minor bruises. The vehicle traveled 55 feet, crossed the center line to the left side of the roadway, and continued on another 358 feet before the driver was able to stop it by downshifting and using the hand brake. Investigation showed that the **cotter pin** was not installed in the right rear wheel, and the left rear wheel **cotter pin** was not spread open to prevent it from coming out.

The above problem is probably a common maintenance deficiency. During a 3-year period, 18 accidents were reported for loss of wheels because mechanics reused old cotter pins or did not install a cotter pin. Mechanics should use new cotter pins when securing wheel bearing adjusting nuts.

These 18 accidents--for want of a cotter pin--cost the Army $54,925 in injury cost, $82,085 in damage cost, for a total cost of $137,010.

All this loss in money, time, and suffering could have been avoided if only a cotter pin had been used. The amazing thing is: cotter pins cost 35 cents per 100!

Ground Guides--A Safety Essential

Most soldiers realize they need to use a ground guide--some of the time--for both wheeled and track vehicle operations. A look at the accident reports received at the Army Safety Center sadly indicates that ground guides should be used much more often than they are.

General guidance is that ground guides are required anytime a large vehicle or track enters an area where other vehicles and personnel are stopped to link-up, preparing a bivouac, and bivouacking in an assembly area. A ground guide is used in a cantonment area when a large vehicle or track is being moved within close confines of other personnel or equipment. Track vehicles are always guided in a cantonment or motor pool area.

Wheeled vehicles

It's not just tracked vehicles that need to use ground guides. FM 21-305 places the responsibility for using ground guides and for passenger safety squarely on the driver of the wheeled vehicle. He is to see that all passengers are on board and that restraint systems are secured. It is his responsibility to see that the load, whether human or material, is secure before moving the vehicle. He is also required to ensure that he can maneuver his vehicle safely.

. The driver of the 5-ton truck was being ground guided into an assembly area. The one ground guide was positioned to the left front of the vehicle to guide the vehicle from the narrow, dry dirt road to the parking area about 50 meters down the road on the right. To

avoid a tractor coming from the opposite direction, the driver moved to the right side of the roadway. The dirt embankment gave way under the right wheels and the driver reacted by turning the wheels to the left and accelerating. The 5-ton truck turned on its side. It was late in the day and only one ground guide was guiding the truck forward and from his position he could not judge how far right the truck had moved. A second ground guide positioned to the right rear of the truck could have prevented the truck from getting too close to the edge of the embankment.

One ground guide can be used for moving a vehicle forward but two or more ground guides should be used (at least one front and one rear) to ensure the driver can see the primary ground guide in front and the other ground guide or guides can see all other areas around the vehicle. Large vehicles with cargoes may require three or more guides.

. The sergeant was moving a 5-ton dump truck. His passenger tried to act as ground guide while sitting in the passenger seat. They hit an APC.

Drivers are told (FM 55-30) never to move vehicles without first checking on both sides, front and rear to ensure they can maneuver without endangering personnel or equipment. A guide should always be posted when maneuvering and backing a vehicle in a motor pool or bivouac area, especially at night and in many instances under blackout conditions. AR 385-55 says ground guides **will** be in view of the driver at all times, but it really doesn't mean in the passenger seat. If ground guides are not available, the driver will dismount and check clearance before backing. The purpose of a ground guide is to move a vehicle safely--both for the well-being of the people on board and for the vehicle.

Drivers

Drivers and ground guides must work as a team. It is the driver's responsibility to:

. Request a ground guide when any doubt exists about safely moving a vehicle.

. Always use a ground guide or guides in bivouac, assembly, or maintenance areas or moving through dismounted troops.

. Check completely around your vehicle before starting it or have your ground guide check.

. Use ground guides before and during any backing operations. Smaller vehicles, under 2 1/2 tons that have good clearance, may be backed without a guide if you are sure you are clear. It pays to get out and check behind you.

. Always use a ground guide when traveling cross-country during periods of reduced visibility if the tactical or training situation permits.

. When using a guide, always follow his directions. If you are unsure of his intent, stop the vehicle immediately and wait until you understand his directions.

. Keep about 10 yards between you and the guide. Be sure you are far enough behind him to be able to stop safely should he stumble or fall.

. If the guide goes out of your sight, stop at once. If you are following a guide at night, stop when you no longer see the light he is using to guide you.

. Do not take signals from more than one guide. If you are backing up, the guide to your front may need help from the guide at the rear. If so, the front guide should relay signals to you.

. The assistance of a guide is especially important when backing into a highway.

. Good judgment is needed to maneuver a track vehicle across a narrow bridge or through a narrow passage. If any doubt exists, request a ground guide. This applies to large wheeled vehicles as well.

. During night operations a crewman at the rear of each vehicle with a handheld flashlight with red lens cover can prevent rear-end accidents.

. **Talk** with your ground guide. **You** must make sure the ground guide knows the capabilities of your vehicle and knows how to serve as a ground guide.

. Drivers have a responsibility for the safety of the ground guides. Make sure the guides are not working in the path of the vehicle and that they are not between the vehicle and an object.

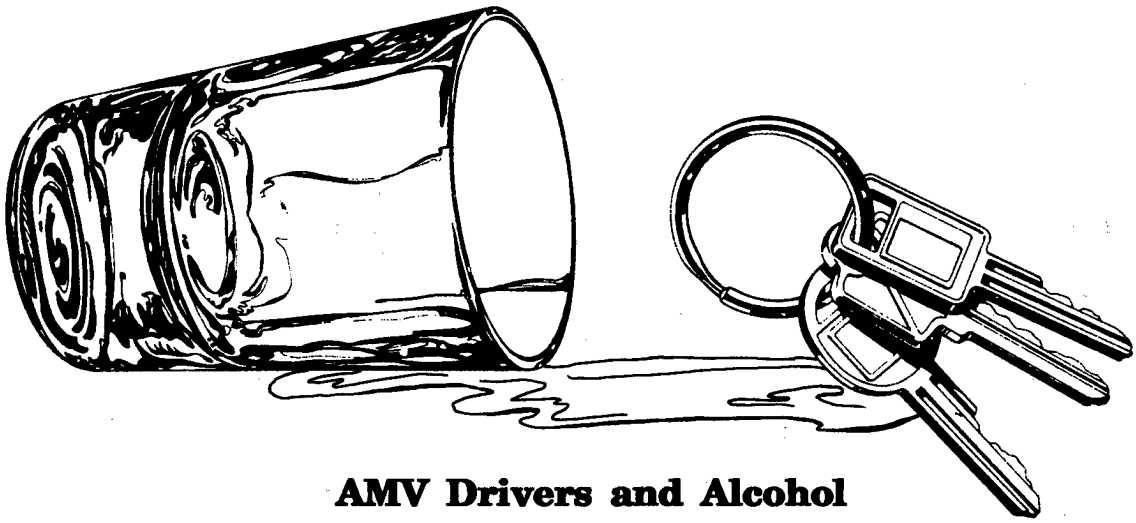
Ground guides

Ground guides are responsible for seeing that a wheeled or track vehicle does not injure anyone and that the vehicle sustains no damage while maneuvering.

. Know all visual signals. Use standard Army signals.
. Be familiar with the vehicle you are guiding and know its capabilities and limitations.
. Check on both sides, front and rear before moving a vehicle. Ensure the vehicle can be maneuvered without endangering personnel or equipment.
. Remain clear of the vehicle path and be visible to the driver at all times.
. Never place yourself between two vehicles or between a vehicle and an object.
. Stay outside the path of the vehicle and at least 10 yards in front of the vehicle.
. If two or more guides are used, know who the primary ground guide is and pass all information through the primary. Make sure there is communication between guides.

Ground guides have a responsibility for the safety of the driver and passengers of a vehicle and for the equipment. They must make sure that no person is in the path of the vehicle and that they guide the vehicle correctly on firm maneuver ground.

Ground guides are a safety essential. But to be of value, they must be knowledgeable. Their own life and the lives of their fellow soldiers can depend on their knowing the characteristics and limitations of the vehicle they are ground guiding as well as **how** to ground guide.



AMV Drivers and Alcohol

Two M915 tractors pulling passenger troop trailers were en route to the company area after picking up 60 personnel from the bivouac area. The driver of the lead M915 tractor and trailer saw an M915 coming back to the bivouac area. He slowed and stopped to tell the returning driver the number of people remaining at the bivouac site.

The driver of the following M915 and trailer drove into the rear end of the stopped troop trailer at about 30 mph. Forty military personnel were evacuated to the hospital for observation and treatment. Fifteen of the 40 soldiers were hospitalized.

The driver of the second or following tractor and trailer was administered a breathalyzer test which showed a .18-percent blood-alcohol concentration (BAC). The driver was cited for drunk driving, inattentive driving, and following too closely. His military driver's license was suspended indefinitely, and he faces UCMJ proceedings.

Although large numbers of people were involved in this accident, the injuries were relatively minor. Injury costs were $2,620 and damage costs were $11,500.

This case does not represent an isolated incident. Over the past 4 years, there have been 471 tactical AMV DUI accidents reported. These accidents have resulted in 21 soldiers killed. The costs for these accidents are substantial.

An AR with teeth

Drinking on duty is not now and never has been an acceptable behavior. Commanders have always had authority to discipline soldiers for on-duty alcohol abuse.

However, until Interim Change 103 to AR 600-85, Alcohol and Drug Abuse Prevention and Control Program, became effective in July 1983, there was no measurable, established level for alcohol impairment. The AR says that soldiers shall not have a blood-alcohol level of .05 percent or above while on duty. This standard clearly specifies the alcohol level at which a soldier is considered too impaired to do the job properly.

The effects of alcohol are a result of the amount of alcohol in the bloodstream. The BAC is measured in milligrams of alcohol per 100 milliliters of blood, or milligrams percent. The potency of alcohol can be appreciated best if one understands that .10 percent means one part of alcohol to 1,000 parts blood.

The .05-percent BAC is the established standard for measuring impaired performance; however, coordination and judgment can be affected at much lower levels of BAC. Impaired judgment and coordination are two handicaps the driver of an Army motor vehicle does not need.

Off-duty AMV misuse

Soldiers sometimes manage to get an Army motor vehicle while they are off duty. Thirteen of the 75 AMV DUI incidents reported for FY 83 involved personnel who were off duty.

. A 23-year-old E5 borrowed a government sedan dispatched to his buddy for on-post use only. He drove the sedan off post into the nearby city. After leaving the post, he stopped and consumed an unknown quantity of alcoholic beverages. Several miles from post, he was involved in an accident on the state road. The E5 said he could not remember how he got to the scene of the accident nor why he was there.

The civilian police took him to the on-post military hospital where he was tested and his blood-alcohol level registered .13-percent BAC. The civilian police charged this soldier with failing to yield right-of-way and driving under the influence. The military charged him with wrongful appropriation of a government vehicle and negligent destruction of government property.

When this soldier went before the civilian magistrate, there is every possibility he was fined, forfeited his state driver's license, and was assigned to do mandatory community service work under supervision of the probation office.

The military took action against him with a trial by summary court-martial. If the soldier were convicted, he could be reduced in rank, restricted for 60 days, and given forfeiture of up to two-thirds of 1 month's base pay. In addition, the commanding general of the installation would place a letter of reprimand in his military record. If a Report of Survey were initiated, and if it resulted in a finding of pecuniary responsibility against the soldier for damage to the vehicle, he could be responsible for the $1,000 of damage up to 1 month's base pay.

Fortunately, only the soldier was injured in this accident. However, if his injuries required hospitalization, a line-of-duty investigation would be made and could result in a finding of "not in the line of duty due to own misconduct." In case of such a finding, the soldier would be required to pay $391 a day for the time he was hospitalized.

If there had been injury to others, this soldier would certainly have spent time in a civilian jail and suffered even more financial punishment.

Chances are the E4 "buddy" who allowed the E5 to take his dispatched vehicle in violation of the dispatch and regulations wouldn't get off scot-free. He could be given an Article 15 and reduced in rank, given forfeiture of up to 1 month's pay, and restricted and given extra duty. He may be charged with violation of regulations, dereliction of duty, and being an accomplice who aided and abetted the E5 in the wrongful appropriation of a government vehicle.

Booze and joy-riding probably cost this E5 his career and hefty out-of-pocket expenses. The E4 responsible for the vehicle would have paid dearly for his part of the story.

Commanders need to be concerned with the ease with which off-duty soldiers can wrongfully appropriate a vehicle. Reports don't show that these misappropriated vehicles were hot-wired. Keys were available.

Army motor vehicles and alcohol are a losing combination, off duty or on duty.

Danger! Black Ice!

There aren't, as far as we know, any road signs posted warning of black ice. Perhaps there should be.

Black ice is sneaky. It is a real danger lurking out there. It is a cold-weather phenomenon that catches the unwary or uninitiated and shakes them until their teeth rattle--if they are lucky. Some aren't lucky. They die.

. The soldier was traveling on a straight stretch of road when he hit a patch of "black ice" on the road, lost control of his car, crossed the oncoming lane, and went into a ditch. The car rolled and the soldier was thrown out. When the car stopped, it was lying on top of the soldier. His injuries were fatal.

. It was 0630 on a cold, wet January morning when the soldier left the bivouac area. He put the jeep in first gear and crept along at 3-5 mph because of the wet pavement and the mountain road. When he started down the hill, the jeep hit a patch of black ice, the back end came around, the jeep made four complete turns, then went off the road onto a severe downslope. Feeling the jeep tipping, the soldier jumped free, striking his left knee and ribs on the pavement. The jeep slid on its side down the slope until it struck a tree. His injuries required first-aid treatment. He was lucky.

Black ice can also occur in shaded areas of the road and on bridges even if the asphalt is stable. When the road is generally clear of ice and snow, you may suddenly come on patches of unexpected ice. Melting snow running down from the upper side of a banked curve may freeze on the pavement as the sun sets. Or, especially in mountainous country, you may go from perfectly clear pavement, round a curve at the base of a large hill where the sun cannot reach the pavement, and hit black ice.

Because the decks of bridges cool much more rapidly than other road surfaces, moisture often condenses on them and freezes quickly into thin sheets of ice when the temperature drops.

An alert and knowledgeable driver is the only protection against the "black ice" phenomenon. Man has not found any way to control Mother Nature--at least not completely.

An alert driver knows about and is on the lookout for "black ice." A good driving rule is to slow down before you come to bridges and places where the road is in shade. Be especially careful in late afternoon and after dark.

Tire Check Can Be Lifesaver

Just how closely are the tires checked on the M151 vehicles in your motor pool?

Standards developed and published by the U.S. Department of Transportation (DOT) say a tire is rejected as unserviceable if:

. Tread has worn down to 1/16-inch deep or wear indicator bars are exposed in any two adjacent grooves in three or more locations spaced approximately equally around the tire.

. Bulges, bumps, or knots are in tread or sidewalls that could indicate internal ply separation.

. Cords are exposed on outer surfaces of tread or sidewalls.

. Cuts are deep enough to expose or damage cords.

The Army requires a minimum tread twice as deep as the DOT requirement. Army criteria for rejecting any M151 series tire are described in TM 9-2320-218-10 as:

. Tire tread depth is 1/8-inch or less, or worn beyond level of wear bar.

. Tires have cuts, gouges, or cracks which would result in mission failure during operation.

Hydroplaning

Over the past 3 years, hydroplaning has been identified as a possible factor in eight M151 accidents. The tendency to hydroplane is affected by three things: the amount of water on the road surface, the speed of the vehicle, and the condition and air pressure of the tires. Any

combination of these factors can cause a degree of control to be lost. Tests have shown that a brand new commercial tire with perfect tread and 20 pounds of air pressure running in 1/2 inch of water will:

. Be partially off the pavement at 28 mph.
. Begin to lose all contact at 37 mph.
. Start hydroplaning on top of the water at 47 mph.

With less-than-perfect tires, the hydroplaning will begin at lower speeds or in less water. The amount of tire tread is less a factor than the tire pressure. Large trucks have no problem with hydroplaning, not because of their weight but because of their high-pressure tires which cut through water film.

Accurate Reporting Essential

All too frequently accident reports contain statements such as:

. The driver said the brakes failed.
. The brakes failed and the driver was unable to stop the vehicle.
. The accident was caused by brake failure.

So far, so good (or bad). But were the brakes TI'd after the accident? What was wrong with them? Was anything wrong with them? Was an equipment improvement recommendation (EIR) submitted when appropriate (block 33 of DA Form 285)? A report that says simply the brakes failed, or maybe they failed, does little to help prevent accidents.

Whenever an accident involves a possible problem with brakes or with any other vehicle component, thorough investigation is essential. Find out what caused the accident and what materiel defect might have contributed. Submit an EIR/QDR in accordance with DA Pam 738-750, The Army Maintenance Management System, and make the DA Form 285 as accurate and complete as possible. Only through conscientious investigation and reporting can materiel-related accident causes be eliminated.

Stop Brake Failures

Faulty brakes are a frequent cause of AMV accidents, especially in 2 1/2-ton and 5-ton trucks. Brake system failure is the largest--maybe even the single greatest--cause of maintenance-induced AMV accidents.

Army vehicle drivers are responsible for keeping their vehicle in safe operating condition and for maintaining its mechanical efficiency. They are the most important single factor in preventive maintenance. Established preventive maintenance checks and services (PMCS) done regularly and thoroughly are the driver's means of ensuring a safe, efficient vehicle.

During the daily maintenance inspection, drivers should pay extra attention to the brake system and check it carefully.

Most brake accidents are caused by failures of brake lines, air hydraulic cylinders, parking brakes, wheel cylinders, and master cylinders. Both drivers and maintenance personnel must pay close attention to these components.

In addition to operating the service brake to determine stopping ability and to setting the hand brake to determine the parking brake's ability to hold the vehicle, the driver should check brake hoses and brake lines. This can be done when looking for evidence of fluid leakage. If a brake hose is stretched, bent, or cracked, it should be replaced. Any brake line that is leaking or damaged should be reported to organizational maintenance so they can replace it. If there is a loose fitting or connector, it should be tightened.

The driver should check the inside area of all four wheels to be sure there are no fluid leaks from the wheel brake cylinders. He can check the hydraulic brake fluid in the master cylinder if he finds the brake pedal sinks too close to the floorboard. To do this, he will need to open the master cylinder, located on the driver's side of the cab floor, and use a flashlight to

see into the master cylinder reservoir to check the fluid level. Lack of fluid in the master cylinder is a frequent cause of brake system failure accidents.

Vehicles are not to be operated with defective brakes. When brakes do not function properly, the driver should leave the vehicle in place and notify organizational maintenance. Maintenance personnel should deadline and physically attach a red tag on any vehicle with defective brakes. When they move the vehicle with defective brakes for maintenance, that vehicle must be towed using an approved tow bar.

Brake failure accidents can be reduced greatly by the following actions:

. Make it unit policy that preoperational checks--with special emphasis and attention on brake systems--be performed by the driver before accepting any vehicle.

. Hold drivers responsible for making these preoperational checks.

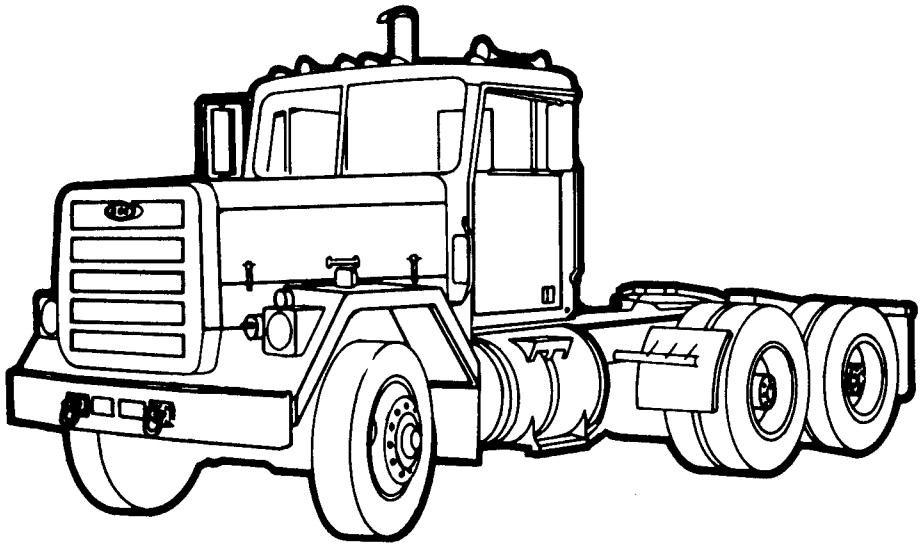
. Have first-line supervisors enforce and supervise the driver's preoperational checks.

. Require drivers to check master cylinder and the inside area of all four wheels to be sure there are no fluid leaks.

. Have drivers start their vehicle, let it move forward about 3 feet, and try the brakes once again. Make sure the brakes hold.

. Require your mechanics to pay special attention to brake systems during periodic maintenance inspections. Have them carefully check brake lines and air hydraulic systems on vehicles for cracks or fractures.

Periodic maintenance, together with the requirement for supervised preoperational brake checks by drivers, is the cure for accidents caused by faulty brake systems.



Use M915 Jake Brake

The driver of an M915 was on a commitment from the tank farm with a load of 5,000 gallons of diesel during a heavy rainstorm. He missed his exit, stopped to ask directions, and was told to turn around and go back the way he had come. He reached 14th gear (35-40 mph) before reaching the 6-percent downgrade and began the descent in that gear. He tried to slow the vehicle down by applying the service brakes. They did not seem to do much. He applied the Johnson trailer hand brake, then the trailer emergency brake, and nothing happened. So he tried the tractor service brakes again, at which time he lost air pressure and the warning buzzer sounded.

At this time the transmission was overridden and effectively neutralized in accordance with TM 9-2320-273-10 and design specifications. The driver lost control of the vehicle, which

proceeded to run through two traffic signs and a traffic light and hit a tree. It then ran along the top of a retaining wall to a garden which was two meters below the road level. At the end of the wall, the rig rolled onto its passenger side on top of a POV in the garden. The impact forced open the front fuel compartment of the tanker, resulting in spillage of 2,500 gallons. Subsequently, a fire of undetermined cause destroyed the tractor and 85 percent of the tanker and damaged the POVs and a storage shed.

The total damage cost of this accident was $276,000.

For those who don't drive M915 series trucks, what TM 9-2320-273-10 says is: "CAUTION - The transmission will neutralize if the vehicle air supply drops below 60 psi." Until a correction is instituted for this problem, as this one grim accident report makes clear, certain other cautions from the TM require strong emphasis:

CAUTION - Pressures below the normal operating range (105-120 psi) indicate a loss in air supply. This will result in a limited number of times the brakes can be applied. . . At the first sign of pressure loss, STOP THE TRUCK AND INVESTIGATE THE CAUSE (pp. 2-4 and 2-5).

In the above accident, of course, the driver was unable to slow the truck, let alone stop it. The main point to make here is to avoid getting in such a situation.

CAUTION - Excessive use of the service brake to control downhill speed will result in loss of braking power because of heat buildup (p. 2-58.1, c1).

Change 1 to TM 9-2320-273-10 provides detailed instructions for use of the engine retarder, called the Jake brake, to slow the vehicle when descending a grade or in any situation where slowing is required but excessive use of the service brakes is not desirable. Following these guidelines might have prevented the above accident as well as others on record, less costly but similar in circumstances. In fact, the principles should be followed conscientiously by all drivers of M915 series trucks and are summarized here since they are well worth knowing--and worth knowing well:

. Proper downhill procedure is to select a gear which will allow the engine with the engine retarder applied to control truck speed with the engine rpm at or below 2,000 and **service brakes applied**. This means **as you approach a downgrade**, progressively select a gear which when combined with the engine retarder will allow you to maintain an engine speed of 1,750-2,000 rpm.

. As engine speed exceeds 2,000 rpm, use one positive application of the service brakes to slow the engine speed to 1,650 rpm, release engine retarder downshift one gear, and reapply engine retarder. Repeat this procedure until engine speed can be maintained between 1,750 and 2,000 rpm.

. In the event engine overspeeds (above 2,100 rpm), make one positive firm application of the service brakes to slow vehicle speed.

. In the event transmission overspeeds (above 2,300 rpm) and totally disengages, perform the following:

--Release engine retarder.

--Upshift.

--Make one positive application of the service brakes to slow vehicle speed and regain control of the vehicle.

. If the transmission totally disengages from the engine due to a shift being made with the engine retarder applied and engine speed has returned to low idle freewheeling, accelerate the engine to reengage transmission.

. If you experience a total loss of braking due to heat buildup:

--Apply engine retarder (place switch in high mode).

--Upshift as engine speed approaches 2,100 rpm. Before each upshift, release engine retarder.

--In 16th gear, continue to apply engine retarder and maintain directional control of vehicle.

In short, driving an M915 series truck requires much skill and care, without which there is a danger of losing service brakes, transmission, or both on a downgrade. Keep it together. Use the Jake brake--and use it right.

M151s Need Correct Wheel Cylinders

The use of incorrect wheel (brake) cylinders on 1/4-ton series vehicles sets up a potentially dangerous situation.

There are two 1/4-ton wheel (brake) cylinders in the supply system. These cylinders are .750 (3/4) inch and 1.00 inch internally measured. Both of these cylinders are identical except for piston size. These wheel cylinders have been installed mismatched as to designated location and size of diameter.

Service brakes, when properly installed and adjusted and with preventive maintenance performed, will stop the 1/4-ton vehicle within 30 feet (9.15m) at a speed of 20 mph (32.18 km/h) on a dry, hard, relatively level, smooth surface when the brakes are applied. Incorrect or mismatched cylinders may cause unequal braking or insufficient stopping ability.

The large cylinder (1.00 inch) is for installation on the front wheels of the 1/4-ton A2 series. The part number and stock number of this cylinder are: 1.00-inch cylinder; PN 11669159, NSN 2530-01-071-9850. The part number is on the wheel cylinder casing. A decal with a **green** background and white lettering is attached to the 1.00-inch cylinder and states that this cylinder is to be used on the front axle of the M151A2 series only.

The smaller cylinder (.750 inch) is for use on the rear wheels of the 1/4-ton A2 series and for all wheels on the 1/4-ton A1 series. The part number and stock number of the smaller cylinder are: .750-inch cylinder; PN 11669158; NSN 2530-01-071-9851. The part number is on the wheel casing. The decal has a **blue** background with white lettering. The decal states the .075-inch cylinder is to be used on the rear axle of the M151A2 and on the front and rear axles of all M151A1 series vehicles.

The next change to TM 9-2320-218-20-1-2 and TM 9-2320-218-34-1 will have the information on the distinctive markings of the two cylinders. The same change to the TMs requires that all four wheels on the M151 series be removed and that brake components be inspected during the semiannual preventive maintenance checks and services. Wheel cylinders are to be inspected for leaks and for proper size.

AMV Convoy Accidents

Rear-end collisions most frequent

Most any day of the year an Army convoy will be on the road somewhere in the world, In too many of the convoys, there will be an accident.

A convoy accident is costly. Sure, a lot of them are only "fender benders." No one gets hurt, so the accidents aren't even reportable. However, fender benders can be costly to a unit.

Time spent in getting the vehicle back to the motor pool, filling out DA Form 2404 or maybe a DA Form 2407 work order, and getting the actual repairs done all add up. If an in-house report of survey is made, that takes away more productive time. If, during this fender

bender, one of the soldiers was shaken up and two or three days later his back started hurting, more days could be lost.

Time spent in paperwork, in recovery and down time of equipment, and the productive work hours lost are all costs to the unit. The costs don't show up on the records, but jobs don't get done, schedules are not met, and mission objectives are "adjusted" for lack of personnel or equipment.

Convoy accidents occur at all hours, but the most frequent convoy accident occurs during the day to a driver who has been on duty 4, 6, or 8 hours; and it will likely be a rear-end collision.

A look at 242 AMV convoy accidents found a number of recurring factors cited as causing the accidents. They were:

. Following too closely or misjudged distance.
. Materiel failure.
. Speed.
. Environmental conditions.
. Civilian vehicle hit AMV.
. Blackout conditions.
. Fatigue.

Following too closely

Following too closely or misjudged distance was listed as a factor in many of the rear-end collisions reported. The sudden stop of the vehicle in front was added as a factor in many of the incidents with following too closely. Speed as a component of following too closely was listed in less than 10 percent of the rear-end collision accidents reviewed.

The guidance for following distance is found in FM 55-30 and in FM 21-305. Adequate following distance means you can stop in time if the driver in front of you suddenly applies his brakes. The safe distance is a combination of your speed, the road condition, the visibility, the condition of your vehicle, and your reaction time (the time required for you to react to a hazardous condition). The average driver's reaction time is three-fourths of a second. The general rule for a car is 20 feet for each 10 miles per hour under good conditions.

Use of the 2-second rule is a good way to maintain distance. Pick a road sign. When the vehicle in front of you passes it, count "thousand one, thousand two." If you pass the sign before "thousand two," you are following too closely. Back off some and repeat the test.

Under normal conditions on an open highway, the safe following distances for trucks are 300 feet in the daytime and 500 feet at night. (Don't get these distances confused with tactical road march distances as stated in FM 71-21). Remember, it would take a 5-ton truck moving at 20 mph 40 feet to stop. Driver perception time and reaction time plus vehicle stopping distance would make it necessary to have 84 feet at 20 mph to stop that 5-ton truck under ideal conditions. Not much time or distance to act!

Under any adverse condition, bad weather, darkness, or even driver fatigue, following distance should be increased. Drivers should give themselves every chance. This extra following distance could be the answer to those 22 reports which indicated "sudden stop of vehicle in front" as the cause of the rear-end collision.

Environmental conditions

A dry, clear, cool day is the dream of an AMV convoy driver, but ice, snow, rain, fog, or dust conspire to cause him to have an accident.

Rain or wetness reduces the friction of the tires against the road. The wetter it gets, the more unsafe will be the posted speed limits. On wet surfaces, keep your speed down. Slow down before you reach a curve. Be cautious when you use the brakes. Give other drivers lots of room. Rain reduces visibility--yours and theirs.

Fog can thicken so quickly your vision is obscured. Keep your windshields clean and use low beam lights, to help a little. Rear-end collisions and running-off-the-road accidents increase during fog. Again, slower is better. The speed depends on the fog, but following distance needs to be increased.

Ice and snow keep being listed as factors in rear-end, impact and running-off-the-road accidents. Ice and snow mean slick roads, and slick roads mean stopping distances are greatly increased. Avoid sudden braking, as it will throw you into a skid.

Dust and smoke can be as thick as fog and obscure your visibility just as effectively. It can cause the eyes to smart and further reduce your vision. In any dusty condition, wear driver's goggles and, of course, slow down and increase stopping distance.

Speed

Speed played the largest role in rollover accidents. In more than half of the reports which stated the vehicle rolled over, "excessive speed for existing conditions" was cited.

Convoy speed depends on the condition of the road and traffic and on the speed of the slowest vehicle. On long moves over rough roadways the speed should not exceed 15 to 20 mph with a prescribed maximum and catch-up speed of 25 to 30 mph. The maximum speed authorized for military vehicles on expressways is 50 mph. Military vehicles moving on controlled access highways will maintain the posted minimum speed, or 40 mph if a minimum speed is not posted. On other than controlled-access highways (conventional roadways), convoy vehicles will attempt to maintain a speed equivalent to the prevailing speed of other users of the highway or 45 mph, whichever is less.

Materiel failure

Materiel failure was cited as a factor in all types of convoy accidents. Typical materiel failures were:

. Tire blew out.

. Generator and air compressor belts broke, causing total failure of the prime mover and trailer brake system.

. Vibration sheared off wheel lug nut, which was not properly tightened.

. Hydraulic brake system failed to function.

. Cotter pin holding the linkage pin in the linkage sheared off, causing the linkage pin to vibrate out. This caused the brake pedal to disengage from the brake linkage, resulting in a loss of brakes.

. Brakes defective due to puncture, chipped or excessively worn brake lining.

. Vehicle was low on brake fluid.

. Brake line fitting to the junction box at the rear wheel cylinder had vibrated loose and the system had lost brake fluid.

. Left front tire came off in traffic because left tire lug nuts were loose.

Convoy commanders are to have all vehicles inspected when they arrive at the convoy assembly area. Minor deficiencies are to be corrected on the spot. If deficiencies are detected that cannot be corrected on the spot, the vehicle should be returned to the unit for replacement. No vehicle should be accepted in a "might make it" condition.

All drivers have maintenance responsibilities. They must perform preventive maintenance checks and services before beginning operations. Drivers are to do a walk-around inspection and PMCS at all halts. As vehicles are being unloaded at destination point before the return trip or at the end of the trip, the driver does post-operation PMCS. On-the-road maintenance is performed by the driver. Mechanics in trail element perform repairs that are beyond the capability of the driver.

A goodly number of the materiel failures cited could have and should have been prevented by proper performance of PMCS. Drivers are the key to a successful convoy operation, but officers and NCOs are responsible for checking the welfare of the troops, security of loads, vehicle performance, and performance of at-halt maintenance.

Civilian vehicle hit AMV or hit by AMV

Army vehicles, as large as they are, are difficult to see in the daytime, and especially so at night. Usually, when a civilian vehicle was reported as hitting an AMV in a convoy, it was reported as being a rear-end collision. These collisions occurred both day and night.

Provisions for making AMVs a little easier to see are found in AR 55-29, paragraph 6e(3), which states: "Convoy vehicles required to operate at night or during period of reduced

visibility will be marked with an L-shaped symbol at the lower corners of their tailgates. The symbol will be composed of a vertical stripe (12" long and 2" wide) and a horizontal stripe (12" long and 2" wide). The symbol may be applied with retroflective paint (MIL-STD P98869), tape, or other reflective material. If paint is used, it may be applied directly to the vehicle surface or to some removable backing material such as masking tape. The length and placement of stripes applied to the rear of small vehicles or towed equipment may be governed by the available flat surface or visibility characteristics of the vehicles."

Reflective tape or paint and a functioning red taillight may give the civilian driver a better chance of seeing an AMV.

Trucks take a great stopping distance even at low speeds. Accidents were reported where civilian vehicles pulled out in front of a convoy and the AMV driver couldn't stop. Some AMV drivers had trouble making turns at intersections when other vehicles were there. At other times, AMV drivers pulled into intersections without looking, tried to pass when the way wasn't clear, and tried to "squeeze" by another vehicle and couldn't.

Proper driver training is essential for a safe convoy operation. Leaders must ensure drivers are trained and licensed and are held accountable for their driving behavior.

Blackout conditions

Overdriving headlights is the most persistent problem of night driving. The eye can perceive objects only half as far at night as it can during the day. When a convoy goes out under blackout conditions, visual problems are definitely increased.

Military vehicles are equipped with blackout marker lights, two on the rear and on the front. Blackout marker lights do not illuminate the road but indicate the position of a vehicle ahead.

To reduce risk in blackout driving, be sure all blackout marker lights are functioning properly. Make sure they are clear of mud or accumulated road dirt. Drive at lower speeds. A man in the rear of a vehicle with a screened flashlight can warn a driver who follows too closely.

Remember, night driving with headlights is like driving by candlelight. In blackout driving, even the candle has been snuffed out.

Fatigue

The majority of the convoy accidents reviewed occurred during the day. However, of those that occurred at night, 74 percent of the drivers had been on duty more than 12 hours at the time of the accident.

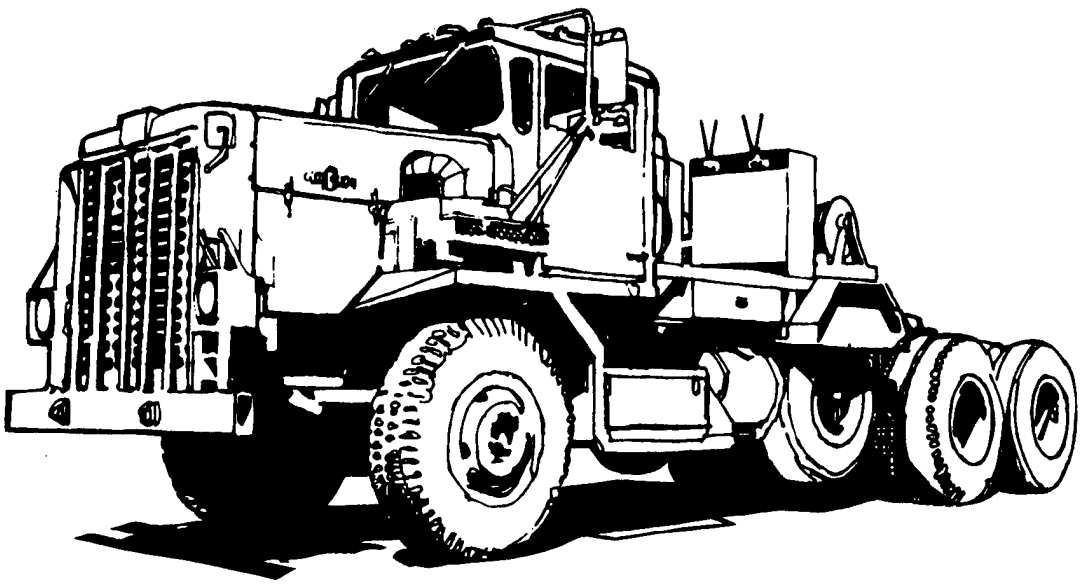
Peak periods for convoy accidents are June, July, and August. Heat would seem to be a factor adding to fatigue of the drivers.

According to AR 55-29, convoy vehicle drivers will be given an opportunity for 8 hours of rest for each 10 hours of driving within a 24-hour period. Rest periods will commence 12 hours before departure of the convoy.

Camouflage Net Causes Hazard

An M813A1 5-ton truck towing an M198 howitzer had the camouflage net stowed between bows of the truck. The net was half on top of the vehicle and half inside the cargo bed when it slipped and dragged on the ground. The net was caught under the wheel of the howitzer. As the net was pulled off, three soldiers were dragged from the cargo bed with it. One soldier was killed.

Camouflage nets inadequately secured or stored can fall from the prime mover and knock or pull personnel from a truck. Assembled camouflage nets (5 hex and 6 diamonds) weigh 300 to 350 pounds. Commanders are urged to discontinue storing camouflage nets on top of prime movers until a secure method of stowage is provided.



Safety Profile--M911 Heavy Equipment Transporter

The heavy equipment transporter (HET) is a big piece of equipment designed to do a big job--pull the M747 semitrailer with a 60-ton payload. For this beast to safely perform its mission, the driver must be properly trained to operate it, to perform maintenance and services, and to load and lash cargo.

This profile focuses on the most common types of HET accidents and corrective actions to prevent them. From FY 81 through FY 84, there were 74 HET accidents reported, with damage costs of $1,143,522. The top six accident causes were:

. Failure to clear - 30.
. Following too closely and excess speed - 11.
. Inadequate maintenance - 7.
. Inattention to ground guides - 5.
. Failure to obey traffic signal - 3.
. Improperly secured load - 2.

Failure to clear

The HET with the M747 trailer attached is around 67 feet long and almost 11 feet high. It takes up a lot of space on the roadway.

. Check height and width clearance of bridges and overpasses. An inch makes a difference when one tries to take a HET through.

. Make sure clearance is adequate before changing lanes and passing other vehicles.

. The HET needs more turning space than most other vehicles. The turn radius of the HET is 43 to 47 feet.

Following too closely and excessive speed

Tailgating with a HET is courting disaster. The HET weighs 39,952 pounds, and even at low speeds it takes some distance to stop. It takes even more with a loaded M747 trailer attached. For example, a HET with a 60-ton load going 20 mph needs about 80 feet to stop.

. Keep a safe interval between the HET and the vehicle in front.

. Maintain safe vehicle speed.

. Remember that weight distribution affects stopping distance. Drivers must be aware that their cargo makes a difference.

Maintenance

There is no substitute for preventive maintenance checks and services (PMCS). Faulty brake systems and bad tires should be found during PMCS and corrective actions taken before the vehicle is driven.

. Check for brake chatter, noise, and side pull.

. Check for proper operation of service and parking brakes. If either is not operating properly, red-tag the HET to ensure it's not driven until the problem has been corrected.

. While tires are cool, check for proper inflation pressure--95 psi for tires on front and pusher axles, and 85 psi for tires on tandem rear axles.

. Be sure to check spare tire.

. Check each tire for unusual wear or damage, objects stuck in tire walls or between treads, and presence of a valve cap.

. Check for loose, damaged, or missing wheel lug nuts.

. Check for damaged wheels, rims, and hubs.

Inattention to ground guides

A ground guide is a must for a HET more often than with other vehicles because it is more difficult to maneuver. A seemingly slight judgment error can be critical.

. Always have a ground guide for backing. If one is not available, the driver should walk around the tractor and trailer to see where and how close obstacles are.

. Drivers should always pay close attention to ground guides, but especially when backing, turning, or trying to squeeze through one of those narrow little streets in Germany.

. Drivers should never move a HET until they are certain they understand the ground guide's instructions.

. Drivers should stop immediately if they lose sight of the ground guide.

Failure to obey traffic light

A surprising number of HET accidents have been caused by drivers failing to stop for a red light. Since the HET has such a long stopping distance, drivers should:

. Start watching a traffic light as soon as it comes into view.

. Be aware when it is a stale green light--slow down.

. Begin stopping when the light turns amber.

. Remember that convoys must comply with traffic signals and other traffic control devices unless proper civil or military authorities direct otherwise.

Improperly secured loads

Loads must be secured. They cannot be transported when simply parked on the trailer.

. Tiedowns must be strong enough to keep the load on the trailer in corners, up and down grades, or in a tilt position, as when the tractor/trailer wheels slip off the pavement.

. When the payload is equipped with a turret, the turret must be locked in position.

Operational cautions

. Don't permit anyone to stand directly behind the HET or trailer during coupling procedures.

. During winching operations, require everyone who isn't involved to stand clear of winches and payload.

. Personnel handling winch cables should wear heavy gloves and never allow the cable to run through their hands.

Reference

. TM 9-2320-270-10, Operator's Manual, Truck Tractor, Commercial Heavy Equipment Transporter (C-HET), 85,000 GVWR, 8x6, M911, October 1983.

Camouflage Net Retention System

The 9th Infantry Division Field Artillery has come up with a solution to the camouflage net problem in their M198 howitzer sections. Other units may find the 9th's solution will work for them, too.

Guidance for transporting camouflage screening systems in M198 howitzer sections comes from FM 6-50, which specifies only that the net be carried atop the 5-ton prime mover. The 9th found that nets couldn't be secured so they would stay put when traveling over rough terrain. The nets were apt to fall from the top of the 5-ton and knock or pull passengers from the bed of the truck. The 9th found this positioning a threat to their troops' safety.

The 9th's solution to this threat to troop safety is a camouflage net retention system. It has three components: full canvas covering from the truck cab to the tailgate, reinforced vehicle canvas bows, and a camouflage net container.

The canvas covering is already part of the truck, and the 9th strictly enforces their policy that trucks run with bows fully canvas covered. Their air guards no longer ride in the rear, and soldiers sit forward in the truck on seats in fixed positions.

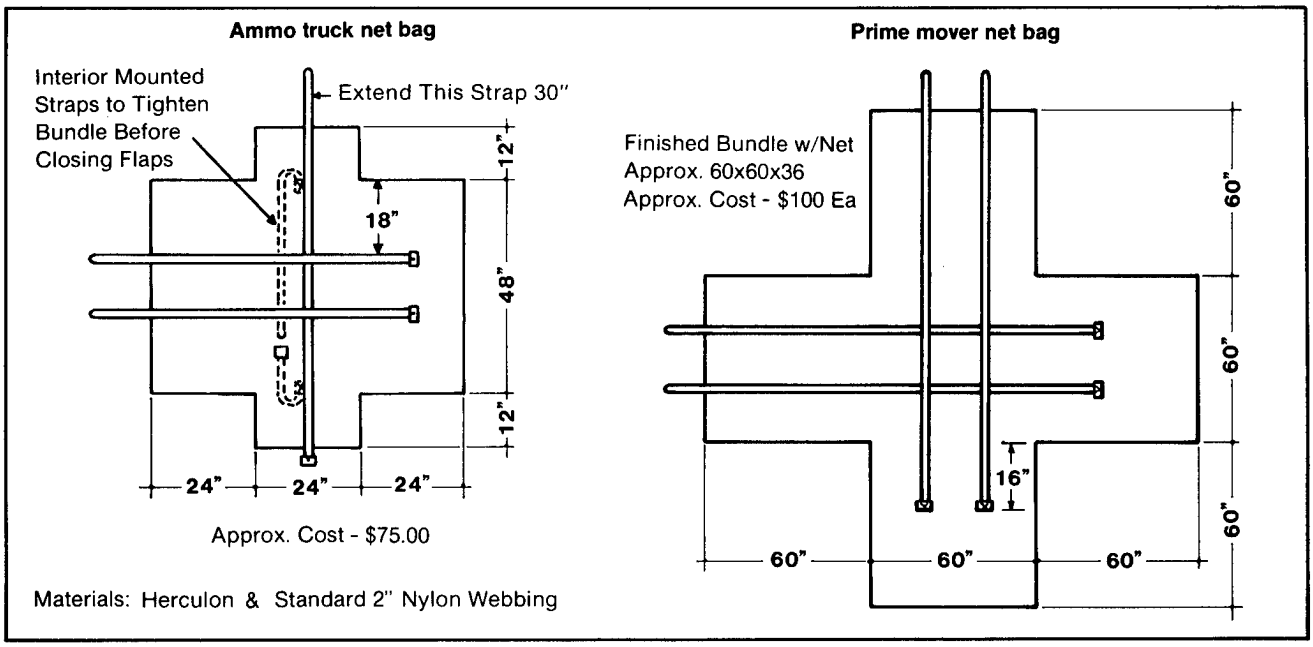
A plywood sheet is placed under the canvas and nailed to the bows. This supports the net container and is strong enough for a soldier to walk on. Two 2x4 diagonal braces reinforce and support the bows and the plywood.

The camouflage net container is a fabric case similar in design but larger than the cover issued with each camouflage screening system. Two nylon tiedown straps pass through loops sewn onto the outside of the case. The straps are then secured to the side of the prime mover with a ratchet-type hook.

The 9th's solution provides two distinct safety advantages over transporting an uncased, rolled net over which tiedown straps have been passed. First, the case loops provide a secure attachment for the net which markedly decreases the possibility of the net falling from the vehicle. Second, in the event the tiedown straps come loose, the net will fall in one encased roll. This will pose little risk to passengers provided they are seated and the cargo canvas is fully extended over the bed of the truck.

An additional advantage of this system is that it is inexpensive and requires a minimum of training to use.

The 9th manufactured and tested a prototype system before conducting additional tests during a battalion ARTEP. The system proved effective during numerous road marches over demanding terrain.



MEK Corrodes M939 Airbrake System

Methyl ethyl ketone (MEK) **cannot replace** methyl alcohol (methanol). MEK has been found in the airbrake systems of some M939 5-ton trucks. Maintenance personnel believe that MEK was substituted for methyl alcohol.

MEK damages the rubber and plastic components of the airbrake system. This damage could cause a high concentration of fumes in the cab of the M939.

If MEK is in an M939 airbrake system, simply purging the system will not repair the damage that has already been done. To correct the problem, TACOM recommends the following procedures for a one-time inspection.

. Contact the local environmental hygienist and run a parts-per-million (PPM) evaluation on the cabs of all M939 series vehicles suspected of MEK contamination. Unacceptable levels are 360 milligrams per meter cubed for a 40-hour work exposure and 310 milligrams per meter cubed for short-term exposure. Methanol exposure should be limited to 15 minutes no more than 4 times per day.

. If the PPM check shows a vehicle has an unacceptable level of fumes in the cab, replace all rubber and plastic components of the airbrake system. Then run another PPM check before putting the truck back into service.

. When M939 checks are completed, send TACOM the serial numbers of any trucks contaminated by MEK, the estimated time they will be deadlined awaiting parts, and the current status of trucks not affected. Send this information to Commander, TACOM, ATTN: AMSTA-MTB, Warren, MI 48397-5000 (AUTOVON 786-8275).

--reference TACOM message 161800Z May 85

Batteries Need Careful Handling

. Sergeant was jump starting a D-8 dozer. When he connected the last jumper cable, the battery exploded in his face.

. Employee was carrying a filled battery when the handle broke. When the battery fell, acid splashed into his eyes.

. Supply clerk was lifting a battery to place it on a pallet when the carrying handle broke. The battery landed on his right foot.

. Mechanic was on top of an M60 handing batteries to his coworker inside. His back made a sudden snapping noise, and he couldn't straighten up.

These are examples of the injuries batteries cause Army personnel. Harmless-looking as they are, batteries should always be handled as if they were potentially dangerous, because they are.

Batteries do splash acid on people, and they do explode. They are also heavy and awkward to handle. In fact, the leading type of battery-related injury involves sprains and strains.

Lifting batteries

There is no quick and easy way to hand batteries down into a tank. It must be done deliberately and cautiously, with alertness, to avoid twisting and overexertion. Mechanical means should be used to move batteries whenever practical. In other situations, two people may do the lifting. The rule to follow is: When in doubt, get help.

Protective equipment

The electrolyte in batteries is corrosive and may splash or drip out. Sealed goggles and rubber or acid-resistant gloves must always be worn when handling them. When performing battery maintenance, people should wear face shields and acid-resistant aprons in addition to the gloves.

The handles of some batteries can become saturated with electrolyte and can become corroded and break. It's safer to use a battery carrying clamp or handle. If the built-in handles are used, the battery should be held away from the body when carried--just in case--and, of course, steel-toed shoes should always be worn.

Battery types

Different types of batteries present different hazards in varying degrees. But all batteries require great care in handling and respect for their injury-causing potential.

Primary cell batteries--nonrechargeable, disposable types such as zinc-air, mercury, carbon-zinc, and alkaline--are in common use. They should be turned in for disposal when they show signs of leaking electrolyte, corrosion, or unusual temperature increase. One type, lithium, is increasing in use in equipment such as night vision devices. The lithium battery is a high energy density power source with highly reactive components. These batteries may emit corrosive and highly toxic chemicals if not handled with care. As is the case with other primary batteries, any attempt to recharge them could set off a violent chemical reaction.

A battery that has a charge-discharge cycle is known as a secondary battery. The most commonly used types are alkaline, with potassium hydroxide solution as the electrolyte, and lead-acid batteries in which sulfuric acid solution is the electrolyte.

The lead-acid storage battery stores power for the electrical system in most vehicles. Proper care of this battery is most important. Excessive charging or discharging shortens the life of the battery and the electrical accessories. Distilled water should be added as needed to keep the liquid (electrolyte) level above the battery plates.

In both alkaline and lead-acid batteries, chemical changes take place during the charge and discharge functions. These changes produce hydrogen gas. This gas, contained in the bubbles you see through the vent hole, can explode if ignited. Ignition sources include the obvious--matches and lighters. Then there are the less obvious sources. Tools falling on batteries and causing a spark have produced many explosions.

Caution your people always to take two precautions to protect themselves from battery explosions:

1. Keep all possible ignition sources away from batteries.
2. Keep face away from battery as much as possible, and use eye protection.

Jump starting

Batteries are prone to explode during jump starting. This is especially so if the jump starting is done incorrectly. Therefore, always have your people wear eye protection, keep their faces well back, and follow proper procedures to the letter:

. Connect only batteries of the same voltage.

. Check dead battery for damage and electrolyte level. Add distilled water if necessary. If battery is damaged or electrolyte is frozen, **do not** jump start. There might be gas pockets in the ice.

. Get the good battery and the dead battery as close together as possible, but don't allow the vehicles to touch.

. Place vehicles in "park" or "neutral" with emergency brakes ON and ignitions, master switches, and all electrical and electronic switches OFF.

. Cover vent openings of both batteries with rags to prevent possible battery-acid splatter.

. Connect one red-end clamp to the positive (+) battery post of the **dead** battery. If you can't see the positive (pos, P, or +) or negative (neg, N, or -) markings on the post, don't guess! Forget it until you can absolutely identify which is which.

. Connect the other red-end clamp to the positive (+) post of the **good** battery.

. Connect one black-end clamp to the negative (-) post of the **good** battery.

. Carefully connect the other black-end clamp to some large metallic part of the dead vehicle's engine block. If the battery is not in the engine compartment, connect to the frame or some unpainted part of the body. This final connection is the one that sparks, so keep it as far from the battery as possible. **Never** connect the cables to the dead battery's negative (-) post. Take special care to keep the jumper cables away from the fan belt or other moving parts.

. Start the working vehicle, and run it at idle. Then start the other vehicle.

. Once the other vehicle is running, immediately disconnect the jumper cables in the exact opposite order from that in which they were connected. The first cable you disconnect will cause a spark, so remove the one farthest from the battery first. This time it's (1) black-end

clamp from engine or frame; (2) black-end clamp from good battery; (3) red-end clamp from good battery; (4) red-end clamp from formerly dead battery.

To jump start or slave start wheeled or tracked vehicles, place vehicles side by side if possible. Otherwise, park them at right angles (with main guns traversed to the rear). Do not allow anyone to be between the vehicles, and clear the front. Vehicles being jump started have been known to jump forward.

For additional jump and slave starting guidelines, consult the applicable vehicle manual.

Precautions

Battery charging areas should be well-ventilated and equipped with eye-wash and shower facilities. If electrolyte gets in the eyes, they should be flushed for at least 15 minutes in running water with the eyelids held open. Complete drenching is called for in cases where electrolyte contacts the body. Follow-up treatment in a medical facility is mandatory.

Incineration of batteries is hazardous and is not an acceptable method of disposal. All unusable batteries should be turned in for disposal in accordance with the appropriate parts manual.

Tires Are Major Safety Device

The second most important safety device on a wheeled vehicle (after the brake system) is its tires.

Correct air pressure is the basis for reliable tire performance. Tires are designed to operate at specified air pressures, which are normally different for light and heavy loads and for different operating conditions. It is important that the pressure be checked at least weekly using an accurate gauge and inflation adjusted as indicated. A tire that appears low during the daily preventive maintenance checks and services (PMCS) should be checked with a gauge, too.

Why all the bother? To help preserve the tires and also the vehicle, driver, and passengers.

. Underinflated tires will give the vehicle a sluggish, squashy feel, and can make the vehicle hard to control in a crisis.

. A tire that's only 25-percent low--hardly enough to see--can lose one-fifth of its useful life.

. Underinflated tires waste fuel.

. Underinflated inner duals can cause costly and dangerous fires.

. A tire that is operated while underinflated will show greater wear on the outside edges of the tread than in the center.

. Overinflation also causes tire failure. Excessive pressure prevents the tire from flexing enough, so that it is repeatedly subjected to hard jolts. The cords may snap, causing a break in the cord body.

. A tire that is overinflated will show greater wear on the center of the tread than on the outside edges.

All inflation pressures are cold inflation pressures. This is the pressure after the tire has been standing for at least 3 hours or driven less than 1 mile after standing for 3 hours. The inflation pressure will increase as the tires warm up. Air should never be bled from hot tires to reduce the pressure to the cold inflation recommendation.

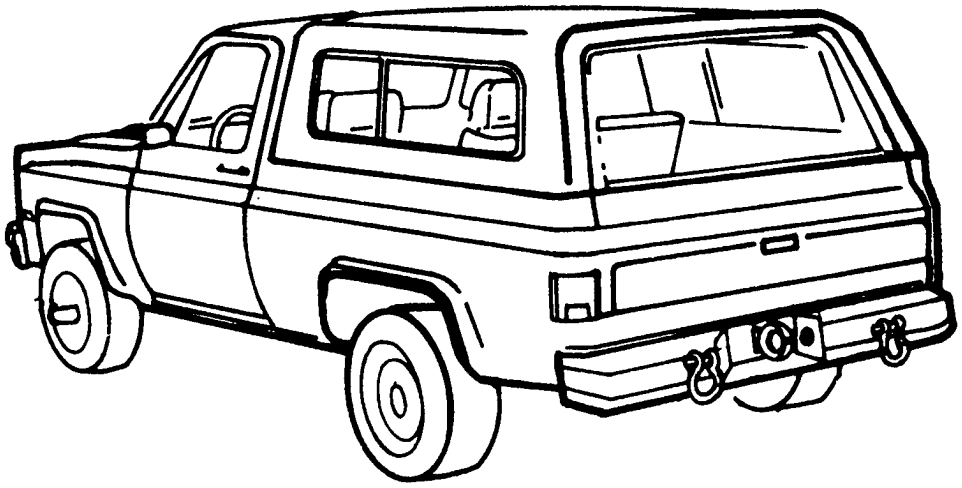
Normally the tire pressure check will be performed in conjunction with the other weekly PMCS. When your unit goes to the field, be sure a tire pressure gauge is included with those minimum-essential tools that go along. A vehicle with its own air supply (2 1/2-ton and larger) also has its own gauge, but be sure there's one available for the smaller vehicles. If a tire is found to need air, you can get it from a wrecker or other air-supplied vehicle.

A daily check of the outside of the tire is essential, too. If it has any gouges or cracks that could cause tire failure, any sidewall or tread bulges that indicate ply separation, tread depth less than 1/8-inch, or exposed cords, replace it before driving the vehicle.

Tires are constantly subjected to cuts by sharp objects and bruises from rough driving surfaces, stones, and shocks in general. It would seem to be plain common sense not to trust

your life to a tire that looks like it's just waiting for the right minute to blow out, but a recent fatal AMV accident began with the blowout of just such a tire.

The daily visual inspection and weekly tire pressure check take only a few minutes, and they are minutes well spent for safety, riding comfort, and protection of equipment.



Safety Profile--M1031 Series CUCV

Two years ago only a few people had heard of a CUCV. By now only a few people haven't driven or ridden in one. According to its acronym, it's a Commercial Utility Cargo Vehicle. When it looks like a pickup truck, it's an M1008, 1 1/4-ton cargo truck taking over for the gamma goat. When it looks a little like a commercial jeep, it's an M1009, 3/4-ton utility truck, taking over many of the functions of the military jeep, the M151 series 1/4-ton utility truck. Other CUCVs look like--and serve as--1 1/4-ton military ambulances (M1010) or commo shelter carrier trucks (M1028).

The utility version is sometimes called a Blazer, which is the name of its commercial look-alike. It's also called a replacement for the jeep, although whether anything could really replace the jeep is open to question. From a safety standpoint, it's a major improvement, being equipped with seatbelts and integrated rollover protection. It is not as prone to roll over as the M151 is, although 25 CUCV rollover accidents have already been recorded.

As stated in TM 9-2320-289-10: Operator's Manual for the M1031 Series Truck, the CUCV is "designed for providing standard tactical mobility required for infrequent off-road operations over selected terrain with the majority of the operations on primary and secondary roads." However, accident records indicate that some drivers have assumed the CUCV could go up hills and down dips at will, that it could maneuver just like the jeep. It can't. Drivers who set out to see what it can do will usually find one thing it can do is get smashed up just like any other vehicle.

Through 15 August 1985, 160 accidents involving CUCVs had been recorded. Analysis of reports indicates the following cause factors:

. Driver inattentive/unobservant - 35.
. Failure to maintain control - 33.
. Failure to follow laws/rules/procedures - 30.

. Speed too fast for conditions - 23.
. Not at fault (struck by other vehicle) - 23.
. Driver fell asleep - 7.
. Alcohol - 6.
. Materiel failure - 2.
. Untrained driver - 1.

Driver inattentive/unobservant and failure to maintain control

These are common cause factors for vehicle accidents in general. Operating a vehicle requires a person's full attention. Drivers must learn to discipline themselves to concentrate on driving and leave to a more appropriate time everything else, such as checking on papers or equipment being carried in the vehicle, studying the scenery, and daydreaming.

Failure to follow laws/rules/procedures

This category includes trying to make the vehicle do what it's not designed for, in disregard of the operator's manual. To prevent accidents due to this cause, ensure CUCV drivers are--

. Well trained.
. Properly supervised.

Speed too fast for conditions

The speed limit in effect on a particular road or range is a maximum. Drivers should reduce speed as appropriate--

. In open country.
. On unpaved or rough paved roads.
. On winding roads.
. When approaching curves and corners.
. After dark, especially while using night vision devices.
. When rain, snow, sleet, dust, or fog is present or the road is slick from recent precipitation.
. When traffic is heavy.
. Any time driving conditions are not ideal, which is probably most of the time.

Not at fault

Drivers should always drive defensively, be on the alert for the unexpected, and of course wear safety belts.

Driver fell asleep

Supervisors should ensure driving is not entrusted to personnel who are likely to be fatigued.

Alcohol and untrained drivers

Proper supervision, vehicle control, and dispatch procedures should prevent accidents due to these causes.

Materiel failure

Conscientious preventive maintenance checks and services will prevent most accidents of this type.

Remember, M1031 series trucks are under warranty in accordance with TB 9-2300-295-15/24. All defects not due to overlooked maintenance should be reported to organizational maintenance.

See also TACOM safety-of-use messages:

. DRCPM-TVLC, 271900Z Apr 84, concerning M1010 electrical problems.
. AMSTA-MTA, 061600Z May 85, concerning fuel leakage due to defective fuel filter assembly base.

References

. TM 9-2320-289-10: Operator's Manual for Truck, Cargo, Tactical, 1 1/4-Ton, 4x4, M1008; Truck, Cargo, Tactical, 1 1/4-Ton, 4x4 M1008A1; Truck, Utility, Tactical, 3/4-Ton, 4x4, M1009; Truck, Ambulance, Tactical, 1 1/4-Ton, 4x4, M1010; Truck, Shelter Carrier, Tactical, 1 1/4-Ton, 4x4, M1028; Truck, Chassis, Tactical, 1 1/4-Ton, 4x4, M1031, April 1983.

. TB 9-2300-295-15/24: Warranty Procedures for Truck, Cargo, Tactical, 1 1/4-Ton, 4x4, M1008, M1008A1; Truck, Utility, Tactical, 3/4-Ton, 4x4, M1009; Truck, Ambulance, Tactical, 1 1/4-Ton, 4x4, M1010; Truck, Shelter Carrier, Tactical, 1 1/4-Ton, 4x4, M1028 and M1028A1; Truck, Chassis, Tactical, 1 1/4-Ton, 4x4, M1031.

Tank Unit Mounted on Trailer is Unsafe

Mounting and moving the liquid dispensing 600-gallon petroleum tank unit on the M105 series 1 1/2-ton trailer is a safety hazard. **This tank unit will not be used on the M105 series trailer.** This is a permanent, nonwaiverable, peacetime operational restriction. This restriction applies to M105, M105A1, and M105A2 series two-wheeled, 1 1/2-ton cargo trailers with equipment and to all models and NSNs of the tank unit.

The tank unit may be used for stationary fuel storage when placed on the ground. It may be mounted on 2 1/2-ton and 5-ton cargo trucks if it is properly blocked, braced, and tied down to prevent lateral and longitudinal movement.

Use of the tank unit on any trailer or vehicle other than the 2 1/2-ton or 5-ton cargo truck must be approved on a case-by-case basis. Approval must be given by the PM, Petroleum and Water Systems (AMCPM-PWS), St. Louis, MO (AV 693-2613), and by the PM, Tactical Vehicles (AMCPM-TV-S), Warren, MI (AV 786-8652).

This restriction comes because the tank unit on the trailer is inclined to overturn. This occurs because:

. The tank unit/trailer combination is overloaded and has a dangerously high center of gravity.

. The tank unit lacks regulatory rollover protection.

. The trailer has a single axle which does not meet certain overseas regulatory dual-axle requirements.

. Tiedowns do not meet certain overseas regulatory requirements.

. Use of the tank with a less than 600-gallon load makes the problem worse, because of fuel movement and CG shifts.

There are no immediate or near-term solutions to this problem. Available options require new trailers. But because of funding restraints, FY 88 is the earliest trailers could be funded, and they would not reach the field until FY 89 or FY 90. TRADOC is evaluating alternatives to the 600-gallon tank unit with trailer and will develop a requirement document if needed.

--from TACOM message, AMSTR-MES, 061700Z Sep 85

Your QDR/EIRs Make A Difference

Every Army publication sooner or later exhorts its readers to "send in those QDR/EIRs." So, a soldier spots a problem and fills out an SF 368: Quality Deficiency Report/Equipment Improvement Recommendation (QDR/EIR). An acknowledgement of receipt and eventually a report of the action taken goes to the soldier. And changes are made. The system works.

Too often the reason you must live with a problem so long is that no one bothers to submit a QDR/EIR. Until a deficiency in equipment is known, it cannot be corrected. If an SF 368 is sent as a result of an accident, or is safety related, include the QDR/EIR number in block 33 of DA Form 285, U.S. Army Accident Investigation Report.

Your QDR/EIRs do make a difference. Take a look at some changes TACOM has made because of them.

. **Problem.** M35A2 2 1/2-ton truck synchronizers, NSN 2520-00-752-1581, were either too thick or tapered at the wrong angle to match gears, causing a lockup.

. **Solution.** TACOM Engineering reviewed the QDR submitted and found that the crux of the problem was in the dimension between the two rings. This dimension did not exist on the drawings. TACOM Engineering revised the drawings to show the distance between the two rings.

. **Problem.** The ball studs in the steering lever assembly, NSN 2510-00-592-2258, of the M39 series 5-ton trucks would loosen and/or pull out, causing partial or complete loss of control. The ball studs were tapered and were not tight in the lever arm. If the ball stud ends did not protrude 1/16-inch through the lever arm, the ends could not be mushroomed against the lever arm to secure them in the assembly.

. **Solution.** The assembly and detailed drawings were updated to correct design errors and clarify notes to ensure machining, hardening, and securing the ball studs in the lever arms. Field users were given inspection and disposition procedures regarding defective steering lever assemblies.

. **Problem.** The cargo body of the M884 1 1/4-ton truck with the S-250 shelter was breaking loose from the forward mounts. The shelter kit front tiedowns were connected to the cargo bed and not to the truck frame.

. **Solution.** The QDR not only stated the problem, it recommended the solution. The front tiedowns were anchored to the vehicle frame by extended bolts (through the body) attached by a piece of flat steel straddled underneath the frame rail.

. **Problem.** The fire extinguisher safety pin retaining cable on the M2/M3 Bradley Fighting Vehicle formed a loop when in the operational position. When the turret was traversed, the loop caught on the ammo can switches, sometimes setting off the fire extinguisher.

. **Solution.** An engineering change proposal was submitted which incorporated the use of a plastic tie wrap to hold the cable to the neck of the fire extinguisher. This solved the problem.

. **Problem.** When loosening the bolts on the M60A1 and M728 cupola hatch cover with the hatch at a 45-degree angle, the spring tension was too strong for the bolts to hold. Also, the bolts would bend or break before removal was completed, and the hatch would collapse.

. **Solution.** An engineering change proposal revised the loader's and commander's hatch by replacing Grade 2 hinge screws with Grade 8 screws. Further, installing them with a thread locking compound prevented failures requiring field repair.

Safety Warning for Nontactical Semitrailer Van

The nontactical semitrailer personnel van, MIL-S-45344, NSN 2330-01-090-7846, used to transport troops at training facilities, can be dangerous. The following instructions are given to make using the van safer.

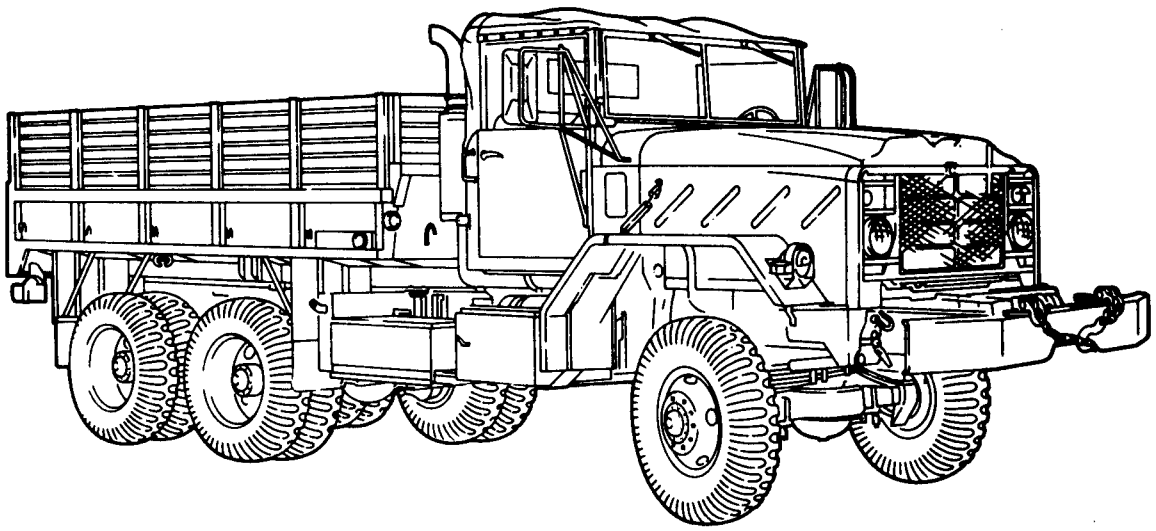
. Guidance in AR 385-55, chapter 2, paragraph 2-17, should be followed to move personnel safely.

. Users of the semitrailer van should include the following safety warning as part of the operator's requirements and should use a decal or written insert to update the operator's handbook. "Safety warning: The semitrailer personnel van shall not be driven at more than 35 mph. In intrapost service or other short runs where road conditions are favorable and state or local laws are not violated, personnel may be permitted to stand when all the seats are full, as long as the number of people standing does not exceed half the number of those seated. However, all seats must be full before anyone is allowed to stand."

. Only experienced drivers shall transport personnel in this vehicle.

. A weekly inspection shall be performed on the semitrailer's upper fifth wheel plate before mating the tractor vehicle. This inspection is to ensure the kingpin and fifth wheel plate have not deformed or been damaged and are securely attached to the mounting surfaces. If the inspection reveals deformity or damage, the affected equipment should be deadlined until corrective actions have been taken.

--TACOM messages, AMSTA-MVA, 101500Z Oct 85 and 181800Z Sep 85



Safety Profile--M939 Series 5-Ton Trucks

The M939 series 5-ton 6x6 truck is designed for use on all types of roads and terrain. Improved versions of the older M809, these trucks are more reliable and easier to operate. Some major improvements are the automatic transmission; improved electrical, cooling, and steering systems; a complete air brake system; tilt hood; a three-crewmember cab; and a hydraulically powered front winch. Although all 20 models of the M939 have the same engine and transmission, they were designed to perform a wide spectrum of missions.

Fifty-three M939 accidents were reported from April 1984 through August 1985. The four top accident categories were--

. Failure to clear or yield.
. Excessive speed.
. Environmental or terrain conditions.
. Following too closely.

Failure to clear or yield

Conducting proper PMCS and ensuring that rearview mirrors were securely mounted and properly adjusted could have prevented many of these M939 accidents.

Changing lanes in traffic can be a problem because the driver's compartment offers limited visibility. Before changing lanes or turning left, M939 drivers should signal their intent well in advance and make a visual check for traffic.

Excessive speed

Vehicle speed must be adjusted to road and traffic conditions, especially in dusty or inclement weather. Ice, snow, and rain on the road greatly increase the vehicle's stopping distance. Cargo weight and the type of trailer being towed will also affect required stopping distances.

Environmental or terrain conditions

Drivers should always be aware of the condition of the shoulders of the road, especially on unimproved roads. They can collapse without warning, causing the vehicle to overturn. Drivers should not spin wheels when placing vehicle in motion in heavy rain or muddy conditions. Pump brakes gradually when stopping vehicle on wet or slippery roads. Sudden stops will cause vehicle wheels to lock, engine to stall, and loss of steering.

Following too closely

This error is usually associated with excessive speed. A driver should always adjust vehicle speed to traffic conditions. A good rule of thumb is to maintain at least 2 seconds' separation from the vehicle ahead.

All four of these accident factors could be reduced by a good driver training program. Commanders and supervisors must ensure that M939 drivers are fully qualified to safely operate the trucks.

References

. AR 385-55: Prevention of Motor Vehicle Accidents
. AR 600-55: Motor Vehicle/Equipment Driver/Operator Selection, Training, Testing and Licensing
. FM 21-305: Manual for the Wheeled Vehicle Driver
. FM 55-30: Army Motor Transport Units and Operations
. TM 9-2320-272-10: Operators Manual, M939 Series

Safety Profile--M977 Series HEMTT

The M977 series heavy expanded mobility tactical truck (HEMTT) is the new heavyweight on the block. This family of vehicles is produced in five models: the M977, M978, M983, M984E1, and M985. The HEMTT series includes two cargo versions, a fuel tanker, a truck tractor, and a recovery vehicle.

The vehicle is an all-wheel drive 8x8 with front tandem steering axles. Power is supplied by a detroit diesel 8V92TA that produces 445 horsepower routed through a 4-speed automatic transmission and a 2-speed transfer case.

These trucks are used for direct rearming of the multiple launch rocket system, to transport Patriot and Pershing II erector/launchers, to resupply field artillery ammunition, and to refuel tracked and wheeled vehicles and aircraft in the forward areas. The gross vehicle weight ratings range from 62,000 to 95,000 pounds.

From 1 January 1984 to 1 August 1985, a total of 14 HEMTT accidents, costing $247,472, have been reported. Analysis of these accidents shows that 10 resulted from recurring causes. The following factors were major contributors:

. Rough terrain - 4.
. Improper/no ground guide - 4.
. Excessive speed - 2.

Rough terrain

The HEMTT is equipped with seatbelts, but they don't do much good if they're not worn properly. In three accidents, the vehicle hit a hole or dip at 5 to 7 mph, causing the passengers to be thrown upwards, striking their heads on the roof of the cab. Luckily, they were wearing steel pots.

The HEMTT's high spring rate makes for a jar when hitting a bump. All personnel should wear their seatbelts and keep them snug, especially during off-road HEMTT operations.

Improper/no ground guide

A ground guide is a must any time the HEMTT is being backed or operated in a congested area. The HEMTT stands over 9 feet tall, measures 8 feet wide, and is up to 33.4 feet long. It's just too much vehicle for drivers to visually clear by themselves. Drivers should--

. Always use a ground guide when backing. If one is not available, the driver should walk around the vehicle to see where and how close obstacles are.

. Always pay close attention to ground guides. If at any time the ground guide's signals are not understood, the driver should not move the vehicle. And if drivers should lose sight of the ground guide, they should stop the vehicle immediately.

Excessive speed

When most people think of excessive speed, they visualize a vehicle traveling at 60 or 70 mph. Not true. With the HEMTT, speeds of only 25 to 30 mph can be too fast depending on road conditions, weather, and the load carried.

Note: The primary purpose of the HEMTT is to transport cargo. Transportation of personnel in the cargo box is NOT authorized (see TACOM message 020000Z Oct 85).

Chock 'Em Up!

It can sure mess up the day if your parked truck or trailer takes off downhill and hits a tree--or worse.

The brakes will usually hold, but why take chances? Carry chocks, NSN 2540-01-052-6234, on your 2 1/2-ton and 5-ton trucks. These chocks will be showing up in the AAL of the dash-10 TM for your truck. Your CO can authorize them.

It doesn't cost much to carry chocks on all trucks and trailers. Your shop can make them from scrap lumber.

A chock on hand will do as a pattern for size and locating bolt holes. Here's the hardware needed:

. Nuts - NSN 5310-00-880-7744
. Washers - NSN 5310-00-809-3078
. Bolts - NSN 5306-00-358-6518

Whether you're chocking a truck, a two-wheeled trailer, or a semitrailer, always use two chocks.

On level ground when you're chocking a trailer that's not hooked to a truck, set chocks in front of and behind wheels on each side.

If your truck or trailer is parked on a slope, place both chocks on the downhill side.

Before you get on the move, stow the chocks in their brackets, tool stowage compartments, or any other handy place.

--from PS Magazine

Tire Servicing the Safe Way

Soldiering can be hazardous duty even in peacetime--especially if you're around weapons, ammunition, explosives, or . . . tires!

Mechanics--and drivers too--are handling what amounts to a loaded, cocked gun when they service a tire on a multi-piece rim. This "gun" has a hair trigger. Missing any tiny detail during deflation, disassembly, assembly, or inflation can set it off.

A fully inflated truck or bus tire rams tons of pressure against the rim lock ring. If the lock ring blows off, it travels with tremendous force, sometimes over a surprising distance. Even if it misses the mechanic, it can take out a bystander in the area of trajectory.

That's why one of the first rules in your training is "always inflate the tire in a safety cage."

Warning

Never--but NEVER--go by this instruction found in some TMs: ". . . if safety cage is not available . . . lay the tire flat, with ring down, and reach through wheel to apply air chuck."

True, if the lock ring blows off, it will go down. But the tire and rim will go up like they were shot out of a cannon. There's even danger in tires on single piece rims. A tire explosion can blast with the force of a bomb!

OSHA standard applies

Servicing tires--especially those on multi-piece rims--is no job for the untrained . . . or for the foolhardy. A person's first mistake can be his last!

People who service certain types of tires and rims must be trained under OSHA Standard 1910.177. It covers servicing multi-piece and single-piece rim wheels used on large vehicles such as trucks, tractors, trailers, buses, and off-road machines. The standard applies to many vehicle drivers and other equipment operators as well as to mechanics who disassemble and assemble tires and rims. Simply "airing up" a soft tire can be dangerous. A tire that's been rolling on only 80 percent of its specified pressure can be a fuzed bomb. The lock ring may have shifted and can blow off when air is added to the tire.

Tire training for mechanics includes use of two charts:

. Safety Precautions for Mounting and Demounting Tube-Type Truck/Bus Tires.

. Multi-Piece Rim Wheel Matching Chart.

The OSHA standard tells how to get these charts.

--adapted from PS Magazine

Stand 'Em Safely!

A jack stand can handle a heavy load, but only if used correctly and safely. Here are the important rules to remember.

. Park the vehicle on a level, hard surface.

. Shut off the engine.

. Set the handbrake.

. Chock the wheels not being raised.

. Raise the entire axle. Never one end and then the other. This places an uneven strain on the jack stand. It might break or fall.

. Always use jack stands in pairs.

. Keep 'em straight--no more than 5 degrees from vertical.

. Use jack stands under a loaded vehicle only in an emergency.

. Lower the vehicle slowly onto the stands.

. Center the load on the jack saddle and be sure the rack and pawl is engaged.

If your jack stand is damaged even slightly, it's not safe. Don't use it!

For shop-type lifting operations, use a 10-ton capacity floor jack, NSN 4910-00-289-7233, and a 7-ton capacity jack stand, NSN 4910-00-251-8013.

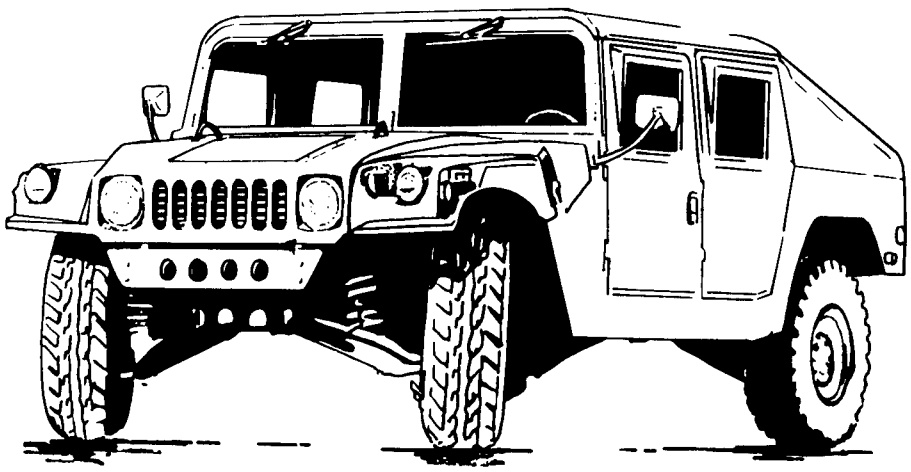
--from PS Magazine

HMMWV to Replace Jeep

There's a new kid on the block, a tough kid who's ready to replace the Army's old workhorse, the M151 "jeep."

The new kid is known as the M998 series HMMWV (High Mobility Multipurpose Wheeled Vehicle). It is so new that it has no accident history, and the Army would like to keep it that way.

The HMMWV was designed to meet the 1/4- to 1 1/4-ton wheeled vehicle requirements of the battlefield of the 1980s and beyond. A 4x4 wheeled vehicle, the HMMWV consists of a common chassis that accepts various body configurations to accomplish combat, combat support, and combat service support roles.



In combat roles, it will be configured as a weapons carrier to support antiarmor, reconnaissance, air defense, rear area combat operations, and base defense. In the combat support role, it will be used in fire support; close air support; target acquisition; command, control, and communications; battlefield obscuration; and NBC reconnaissance. In the combat service support role, it will be used for administration, logistics, and medical evacuation.

The basic chassis with common drive train, diesel engine, automatic transmission, disc brakes, and power steering will provide increased mobility, agility, and capability of ballistic protection over those vehicles it will replace.

The chassis has a 130-inch wheelbase and double A-frame independent coil suspension stabilized by front and rear torsion bars. This coupled with variable-ratio power steering, a wide track vehicle design, low profile tires, and power-assisted disc brakes combine to provide the Hummer excellent handling characteristics and increased stability.

The power train consists of a 6.2-liter diesel engine capable of delivering 130 horsepower and 240 foot-pounds of torque, an automatic 3-speed transmission, and a dual range (high/low) full-time 4-wheel-drive transfer case. This power-train combination makes for a vehicle that accelerates like a sports car and pulls like a tractor.

The body is made of aluminum and has four doors for side access. It also has a fold-down, removable windshield frame which functions as a roll bar when upright. The center post that supports the rear doors and the canvas doubles as another roll bar. For added safety, the HMMWV is equipped with seatbelts. These seatbelts not only reduce the chance of injury in an accident, but they also keep occupants from being bounced around while traveling cross-country. (A word of caution: the seatbelts are nonretractable and must be manually snugged up.)

Ground clearance of 16 inches, silhouette height of 69 inches, width of 83 inches, and a short wheelbase give the HMMWV a low center of gravity with the capability to negotiate high steps or obstacles and 30 inches of water without preparation.

The combat-loaded HMMWV-TOW weighs about 7,900 pounds and has ballistics armor over the crew to stop small fragments and shrapnel. The TOW vehicle configuration provides for a crew of three. When the TOW system is mounted on the HMMWV, special safety precautions outlined in the TOW operator's manual must be followed.

New equipment often has bugs that must be worked out, and the HMMWV is no exception. Its transmission has no park position, and there have been incidents where the vehicle was started in gear. This is possible when the neutral start switch malfunctions or becomes packed with dirt. Operators should ensure the transmission is in neutral and the parking brake set before starting the engine. Wheel chocks should be used as a precautionary measure when the vehicle is parked on a hill.

The HMMWV's service brake pedal is also a problem. TACOM and the manufacturer are working to replace the pedals of fielded vehicles. Units should ensure their HMMWVs have been modified with the new brake pedals.

A problem has been identified with the noise barrier insulation installed under the hood and on the firewall. Until the problem is corrected, drivers and all passengers must wear hearing protection.

The Army is working to correct all identified problems and provide a safe vehicle to the field.

Safety Belts and Tactical Vehicles Go Together

Safety belts and tactical vehicles--at last they DO go together. In convoys, in the field, and in garrison, more and more tactical truck drivers and passengers are able to buckle up.

For some years restraint systems were in only M880 series trucks and some truck tractors. They were in the supply system for the M151, but you didn't see too many installed. Now the CUCV and the HMMWV have come along complete with seatbelts.

Indications are that safety belts have already had considerable impact in preventing injuries. A review of first half FY 86 accidents involving seatbelt-equipped tactical vehicles is very encouraging. Of the 133 drivers and passengers whose use or nonuse of seatbelts was reported, 112 did use the restraint. Of this group, 99 (88 percent) were uninjured except for a few cases of minor first aid. Some experiences:

. The soldier was operating an M1028 1 1/4-ton cargo truck at excessive speed on a country road during daylight hours. He entered a curve with limited visibility and collided head-on with an oncoming POV. The soldier was wearing a seatbelt, and his injuries were minor.

. The soldier fell asleep at the wheel of his M1008 cargo truck. The truck left the road and overturned in an adjacent field. Damage to the vehicle was extensive. The soldier unbuckled his seatbelt, kicked open the driver's door (which was jammed), and walked back to the road. A civilian gave him a ride to his company headquarters to report the accident.

. The soldier was driving an M1009 utility truck down a sharp incline on a banked curve on an unpaved road packed with ice topped by snow. The tires suddenly lost traction, causing the truck to slide off the road and down a steep slope. Realizing he could not stop the vehicle, the driver removed his safety belt and jumped out. The rear end of the truck slid in his direction and ran over his legs. The vehicle came to rest at the bottom of the slope, 125 meters from where it left the road. The senior occupant, who had remained in the vehicle with his seatbelt fastened, was uninjured.

Probably some of these soldiers used the safety belts only because AR 385-55: Prevention of Motor Vehicle Accidents requires it. Some would have used the belts anyway, because they'd made a decision in favor of themselves: they'd acquired the seatbelt habit. Likely all those who lived through rollover or head-on accidents have by now acquired the habit and buckle up in their own vehicles, too.

On the other hand, the reports examined showed that 21 people who had safety belts available were not using them when the accident occurred. Only 9 of the 21 came out of their accidents without a lost-time injury! For example:

. The soldier was driving an M1008 cargo truck on a tank trail at about 15 mph. His vision was impaired by a pitted windshield, and he was not wearing a safety belt. When the truck hit a large rock, the driver's head hit the windshield, injuring his neck.

Such accidents can be effective, though costly, learning experiences, and should help increase the number of Army safety-belt believers. But accident reports show there are still a few who need some sort of convincing to ensure they buckle up every time. NCOs can convince them.

NCO action could have prevented some of the accidents cited above where driver errors such as speeding or driving when fatigued were involved. In any case, an important standard is 100-percent use of safety belts in vehicles equipped with them. NCOs can make it happen.

Skids, Slides, Lost Visibility: Hazards of Winter Driving

A review of FY 86 winter Army motor vehicle accidents looks like a rerun of the previous winter and the one before that--same icy roads, same sequence of events, same operator errors. In fact, every one of 1986's more than 200 icy- or snowy-road accidents involved one or more of the factors discussed here.

Inability to get out of the way

. The road was covered with snow although it had been recently plowed. High snowbanks on both sides left barely enough room for two vehicles to pass. The driver of an M1009 CUCV was traveling downhill at 5 to 10 mph when he saw a POV about 100 meters away. The vehicle was partially in his lane, approaching at about 10 mph. Both vehicles moved to their right to clear each other. The CUCV was in 4-wheel drive and as far to the right as the snowbank would allow. The rear of the POV slid into the left side of the M1009. Road conditions were red.

The message here can't be overemphasized: When conditions are as bad as they were in this case, **stay off the road** unless the trip is so mission essential that it's worth risking considerable vehicle damage--$1,700 worth in this case--and possible injury. If the trip is that necessary, put on chains and hope other drivers do, too. And if your vehicle has safety belts, use them.

Failure to anticipate or recognize hazardous road conditions

. The soldier was operating an M35A2 truck with trailer and 15 kilowatt generator. The rig hit a patch of black ice at about 45 mph while changing lanes. The trailer jackknifed and flipped over onto its right side.

When the temperature is near or below freezing, even if the roads seem clear, always be ready for unexpected patches of ice, and reduce speed accordingly. If the road or any patch of it looks wet, it may well be black ice--a thin covering of ice that is very slippery.

Inability to stop

. When the CUCV pulled up to a stop sign, ice caused the vehicle to slide on past the sign and into the intersection, where it was hit by an oncoming vehicle.

Those persistent driver errors, driving too fast for conditions and following too closely, often result in inability to stop in time to avoid a collision. To stop on ice from a speed of 20 mph takes 133 feet, about what it takes from a speed of 55 on dry pavement. If you double the 20 mph to 40, braking distance increases by the square of the increase in speed; that is, by two times two or **four times**. The 133 feet quadruples to 533 feet. Of course, long before sliding that far, a vehicle will likely have gone off the road or collided with something.

The slipperiness of ice and packed snow varies along with the temperature. In the course of one trip it might improve considerably--or become much worse. Braking distance from only 20 mph at around 32 degrees F. can be as much as 260 feet, about twice what it is at zero degrees. It's important for drivers to pay attention to changes in the feel of the road and to keep in mind that 20 mph can be much too fast when approaching any situation where stopping may be needed.

Locked brakes

. There was snow on the autobahn when the driver of an M35A2 2 1/2-ton truck moved into the left lane to pass a furniture truck. He then decided against passing, veered back into the right lane, and applied the brakes. The wheels locked up, causing the 2 1/2-ton truck to slide into the guardrail, bounce off, and collide with the left side of the furniture truck.

When wheels lock, they cannot develop any cornering force, and steering control is lost. On slick roads, everything should be done cautiously and methodically. The first rule is to

keep your speed down so that when it's necessary to slow a little more, it can often be done by simply easing off the throttle. When braking is needed, **sque-e-e-eze** the brakes. This is done by applying a little pressure to the brake pedal and then continuing to increase the pressure steadily but not too fast. The wheels will still be rolling, maintaining some steering control.

In the past, pumping the brakes was emphasized in this type of situation. In some instances, pumping can be effective, but it must be done lightly and skillfully. Squeezing is a more reliable way to achieve controlled braking.

Skidding and sliding

. While traveling at about 55 mph on the autobahn, the soldier lost control of the CUCV when it hit a patch of black ice. The vehicle slid to the right and hit the guardrail. It then slid off the guardrail and spun around, losing the left rear wheel. The CUCV finally came to a stop at about a 90-degree angle to the guardrail. The driver of a following POV lost control on the same patch of ice and slid into the left rear of the CUCV.

Skidding and sliding are caused most often by driving too fast for conditions. Braking and jerky steering are other common causes. The most effective preventive measures:

. Stay off icy roads.

. Reduce speed.

. Keep as much room as possible between your vehicle and any ahead of, behind, or beside you.

. Stay in control. Keep your hands at the 9 and 3 o'clock positions on the steering wheel. Then if you must steer around an obstacle, you can do so without the momentary loss of control that results from taking one hand off the wheel.

. Use controlled braking.

If, despite all precautions, your vehicle starts to slide, remember the cardinal rule of winter driving: Do everything with a light touch. Gently ease off the accelerator while steering in the direction you want to go. You want to regain control; you won't if you overcorrect. Stay off the brakes if possible. Otherwise, use a squeezing-type pressure on the pedal.

Restricted or zero visibility

. The soldier was driving an M1008 CUCV at about 20 mph downhill on a range road. The road was slippery and visibility poor due to heavy snow and fog. When he applied the brakes, he lost control of the vehicle. It exited the left side of the road and rolled over completely. The soldier had his safety belt fastened and was not injured.

It's best to wait out a snowstorm. If one comes on suddenly in a training area, it may be possible to slow way down and reach a destination safely. But on a public road, zero visibility leads to a no-win situation. If you don't slow way down, you're likely to hit the vehicle ahead; if you do slow down, you'll surely be hit from behind. If you can, pull off the road--well off, as far off as you can get--set out warning devices, and wait for the storm to subside.

Training is the key

Driving on ice and snow is a proposition separate and distinct from normal day-to-day driving. Because it requires its own unique set of skills and a special attitude of concern, special **training** is essential.

The Committee on Winter Driving Hazards of the National Safety Council conducts a winter and emergency driving workshop each year. The workshop is designed to give driving instructors hands-on experience in maintaining vehicle control and avoiding obstacles on icy surfaces, as well as ways of teaching the skills to others. Participants come away from the workshop with a whole new respect for the difficulties of driving on ice and the degree of care and concentration it requires. They are then able to pass their skills and knowledge to others. Installations with freezing, snow, icy winters should consider sending a driver trainer to the workshop.

Winter PMCS

You can't control the winter weather.

You can't do much about other vehicles on the roads except to be alert, drive defensively, and try to stay away from them.

Fortunately, you can control the condition of the vehicle that's dispatched to you through your before-operation preventive maintenance checks and services (PMCS). Cold and ice and traffic are enough to be concerned about; it helps to know your vehicle is winter roadworthy. Pay special attention to:

. The exhaust system. Carbon monoxide leaking into a closed vehicle can be lethal.

. Heater and defroster controls. Check for proper operation, and check cables for correct attachment.

. Windows, mirrors, and lights. Be sure they're clean and the windshield wiper works well. Good visibility is essential.

. Tires. Check for correct pressure--it's the same no matter what the outside temperature. Check tread depth in accordance with the vehicle operator's manual. Service brake pedal and parking brake lever. Check for proper pedal travel and parking brake adjustment.

. Oil and coolant levels. Oil consumption increases in cold weather. Add antifreeze as needed according to the appropriate TM.

. Batteries. Check electrolyte level, terminals, and clamps. Batteries are more likely to lose their charge in cold weather, and a discharged battery can freeze and crack. Never try to jump-start a frozen (ice in the electrolyte) battery.

During very cold weather, zero degrees and below, follow guidance in FM 9-207: Operation and Maintenance of Ordnance Materiel in Cold Weather.

Quiet Danger: Carbon Monoxide

. It was cold. The onboard generator was running, so the two soldiers sat under the cargo cover on the deck of the M48A1 trying to keep warm. Carbon monoxide from the generator collected under the cargo cover. The soldiers became ill from inhaling the gas.

. The employee was using a forklift in a closed warehouse. He was overcome by carbon monoxide.

. The truck driver began feeling dizzy and sick to his stomach. By the time he got back to his duty station, he was constantly vomiting and was taken to the hospital. A hole in the exhaust pipe of the truck had let carbon monoxide enter the cab.

Carbon monoxide can't be seen, tasted, or smelled. It won't tickle your throat or make your eyes smart. It sickens and kills without a sound.

The earliest symptom of carbon monoxide asphyxiation is usually a headache accompanied by dizziness, blurred vision, and sleepiness. With continued exposure comes shortness of breath, nausea, vomiting, fluttering and throbbing of the heart, and finally unconsciousness. Not all the symptoms occur in every case. Symptoms may show up so gradually that victims may not be aware of the danger. They become drowsy and fall asleep--permanently. The length of exposure and concentration of carbon monoxide are important. Air containing only 1 percent of carbon monoxide can kill a person within 5 minutes.

Precautions

. Ensure there is adequate ventilation, whether at home, in a vehicle, or in the workplace. Adequate ventilation is the best defense against carbon monoxide asphyxiation.

. Check vehicle exhaust systems, especially for blown gaskets, leaking pipe connections, and holes in mufflers and tailpipes.

. Do not sleep in tightly enclosed areas, near vehicle exhausts, in vehicle cabs, or in generator trucks.

. Be alert to the dangers of makeshift heaters--charcoal grill, gas lantern, hibachi. Such heaters require a great deal of ventilation to operate safely.

. Have home heating equipment checked periodically.

Remember, carbon monoxide gives no warning of its presence. It comes quietly and does its damage without a sound.

Driver Training

. A soldier who had said he felt uncomfortable driving an M51A2 dump truck was told to drive it anyway. Approaching a highway T intersection, he became distracted trying to shift gears, and the truck rolled through the stop sign onto the highway. It was struck by a tractor-trailer coming from the right, and both drivers and the dump truck's assistant driver were killed.

. An NCO who had said he did not fully understand the operation of the M916 truck drove it anyway to transport a D-7E bulldozer. When the brakes lost air pressure on a downgrade, the NCO lost control of the truck. He jumped or was thrown out, sustaining fatal injuries.

All too often people assume that driving an AMV is no big deal, that anyone can do it, no matter what sort of training a driver has or hasn't received. Such an assumption is not only false, it's dangerous. About 70 percent of all AMV accidents involve driver error.

Operating tactical vehicles calls for special skills well beyond those needed for commercial sedans and pickups. That means **training**; there's no getting around it--no substitute, no shortcut.

Accident investigations have shown that the SF 46 (U.S. Government Motor Vehicle Operator's Identification Card) is sometimes issued in a hurry, and drivers are assigned with little attention paid to the need for training. But sooner or later a cost is exacted for skimping on driver training, and that cost may be the highest--soldiers' lives.

The revised AR 600-55: Driver Selection, Training, Testing, and Licensing is out now. Driver training requirements have been strengthened because quality training is so important in preventing AMV accidents. The AR provides for driver training in the Active Army to be conducted at battalion level.

The Army Transportation School has produced FC 55-32: Driver Selection, Training, Testing, and Licensing in Units--Tactical Wheeled Vehicle Operator, which should be a basic item in every battalion or Reserve component driver training program. Request copies from your MACOM, ATTN: Publications Control Officer.

Most of the information in FC 55-32 applies to training for all tactical wheeled vehicles, but some vehicle-specific guidance is included. Until comprehensive vehicle-specific training materials are available for every vehicle, trainers will have to supplement the FC with unit-developed training in the unique handling characteristics of each vehicle for which the applicant is to be licensed.

Programs of instruction should identify tasks, conditions, and standards that apply to the unit's mission and equipment. Training should include preventive maintenance checks and services (PMCS); unique problems of the vehicle; handling peculiarities; emergency procedures; backing; and ground guides.

If drivers will be required to pull trailers at any time--and most will, sooner or later--they will need additional training, and it needs to be annotated on the SF 46. For example, driving a 2 1/2-ton truck by itself is one thing; add a trailer, and a whole different set of principles applies. It's harder to maintain control with a trailer attached, and turning corners and backing are especially tricky--they must be practiced.

The revised AR 600-55 allows commanders to waive the requirement for an SF 46 for personnel who have a valid State driver's license and will operate **only** administrative-type commercial vehicles. However, to operate any tactical vehicle, including the CUCV, and all vehicles over 10,000 pounds gross vehicle weight, vehicle-specific training is required.

Qualifications for a State driver's license have little relation to the task of driving a CUCV in 4-wheel drive or a tactical 2 1/2-ton truck cross-country at night in blackout drive, with a cargo bed full of troops, or maybe pulling a trailer. The vehicles' size and shape are different, different mechanical operations are involved, and, especially, the mission is most often an Army-unique one.

The battalion commander should look at the driver training program to ensure it is a quality program and is functioning as intended. Is the program run by highly capable, experienced personnel? Are driver candidates **thoroughly** trained in the specifics of each vehicle they will drive? Is the training followed by a road test that demonstrates the driver trainee's ability to handle the vehicle in a variety of situations (not "once around the motor pool")?

Every unit depends heavily on its drivers day in and day out. Without their skill and dependability, the unit would be virtually shut down. The temporary loss of even one driver, passenger, or vehicle because of an accident can be a severe hindrance. Too many such losses might have been avoided if the drivers' units had invested the time and resources to build a strong driver training program.

Preventive Maintenance Checks and Services

Preventive maintenance checks and services (PMCS) are a vital part of organizational maintenance. PMCS consists of systematic inspections to identify and correct minor faults and safety deficiencies before they become major defects or accidents. It's like checking the oil and gas in the family car before a trip so you won't end up having to call a wrecker or walk miles to the nearest service station.

Basic PMCS

. Before-operation checks make sure the vehicle is ready for operation. An example would be to see if oil, coolant, or fuel leaks have developed since the vehicle was last used. Safety checks of tires, horns, turn signals, and brakes are included.

. During-operation checks detect defects while the vehicle is operating. Drivers should stay alert for unusual noises, odors, and instrument readings. Short halts are a good time to perform checks and make on-the-spot corrections, if possible. If not, the vehicle should be turned over to unit maintenance personnel.

. After-operation checks are performed whenever the vehicle has finished operations for the day. They identify and correct defects that may have developed during the day and prepare the vehicle for the next day's operations.

. Periodic services are performed by crewmembers and unit mechanics. These are regularly scheduled services that amount to a "tune up" for vehicles. They consist of special lubrication, adjustments, and other general vehicle services. They are usually done on a quarterly or semiannual basis depending on the equipment (see appropriate TM).

Proper maintenance saves lives

Descending a steep slope in a vehicle is a dangerous way to suddenly find out that the brake fluid is low and the master brake cylinder doesn't work. Mechanical failure, often caused by faulty maintenance, is to blame for a lot of vehicle accidents.

Vehicle drivers are not expected to perform maintenance beyond their knowledge and skills, but they are required to make a daily inspection of their vehicle. Daily PMCS is outlined in the appropriate vehicle manuals. Too often, ignoring them results in accidents. For example:

While moving an M113 armored personnel carrier (APC) from one location to another on the range, the driver noted a small dirt mound in his path. He dismounted to check the mound and determined that he could maneuver the APC across it. During the attempt, the right track came off. The vehicle immediately turned right and was stopped by the driver. He placed the vehicle in reverse and had backed up about a foot when the vehicle stopped.

The driver dismounted and saw that both tracks were off the vehicle. A witness stated that both tracks appeared to be loose before the accident occurred.

Maintenance records showed that required inspections were not being completed. The following maintenance inspections were due and completed as shown:

. Annual inspection - Due date was 26 November; date completed was 23 December.

. Quarterly inspection - Due date was 22 February; date completed was 23 February.

. Semiannual inspection - Due date was 20 October; date completed was 24 January.

. Quarterly inspection - Due date was 6 June; date completed was 15 December.

A combination of loose tracks, a failed inner sprocket on the right side (which induced a bind in the track), and loose dirt and rocks from the dirt mound resulted in this accident, which cost the government $4,667. Proper PMCS would have identified these deficiencies before this accident happened.

It is drivers' responsibility to inspect and service their vehicles daily. A vehicle that is not maintained properly is unsafe. Driving an unsafe vehicle can, and often does, lead to an accident.

Still More on 600-Gallon Fuel Pods

In the December 1985 Countermeasure, we reported that TROSCOM had determined that all 600-gallon fuel pods without internal baffles were unsafe for mobile use. Since then, TROSCOM notified us that the June 1986 Materiel Readiness Information Bulletin referred to in that article no longer reflects TROSCOM's position on the use of unbaffled tanks. Following is the current guidance.

The 600-gallon unbaffled tanks may be used in a mobile configuration; however, the following must be adhered to:

. Due to weight limitation, no more than 600 gallons of fuel shall be transported on a 2 1/2-ton cargo truck.

. Tiedown, blocking, and bracing procedures must be implemented without deviation. Tiedown procedures for 2 1/2- and 5-ton cargo trucks are stated in TM 10-4930-204-13, paragraph 4-4, and TM 5-4930-230-13, paragraph 4-4. New blocking and bracing procedures were distributed worldwide by TROSCOM in November 1985. At the same time, users were told of new tiedown components and blocking and bracing procedures for the M796 4-ton bolster trailer. Drivers must exercise extreme caution when using unbaffled 600-gallon fuel tanks in a mobile configuration.

. The permanent nonwaiverable peacetime ban on transporting fuel in 600-gallon portable fuel pods mounted on M105 series trailers remains in effect. This restriction applies to M105, M105A1, and M105A2 series 1 1/2-ton, 2-wheeled cargo trailers and to all models and NSNs of the tank unit.

Use of the tank unit on any trailer or vehicle other than the 2 1/2-ton cargo truck, 5-ton cargo truck, or M796 4-ton bolster trailer must be approved on a case-by-case basis by the Project Manager, Petroleum and Water Logistics (AMCPM-PWL), St. Louis, MO, and the Project Manager, Tactical Vehicles (AMCPM-TV-S), Warren, MI.

TROSCOM point of contact is Mr. Jack Shortridge, AUTOVON 693-2618; TACOM point of contact is Mr. Roger Gay, AUTOVON 786-8652.

AMV Operations in Confined Areas

What do field operations, motor pools, maintenance facilities, supply storage areas, and built-up areas have in common? They all offer vehicle operators the opportunity to use all their skills in operating their equipment. However, along with this opportunity goes responsibility to use extreme caution.

Operating vehicles in confined areas poses unusual problems in that maneuvering space is condensed. Operators must make more turns, back up more often, use their brakes more frequently, and do all this with more going on around them. They must have ground guides, good visual references, and a working knowledge of the equipment they are operating.

There are times when an operator will just take a vehicle for a short spin around the motor pool area. This often results in damage to equipment and personal injury. The operator usually will not use ground guides or perform PMCS because there seems no reason to, not just to move the vehicle a short distance. But when a vehicle starts to move, especially in a confined area, the potential for an accident starts to happen.

Field operations invite other dangers. Operators can be tired, in a hurry to prove they can accomplish the mission, or nervous about their ability to perform with unfamiliar equipment or in an unfamiliar environment. Any of these conditions set the stage for human error. For example, a 1/4-ton-truck driver is tasked by his squad leader to park a 5-ton cargo truck. The soldier, knowing that both vehicles have four-speed manual transmissions and that he only has to move it a short distance, accepts the task. When he starts the vehicle, he hears a buzzer. Not knowing that it's a brake warning, he ignores the buzzer and proceeds to move the truck. When he sees two soldiers with their backs to him in his immediate path, he applies the brakes with no result. The truck hits both soldiers and a tree all because he was not familiar with the equipment.

Operators should ask themselves the following questions before operating their equipment or vehicles in confined areas:

. If I fail to perform PMCS and the brakes fail, who is at fault?

. If I back over a sleeping soldier, who is at fault?

. If a soldier riding on the tailgate of my vehicle falls off and is killed, who is to blame?

. Have I made all the safety checks and done all I can do to prevent an accident from happening?

Any operator who can answer yes to the last question need not worry about the answer to the others.

Winch Cables Devour Fingers

In the last 3 years, at least 34 soldiers and Army civilian employees have had fingers or thumbs cut or crushed by winch cables. Eleven of the injuries were serious enough to be classified as permanent partial disabilities. This dismal record suggests that some personnel are not receiving enough safety awareness training before they get involved in winch operations.

As the 34 victims found out, winching--or performing maintenance on winches--can be downright dangerous. Given half a chance, winch cables will devour fingers. In 32 of the cases, that chance was presented when the victim's glove, rag, or bare hand was caught on the cable and pulled into the winch. Some extracts:

. Employee's glove was pulled into winch by frayed cable.

. After recovering an M1 tank, soldier was helping to rewind winch cable. He did not let go as cable approached rollers on trailer, and it pulled his thumb through the rollers.

. Employee reached for winch cable while it was operating and got his right hand caught in front winch.

. Due to inadequate communication (a problem cited in eight reports), winch cable was engaged while soldier still had his fingers between winch cable and winch drum.

If possible, winches should be fully rewound with a load or deadfall attached. Otherwise, personnel should follow instructions in the applicable operator's manual for rewinding the winch without a load.

Section V of FM 20-22: Vehicle Recovery Operations is devoted to safety precautions, one of which states: "Make every effort to stand clear of any wire rope under tension. When wire rope is drawn taut and then released suddenly by a break, its recoil (or backlash) will cut a person in two. A winch line under load stretches like a rubber band and stores up a lot of energy. In fact, a steel winch cable weighing 50 to 500 pounds has a better spring than rubber. A broken winch cable snapping back could be compared with a rifle bullet except the bullet makes a fairly clean hole and the winch cable makes a messy wound. Treat a wire rope under stress with the same respect you would a loaded gun." In short, stay alert.

Another precaution: "Personnel handling wire ropes should wear heavy leather-palmed gloves to prevent hand injuries or cuts from broken wires. Never allow a moving cable to slide through the

hands even when gloves are worn since broken wires can cut through the gloves." Based on accident reports, it appears most personnel do wear gloves when handling winch cables.

But nowhere does FM 20-22 say to use those gloved hands to keep the cable winding tight and even on the drum. On the contrary, the operator's manual for the M44 series 2 1/2-ton truck states: "If necessary, **use wooden block** to push or hammer line closely wrapped. If truck is equipped with a load-winding device, this will not be necessary." The M809 series 5-ton truck operator's manual states: "Use a **metal bar or wood if necessary** to keep cable winding tight and even on drum."

In the interest of conserving fingers, these precautions should be stressed to all personnel every time a winch is used or serviced.

Transporting the Troops

. The 2 1/2-ton truck was traveling down a tank trail under blackout conditions when it hit a washout. The driver lost control, and the truck ran into a ditch. A soldier riding in the cargo bed was struck in the head and back when the tool cabinet broke free from where it was anchored.

. The soldier was riding in the back of an M817 dump truck that was towing an M105A1 cargo trailer. As the truck jolted over rough terrain, the soldier's foot slipped between the tailgate of the truck and the trailer. The trailer slid against the tailgate, catching his right foot and fracturing his big toe.

. The M1028 cargo truck was towing an M101A1 trailer under blackout conditions. The truck struck a ditch, throwing two passengers from the cargo bed. Both had a leg run over by the trailer.

. A field training exercise cleanup detail was riding in the back of the M925 cargo truck. Four detail personnel were sitting on the open tailgate with their arms over the hooked troop strap. When the driver accelerated to 20 mph, the increased vibration caused the tailgate to drop. The soldiers fell backwards, striking their heads.

These are some of the injuries that occurred to soldiers riding in the back of AMVs in FY 87. Most of them could have been prevented by the drivers.

Three types of driver error show up repeatedly. The most common is **driving too fast for conditions.** AMV drivers must be especially cautious when there are people in the back who cannot easily hold on and brace themselves.

Another driver error is **failing to ensure cargo is properly secured.** There are numerous examples in the accident records of passengers being struck by wire reels, spare tires, and the like.

The third type of driver error is **failure to ensure the safe seating of passengers.** Paragraph 2-17e, AR 385-55, requires that drivers transporting passengers in cargo trucks walk to the rear of the truck to ensure that the tailgate, safety device, or safety strap is in place and that all passengers are seated. It further states that drivers must "refuse to move a motor vehicle in which anyone is in an unsafe position."

Another type of driver error, which fortunately happens less often but can result in multiple injuries when it does happen, is that of transporting more than the authorized capacity of passengers in the cargo bed. TB ORD-639 states that the authorized passenger capacity (not including operating crew) in an M35 2 1/2-ton truck is 14; in an M54 5-ton truck it is 16. Troop seat kits for CUCV (M1008) and HMMWV troop carriers (M998 and M1038) are for eight personnel.

Safe operation of cargo trucks requires knowing and following all applicable rules.

References

. AR 385-55: Prevention of Motor Vehicle Accidents

. TB ORD-639: Passenger-Carrying Capacity of Tactical and Administrative Vehicles Commonly Used to Transport Personnel

. FM 21-305: Manual for the Wheeled Vehicle Operator

Drug Use and the Army Motor Vehicle Driver

The operation of Army motor vehicles requires that drivers be in total control, both mentally and physically. Soldiers using drugs can be a danger to themselves, their fellow soldiers, and their equipment. Even drugs issued by medical facilities can degrade reasoning abilities, blur vision, cause drowsiness, and alter motor reflexes. These altered states could cause accidents. For example:

. A soldier returning to the rear area for supplies lost control of his vehicle on a curve and drove into a tree. There were no skid marks to show he tried to avoid the accident. Although the soldier was only slightly injured, the vehicle was a total loss. Earlier that morning, the soldier had reported to sick call and was given a decongestant for his cold.

. A soldier was en route to turn in his vehicle when he blacked out. His vehicle hit a street sign, a fence, a fire hydrant, and two parked cars. The soldier was taking prescribed medication.

Drugs issued through military medical facilities carry side effects warning labels that may state, "Do not operate equipment; use may cause drowsiness." Users should read and comply with these warnings.

Soldiers who report to sick call have a responsibility to understand what is being prescribed for them and the effects it may have on their assigned duties. They should inform their first-line supervisors of the restrictions that the prescribed drug places on them. First-line supervisors should take these restrictions seriously and never overrule limitations or allow the user to operate equipment.

While prescribed drugs can cause problems, nonprescription drug use is more difficult to control because the supervisor has no sick-call book to check. Users may not notify their supervisor that they're taking over-the-counter drugs, even those that carry warnings, because they don't notice any effects. However, notification of nonprescription over-the-counter drug use is the responsibility of the soldier.

Illegal drugs are a totally different matter. The pusher places no warning labels on the drugs, and users are not going to notify their supervisors. Supervisors can only rely on their past experience and knowledge of their soldiers.

While extra training, reprimands, and UCMJ punishment are corrective measures after the fact, the best countermeasure against drug-related accidents is well-informed soldiers and vigilant first-line supervisors.

AMV Accident Prevention Tips

The one driver error that occurs more often than any other in AMV accidents is inattention. For example:

. The driver of an M1009 utility truck looked down momentarily from the road to the inside of the truck. When he looked up, he saw that an oncoming truck had crossed the median strip into his lane. The soldier applied his brakes and began to skid. He then attempted evasive action by steering into the opposite lane, but his truck swerved into the path of the oncoming truck and was hit broadside. Total damage cost was $21,099.

Countermeasure: Operating a vehicle is a full-time job. Attention must be concentrated on that job every minute, every second. When a driver needs to stretch or to look for something in the vehicle, he should find a safe place to pull off the road, stop, and only then take care of nondriving concerns.

. The soldier driving an M936 5-ton wrecker noticed a blue sedan on his left approaching the intersection. Concentrating on that vehicle, he failed to watch the cars in front of him. When his assistant driver told him the traffic was stopping, he hit the brakes, causing his vehicle to slide into the rear of a Volkswagen. Damage from this accident was $1,525.

Countermeasure: Drivers need to stay aware of what all traffic, in all directions, is doing. They need to keep their eyes constantly moving and avoid watching one spot too long. Because of the speed with which changes can occur, 2 or 3 seconds of inattention can be too long.

The assistant driver can and should help keep the driver's attention on the driving task. When alone in the vehicle, the driver needs to be his or her own assistant, using frequent self-reminders such as--

. "Accidents can happen to anyone, and they can happen suddenly. I have to stay alert."

. "What if that car in the other lane suddenly swerved into mine? What would I do?"

. "What if that truck ahead of me should stop suddenly?"

This type of "What if" thinking, especially on a straight, monotonous road, helps drivers keep their minds on driving and train themselves to expect the unexpected

Speed needs attention too

Speed limits apply to ideal conditions--weather clear and calm, road smooth and straight, minimum vehicle load, minimum traffic. Any time even one of these conditions is not present, the speed limit may be too fast, as drivers learned in the following accidents:

. The soldier was driving an M1025 on a gravel road in a range area at 35 to 40 mph. Rounding a blind curve, he saw a motorcycle a short distance in front of him and slammed on the brakes to avoid hitting it. His vehicle went into an uncontrollable slide, hit a large rock, and rolled over, incurring $1,000 worth of damage.

Countermeasure: The maximum allowed speed in a range area might possibly be 35 to 40 mph, but chances are it was more like 25. In a curve, of course, it should be less; in a **blind** curve, possibly no more than 15. This driver was asking for trouble, and he got it.

. A tractor truck with an empty trailer, rounding a banked curve during heavy rain and high winds, jackknifed, causing $3,739 damage. The MP report indicated the driver was operating within the posted speed limit.

Countermeasure: Again, posted speed limits are for ideal conditions and straightaways, not for curves. With heavy rain and high winds, the posted limit may be too fast even on straightaways.

. The soldier was driving a CUCV at 25 to 30 mph down a tank trail when an M151 and three Bradley fighting vehicles passed in the opposite direction, raising a large dust cloud. Unable to see ahead of him, the CUCV driver slowed to 20 mph. The left front tire hit loose sand and a small log, causing the CUCV to roll over. The driver was wearing his safety belt and steel helmet and was not injured, but the vehicle sustained $1,500 damage.

Countermeasure: Even 20 mph is too fast when you can't see! If this driver had stopped until the dust settled, he would have lost a few seconds and saved a large repair cost.

Tactical vehicles require well-trained drivers

A state driver's license **does not** qualify a person to drive HMMWVs, HEMTTs, or any other tactical vehicle. Each has its own handling characteristics that must be learned before driving.

. The TOW HMMWV driver was traveling downhill along a dirt trail. When he made a sharp left turn off the trail, the vehicle began to slide in the loose gravel. The driver reacted by locking the brakes, causing him to lose steering control. The HMMWV slid sideways, struck a slight embankment, and flipped over. The soldier in the gunner's turret was thrown from the vehicle. Total injury cost was $3,840, and damage to the vehicle was $2,500.

Countermeasure: Emergency procedures are an essential part of tactical vehicle driver training. Sharp turns and panic braking are two things training would have taught this driver to avoid.

. The untrained and unlicensed NCO tried to drive the HMMWV up a very steep hill. When he was unable to make it to the top, he tried to back down. He lost control, and the vehicle ran into a ditch, bounced, and landed hard. The driver and two passengers sustained minor injuries, and the vehicle was damaged beyond repair.

Countermeasure: Supervisors should ensure that untrained and unlicensed drivers are not allowed behind the wheel. When in doubt, they should check licenses.

Driving by an untrained and unlicensed driver will lead to an accident and lost resources sooner or later. On the other hand, thorough and conscientious driver training will pay off consistently in accident prevention and preservation of resources.

Towing Is Hazardous

Towing with trailers or disabled vehicles and the associated activities of connecting and disconnecting are common day-to-day Army operations. Unfortunately, injuries and property damage involving towing operations are also rather common.

The potential for an accident, always present in vehicle operations, is significantly increased when towing is involved. The presence of the towed load magnifies all the difficulties encountered during driving, especially in emergency situations.

Driving with trailers

FM 55-30: Army Motor Transport Units and Operations states in chapter 9: "Operators will be tested on appropriate truck-trailer or truck-tractor semitrailer combinations when required to tow trailers. The operator must complete the prescribed training and tests and must qualify in accordance with the pertinent regulations. Qualification to tow trailers will be so noted on both DA Form 348 and SF 46."

Accident reports indicate that some drivers are being assigned to towing missions with inadequate training or, in some cases, no training at all. This lack of adequate training is costing dearly in personnel time lost and equipment downtime. Some FY 87 examples:

. The soldier was driving an M35A2 2 1/2-ton truck towing an M103A3 mobile kitchen trailer. He was driving too fast and lost control of the truck. The truck and trailer left the road, and the trailer rolled onto its side, resulting in total destruction of the $12,365 mobile kitchen.

Keeping speed down is critical. This is the first principle all towing training must emphasize. Operating a single vehicle, it is sometimes possible to regain control after losing it, but with a trailer in tow, forget it! The operator never really had control over that piece of equipment anyway, except insofar as it would tend to follow its leader **as long as they were moving at a relatively slow, even speed.**

. The generator set and several cans of fuel were in a trailer being towed by a 5-ton truck. One of the fuel cans came loose from its mount and fell over, leaking fuel into the bed of the trailer. The generator then began to crank spontaneously due to an electrical

short. The electrical short ignited the spilled fuel, and the overturned fuel can exploded, followed shortly by explosion of the other fuel cans on the trailer. Total damage cost was $1,500.

Follow prescribed procedures carefully. Towing provides enough hazards in and of itself, without the dangers added by failure to follow procedures. Operators must be sure fuel cans and other cargo are properly secured. Doing it right is always the safest and most efficient way.

Towing with wrecker or towbar

As stated in FM 21-305: Manual for the Wheeled Vehicle Operator, when towing a vehicle, proceed slowly at 5 to 10 mph because the towed vehicle will skid on turns at higher speeds. In addition, drivers need to know the towing capacity of the equipment they are using.

. The soldier was towing one M936 5-ton wrecker with another. The towbar broke because the weight of an empty M936 exceeds the wrecker's maximum towing capacity. The towed vehicle, held only by the safety chain, began to veer back and forth and struck a light pole, causing $900 damage.

Towing with field expedients (cables)

. The soldier was tasked to recover a disabled M109 shop van. He used an M813 5-ton truck for the mission but failed to use a towbar. As a result, when the truck stopped, the shop van ran into its rear, causing $1,150 damage.

The 5- to 10-mph speed prescribed in FM 21-305 for towing vehicles is especially crucial when a towbar is not being used. In addition, make sure there is a driver in every towed vehicle unless it is being towed by a wrecker.

Connecting and disconnecting

If the hazards of over-the-road towing would make a long list, so would problems occurring during the connecting and disconnecting process. Accident reports are filed on a regular basis on personnel who have had a hand, foot, or leg injured while hooking up or detaching a trailer. Some recent examples:

. Two soldiers unhooked a full water trailer from the back of a 2 1/2-ton truck without first lowering the front support leg. When the tow pintle of the trailer cleared the hitch on the truck, the trailer crashed to the ground. The tow pintle landed on one soldier's foot, breaking two toes.

. The NCO was assisting other soldiers in hooking up a generator trailer to an M813A1 truck. While the vehicle was being backed up to the trailer, the NCO noticed that the towing pintle was closed and reached to open it. His hand was crushed between the two pieces of equipment.

Towing connection and disconnection requires training and supervision--and some common sense. Just as drivers must have special training for towing, participants in the hookup process need to be taught how to do it right. Learning by trial and error is far too painful.

Severe, and sometimes fatal, injuries occur when personnel position themselves between the towing vehicle and the towed vehicle or trailer:

. Three soldiers were assigned to disconnect a 2 1/2-ton truck from the recovery wrecker. When the wrecker assistant driver set the parking brake, he failed to set enough tension, and, for a chock, he used a rock not large enough for the job. One soldier stepped between the two vehicles to lift the towbar. As the wrecker driver pulled his vehicle forward, the towbar was released and the 2 1/2-ton truck rolled forward, pinning the soldier against the wrecker and causing a pelvic fracture.

. Three soldiers were trying to remove a towbar connecting two 5-ton trucks. The vehicles were positioned on a 2-degree grade, which wedged the towbar, making it difficult to remove from the towing vehicle. The bar was removed from the right side of the towed vehicle, after which the towing vehicle was backed to allow play in the left side. The pintle bar was then released and the towbar disconnected. The towed vehicle began to roll forward, and two of the soldiers attempted to stop it by hand. It kept rolling. One soldier jumped out of the way,

warning the other to jump also. The other soldier did not move fast enough and was fatally crushed between the two vehicles.

There are four rules for connecting or disconnecting a towbar:

1. Perform the operation on **as level a surface** as possible.
2. Be sure the disabled vehicle's **parking brake** is fully set and operative.
3. **Chock** the disabled vehicle's wheels with real chock blocks.
4. **Stay out from between** the two vehicles as much as possible.

Except when there is a good reason why these rules cannot be followed, they should **all** be followed every time. Additional guidance on towbar safety can be found in applicable vehicle operator's manuals and in TM 9-4910-593-12&P: Operator's and Organizational Maintenance Manual for Towbar, Motor Vehicle.

Trailer Towing Preparation and Procedures

In FY 87, the top five causes of trailer-towing accidents were:

1. No PMCS before use.
2. Failure to secure loads.
3. Overloading.
4. Excessive speed for conditions.
5. No ground guides or improper use of ground guides.

In some cases, several of these factors combined to cause an accident. For example--

. After completing a field training exercise, two NCOs were told to recover and wash a D8K dozer. They selected an M123A1C tractor with an M870 trailer attached for the mission without performing PMCS or getting the vehicle dispatched. If they had completed PMCS, they would have discovered that the trailer had no brakes. All went well until the return trip with the load. While traveling down a 5-percent grade, the driver allowed the vehicle to exceed safe speed, and he lost control and wrecked. The driver was killed, and his assistant driver was hospitalized for 8 weeks.

The accident investigation determined that the NCOs had violated several important procedures that resulted in the tragedy:

. No PMCS was conducted.
. The vehicle was not dispatched.
. The trailer was overloaded by 4,500 pounds.
. The driver exceeded the speed limit and maximum rpm recommended for the vehicle.
. The load was not secured properly on the trailer.

This accident, which involved four of the top five accident causes, could have been prevented if procedures had been followed.

FM 55-30: Army Motor Transport Units and Operations, appendix I, gives a good and simple checklist for inspection of trailers. In addition, each trailer TM outlines specific procedures. Chapter 10 of FM 55-30 also gives detailed instructions on how to secure cargo. Following is a summary of these instructions:

The vehicle driver is responsible for ensuring that the load on his vehicle is safe. While the shipper normally loads the cargo, the driver must ensure it is loaded properly. The driver must know--

. How much weight his vehicle can carry.
. How much weight can be put on each axle.
. Where the center of gravity is for different loads.
. Payload capacity.
. How to distribute loads on vehicles.
. How to secure the load.

See FM 55-30 for further information.

Costly HEMTT Rollovers Are Preventable

Rolling over a heavy expanded mobility tactical truck can be very expensive. More than 50 HEMTT rollover accidents were recorded in their first 5 years of use.

. The HEMTT driver moved to the right to let a convoy pass. The soft shoulder of the road gave way, causing the vehicle to slide off the right side and flip over.

. The driver moved as far to the right side of the road as he could to allow the tanks to pass. He had 2400 gallons of diesel fuel in his truck, and the side of the road gave way beneath the load. The truck slowly rolled onto its right side.

. The HEMTT driver completed a left turn too close to the left shoulder of the road. The left bank collapsed under the weight of the vehicle, which rolled into a pond and came to rest upside down.

. The driver was attempting a right turn on a 10-foot-wide dirt road when the rear wheels slid off the edge. The ground gave way and the HEMTT, which was full of fuel, began to roll. It rolled 2 times, coming to rest 40 feet below the road.

If all those accidents sound alike it's because they are, and the logical conclusion to be drawn is: **A HEMTT driver should make determined efforts to keep the vehicle <u>on</u> the roadway, away from the edge.**

This principle needs to be given special emphasis in driver training for HEMTT operators. With most other vehicles, staying on the hard surface may not be so important, but the HEMTT is a unique vehicle. It has a high center of gravity, and the "lightest" model (M983 without crane) is 32,200 pounds empty. In a word, "Heavy" is this truck's first name, and it must always be driven with that in mind.

Because the HEMTT's normal operating environment is the tactical training area, keeping the vehicle under control and upright often calls for a good measure of judgment on the driver's part. When he encounters oncoming traffic on narrow tank trails and back roads, he should decide how far he can safely move to the right, then move there, and stop and wait until the other vehicles have passed. He can then resume travel on the most solid portion of the road.

If the road is so narrow that something must pass on the shoulder, in most cases, that something should not be a HEMTT. Most wheeled vehicles are lighter and have a lower center of gravity. They are thus less likely to cause a cave-in or to roll over. As for tanks, traveling on rough terrain is what they do best.

In spite of its rollover record, from the standpoint of injuries, the HEMTT is proving to be a big improvement over its predecessor, the GOER. In more than one-third of GOER rollover accidents, the driver was killed. Until 28 July 1989, when the first fatality occurred, no HEMTT driver or passenger had been killed in an accident, rollover or otherwise.

To keep injuries down, and to save vehicle damage costs averaging more than $20,000 per accident, driver training should stress, and HEMTT drivers should pay close and constant attention to, countermeasures to prevent rollovers and other accidents. Besides staying on the road, actions indicated by a review of accident records include the following--

. Adjust speed for road and environmental conditions. Slow down for rough terrain, rain or snow, or anything else that reduces visibility, especially curves and corners.

. Know how to use the Jacobs engine brake along with the wheel brakes to control speed when going downhill. Check that the tachometer reads between 1650 and 2100 rpm whenever the engine brake is used. If **too much** braking occurs, set the transmission range selector to a higher range. If **more** braking is required, set the engine brake high/low switch to high.

. In a convoy, maintain the proper distance between vehicles as prescribed by the convoy commander. And stay alert! The HEMTT appears to have a special talent for rear-ending other HEMTTs.

. Have at least one ground guide when backing, and follow the guidelines in the Safety Center pamphlet "Ground Guide Safety Procedures" (available from U.S. Army Safety Center, ATTN: CSSC-M (Distribution), Fort Rucker, AL 36362-5363). The driver must keep the ground guide in his sight at all times. The ground guide should stay out of the vehicle's path of travel when possible; otherwise, he should maintain a distance of at least 10 yards.

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